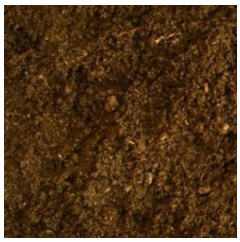
IUSS Bulletin 138

International Union of Soil Sciences (IUSS)

Bulletin 138

June 2021



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International Decade of Soils 2015-2024

Cover photo: © Stefan Norra (for details see p. 56)

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The IUSS Bulletin is the official Newsletter of the International Union of Soil Sciences. It is freely distributed through the IUSS website.

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World Congress of Soil Science 2022 (WCSS22): Update

By Bruce Lascelles, IUSS Vice President Congress and Sarah Garry, Executive Officer, British Society of Soil Science

Planning is really underway with the World Congress of Soil Science (WCSS) taking place in Glasgow from 31 July – 5 August 2022.

Our WCSS Working Group is now getting ready for a flurry of activity as the real planning begins! The Congress and its theme, ***Soil Science – crossing boundaries, changing society***, provides an exciting opportunity for the Society to capitalise on the growing interest in soils with plenary sessions themed around **soil and security, the north/south divide, soils and land use in the 22nd century** and **data and information**.

We will also be hosting a range of interdivisional sessions, alongside sessions aimed at governments and policy makers. In addition, we hope to welcome members to exclusive networking events and provide our early careers members with the opportunity to meet their peers. This Congress, organised by the Society in conjunction with the International Union of Soil Sciences (IUSS), will be the first to maximise opportunities for people from a diverse range of backgrounds and geographies to attend. The impact which Covid-19 has had, is likely to mean that delegates from many countries will be unable to attend the event in person and for the first time, we will be offering online streaming of several Congress sessions, allowing those unable to travel the opportunity to hear many of the speakers live and access poster presentations.

Abstracts, Bursaries and Registration

We will be welcoming abstract submissions for the Congress, along with early-bird registration from mid-summer via *www.22wcss.org*. Watch this space for further information on how to submit your poster or attend the event!

Volunteers

Later this year, we will be releasing details of the volunteers we will need to make the Congress and related tours and arts programme a success! If you are interested in finding out more about the volunteer opportunities when we release them later this year, please email *wcss2022@soils.org.uk*.

Sponsorship

There are a whole host of sponsorship opportunities for organisations big and small at the Congress. This will be the first major soil-related event to be held face-to-face since the pandemic and will provide sponsors with the opportunity to engage in-person and remote delegates, widening the reach of both the Congress and those who choose to support the event. Find out more about the packages available by visiting *www.22wcss.org* or contacting *Kirsten.Lamb@speak.co.uk*.

Tours

Our tour programme, ***Small Island, Diverse Soils, Big Opportunities – Connecting people and soils***, will include a range of tours, providing international delegates with an opportunity to visit a number of UK destinations.
Our day tours, taking place on Friday 5 August, will visit:

1. Glasgow's Industrial Legacy
2. Forth
3. Isle of Arran
4. Lothian and the Bush Estate.

Tickets for the four, day tours will be available to book as part of the Congress registration process. Tickets are available on a very limited basis and please book as early as possible to avoid disappointment!
Our two, three-day post-congress tours will visit areas around the north east and north west or south west of Scotland and will include ample opportunity to review the local geology and coastal topography.
The programme will include a six-day pre-congress tour taking delegates from south east England to the Southern Uplands of Scotland; one-day mid-congress tours to Edinburgh, Glasgow, Stirling, the Isle of Arran and Boghall Glen; and three post-congress tours with an opportunity to visit three diverse Scottish regions.
Our three-day pre and six-day post Congress tours will be opened for booking in late 2020/early 2021 and to enquire about the tours please contact *wcss2022@soils.org.uk*.

Soil Judging

The soil judging competition will also feature and take place in the days leading up to the Congress. International teams will be invited to participate in three to four days' of training sessions followed by one to two days of competitive soil judging. Further information on the programme will be available once Congress registration launches in the summer and to register your interest in advance, please email *wcss2022@soils.org.uk*.

Marketing

We would love our members to share the news about the Congress amongst their own networks! We have produced a range of email banners and PowerPoint slides which can be used to promote the Congress.
If you can support the event by adding slides into your future presentations, please email *wcss2022@soils.org.uk*.

Environmental Position

As an environmental charity, we are developing a policy which sets our commitment to making the Congress as sustainable as possible. This will include minimising our use of single-use materials and meeting virtually where possible. Delegates will be encouraged to play their part and will have the opportunity to off-set their impact in attending the event and will be signposted to carbon offsetting platforms.
If you aren't already, please follow our social media pages for the latest information on the Congress as it becomes available.
Facebook: @WCSS2022 – *www.facebook.com/WCSS2022/*
Twitter: @WorldSoils2022.

YouTube videos of the British Soil Science Society shared during the Inter Congress Meeting

Below please find links to two YouTube videos about the 22nd World Congress of Soil Sciences (WCSS22), which the British Soil Science Society shared during the IUSS Inter Congress Meeting, which took place virtually 18-23 November 2020.
WCSS 2022 – Arts and Tours Programme
WCSS 2022 – Welcome to Glasgow!
The video *#Grounded* shows the importance of soils for humankind. Soils are our past present and future. We must stay *#Grounded*. For more information on how you can reconnect with soils, visit: *www.soils.org.uk/grounded*.

Report from the IUSS Secretariat

New design of IUSS website

Since the 97th anniversary of the IUSS on May 19, 2021, the IUSS website appears in a modern design. The new structure allows easier handling and finding interesting content. Some older content was transferred to an archive area. The website is now optimized for use on mobile devices and complies with the current technical standards. As the transfer of all contents from the previous version is not completed yet, we ask for your understanding if specific information is currently not available.
Read more: *https://www.iuss.org/*.

Screenshot of the new IUSS website (© IUSS)

IUSS on TWITTER and YouTube

The International Union of Soil Sciences has an Official Twitter Account. Follow us on **@IUSS_ORG**, where we promote all our official activities and remain in touch with the Soil Science Scientists community worldwide. There are weekly tweets, with close to 1900 followers.

From our Twitter account, you can also directly access the IUSS Website by touching on the symbol.

iuss.org

Offer to share YouTube videos related to soil science

The International Union of Soils Sciences has invited its members to provide links of their YouTube videos on soil science, which IUSS offers to share on their YouTube channel in order to make them known more widely. Videos should preferably be in English, but all languages are welcome. YouTube videos should not be larger than 2 GB, nor longer than 10 minutes. Please bear in mind to check pertaining copyrights. IUSS will not consider videos with unsuitable content.
Read more: *https://www.youtube.com/playlist?list=PLi-8j0XEXF7nrixZwcMAXA6-8PB3MPvOk.*

IUSS Stimulus Fund

The IUSS Stimulus Fund was created to support suitable activities within the Commissions and Working Groups. Where appropriate, the Fund will also support other activities to assist the development of Soil Science in general, but particularly in regions of the world where lack of resources limit opportunities.
Some funds have been and will continue to be allocated to undertake specific projects identified by the Executive Committee, particularly projects which contribute to fulfilling the objectives of the International Decade of Soils.
IUSS has set aside a sum of $15,000 annually to help fund a number of activities, but this funding may be increased, if the quality of applications is particularly high. The normal maximum award will be $2,500, but larger awards may be considered. For more information about the stimulus fund, please go to *https://www.iuss.org/about-the-iuss/iuss-stimulus-fund/?search_highlighter=stimulus+fund*.

Please note that research projects, travel costs of individual people, and applications from countries with outstanding membership fees as well as applications lacking detailed budgets cannot be taken into consideration for funding.
As in the preceding years, in 2021 again $15,000 are available, with two submission dates for applications: 15 March and 15 September. Applications are always welcome and should be sent in due time to *iuss@umweltbundesamt.at*.
Calls for submissions were published in the IUSS Alert. From the first round of submissions in 2021, the IUSS decided to support four activities:
1) Cuban Soil Museum – National Collection of Soil Monoliths will be preserved in a virtual format;
2) Soil Voices – Organisation of 4 workshops and uploading of up to 20 soil memories to Soil Voices website;
3) Suelófono – The first podcast of soils in Spanish, support to develop 16 podcasts; and
4) 4th International Conference of Young Scientists – Soil in the Environment (SITE 2020), Toruń (Poland), 27-30 June 2021, 8 participation grants plus transportation cost during field trips.
A short (500-1000 words) report of the activity for which the funds were received, must be presented for inclusion in the IUSS Bulletin within 2 months of completion.
The next submission date for applications will be 15 September 2021.

News from national and regional Soil Science Societies

Soil Science Society of America

IUSS and the U. S. National Academies of Sciences, Engineering, and Medicine, invited to collaborate to construct a list of soils repositories/soil archives in the world by completing this survey *https://www.surveygizmo.com/s3/5786076/Soil-Repository-Survey* by March 31, 2021.

Soil Science Society of China

Soil Science Society of China and Soil Science Society of America Established Strategic Cooperation Framework

On March 20, 2021, Soil Science Society of China (SSSC) and Soil Science Society of America (SSSA) signed a memorandum of understanding. Both parties agree to establish a strategic cooperation agreement to foster international collaboration and academic exchange. This agreement will provide mutual benefits for their members, including accesses to society media, journals, and conferences. SSSC recently started a series of initiatives to promote international exchange and collaboration in soil research, and this strategic partnership between SSSC and SSSA will open up new possibility between the two dynamic research communities.

The inaugural (virtual) meeting of the International Collaboration Working Committee of Soil Science Society of China (© SSSC)

Soil Science Society of China Launched the International Collaboration Working Committee

A new committee under the Soil Science Society of China (SSSC) was formed as a special celebration of the 7th World Soil Day. On December 5th, 2020, the International Collaboration Working Committee of SSSC convened its first meeting online, announced its official establishment and initiated fruitful discussions on the mission, strategy and working mechanisms of the group. The inaugural committee is consisted of 25 researchers who have ample experiences and enthusiasm for international collaborations. Prof. Yongguan Zhu, a member of Chinese Academy of Sciences, was elected as an advisory member of the committee and Prof. Fang Wang (Institute of Soil Science, Chinese Academy of Sciences) was elected as the chair. As an integral part of SSSC, the new committee aims to promote international cooperation, to broaden international exchanges and to strengthen its international impact, all of which are critical to pave the way for SSSC to become a first-class scientific society of the world. The committee will also provide a forum for the SSSC members and soil scientists to communicate the latest progresses and achievements from Chinese soil scientists to the world. Moreover, the new committee is expected to lay down a solid foundation for the preparation of the 23rd World Congress of Soil Science that will be hosted by SSSC in Nanjing, China in 2026.

Soil Science Society of Italy

Under the patronage of the IUSS President, the Soil Science Society of Italy invites the soil science community to participate in its International workshop: "Soil Conservation and environmental protection" to be held in Imola from 6 to 8 September 2021.
Read more: *https://scienzadelsuolo.org/congressi.php*.

News from the Latin American Soil Science Society (SLCS)

1st International Soil Assessment Course and 3rd Mexican Soil Evaluation Contest

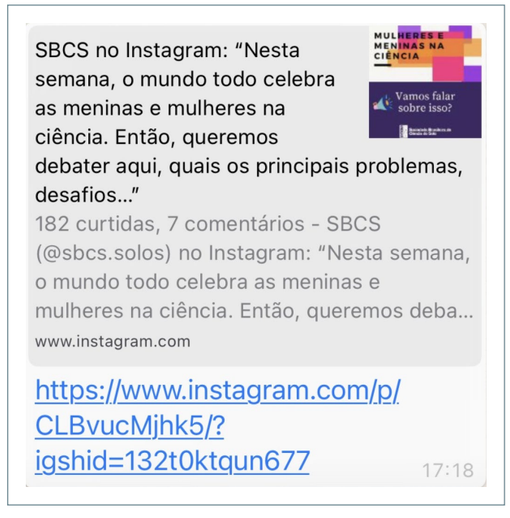
From November 30 to December 4, 2020, as part of the SLCS-UNITED's Macro-event organized by the Latin American Soil Science Society to celebrate the WSD, the 1st International Soil Assessment Course organized for the National Autonomous University of Mexico was held online. 357 participants from 21 countries were officially registered. At the Latin American level, Peru, Argentina, Colombia, Mexico and Spain stand out, as far as the number of registered participants is concerned. Apart from Latin America, participants came from Israel, the Czech Republic, Portugal and the United States.
At the same time, as a second part of the WSD celebration, on December 5th, the third Mexican Soil Evaluation Contest was successfully concluded by 26 participants from 18 countries. Registration and international participation in both events was free. For details of both events, the reader is kindly referred to the Section Conference and Meeting reports.

Left: Posters announcing the third Mexican Soil Evaluation Contest. Right: the winners of this Contest (© Elizabeth Solleiro)

SLCS joins Standing Committee for Gender Equality in Science

Celebrating the International Day of Women and Girls in Science on February 11, convened by the UN, the Latin-American Soil Science Society, as well as the Argentinean Association of Soil Science, joined the Standing Committee for Gender Equality in Science.
Argentina, Brazil, Costa Rica, Mexico, Perú and Spain, organized activities celebrating women and encouraging girls to work on soil science.

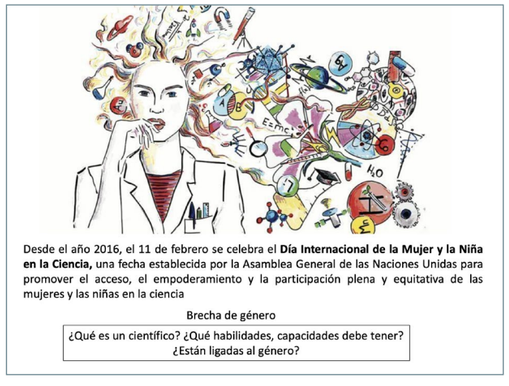
Building a mural with photos of women in soil science to celebrate the Day of Women and Girls in Science from the Argentinean Association of Soil Science (© Argentinean Association of Soil Science, AACS)



Instagram discussion to celebrate the Day of Women and Girls in Science from the Soil Science Society of Brazil (© Soil Science Society of Brazil)

Video celebration of the Day of Women and Girls in Science of the Soil Science Association of Costa Rica (© Soil Science Association of Costa Rica)

Celebration of the Day of Women and Girls in Science of the Mexican Soil Science Society (© Mexican Soil Science Society)



Celebration of the Day of Women and Girls in Science of Spanish Soil Science Society (© Spanish Soil Science Society)

Virtual meeting and awarding of the contest "The scientific girls in soils" to celebrate the Day of Women and Girls in Science of the Soil Science Society of Peru (© Soil Science Society of Peru)

Soil Science Society of Argentina

Women in Soil Science

With the hashtag #WomenInSoilScience, the Argentine Association of Soil Science called to celebrate March 8 International Women's Day, building a mural with photos of women in soil science, and invited the President of the IUSS to be part of this activity with her photos and a message to Latin-American women.
Read more (in Spanish only): *http://www.suelos.org.ar/sitio/wp-content/uploads/2021/03/Laura-Berta-Reyes-Sanchez-Mensaje-para-la-AACS-LBRS-8M.pdf*. Video: *https://www.youtube.com/watch?v=xLAKHevvxiA&t=14s*.

Building a mural with photos of women in soil science to celebrate the Day of Women and Girls in Science from the Argentinean Association of Soil Science (© Argentinean Association of Soil Science, AACS)

Celebrating World Soil Day 2020 in Argentina

Celebrating the WSD, from November 30 to December 5, 2020, the Argentinean Soil Science Society successfully organized 16 different events online and on the radio, both for scientists, citizens and children. These events were part of the SLCS-UNITED's Macro-event organized by the Latin American Soil Science Society (Figures below).

Argentine Association of Soil Science invites contributions to 2021 National Soil Conservation Day

Within the framework of the 2021 National Soil Conservation Day, to be held in virtual format during the month of July, the Organizing Committee invites you to present exhibitions on topics of physical, chemical and/or biological degradation of soils, in video format.

WSD celebration from the Argentinean Association of Soil Science (© Argentinean Association of Soil Science, AACS)

Soil Science Society of Brazil

Instagram discussion and celebration to encourage women to work in soil science

The Brazilian Soil Science Society organized an Instagram discussion and celebration and invited the IUSS President to participate. Through her message, the IUSS president celebrated women and encouraged girls to enjoy studying and work on soil science.

Message from the IUSS President celebrating the Day of Women and Girls in Science during the discussion organized by the Soil Science Society of Brazil (© Soil Science Society of Brazil)

Soil Science Society of Chile

On April 28, the Research Colloquium in Agricultural and Food Sciences of the Austral University of Chile was held, and the IUSS President was invited as speaker.

Soil Science Society of Colombia

On May 27-28, 2021, the update Seminar on fertilization with an emphasis on nitrogen and crop nutrition was held.

Soil Science Society of Mexico

Working as a team to celebrate the WSD, the Mexican Soil Science Society successfully organized 56 different events within the SLCS-UNITED's Macro-event, and as part of the National Soil Partnership, the academy, citizens, NGOs and the government sector signed a new pact to preserve the resource soil. The IUSS President participated as the IUSS spokesperson during the inaugural meeting organized and chaired by the Agricultural Minister of Mexico.

Poster of the Colloquium in Agricultural and Food Sciences (© Soil Science Society of Chile)

Left: Poster of the WSD celebration organized by the Benemérita Universidad de Puebla, Mexico and SLCS-UNIDA (© BUAP)
Right: Poster of the WSD celebration organized by the Postgraduate College, Mexico and SLCS-UNIDA (© Postgraduate College)

Poster of the WSD celebration organized by the Mexican Ministry of Agriculture, Pillar 2 of the FAO-GSP, Mexican Soil Science Society, UNAM and SLCS-UNIDA (© SADER)

The Soil Classification Congress of the IUSS Commission Soil Classification in Mexico (ISCC-2020+2)

The organizing committee is working hard to grow and develop the ISCC in 2022.
The activities now have been rescheduled as follows:
Field Workshop Cuatro Ciénegas-Juriquilla: March 25 to 29
Conference: March 30 to April 1
Courses: April 4 to 9.
The program of invited lectures and oral communications is maintained as communicated to the authors. Call for a new period to receive abstracts from May 1 to November 30, 2021.
More information: *http://www.iscc2020.org*.

University Program for Interdisciplinary Studies of Soil Science (PUEIS)

On May 19th the National Autonomous University of Mexico (UNAM) launched the University Program for Interdisciplinary Studies of Soil Science (PUEIS) for all its campuses nationwide, with the participation of the IUSS president as part of the PUEIS advisory council.

University program for interdisciplinary studies of soil science of UNAM launch poster (© University program for interdisciplinary studies of soil science of UNAM)

Soil Science Society of Spain

Tribute from the Department of Environment and Sciences of the University of Lleida to Professor Jaume Porta Casanellas

On May 5, 2021, an act of recognition took place from the Department of Environment and Soil Sciences (DMACS) of the University of Lleida to Professor Jaume Porta Casanellas. The act had two parts. In the first, Professor Jaume Porta gave the master class "Professional perspectives in Soil Sciences" within the framework of the Interuniversity Master's Degree in Soil and Water Management. The second part of the event was a tribute and recognition of the work carried out by Professor Jaume Porta in the Department of Environment and Sciences of the University of Lleida.

Seminar on Biofertilizers and Biostimulants

On May 21, the "Biofertilizers and Biostimulants" seminar was held, which was organized by the Polytechnic University of Valencia, Spain.

IUSS President delivers talk at CONDEGRES
The IUSS President was invited to participate as speaker in the Spanish Soil Science Society on-line Congress CONDEGRES-2021 that took place on May 24-25, 2021.

Malaysian Society of Soil Science (MSSS)

Starting out with a message from the MSSS President Dr. Rosazlin Abdullah, it contains a number of interesting articles including a review of the Soil Science Conference of Malaysia 2020 (SOILS 2020), which took place in October 2020; a tree planting programme @UCYP "Green Campus for Sustainable Biodiversity" in conjunction with World Soil Day 2020 "Keep Soil Alive, Protect Soil Biodiversity" and the MSSS International Webinar 2020 "Soil: Forestry and Environment" held in December 2020.
It is worth noting that MSSS is celebrating its 50th year of existence in 2021.
Read more: *https://www.iuss.org/newsroom/newsletters/malaysian-society-of-soil-science-newsletter/*.

Soil Science Society of Poland

The Soil Science Society of Poland published an issue dedicated to technogenic soils in the Soil Science Annual journal, entitled *Technogenic soils – soils of the year 2020 in Poland. Concept, properties and classification of technogenic soils in Poland.*
DOI: *https://doi.org/10.37501/soilsa/131609*
Read more: *http://www.soilsa.com/Issue-4-2020,8068*.

Dokuchaev Society of Soil Science, Russia

For the 175th birth anniversary of V. Dokuchaev the Central Soil Museum created a presentation about this great scientist (for details see section "Miscellaneous").
Read more: *http://soil-museum.ru/en/*.

XXIV Dokuchaev International Scientific Conference for young Scientists
The Organizing Committee of the International Scientific Conference XXIV Dokuchaev Conference for Young Scientists, invited the IUSS President as principal speaker of the opening Plenary Ceremony, on March 1, 2021 in St. Petersburg, Russia.
Read more: *https://www.iuss.org/media/dokuchaev_conference_for_young_scientists.pdf.*

William's Soil-Agronomic Museum from Moscow
The Timiryazev Agricultural Academy in Moscow and the GSP invited the IUSS President as speaker during the Launch ceremony of the modernized William's Soil-Agronomic Museum" on May 20, 2021 in Moscow, Russia. The Museum's collection was started in 1888 by V.R. Williams and his students. Inaugurated in 1954 at the Timiryazev Agricultural Academy in Moscow, the Museum now exhibits over 2 500 monoliths from a great variety of soils. Its role was crucial to soil science and agricultural progress.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1397779/.*


International Scientific Conference
XXIV Dokuchaev Conference for Young Scientists
"Soil Science in a Digital Society"
dedicated to the 175th anniversary of the birth of V. V. Dokuchaev and the Year of Science and Technology in Russia

Dear Laura Bertha Reyes Sánchez!

The Organizing Committee of the International Scientific Conference XXIV Dokuchaev Conference for Young Scientists "Soil Science in a Digital Society" invites you to deliver an invited talk at the Plenary Session which will be held on March 1, 2021.

Sincerely,
Prof. Boris F. Aparin
Chair of the organizing committee
Scientific supervisor of the Dokuchaev Central Soil Science Museum,
Vice-president of the Dokuchaev Society of Soil Science (Russia)

Invitation of IUSS President, Laura Bertha Reyes Sánchez, to the XXIV Dokuchaev International Scientific Conference for Young Scientists (© Dokuchaev Society of Soil Science, Russia)

News from the European Society for Soil Conservation (ESSC)

European Society for Soil Conservation (ESSC) & the European Ecocycles Society (EURECYS)
Invite you to their 1st International Joint Congress (10-14 November 2021; Santo Stefano di Camastra, Italy). "Sustainable Management of Cultural Landscapes in the context of the European Green Deal"
Read more: *https://www.ecocycles.net/ESSC-EURECYS-Congress/*.

Awards

Kubiëna Medal 2022

The Kubiëna Medal award is conferred by the IUSS Soil Morphology and Micromorphology Commission to commemorate Walter L Kubiëna for his distinguished contribution to soil micromorphology. This IUSS medal is awarded for outstanding and sustained contribution in the discipline of soil micromorphology.
The deadline for submissions was once prolonged and ended May 31, 2021.
Read more: *https://www.iuss.org/about-the-iuss/awards-prizes/medals/kubiena-medal/*.

Call for Nominations: Dokuchaev, Von Liebig, and IUSS Jeju Awards

At each World Congress of Soil Science IUSS presents three awards to recognize outstanding contributions in basic and applied research and to an early-career scientist:

- IUSS Dokuchaev Award for basic research in soil science
- IUSS Von Liebig Award for applied research
- IUSS Jeju Award for an early-career scientist's contributions to the IUSS mission.

Eligible nominees and nominators must be members of the IUSS. Each award consists of a medal, plaque or equivalent, a certificate, a US$ 1000 honorarium, and financial support to attend the award presentation ceremony at the World Congress of Soil Science. Nomination procedures are on the IUSS Website. Go to *https://www.iuss.org/about-the-iuss/awards-prizes/awards/* and then click on "Read more" next to each award description for additional details. On each award page click on "Criteria & Guidelines" to learn about eligibility requirements and nomination procedures for that award. Award nominations are due one year before the beginning of the next WCSS. The next WCSS is scheduled to begin in Glasgow, Scotland, on 31 July 2022. Therefore, **nominations are due 31 July 2021**. Nominators who have submitted previous nominations are encouraged to submit the nomination again. For further information, please contact Tom Sauer (*tom.sauer@usda.gov*), Chair of the IUSS Committee on Awards and Prizes.

Call for applications for the Dan H. Yaalon Young Scientist Medal

An award by the IUSS Division 1: Soils in Space and Time and Commission 4.5: History, Philosophy and Sociology of Soil Science.
Nomination:
The Dan H. Yaalon Young Scientist Medal is awarded once every four years at the World Congress of Soil Science. Next time will be at **the 22nd World Congress at Glasgow in 2022**.
Applications:
Please send applications to the nomination committee c/o Karl Stahr *kstahr@uni-hohenheim.de*
or mail to: Prof. Dr. Karl Stahr Universität Hohenheim (310a) D 70593 Stuttgart Germany.

Criteria for the selection of nominees for the Dan Yaalon Young Scientist Medal

A nominee should have the following qualifications:

- be a researcher in her/his early scientific career, i.e., PhD student or postdoc researcher within the first 5 years after PhD graduation and,
- be an active member of a national soil science society and/or the International Union of Soil Science and,
- have published in at least one of the following fields: Soil morphology, Soil micromorphology, Soil geography, Soil genesis, Soil classification, Pedometrics, Palaeopedology, History of soil science, Philosophy of soil science, Sociology of soil science, and
- either have made a significant contribution that advanced any field of soil science as presented above, or compiled a body of work that has advanced the science, success, methodology, or use of the above fields. The medal is not awarded posthumously. Current officers of IUSS Divisions, Commissions and Working Groups cannot be nominated.

Nomination procedure

The nominees may be proposed by institutions, societies, commissions and working groups of the IUSS, and by individuals. *Self-nomination is not encouraged.* The proposal for nomination should include a short justification, including the main steps of the scientific career of the nominee, his/her main scientific publications and the major contribution(s) to the development of one or more of the following fields: Soil morphology, Soil micromorphology, Soil geography, Soil genesis, Soil classification, Pedometrics, Palaeopedology, History of soil science, Philosophy of soil science, Sociology of soil science.
The deadline for nominations is **November 1, 2021**.
The nominees will be notified on February 1, 2022. The medalist name will be announced in the following IUSS alert. The presentation of this medal will be take place at the 22nd World Congress in Glasgow, Scotland on August 1, 2022.
For further information please visit: *http://www.iuss.org/index.php?article_id=631*.
[By the Dan Yaalon Young Scientist Medal Award Committee]

Election of IUSS Division and Commission Officers 2022-2026

Call for nominations

The following call for nominations was published in IUSS Alert 189 (March 2021):

Call for nominations of IUSS Division and Commission Officers 2022-2026

This is your chance to become involved in the International Union of Soil Sciences (IUSS) and shape its future in the years 2022 to 2026. The IUSS is the global union of soil scientists, and has participation from some 130 countries involving some 50,000 soil scientists. The IUSS Mission is to promote the scientific and life-sustaining importance of soil to humankind, and to support and enhance the discipline of soil science globally.

The scientific activities of the IUSS are organized by the Divisions, Commissions and Working Groups.

We are seeking nominations for all Division and Commission positions except Division vice-chairs, and a description of the Divisions is given *here*, of the Commissions *here*. The description of the specific duties and functions of Divisions and Commission officers is *here*.

IUSS Full Members (national soil science societies who paid the membership fees) **are encouraged to participate in this call making strong efforts to seek and nominate candidates to the Divisional Nominating Committees**. Nominees can be nominated for only one position. Candidates to be nominated cannot be members of the Divisional Nominating Committees.

Please send in your nominations before 30 April 2021. Each nomination should include the position, a 100 words biography and homepage URL, if available. It should be sent to:

- Positions in Division 1:
  Erika Micheli at *micheli.erika@uni-mate.hu*
- Positions in Division 2:
  Ryusuke Hatano at *hatano@chem.agr.hokudai.ac.jp*
- Positions in Division 3:
  Bal Ram Singh at *balram.singh@nmbu.no*
- Positions in Division 4:
  Damien Field at *damien.field@sydney.edu.au*.

The **timeline** is as follows:

- 30 April 2021 – call for nominations ends
- 2 June 2021 – list of candidates and their biographies available
- 1 September 2021 – voting system will open
- 31 December 2021 – voting system will close
- 28 February 2022 – announcement of new IUSS officers.

We look forward to receiving your nomination!

End of April the deadline for nominations was extended until May 15 2021. Many nominations were received by the Divisional Nominating Committees which were evaluated and lists of candidates were forwarded to the Electoral Committee. It is expected that the ballot for elections will be available by the end of June 2021.

Other IUSS News

IUSS-WASWAC Memorandum of Understanding

The International Union of Soil Sciences (IUSS) and the World Association for Soil and Water Conservation (WASWAC) agreed on a Memorandum of understanding (MOU). The MOU was signed by the presidents of these two organisations: Dr. Laura Bertha Reyes Sánchez (IUSS) and Dr. Duihu Ning (WASWAC).

With the signing of this MOU, the IUSS takes a further step towards the actual construction of alliances that allow us, together with the Societies, Associations, and related Organizations, to face in an interdisciplinary way both the present challenges of the management and use of the soil resource and the great future challenges associated with achieving the soils' sustainability.

#TheSoilIsLife #TogetherWeAreStronger.

Read more: *http://www.waswac.org.cn/waswac/LatestNews/webinfo/2021/03/1616871944456697.htm*.

IUSS-SCGES Memorandum of Understanding signed

The International Union of Soil Sciences (IUSS) and the Standing Committee for Gender Equality in Science agreed on a Memorandum of understanding (MOU). The MOU signature was in charge of their representatives: Dr. Laura Bertha Reyes Sánchez as the IUSS President and Ms. Catherine Jami Chair, SCGES.

News from IUSS Commission 1.6 Paleopedology

Dear friends of paleopedology!

Unfortunately, all over the world situation with the COVID-19 outbreak remains rather tough and uncertain, which does not look promising about face-to-face scientific events this year. In these circumstances, neither visa support nor safe travel and stay in Russia can be provided by organizers of IUSS Paleopedology Commission and INQUA Paleopedology Working Group regular event XIVth International symposium and field workshop on paleopedology. It was shifted to 2021, and now **we are forced to shift it again to August 2022** (hopefully it will be possible that time).

We are deeply sorry about it! We are sure that sooner or later we will get back to a normal style of life where face-to-face meetings, and particularly so important for all of us field workshops will be possible again.

Meanwhile, to compensate somehow a year gap in alive active communication, the IUSS Commission 1.6 Paleopedology and the INQUA Paleopedology Working Group together with the IGRAS and UNAM have decided to organize a three-day on-line meeting with scientific sessions: «Paleosols and ancient societies: from early humans to the industrial revolution» Please, find the 1st announcement and call for papers in the attachment.

Please, find below a brief overview of on-line events where paleopedology-related sessions are scheduled.

There are a few interesting sessions at EGU, April 19-30, in SSS3 – Soils as Records in Time and Space. The program is already compiled, you can find it here: *https://meetingorganizer.copernicus.org/EGU21/sessionprogramme#SSS3*.

There is no notion that you can participate only by being included in the program. To participate in the on-line sessions, you should be registered *https://egu21.eu/register.html*. Registration is free for all students, PhD candidates from middle-income countries, for all participants from low- & lower-middle income countries, and EGU emeritus. But as I understood you should still pay the annual membership fee for 2021 to the European Geosciences Union.

The Eurosoil 2021 Geneva Virtual Congress, 23-27 August 2021. It is possible to submit a late breaking contribution for consideration by the convenors before 3 May 2021, Midnight CET. *The list of all available sessions and descriptions can be found here https://eurosoil-congress.com/wp-content/uploads/2021/02/EUROSOIL-2021-Geneva-Sessions-descriptions-VIRTUAL-26-Feb-2021.pdf*.

The paleosol session is 6.13 Soil archives to understand future changes of climate, landscapes, and the pedosphere guided by Tobias Sprafke, Danieal Sauer and me. Please, contact Tobias if you like to contribute: *tobias.sprafke@giub.unibe.ch*.

The International Conference on Soil Micromorphology (ICoSM), Kraków, Poland, is postponed to 2022.

Let me remind you that we are collecting materials for the next Newsletter, which is planned for June. Please, send any relevant materials: news, new publications, ideas, art etc. to *newsletter.com1.6@gmail.com*.

If you care about global awareness for pedology and paleopedology, you are most welcome to take action and join us twice a year in producing Paleopedology Newsletter. For joining the editorial board, please contact Danny Itkin: *danitkin@gmail.com*.
I'd like to draw your attention to our Twitter account. Due to the efforts of Danny Itkin running news are published here: *https://twitter.com/6Commission*
Maria Bronnikova, Chair of IUSS Commission 1.6 Paleopedology.

Best Paper in Pedometrics 2020 – Call for nominations

The Awards Committee of the Pedometrics Commission is calling for nominations for the Best Paper in Pedometrics Award, 2020.
Nominated papers will be considered by the committee, listed below, who will draw up a shortlist for a final public vote.
To be eligible, a paper must have substantive pedometrics content, advancing pedometrical methodology or demonstrating novel applications of statistical methods in soil science. It must be published in an international peer-reviewed journal. The official publication date of the paper must fall in 2020, papers available for early access or similar in 2020, but not published until 2021, are not eligible this time around.
Please send full bibliographical details of the paper that you wish to nominate, ideally with a full doi link, to *murray.lark@nottingham.ac.uk*. Your email must come from a traceable address, and your identity must be clear. We do not encourage nomination of papers by authors, but such nominations will not be ruled out provided they are not by the lead (first-named) author. Nominations must be received at the above email address by **31 July 2021**.
The Pedometrics awards committee.
Murray Lark, University of Nottingham, UK (Chair)
Sabine Grunwald, University of Florida, USA
Gerard Heuvelink, ISRIC World Soil Information and Wageningen University, The Netherlands
Yang Lin, Nanjing Normal University, Peoples' Republic of China
Alessandro Samuel-Rosa, Federal University of Technology, Paraná, Brazil
Uta Stockmann, CSIRO, Australia.

IUSS SUITMA WG second Newsletter

The second newsletter of IUSS Working Group SUITMA (Soils of Urban, Industrial, Traffic and Mining Areas) is now available, documenting WG activities during the year of the pandemic. Among other news, the newsletter announces the move of SUITMA 12 to the year 2023 and presents the German Working Group "Urban Soil" (AGUB).
Read more: *https://www.iuss.org/newsroom/newsletters/soils-of-urban-industrial-traffic-mining-and-military-areas-suitma-newsletters/*.

Report of Division 1: Soils in Space und Time

Division 1 deals with the soil body in the landscape context. The commissions and working groups coordinate, and harmonize research activities on observation, genesis, classification and mapping of the soil body and landscapes and communicate results to the soil science community, soil users and the general public.

Structure and officers
Chair: Erika Michéli, Hungary
1st *Vice Chairperson:* Matt Aitkenhead, United Kingdom
2nd *Vice Chairperson:* Jacqueline Hannam, United Kingdom.

Vice Chairs are responsible mostly for the organization of the World Congress. The Chair is responsible for communication with the commissions, working groups and vice chairs.
In the overviewed period, despite of COVID-19 constraints the Commissions and Working Groups continued organizing their events, published books and newsletters and participated in the planning of the next World Congress. They also participated in the discussions of the IUSS Forum, which provides a platform for interactions between commissions and working groups, and coordinated a special publication with other divisions.

IUSS Division 1. Commissions working groups:
- Commission 1.1 – Soil Morphology and Micromorphology
- Commission 1.2 – Soil Geography
- Commission 1.3 – Soil Genesis
- Commission 1.4 – Soil Classification
- Commission 1.5 – Pedometrics
- Commission 1.6 – Paleopedology

Working Groups: Cryosols, Digital Soil Mapping, Digital Soil Morphometrics, Global Soil Map, Proximal Soil Sensing, Soil Information Standards, Soil Monitoring, Universal Soil Classification, World Reference Base for Soil Resources.
The intensity of activities among the commissions and working groups varied as reflected in the reports presented below.

Commission 1.1: Soil Morphology and Micromorphology

Chair: Fabio Terribile, Italy
Vice Chair: Richard J. Heck, Canada

The commission is dealing with soil as a continuous natural body that has spatial and temporal dimensions (soil cover or pedosphere) and studies the organization of its organic and inorganic constituents on different scales from micro to macro. They closely cooperate with IUSS units dealing with paleopedology and soil genesis. The Commission has two awards, the Kubiëna Medal and Young Micromorphologist Publication Awards.

Meetings
Announcement from the ICOSM Organizing Committee: the International Conference on Soil Micromorphology is postponed to 2022.

Report on past meetings
The first Virtual Micromorphology Meeting organised by Dagmar Fritzsch (University of Frankfurt), Astrid Röpke (University of Cologne) and Christine Pümpin (University of Basel) took place successfully on April 23th. A total of 129 micromorphologists from 30 countries all over the world registered and participated actively. The programme included four great talks given by Y. Devos (Vrije Universiteit Brussel), K. Ismail-Meyer (University of Basel), R. Shahack-Gross (University of Haifa) and L. Lisá (Czech Academy of Science) and three exciting live microscopy sessions conducted by H. Huismann (Groningen University), Q. Borderie (ArScAn – UMR 7041) and C. Mallol (Universidad de la Laguna) with thin sections shared via Zoom.

New activities

A series of new activities have been performed by the Commission.

Among them:

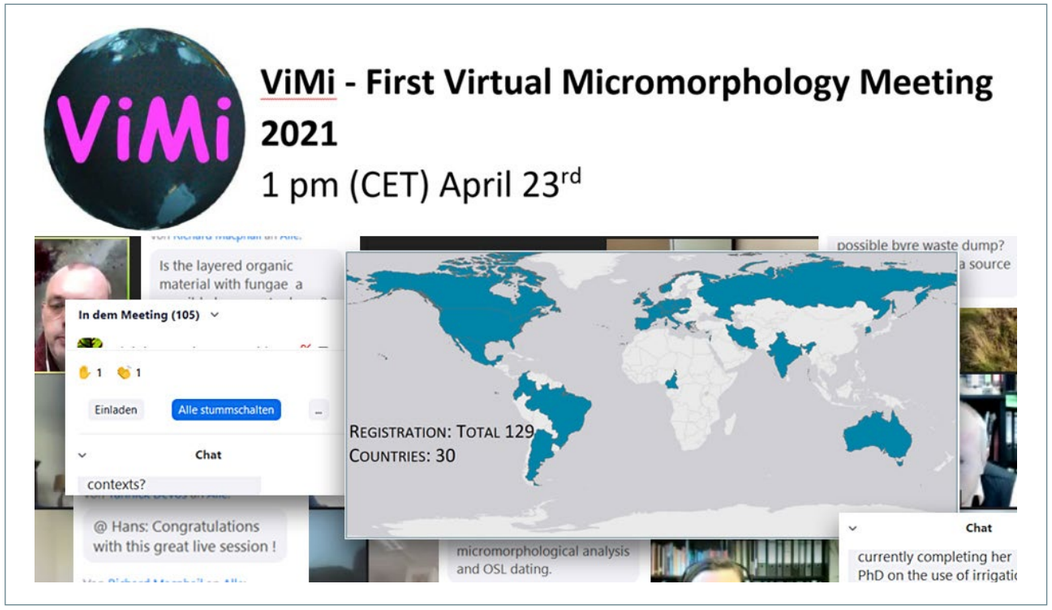
(i) Assemble a list of manufacturers of soil thin sections.

(ii) Create a list of places of collections having a medium-large number of thin sections.

List of the most cited articles published in 2020

(having soil morphology or soil micromorphology as topic)

- X-ray microtomography analysis of soil pore structure dynamics under wetting and drying cycles 2020.GEODERMA, 362. DOI:10.1111/sum.12556
- Soil microstructure alterations induced by land use change for sugarcane expansion in Brazil 2020.SOIL USE AND MANAGEMENT, 36. DOI:10.1016/j.catena.2020.104649
- Physicochemical properties and micromorphology of degraded alpine meadow soils in the Eastern Qinghai-Tibet Plateau 2020.CATENA, 194. DOI:10.1016/j.catena.2019.104319
- Soil parent material is the main control on heavy metal concentrations in tropical highlands of Brazil 2020.CATENA, 185. DOI:10.4102/koedoe.v62i2.1584
- Identification of hydropedological flowpaths in Stevenson-Hamilton catena from soil morphological, chemical and hydraulic properties 2020.KOEDOE, 62. DOI:10.1016/j.coldregions.2020.103183
- Influence of freeze-thaw cycles on microstructure and hydraulic conductivity of saline intact loess 2021. COLD REGIONS SCIENCE AND TECHNOLOGY, 181.



Impressions from the first Virtual Micromorphology Meeting (© Commission 1.1)

Commission 1.2: Soil Geography

Chair: Thomas Scholten, Germany
Vice Chair: Sergey V Goryachkin, Russia

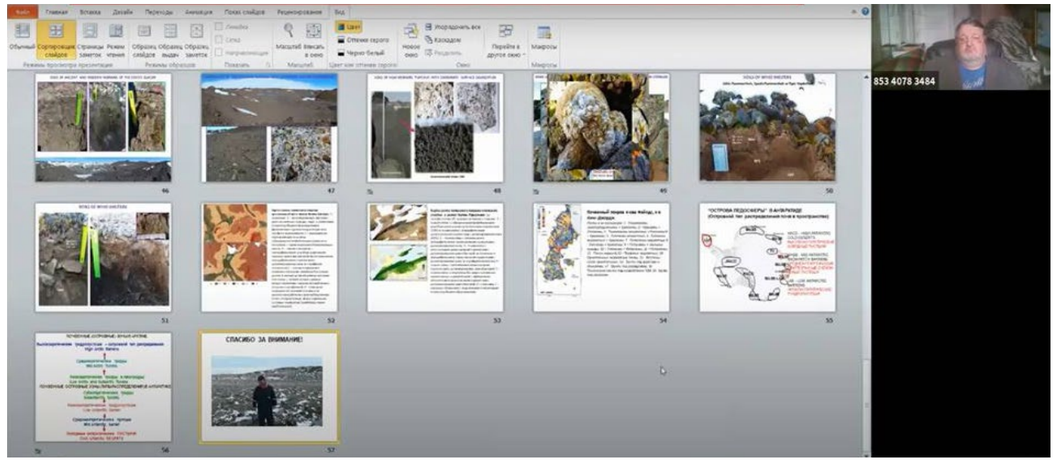
Commission 1.2 Soil Geography deals with the development and spatial distribution of soils worldwide and its many morphogenetic attributes and properties. Soil formation is understood as a complex adaptive interplay of biological and physico-chemical processes driven by environmental climate, organisms including humankind, topography including certain hydrologic features, parent material, and age of soil.

The Commission participated and supported the organization of several events such as the European Geosciences Union General Assembly (EGU) 2020 and also the events organized by the European Society for Soil Conservation (ESSC). Further, it assists in the scientific planning of excursions of the German Soil Science Society being part of the 2022 congress in Trier, Germany.

The Commission is also closely cooperating with Global Soil Map Working Group as well as with the Cryosols, the Paleopedology and the Pedometrics Working Groups. The chair is actively participating in the IUSS Research Forum and the organization of the Eurosoil 2021 meeting as well.

Major events organized by the Commission

All in-person events planned for 2020 were cancelled because of the COVID 19 pandemic. However, the EGU sessions were done on-line and several papers dealing with soil geography and soil cartography were presented at this conference. As a reaction to the pandemic a group of authors around Rattan Lal, our former president, including members of the Commission 1.2 Soil Geography published a paper on managing soils for recovering from the COVID-19 Pandemic (Lal et al. 2020). Commission 1.2 also organizes 3 international and several national zoom-sessions on soil geography subjects.



Zoom-paper of Sergey Goryachkin on soils and soil covers of Polar regions (© Sergey Goryachkin)

The Commission 1.2. also continues to develop the initiative to establish the Gold Medal named after V.M. Fridland and give this award to the soil scientists for outstanding success in the field of geography and cartography of soils. Professor Vladimir Markovich Fridland is well known among soil scientists and geographers in the world for his contribution to several spheres in soil genesis, geography and soil mapping, part of which is his theory of soil cover patterns. His life was rather short, and during its active "pedological" period, namely, 1950ies–1983, he created three new and important spheres in soil science. One, the earliest and best known to specialists in Earth sciences, is the theory of soil cover patterns (Fridland 1976), the second is the original three-component basic soil classification, and the last one is the soil map of the Russian Federation, scale 1:2.500 000; today, it is the only real detailed map of the whole country, published posthumously, in 1988.

Commission 1.2. found sponsors for the Fridland Gold Medal and prepared an application to the IUSS for the approval of the status of this award (Figure below).

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Fridland, V.M., 1976. Patterns of soil cover. Transl. From Russian 1972, D. H. Yaalon (Ed.), Israel Program of Scientific Translations, Jerusalem, and Wiley, Chichester)

Lal, R., Brevik E.C., Dawson L., Field, D., Glaser, B., Hartemink, A., Hatano, R., Lascelles, B., Monger, C., Scholten, T., Singh, B.R., Spiegel, H., Terribile, F., Basile, A., Zhang, Y., Horn, R, Kosaki, T, Reyes Sánchez, L.B. (2020): Managing Soils for Recovering from the COVID-19 Pandemic. Soil Syst. 4, 46.

Preliminary sketch of the Fridland gold medal (© Commission 1.2)

Commission 1.3: Soil Genesis

Chair: Endre Dobos, Hungary
Vice Chair: Megan Balks, New Zealand

Besides of the traditional soil genesis research, the commission maintains its focus on translating the core soil genesis knowledge into simple, easy to use and apply indicators to assess the benefits of soil improving practices and communicate them to the end-users, meaning both the farmer and the administrative segments. In line with this goal the commission is actively contributing to the IUSS Special Publication initiated by Bal Ram in cooperation with other commissions within division 1.

Our contribution will target the "**Short-term soil genesis – putting principles into practice for sustainable agriculture**." (Endre Dobos is the lead author). This title is in line with the major initiations and needs for specific indicators of short term soil improvement and degradation processes to backup and validate the international and national initiatives supporting the farmers to implement soil quality improving approaches, but measures to describe these short term processes are limited.
A wide geographical distribution to cover the different pedoclimatic zones and related agricultural practices is crucial. Invitation of coauthors to participate will be sent after further specification of the details. Interests to contribute should be sent to the chair or vice-chair of the commission.
Knowledge repository initiative has been continued.
A new Soil Monolith collection has been opened in Hungary covering the main soils of the Carpathian-basin (*https://dobosendre.hu/talajtar/*). The official opening was part of the International soil day celebration. A set of media contents have been developed to describe the soil resources of the Carpathian-basin and several shorter ones for the soil type descriptions (*https://dobosendre.hu/virtualis-tarlatvezetes/*). The work has been started to develop a network soil monolith exhibitions and initiate a project to develop a joint digital soil repository containing images, locations and datasets of the monoliths. There are many smaller, University based collections and also larger ones as the Williams in Moscow or the ISRIC soil museum. The goal is to unify these segmented collections into a worldwide dataset.
In case You would like to join or to suggest potentially interested parties, please contact Endre Dobos (*ecodobos@uni-miskolc.hu*).
Contributions to the planning of the 2022 IUSS meeting Commission 1.3 would like to take a significant part in the soil judging contest organized in the frame of the Glasgow meeting. The commission has suggested three topics as important aspects of Soil genesis research and communication, namely the

1. Soil genesis – improved understanding of soil formation processes to support soil resilience
2. Human driven/accelerated soil genesis – tools to support soil resilience and improve soil quality of degraded lands
3. Soil genesis – a background to understand the landscape.

Due to the specific pandemic conditions the congress will be held in a hybrid way, with limited physical participation and expended on-line joining possibilities, the number of sections was decreased and suggested sections were combined into more general topics. However, the session organizers would like keep these messages and invite/encourage contributions targeting these special topics.

Soil Monolith Collection in Miskolc (© E-Dobos)

Commission 1.4: Soil Classification

Chair: Curtis Monger, USA
Vice Chair: Bipin B Mishra, India

1. **International Soil Classification Congress** was postponed yet again because of the COVID-19 pandemic. The ISCC now will be the spring of 2022. The conference is hosted by Mexico.
Originally scheduled for April 16-24, 2020, the field trip and conference were in place with the abstracts having been submitted and reviewed. The first postponement was to October 2020. The organizing committee met again and decided the following schedule. A new call for abstracts will be sent.

Field Workshop Cuatro Ciénegas-Juriquilla	March 25 to 29, 2022
Congress Conferences	March 30 to April 1, 2022
Courses	April 4 to 9, 2022

2. Commission 1.4 continues to work through the IUSS Research Forum to produce a "Global Map of the Potential for Soils to Sequester Atmospheric CO_2 as Inorganic Carbon". This proposed map will solicit Commission 1.4 members interested in a project to build a global inventory of soil inorganic carbon. The focus of this project is not only inventory, but it is also focused on identifying those soils that have the potential for sequestering carbon under natural and amended conditions at the global scale. The project will also involve Commission 1.6 (Maria Bronnikova and Elizabeth Solleiro). The purpose of this involvement is to compare the rate of carbon sequestration by paleosols in the geologic past to modern soils.
3. Commission 1.4 is contributing an article to a proposed IUSS publication on Sustainable Agriculture. On behalf of Division 1 the following titles have been submitted.

- Short-term soil genesis – putting principles into practice for sustainable agriculture. Endre Dobos (lead author).
- Integrating multiscale observations and emerging technologies for understanding soil sustainability. Richard Heck and Titia Mulder (co-lead authors).
- Soil classification as a tool for sustainable agriculture. Curtis Monger (lead author).

Commission 1.5: Pedometrics

Chair: Vera Leatitia Mulder, Wageningen University, the Netherlands
Vice Chair: Nicolas Saby, French National Institute for Agriculture, Food, and Environment (INRAE), France

The Commission deals with the application of mathematical and statistical methods for the study of the distribution and genesis of soils. The goal of pedometrics (and the WGs) is to achieve a better understanding of the soil as a phenomenon that varies over different scales in space and time. The commission is very active in communication, including Twitter *https://twitter.com/pedometrics?lang=en*. They are circulating regular Newsletters called Pedometron, which provide very valuable details of the great activities of the Commission. The Newsletters can be downloaded from the Commission's web site: *http://pedometrics.org*.

Meetings

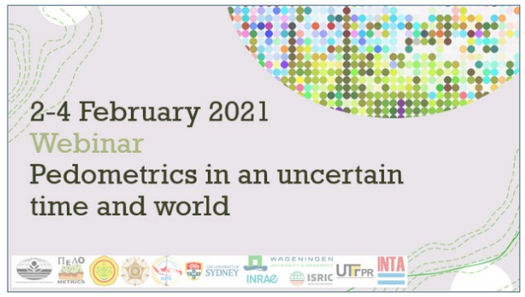
The Commission organizes a biennial conference (Pedometrics Conference) which showcases innovative research on the mathematical spatial and temporal modelling of soil. The latest meeting should have taken place in Indonesia in 2021. Unfortunately, due to COVID-19 the physical event has been cancelled until further notice. In order to keep the community together, we have organized a series of webinars. The first one took place from 2-4 February 2021 (*http://pedometrics.org/pedometrics-meetings/pedometrics-webinar-2021/*). More than 350 people from all over the world registered for this event. On each day, we had a 3hs meeting in which there was a keynote speaker, followed by 8 talks from early-career scientist. Afterwards, there was a network event in breakout rooms in which people could meet and discuss scientific challenges. Due to its success, a second webinar is planned on 16-17 June 2021, *http://pedometrics.org/pedometrics-webinar-2-june-2021/*. This time we focus on topics relevant to the WGs Digital Soil Mapping and Global Soil Map.

Activities

Aside from the webinars, we are collaborating on scientific publications. The first collaborative paper was written by Wadoux et al. (Accepted 2021) entitled 'Ten challenges for the future of Pedometrics'. In this paper, we have outlined contemporary problems in Pedometrics and developed a near-future research agenda. The work resulted from the earlier challenge that Gerard Heuvelink set for the Pedometrics community in 2019, *http://pedometrics.org/10-pm-challenges-forum/*. In addition, a contribution is foreseen to the IUSS Research Forum special issue where we discuss and demonstrate how Pedometrics can contribute to the management of soils for sustainable agriculture, addressing themes such as modelling soil functions and soil security and how Pedometrics can play a role as data provider.

Pedometrics awards

The Commission has three awards: The Best Paper in Pedometrics (yearly), the Richard Webster medal (every 4 years), and the Margaret Oliver Award for Early-Career Pedometricians (every 2 years). **The Best Paper in Pedometrics 2019** was awarded to Songchao Chen and colleagues (Chen et al., 2019). The winning paper tackled an interesting problem in spatial prediction of particular relevance to soil science. The thickness of the soil is an important variable, potentially limiting the volume of soil in which roots can forage for water and nutrients, and in which they can anchor plants. Soil thickness also reflects the balance between weathering and erosion processes, so is of basic interest to soil scientists. However, in practical survey the measurement of soil thickness requires that we use an auger or similar to probe to the parent material, and if this auger is, say, 150cm long, then many of our data will be "right-censored", that is to say, we record a depth equal to or exceeding 150cm. How should these observations be handled? The authors of the winning paper, Songchao Chen and colleagues, propose a method based on the random survival forest, and illustrate it with survey data from France. They show how the method allows them to avoid underestimating soil thickness near the location of censored observations, and to make robust estimates of the probability that soil thickness falls above or below a threshold up to the maximum value of the observations (*http://pedometrics.org/pedometrics-best-paper-2019/*).
The **Margaret Oliver Award for Early-Career Pedometricians 2021** was awarded to Alexandre Wadoux. Since the end of his PhD studies Alexandre has been employed as a Research Associate at the Sydney Institute of Agriculture & School of Life and Environmental Sciences, Australia. Alexandre has made an impressive contribution to Pedometrics. He has published 23 papers (at the time of nomination), and was lead author and animator of a recent innovative paper on contemporary problems in Pedometrics which has just been accepted by Geoderma, entitled 'Ten challenges for the future of Pedometrics'. His 2019 paper *Efficient sampling for geostatistical surveys* (European Journal of Soil Science, 70, 975-989) was in the top 5 most downloaded papers in that journal for 2019.



Announcement of the first two webinars of the Pedometrics Commission (© Commission 1.5)

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Commission 1.6: Palaeopedology

Chair: Maria Bronnikova, Russia
Vice Chair: Elizabeth Solleiro-Rebolledo, Mexico

Commission events

XIV[th] International symposium and field workshop on paleopedology (ISFWP-XIV) Paleosols, pedosediments and landscape morphology as archives of environmental changes. Russia, Altai, was initially planned for 13-23 August 2020 (*http://www.isfwp.igras.ru*). Commission has been contributing serious efforts on it since 2018, but very, unfortunately, we were forced to shift it to August 2021, and later to August 2022.
After one year without active communication, the Commission 1.6 Paleopedology and the INQUA Paleopedology Working decided to organize a three-day online meeting Paleosols and ancient societies: from early humans to the industrial revolution. It will be held in zoom format, June 10-12, 2021. 50 contributions were submitted.
A pre-conference 3-day Ibero-American online Workshop on Paleopedology and Geoarchaeology (PaleoIber 2021) will take place on June 7-9 (2021), mostly in Spanish. It will get about 250 participants.

Newsletter *https://www.iuss.org/newsroom/newsletters/paleopedology-newsletters-commission-16/*
The last newsletter was issued in June 2020.
Besides reports and announces on paleosol-related events and other running news from commission members and officers, our newsletter now is the hosting of contributors that arrive from outside Commission 1.6, including some senior researchers, who presents their original research materials here.
Due to very restricted amount of information during pandemic, we skipped an issue planned for Dec. 2020. Next issue will be delivered in June 2021.

Integration in professional geoscience unions

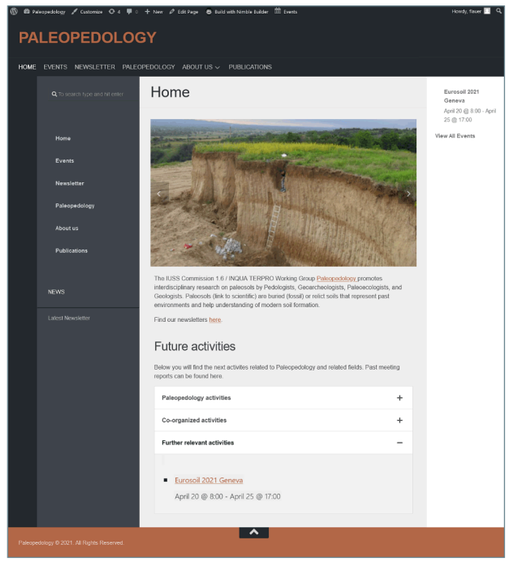
Paleosols are regarded as one of paleoenvironmental records (proxies). Foreseeable future challenges in paleoenvironmental reconstructions will result from multiproxy approach and correlation of different types of paleoenvironmental records. Therefore, IUSS Commission

1.6 Paleopedology is aimed to promote interdisciplinary collaboration and integration in professional geoscience unions.

INQUA cooperation International Union for Quaternary Research (NQUA) officially established a status of Working Group as a long-term association addressing specific broad-scale scientific issues in 2020. This decision was stimulated in large part by activities of paleosol community developed under the umbrella of IUSS Commission 1.6. Recognition of WG status allowed paleosol community to take up more stable permanent position in INQUA. Now paleosol community functions within INQUA as Paleopedology Working Group (led by the officers of IUSS Commission 1.6). We got the official WG status in 2020, and we got the continuation in 2021. Paleopedology WG is in the list of current INQUA Working Groups: *https://www.inqua.org/commissions/wgs*.

EGU cooperation Commission 1.6 successfully develop the cooperation with European Geosciences Union in the frame of Soil System Sciences division. Traditionally Commission 1.6 co-organize sessions at EGU general assembly. EGU general assembly was held in on-line format in 2021. Commission 1.6 co-organized session Soils as records of past environmental conditions, climate change and anthropogenic impact in the program block SSS3 – Soils as Records in Time and Space, in Tue, 27 Apr, 09:00–12:30 (CEST).

Convener: Oren Ackermann | Co-conveners: Anna Schneider, Kunshan Bao, Maria Bronnikova, Gaël Le Roux, Tobias Sprafke, Barbara Fiałkiewicz-Kozieł, Claudio Zaccone.



Screenshot of the website of Commission 1.6 Paleopedology (© Commission 1.6)

It contained 42 short (2-minutes) presentations in zoom format. Every presenter had an opportunity to upload a file with any additional materials which were accessible for all registered participants during 2-month period. Presented contributions were concerned with peatland records, loess-paleosol records, paleofires, man-impact in soils and sediments.

Eurosoil 2021 Connecting People and Soil, was initially planned 24-28 August 2020, Geneva, Switzerland Cancelled. It was shifted to 2021, now announced in an on-line format. Session related to the Paleopedology WG activities: 6.16 Soil archives to understand future changes of climate, landscapes, and the pedosphere. Conveners: Tobias Sprafke, Daniela Sauer, Maria Bronnikova. 6 orals and 6 posters have been accepted.

Googlegroup communication

In 2021 we also realized that communication via the googlegroups forum does not work properly anymore. We extracted the email list from this webpage, which contains > 300 email addresses. Our request to all of these to provide feedback resulted in ca. 100 positive and few negative answers and 30 failure notes, where email did not work. While we wait for further response, we identified ca. 20 colleagues who are not on this list. Based on this update we can safely assume that there will be 120-150 paleopedologists in our updated network.

Website

The currently existing webpage of the IUSS Commission 1.6 Paleopedology *https://sites.google.com/site/paleopedology/* was created more than 10 years ago and contains numerous meeting announcements, reports, a commission history and a link to a googlegroups forum where paleopedologists have registered since 2007. At a Commission officers meeting at EGU 2019 we agreed that our webpage was technically outdated, visually repelling and too much loaded with weakly structured information. Tobias Sprafke is responsible for the site renovation. Since then we worked on storing the existing content and developing a new structure for a modern webpage. As we are no professional webdesigners, this process has required many learning hours. Using wordpress and nimble webpage builder, we now (spring 2021) arrived to a first visually attractive version of the Paleopedology webpage that is waiting for a host and to be filled with content.

Major Publications

Catena Special issue Contemporary soil and paleosol landscapes as records of past environmental conditions was processed in collaboration with EGU SSS3 – Soils as Records in Time and Space. Invited editors: Anna Schneider, Maria Bronnikova, Elizabeth Solleiro-Rebolledo (published in Dec. 2021)

Twitter profile

We support Twitter profile *https://twitter.com/6Commission* was established in 2019 and further kept on by Danny Itkin.

Working Group Global Soil Map (GSM)

Chair (GSM): Dominique Arrouays, France
Vice Chair: Pierre Roudier, New Zeland
Secretary: Zamir Libohova, USA).
Activities mostly together with Commission 1.5 and Working Group DSM (Digital Soil Mapping)

Working Group Digital Soil Morphometrics

Chair: Alfred Hartemink, USA
The working group is working under Commission 1.5: Pedometrics with close collaboration with other working groups of the Commission. The major event in the period was a session of the working group during the Pedometrics Conference in Guelph, Canada. Other planned events were impacted and postponed.
Merge with Commission 1.1. was suggested.

Working Group World Reference Base (WRB)

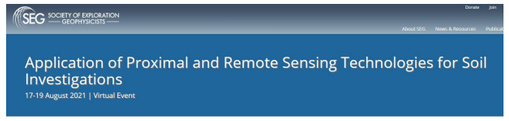
Chair: Peter Schad, Germany
Vice Chair: Stephan Mantel, the Netherlands
The covid-19 crisis prohibited all meeting and field activities. On the other hand, online teaching material had to be provided.
We prepared a video for soil description (WRB Guidelines) and soil classification (WRB) together with a flow chart for detecting soil texture and a brief form for soil description in English and Spanish. They are available here: *https://www.boku.wzw.tum.de/index.php?id=wrb-teaching-material&L=0*.
The WRB homepage has been constantly updated to publish the new dates of meetings and field workshops: *https://www.boku.wzw.tum.de/index.php?id=wrb-upcoming-workshops*.
The twitter account of the WRB Working Group is maintained and counts 1030 members (status May 2021) as a platform for information and exchange.
The development of an automated WRB classification is in progress. There will be two versions, one using field data according to the FAO Guidelines and one using field data according to the NRCS Field Book.
The WRB Working Group plans the 4th edition of the WRB to be published at the next WCSS in 2022. The 3rd edition has been a major revision, but the 4th edition will only be a minor revision.

Working Group Universal Soil Classification

Chair: Budiman Minasny, Australia
Vice Chair: Philip R. Owens, USA
The WG is functioning under Commission 1.4 Soil Classification with great overlap in membership and activities. The WG organized several skype workshops on the development of the principles of future harmonized soil description and classification systems. The postponed Commission meeting in Mexico affected the collaboration and activities.

Working Group Proximal Soil Sensing

The WG is organizing a virtual workshop ‚Application of Proximal and Remote Sensing Technologies for Soil Investigations' in collaboration with the EEGS and SEG (linked below).



https://seg.org/Events/Application-of-Proximal-and-Remote-Sensing-Technologies-for-Soil-Investigations?utm_source=informz&utm_medium=email&utm_campaign=soil_investigations_21&utm_content=cfa&_zs=5B0Nf1&_zl=GsGe7

Working Group Digital Soil Mapping (DSM)

Chair: Laura Poggio, the Netherlands
Vice Chair: Alessandro Samuel-Rosa, Brazil
Organisation of the joint Workshop with Global Soil map IUSS WG : the workshop itself was postponed because of COVID situation and is now postponed to early 2022.
Organisation of EGU session Digital Soil Mapping and Assessment collaborating with Pedometrics division and Global Soil Map WG.
Initial co-organisation of the online webinar for Pedometrics (took place in February 2021).
Initial co-organisation of the online webinar for Digital Soil Mapping and Global Soil Map (to happen in June 2021).
Contribution to session for the WCSS22 program.

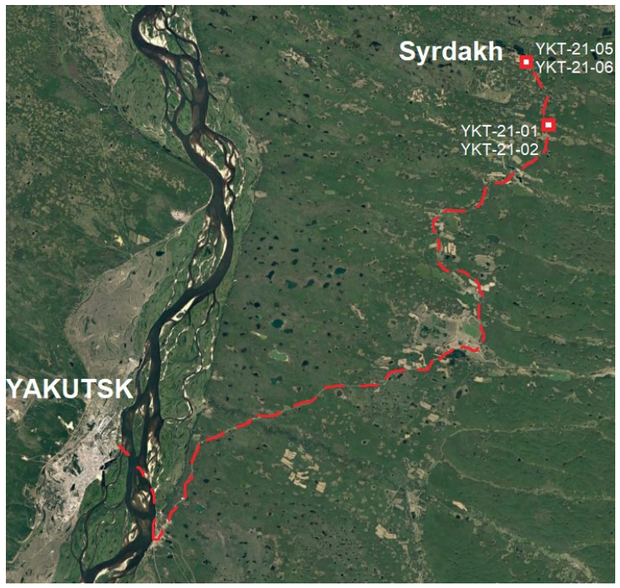
Working Group Cryosol

Chair: Alexey Lupachev

Despite the COVID logistical restrictions, Cryosol Working Group members could organize a short soil science field-class in March 2021 using the logistical facilities of the Ammosov's North-East Federal University (Yakutsk, Sakha Republic, Russian Federation) and financial support of the IUSS Stimulus Fund in the region of the Lena-Amga interfluve (Syrdakh, Central Yakutian Plain). The key site is situated around 120 km from Yakutsk, on the right bank of the Lena River and represents the wide range of natural and agricultural types of permafrost-affected soils of the Central Yakutia. The mean multiannual depth of the snow cover here does not exceed 60-80 cm and provides the opportunity of powered auger drilling cores of the soil profiles up to the nearly maximal active layer thickness (1,5-2 meters).

This fieldwork was conducted by soil and permafrost scientists from the Institute of Physico-Chemical and Biological Problems in Soil Science, Russian Academy of Sciences, Puschino Scientific Center (Dr. Aleksei Lupachev and Dr. Stanislav Gubin) and the Institute of the Applied Ecology of the North, Ammosov's NEFU (Dr. Petr Danilov). Cryopedologists visited local school in Syrdakh settlement where pupils of GEOQUANTUM study group reported the results of permafrost monitoring and ecological studying of the settlement surroundings that they conducted for more than four years in cooperation with different scientific and educational organizations of Yakutia and international colleagues. Together young and experienced scientists discussed the issues of permafrost degradation, ecosystem changing and different aspects of anthropogenic influence on the fragile nature of the North. The head of GEOQUANTUM, Marianna Petrova and the group member, Sergei Sadovnikov, underlined the climatic, hydrological, geomorphological and other environmental changes that directly affect the way of natural resources management in the region – agriculture, fishing and hunting, building construction etc.

The indoor seminar was followed with an outdoor field class where school kids have participated in studying of cryogenic soils – drilling soil cores, describing and sampling them. All of these procedures were accompanied with open-air lectures explaining the fundamental and applied value of such work. Pupils became acquainted with different cryopedological processes and features of Cryosols such as soil structure and cryogenic texture, morphological forms of organic matter, ice segregation and cryogenic desiccation, water-soluble salts migration, gleyization and many others. Four soil-permafrost cores were sampled for further studying of the meso- and micromorphological structure of thin sections and analysis of the basic chemical properties of Cryosols during the winter period in order to compare them with the results of the previous studies of the very same soils but being in a thawed state during the summer period.



Fieldwork route and core sites (© Aleksei Lupachev)

Dr. Stanislav Gubin and Dr. Petr Danilov (© Aleksei Lupachev)

The results of the latest and multiannual Cryosol and Ice Complex deposits studying were discussed at the seminar with academic colleagues from Ammosov's NEFU and IBPC SB RAS. The samples from the Cryosol cores are now under the laboratory microscopical and chemical analysis in the Institute of Physico-Chemical and Biological Problems in Soil Science (Puschino) and in the Institute of the Applied Ecology of the North, Ammosov's NEFU (Yakutsk).

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Report of Division 2: Soil properties and processes

By Ryusuke Hatano, Chair. Paul Hallett, Vice-Chair and Leo Condron, Vice-Chair

Division 2 integrates physics, chemistry, biology, mineralogy and pedo-genesis to understand fundamental soil properties and processes that underpin soil behavior. These phenomena are studied at multiple scales ranging from global to atomic.
Division 2 is organized in five commissions and two working groups:

- Commission 2.1 – Soil physics
- Commission 2.2 – Soil chemistry
- Commission 2.3 – Soil biology
- Commission 2.4 – Soil mineralogy
- Commission 2.5 – Soil chemical, physical and biological interfacial reactions
- Working groups – Hydropedology; International Soil Modeling Consortium

Officers

Officers of Division 2 were elected 2017, taking up post after WCSS in Rio (12-18 August 2018).
Chair: Ryusuke Hatano/Japan
1st Vice Chairperson: Paul Hallett/United Kingdom
2nd Vice Chairperson: Leo Condron/New Zealand.

Divisional activities in 2020

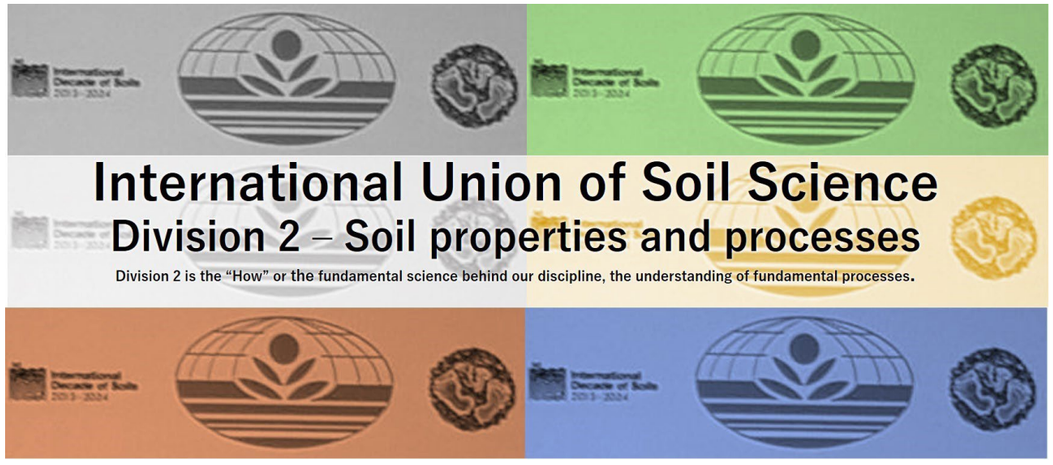
Division and Commission Chairs had a busy 2020 balancing COVID lockdowns with their research and teaching. A positive outcome has been the development of new teaching material that have a long lasting impact. Some of them can be seen in YouTube and introduced in the FB group of Division 2.
The Division Chair contributed to several national, regional and international conferences, symposia and workshops, such as the symposium on the Annual Conference of the Japanese Society of Soil Science and Plant Nutrition (JSSSPN), at Okayama, Japan, on 8-10 September 2020 (on line), International e-Conference on Sustainable Agriculture and Farming System (ICoSAFS) hosted by IPB University, Indonesia, 24 and 25 September 2020 (on line). In the online council meeting on 19 November 2020, the Division Chair presented the activities of Division 2 in 2018-2019. The Division Chair has published a book "The Soils of Japan" in the World Soils Book Series, as one of editors. And he acts as a section EIC of "Agricultural Soil" in "Agriculture", and as a guest editor of a Special Issue "Nitrogen in Environment" in "Frontier of Environment".
The 1st and 2nd Vice Chairs contributed to planning for the IUSS Congress in 2022. This mainly involved working to develop the draft program for Division 2 and the associated Inter-Divisional sessions. This was accomplished in collaboration with the Vice Chairs of the other Divisions, and involved regular on-line meetings, and this work will continue through to the Congress in 2022.
The 1st Vice Chair contributed to a "Roots Medal Lecture" virtually in May 2021, sponsored by the International Society of Root Research. The 1st Vice Chair is the Soil Physics Section Editor for the Second Edition of the Encyclopedia of Soils in the Environment that is currently being commissioned and written, expected to be published in 2022.
The 2nd Vice Chair was also involved in the IUSS Research Forum, which included presenting at the Mid-Congress meeting in November 2020, and presented "Sustainable Use of Legacy Soil Phosphorus".

Travel fund in WCSS 2020

The funds were not used due to COVID-19 Pandemic.

Facebook Group of IUSS Division 2

The Division Chair established the FB Group "IUSS Division 2" on 18 August 2018 to share the schedule and activities of the symposia, workshops and conferences, and information of books, papers and some other issues related to Division 2. So far, near 5,000 colleagues have joined the FB Group. The FB group also shows the photos of the events opened in the several countries on and around the World Soil Day and of the parties for celebration of awarded scientist. Welcome all who would like to join!
Address of the FB Group is
https://www.facebook.com/groups/213698576164024/
(Figure below).



Cover of the Facebook Group of IUSS Division 2. Five colors of the cover relate to plant and dominant soils in Japan. Green means plants. Bluish gley soils are dominant in the alluvial plain, and red soils are seen in the southern warm area. White sand dune soils and pumiceous volcanic regosols are seen in western Japan, and black andosols are dominant in the northern cool area

Commission 2.1: Soil Physics

By Stephan Peth, Commission Chair and Brigitta Szabo (Toth), Commission Vice-Chair

Due to the COVID-19 restrictions several activities and initiatives have been prohibited or inhibited. Some conferences, such as the European Geoscience Union General Assembly (EGU 2020) were held online, which provided a previously not commonly used way for networking, but majority of the meetings, conferences and workshops were cancelled. In EGU2020 there were six session directly dedicated to Soil Physics with topics on soil water infiltration, preferential flow and mass transfer, soil structure dynamics, soil physical parameterization, water management for resilient arid and semi-arid agroecosystems and hydrogeophysics. Also at the EGU2021 soil physics was well represented with a range of interesting sessions on coupling fluid dynamics, heat and solute transport, feedbacks between soil structure and soil biology and classical topics on vadose zone processes like soil infiltration and preferential flow.
Eurosoil had to be postponed and is now going to take place as a fully virtual congress in August 2021. The congress is focusing on sustainable development goals and soil physics certainly plays an important role in many of them. There are sessions on the soil-root-interface, the interaction between soil structure, soil biota and soil functions and physical soil protection, to name a few with a soil physics context. Taking a look forward into 2022 we are hoping to get back to some normality and seeing many of you personally at the next WCSS in Glasgow.
Very sad news reached us lately on the death of Daniel Hillel who passed away on March 9, 2021. He was a pioneer and an outstanding leader in soil physics and his work made a high impact contribution to water conserving agricultural production and climate change mitigation finally and deservedly honored by the World Food Price in 2012. We all know his great textbooks which most of us have on their shelves and his enthusiastic and inspiring talks. His incredible production as a scientist and admirable dedication to teaching soil physics will reach out far into the future. We will keep Daniel Hillel as a mentor, friend and colleague in blessed memory.

Commission 2.2: Soil Chemistry

By Boris Jansen, Commission Chair and Karen Vancampenhout, Commission Vice-Chair

In 2020 Commission 2.2. continued with the promotion and stimulation of soil chemical research and education. Such efforts were of course severely hindered by the effects of the COVID-19 pandemic and the coupled world-wide measures to contain the spread of the disease. This led to the cancellation of many conferences, including the Eurosoil 2020 conference, and severely limited the possibility for organizing field trips and other forms of collaborative research and teaching. At the same time, the fact that the focus of research and teaching in general, including the soil sciences, shifted to a focus on digital/online platforms and means also offered opportunities.

In 2019, the Vice-Chair of the Soil Chemistry Commission, Dr. Karen Vancampenhout (KU Leuven) developed and launched a massive open online course (MOOC) titled: "As above, so below: An introduction to soils, ecosystems and livelihoods in the Tropics", together with Dr. Seppe Deckers (KU Leuven) and Dr. Stephan Mantel (Head of the World Soil Museum, ISRIC). The course focusses on using the knowledge about natural variability in soil properties for the sustainable management of ecosystems and farms: [link to video about the course: *https://youtu.be/ucZN6rRpIkM*]
The course ran again in 2020. It was very well received and was selected as a finalist for the 2020 EdX Prize for Exceptional Contributions in Online Teaching and Learning: *https://blog.edx.org/congratulations-2020-edx-prize-finalists*.
You can read more about the course here: *https://www.edx.org/course/as-above-so-below-an-introduction-to-soils-ecosy-2*.

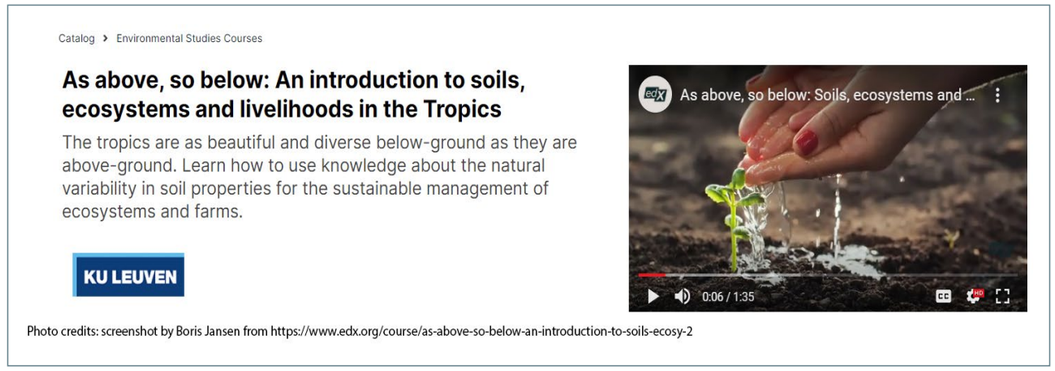


Photo credits: screenshot by Boris Jansen from https://www.edx.org/course/as-above-so-below-an-introduction-to-soils-ecosy-2

In addition, the Chair and Vice-Chair of the Soil Chemistry Commission organized a session titled: "From source to storage – understanding soil organic matter cycling in space and time using molecular tools" for the Eurosoil 2020 conference. Due to COVID-19, the conference was postponed and is scheduled to take place in August 2021 as an online conference.
Furthermore, the Soil Chemistry Commission started the planning and organization of sessions for the 22nd World Congress of Soil Science to be held in Glasgow, UK in 2022.

While 2020 has been a very hectic year in many aspects, we hope that as the world slowly gets the COVID-19 pandemic under control, the possibilities for the Soil Chemistry Committee to promote soil chemistry research and teaching world-wide will grow again too.

Commission 2.3: Soil Biology

By Ellen Kandeler, Commission Chair and Magdalena Frąc, Commission Vice-Chair

As it was not possible to hold conferences and meetings last year, we would like to report on alternative activities of Commission 2.3. The participation of different members of the IUSS in the FAO report on the global status of soil biodiversity was certainly outstanding. This report can be downloaded under the following link: *https://doi.org/10.4060/cb1928en*; reference: FAO, ITPS, GSBI, SCBD, and EC. 2020. State of knowledge of soil biodiversity – status, challenges and potentialities, Report 2020. Rome, FAO. This report is the result of an inclusive process involving more than 300 scientists from around the world under the auspices of the FAO's Global Soil Partnership and its Intergovernmental Technical Panel on Soils, the Convention on Biological Diversity, the Global Soil Biodiversity Initiative, and the European Commission. This report clearly presents the current state of research and highlights potential factors affecting soil organism biodiversity. It also identifies ways in which humans can prevent damage to soil organisms through appropriate measures. We also want to report on the new trend of making data on all aspects of soil biodiversity publicly available. One of the pioneers in this process is the Biodiversity Exploratories project coordinated by Markus Fischer (Bern, Switzerland), which has already been collecting biodiversity data of plants, soil animals and soil microorganisms at 150 grassland and 150 forest sites since 2006. After a certain lag period, which is used for the publication of the original data by the PhD students, the data will be made publicly available via BEXIS. Birgitta König-Ries is responsible for the central data management of the Biodiversity Exploratories (*http://www.biodiversity-exploratories.de/Projects/core-project/Datamanagement*).
In addition to the meetings already mentioned on the IUSS website, we would like to inform you that Petr Baldrian, Prague, will again hold a meeting on "4th conference on the Ecology of Soil Microorganisms" in 2021 (from 28 November to 2 December 2021). The organizer expect again more than 400 participants from all over the world. The conference will address questions like the importance of individual microbes, microbial communities as well as their interactions with the environment and other soil biota. Most contributions will link the modern molecular "omics" methods such as metagenomics, metatranscriptomics and metaproteomics with approaches based on soil chemical and biochemical analyses, the exploration of soil fauna and plant ecology. You can find additional information under the following link: *https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwijn_j2m5buAhVGPewKHdaABS8QFjABegQIBBAC&url=http%3A%2F%2Fwww.biologicals.cz%2Fconferences%2Findex.php%3Fconference _id%3D28&usg=AOvVaw2ChAtTuY5ffEq7AbDJzLFV*.
In the frame of the IUSS we are currently planning different sessions for the 22nd World Congress of Soil Science 2022 which will be held in Glasgow, United Kingdom from Sunday, 31. July 2022 to Friday, 5. August 2022 (*https://www.soils.org.uk/wcss2022*).

Commission 2.4: Soil Mineralogy

By Stephen Hillier, Commission Chair and Sofia Lessovaia, Commission Vice-Chair

Introduction

In the framework of the International Eurosoil 2020 Conference, which was postponed to 2021 a session "Linking soil mineralogy to soil properties and functions" (4.27) was suggested by the leaders of the Mineralogy Commission. Summarizing a session program the submitted abstracts were grouped as following (i) "soil mineralogy and nutrients"; (ii) "weathering and pedogenesis"; (iii) "minerals in soil environment"; and (iv) "soil organic matter and minerals. We recommend to join this session of Eurosoil 2021, which will take place 23-27 August 2021 Geneva, Switzerland as ***virtual Congress***.

Events

We would like to recommend the following sessions of the International Clay Conference (XVII ICC, Turkey, Istanbul) postponed to 12-16 July 2021:

- "*Soil minerals in connection with pedogenic processes*" (Stahr K., Kadir S., Kapur S., Costantini E., Bronnikova M).
- "*The role of clays in critical zone architecture and function*" (Schroeder P.A., Lanson B.)
- "*Soil mineral quantification – from poorly crystalline phases and interstratified soil clay minerals to digital soil mineralogy*", (Dietel, J., Dohrmann, R., Georgiadis, A., Hillier, S., Hubert, F., Mikutta, C.).
- All three of which deal with different aspects of ***soil and clay mineralogy*** in both modern soils and palaeosoils.

Publications

The following publication is an example of the application of the concept of 'Digital Soil Mineralogy', which forms one of the commission's proposals for mineralogy sessions planned for the next IUSS general assembly.
Mineral–nutrient relationships in African soils assessed using cluster analysis of X-ray powder diffraction patterns and compositional methods. *https://doi.org/10.1016/j.geoderma.2020.114474*.

Commission 2.5: Soil Chemical, Physical and Biological Interfacial Reactions

By Siobhan Staunton, Commission Chair and Qiaoyun Huang, Commission Vice-Chair

This year has been unusually quiet with little activity.
A special issue was published in European Journal of Soil Science, arising from some of the communications made at the WCSS in Rio de Janeiro, Brazil in 2018. This issue comprised five papers selected from the 120 posters and oral presentations in the two sessions chaired by Ladislau Martin-Neto and Siobhan Staunton and by Siobhan Staunton and Jeferson Dieckow.

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Petrov, D., Tunega, D., Gerzabek, M. H., & Oostenbrink, C. 2020. Molecular modelling of sorption processes of a range of diverse small organic molecules in Leonardite humic acid. *European Journal of Soil Science*, 71, 831–844.

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Villas-Boas, P. R., Franco, M. A., Martin-Neto, L., Gollany, H. T., & Milori, D. M. B. P. (2020a). Applications of laser-induced breakdown spectroscopy for soil analysis, Part I: Review of fundamentals and chemical and physical properties. *European Journal of Soil Science*, 71, 789–804.

Villas-Boas, P. R., Franco, M. A., Martin-Neto, L., Gollany, H. T., & Milori, D. M. B. P. (2020b). Applications of laser-induced breakdown spectroscopy for soil analysis, Part II: Review of elemental analysis and soil classification. *European Journal of Soil Science*, 71, 805–818.

The other activity of the Commission during this period was the evaluation of papers for another special for European Journal of Soil Science, resulting from the inter Congress meeting of Commission 2.5, ISMOM. This will be published in the May 2021 issue.

Working Group Hydropedology

By Hans-Jörg Vogel, Chair and Johan van Tol, Vice-chair

After the sudden and tragic death of Henry Lin, the former chair of this working group, the year 2020 was dedicated to restructuring the working group in terms of title, contents and chair persons. The international hydropedology conference planned for 2020 would have provided an ideal platform for this process, however, this meeting had to be cancelled due to the COVID pandemic. Instead, the discussion about the future of this working group was organized via virtual tools such as email and videoconferences. Approximately 30 scientists from all over the world, who were engaged in former hydropedology conferences contributed to the discussion. One conclusion was to rename the working group to its original title "Hydropedology".
Few years ago, this working group was renamed by Henry Lin to "Critical Zone System". This was motivated by the wish to include theoretical aspects and new conceptual approaches on how to analyze and quantify complex systems. Today, however, we conclude that "'system thinking" is integral part of soil science in general, while hydropedology is a specific, powerful and widely acknowledged scientific approach at the interface between soil hydrology and pedology which justifies a WG at the level of IUSS. Pedological processes are shaping subsurface structures that are of critical importance for water dynamics within soil and terrestrial systems. Vice versa, water dynamics is shaping pedogenetic processes significantly through transport of solutes and solid materials. Hence, there are close interactions between soil hydrology and pedology that are explored within the framework of hydropedology for a better understanding of soil functions. This is true at the scale of pedons but also at the landscape scale where the spatial patterns of soils determine the storage capacities and flow paths of water and the entrained substances.
With climate change, the research field of hydropedology will gain additional momentum since water shortage will become a highly critical issue for the functioning of terrestrial ecosystems. A keyword search on Web of Science yielded 21 publications featuring hydropedological research in 2020. These papers focused *inter alia* on improved predictions of preferential flows; using hydropedological interpretations to improve the understanding and modelling of hydrological processes at different spatial scales; application of hydropedology to characterize hydric soils, wetland boundaries and carbon stocks; and a review paper on the application and research opportunities in hydropedology.
As another result of the online discussions the acting chair, *Hans-Jörg Vogel*, was confirmed in this position and *Johan van Tol* was elected as vice chair. We started planning the next international hydropedology which is now scheduled for the latter part of 2022 in South Africa. The first announcement and call for abstracts will be circulated soon.

Working Group International Soil Modeling Consortium (ISMC)

By Harry Vereecken, Chair and Teamrat Ghezzehei, Vice-Chair and Roland Baatz, Coordinator

The **IUSS Working Group International Soil Modeling Consortium (WG ISMC)** was established in 2016 with the aim to integrate and advance soil systems modeling, data collection, and observational capabilities. The underlying principles and scientific basis were outlined in a recent white paper on "Modeling soil processes: review, challenges and new perspectives" published in Vadose Zone Journal in 2016. Its activities are organized into three science panels: data and observation model linking, soil modeling development and intercomparison, and cross cutting and outreach activities. WG ISMC has an executive board and a scientific advisory board that guides WG ISMC in pursuing its objectives. WG ISMC is a community effort based on voluntary contributions. Everyone can sign up freely under *http://eepurl.com/hjZvnX*.
First quarter 2020, the ISMC Executive Board elected **Martine van der Ploeg as new Co-Chair** effective from 1st July 2020. Together with Teamrat, Martine will lead ISMC for the coming three years. Martine succeeds Harry Vereecken as European Co-Chair.
The **3rd ISMC Conference – Advances in Modeling Soil Systems** (Figure 1) was postponed, and will now be a virtual event to take place from May 18-22, 2021. The conference programme addresses recent research in the soil-vegetation-atmosphere continuum centred around soils over all spatial scales, time scales, and elements – from processes to prediction. Conference goals of 1) Engagement during scientific sessions 2) Active interaction and discussions and 3) Excellent oral talks and poster presentations will be achieved within ten scientific sessions from soil processes in Earth system models, soil formation, soil and plant interaction, transport processes, scaling of biogeochemical models, runoff and erosion, landscape heterogeneity, soil functions, biogeochemical fluxes and soil organic carbon dynamics, and a big data session.

ISMC Award Winners 2021

The biennial Rien van Genuchten Award is issued for outstanding contributions to the understanding of flow and transport processes in soils. It is dedicated to recognizing outstanding scientific achievements made by well-established researchers in the field of soil and vadose zone sciences. The ISMC Executive Board thanks the four anonymous reviewers for carrying out the review process on this year's nominations.
This year's Rien van Genuchten Award goes to Prof. Tiina Roose (Figure 2 a), University of Southampton. The award was made on the basis of Prof. Roose's

Figure 1: Banner ISMC Conference May 2021 (© ISMC ©freeimages.com Flavio Takemoto and © imaggeo.egu.eu Shailendra Pratap)

Figure 2 (from left to right):
a) Prof. T. Roose, winner of the Rien van Genuchten Award 2021 (© Prof. Tiina Roose),
b) Dr. M. Sadeghi (© Dr. Morteza Sadeghi) and
c) Dr. R. Stewart, winners of the ISMC Early Career Award 2021 (© Dr. Ryan Stewart)

significant contributions to advancing understanding of plant-soil interactions by combining theory, computational modeling, and experimentation. In particular, her work on plant-soil systems extends from fundamental theory to practical application. A further reason for her receiving the award was the fact that her scientific contributions are broad and innovative. The broad application here is the extension of her work to the field of biophysics, modeling such phenomena as the growth of tumours. The innovative technique being applying her mathematical skills and insights to advance a fundamental understanding of the plant-soil-microbiome continuum.

The **ISMC Early Career Award** recognizes outstanding scientific achievements made by early career researchers in the field of soil and vadose zone sciences. This year's ISMC Early Career Award goes to two candidates who received equal scores during review: Morteza Sadeghi, California Environmental Protection Agency, and Ryan Stewart, Virginia Tech.

Dr. Morteza Sadeghi (Figure 2b) **receives the ISMC Early Career Award** on the basis of his work on bridging the gap between traditional soil physics and terrestrial remote sensing. His work has been particularly interdisciplinary and bridging across scales to better capture and understand hydro-terrestrial processes. This is exactly what is needed from the next generation hydro-terrestrial scientists to advance the field.

Dr. Ryan Stewart (Figure 2c) **receives the ISMC Early Career Award** on the basis of his work in the area of environmental quality and "soil health" with emphasis on water, solute and gas transport in soils. In particular, Dr. Stewart has helped the concept of soil health and made it "a quantitative sub-discipline of soil science". This is significant as it requires a holistic systems perspective in which the complexities of physical, chemical, biological, ecological processes have to be treated as a whole. In our opinion, this set Ryan apart as a leader in this important sub-field.

The **ISMC General Assembly** (Figure 3) took place during the virtual European Geoscience Union (EGU) Assembly 2020. At EGU2020, ISMC co-sponsored two sessions namely "HS8.3.2 Modeling Soil and Vadose Processes: Status and Challenges" and "SSS10.7. Scaling soil processes across space and time: leveraging models and data syntheses". The first session aimed to bring together scientists advancing the current status in modelling soil processes from the pore to the catchment and continental scale. The Modeling soil and vadose zone processes is vital for estimating physical states, parameters and fluxes from the bedrock to the atmosphere. Because the solid, liquid, and gaseous phases in the soil physically affect biogeochemical processes, transport of nutrients and pollutants, and infiltration-runoff generation, the implications on ecosystem functions and services and terrestrial storage capacities are vital to the understanding of global, land use and climate change. Advanced measurement techniques, increased availability of high-resolution data, and the need for terrestrial system understanding challenge vadose zone modeling concepts. The second session aimed at soil organic matter (SOM) as an ecosystem property that emerges from a suite of complex biological, geochemical, and physical interactions across scales. As the largest pool of actively-cycling terrestrial carbon, understanding how SOM persistence and vulnerability will respond to global change is critical. However, Earth System Models (ESMs) are often unable to capture emergent SOM patterns and feedbacks across smaller spatial and temporal scales. Identifying, prioritizing, and scaling key driving mechanisms from detailed process models to advance ESMs is crucial, and better empirical constraints on SOM pools and fluxes are urgently needed to advance understanding and provide model benchmarks. Interdisciplinary research and observation networks collecting long-term, geographically-distributed data can help elucidate key mechanisms, and international efforts that synthesize and harmonize these data are needed to inform data-model comparisons.

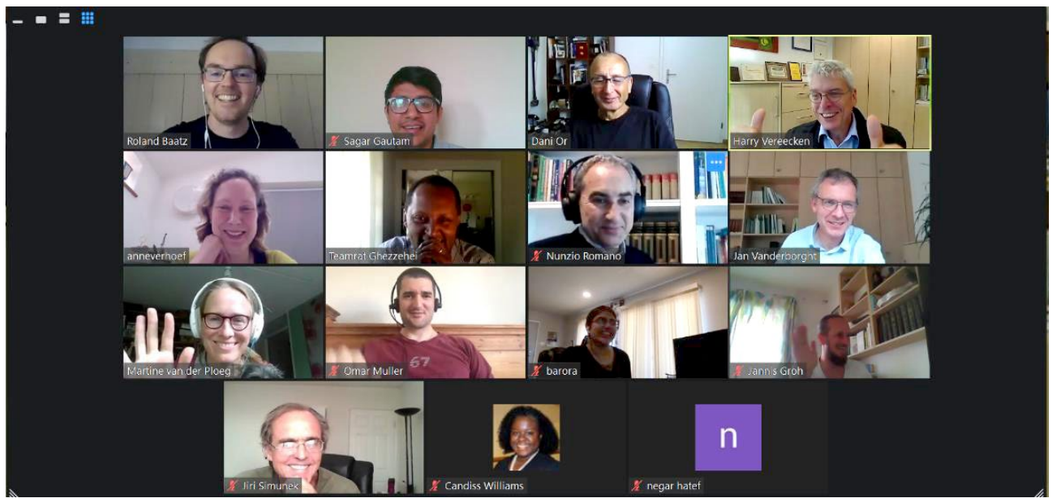


Figure 3: Screenshot of virtual ISMC General Assembly 2020 (© ISMC)

Task force on soil carbon modeling

Under the ISMC umbrella, three main international task forces were established. The *task force on soil carbon modeling* started a new ISMC project focusing on comparing global soil carbon maps generated with machine learning products to soil carbon maps generated using a reduced complexity process model. This may be one way to address global soil storage potential, and/or a way to highlight shortcomings in our understanding of the global biogeochemical cycle. We are also aware of the latest effort in monitoring top layer soil organic carbon globally using the state-of-the-art Earth Observation models/algorithms, which will be taken into account for the comparison when available. The task force is led by Kathe Todd-Brown and Jan Vanderborght together with Sagar Gautam, Umakant Mishra and Martine van der Ploeg.

Task force on soil thermal properties

The *task force on soil thermal properties* aims towards improved descriptions of thermal soil properties, and related global parameter sets, for land surface models. The overarching aims of this ISMC task force project are i) to collate and generate global datasets of measured thermal property data (laboratory and field), conditions during the experiments (including soil moisture content and temperature, and ideally matric potential), and sample/field soil properties (texture, OM, mineralogy (if available), stoniness); ii) to collate and test (using measured thermal property data, as mentioned above) existing, and design and test improved equations of thermal soil properties, that can be used in land surface models, at field to global scales; and iii) to link thermal theories with hydraulic theories, and to move away from empirical approaches where possible; iv) to generate global datasets of parameters required in existing and proposed equations, based on soil texture, OM, as well as mineralogy and rock content, or proxies thereof ; v) to generate datasets of field-site driving data and thermal regime verification variables (soil temperature, soil moisture/matric potential, soil heat flux) for testing of the equations at the field-scale (this includes FLUXNET-style sites, where these data are available). This task force serves to support development and verification of models simulating thermal properties, by both existing and novel approaches. The task force is led by Anne Verhoef and Yijian Zeng. *https://soil-modeling.org/science-panels/working-groups/soil-thermal-properties*.

Task force on pedotransfer functions and land surface parameterization

The *task force on pedotransfer functions and land surface parameterization* aims to bring together international experts working on pedotransfer functions and land surface parametrization in different disciplines such as soil sciences, climate, and crop modelling. Hereby, the focus will be in a first step on pedotransfer functions (PTF) to estimate soil hydraulic parameters. In addition, also thermal and biogeochemical pedotransfer functions will be tackled. Within the task force urgent needs in pedotransfer and land surface parameterization development and validation will be identified covering the following topics: i) Establishing a database of hydraulic properties, soil properties that not only contain data on texture, bulk density, organic carbon, and other basic properties but that also include information on soil structural features. Hereby, discussions are needed which structural infor-

mation can be routinely measured to improve PTFs. Current knowledge shows that taxonomic information such as granular, blocky, subangular, did not prove to be valuable. Imaging techniques are most likely the way forward. Measuring and including such information can be a community effort in a way that defined groups measure soil hydraulic properties on undisturbed samples, and others use their imaging capabilities such as CT or MRI. If possible, such an effort will be financially co-supported by ISMC in terms of shipping costs. ii) Integration of soil structure in pedotransfer functions iii) Development of harmonized and physically constrained pedotransfer functions iv) Functional sensitivity studies of developed pedotransfer functions v) Pore-scale modeling of the effects of soil structure on soil hydraulic properties vi) Validation of pedotransfer functions in land surface modelling. The task force is led by Lutz Weihermüller and Yonggen Zhang.
https://soil-modeling.org/science-panels/working-groups.

ISMC responded to the new EU Soil Strategy, Healthy Soil for a Healthy Life, highlighting the need to account for long term processes and the key role of modeling in prediction.
The International Soil Modeling Consortium (ISMC) strongly supports the new EU Soil Strategy to develop knowledge-based management options to support the formulated objectives. The consortium's Executive Board envisions European scale soil databases providing concrete evidence for high-resolution soil process models synergized with Copernicus Earth Observation Programmes. These will be some key components of a soil strategy implementation. The 2017 Report of the EU Soil Thematic Strategy identified a gap between science, policymakers, and society. The strategy to overcome this gap requires measures for exchange, integration, and dissemination of knowledge on maintaining soil ecosystem functioning. It urges for a concept to promote, integrate, and strengthen soil-related data availability and model capacity so that stakeholders and the broader public can better understand soil and soil processes' status and importance. To this end, developing knowledge and research is instrumental in guiding the gap between the goals of the new EU Soil Strategy and how to get there. Beyond the challenges addressed in the New Soil Strategy, we suggest consideration of three further challenges:

1. Integrate soil, crop, and socio-economic models to assess economic impacts on soil functions and services across different scales. Such modeling efforts inform long term monitoring campaigns on which processes need careful observation. These models integrate data, processes, and transdisciplinary knowledge in a machine-readable format.
2. Assess the implications of proposed policies through pilots. We point out increasing carbon stocks by conservation tillage takes 3-5 decades to be detected (Angers and Eriksen-Hamel 2008 SSSAJ, Haddaway et al. 2017 Enviro. Evidence). We highlight the challenge for the New Soil Strategy to consider massive calibration of expectations.

Assess the costs and benefits of land management on soil degradation, thereby informing policy in a meaningful way on medium and long-term costs and gains of soil management scenarios. Land degradation (in terms of SOC) due to land-use conversion is rapid (a decade or two) in adverse to soil carbon sequestration processes and chronic compaction effects. Restoration considers a policy-planning period of half a century.
Further information can be found under
https://soil-modeling.org/news/meetings-reports-publications/ismc-news-december-2020.
ISMC also **promoted several movies** (Figure 4) to promote further ways to disseminate knowledge. The video abstracts were made on highlighted publications of the vadose zone journal, supported by the journal editor Markus Flury. Magazine 1 features 'Research and tools to achieve a more productive and sustainable agriculture, combining geophysics-based soil mapping and crop growth modelling' by Naftali Lazarovitch, Cosimo Brogi and Nimrod Schwartz *https://www.youtube.com/watch?v=oRnD8HbgKpc*. Further, the @ISMC_News Twitter channel was visited frequently and serves as outlet for short news items *https://twitter.com/ISMC_News* for its 665 followers.

The existing **Soil Meta Data Repository** (Figure 5a) links to databases relevant for international soil modeling experts. The 18 data sets cover root and biological data, soil hydraulic data, soil sample analyses, and many more. The Soil Model Portal (Figure 5b) has grown to 41 numerical models focusing on one or more of the soil-vegetation-atmosphere compartments. With tens of thousands of visits a year, these portals guide researchers and practitioners through the dungeon of available simulation tools. Most frequently visited were the models DNDC and RothC in the model portal with 864 and 1411 visits a month.

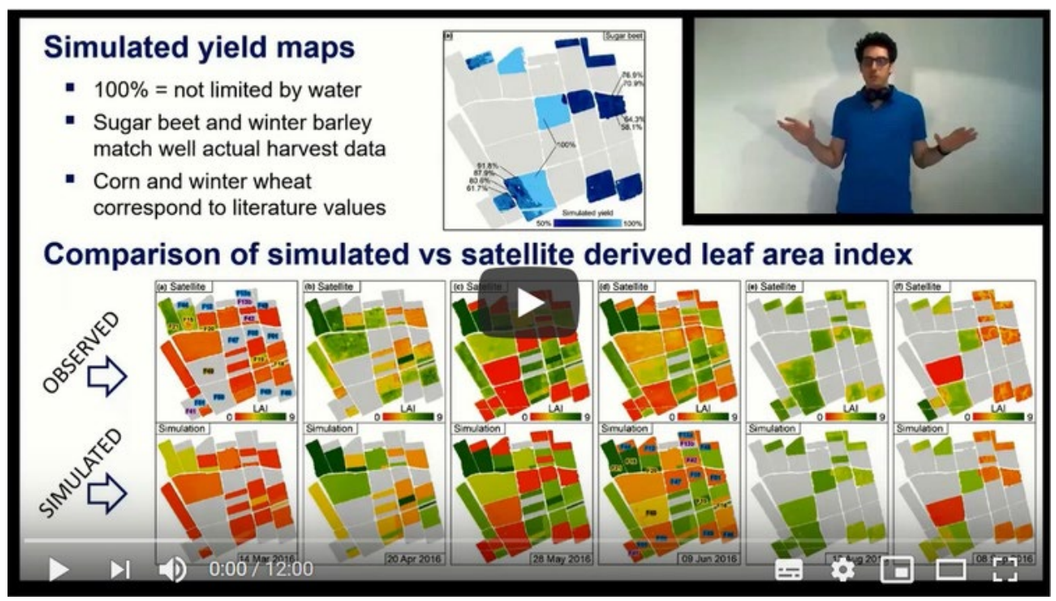


Figure 4: Magazin 1 Video on Youtube. Screenshot of Youtube (© ISMC)

Figure 5: a) ISMC Meta Data Portal and b) ISMC Soil Model Portal (© ISMC)

Report of Division 3: Soil Use and Management

Progress report for 2020

Division 3 "Soil Use and Management" focuses on how we use the soil and how it links to the knowledge base of Divisions 1 and 2 to ensure that soils are used and managed in a sustainable manner. The Division is concerned with both soil use and management in terms of agricultural production, forestry, grazing lands, and the broader environmental context. Activities to remediate degraded soil, arising from the Agricultural misuse of soil or contaminations resulting from agricultural or non-agricultural activities are part of the scientific area of this Division. The aim of this Division is to ensure that through our knowledge and understanding of soil properties and processes and the Distribution of soils within the landscape soils and soil quality are maintained and improved.

Division 3 consisted of 6 commissions and 4 working groups (WG) in 2020. They are briefly presented below along with chair and vice chair responsible for commission or working group's activities

- Commission 3.1 – Soil evaluation and land use planning
- Commission 3.2 – Soil and water conservation
- Commission 3.3 – Soil fertility and plant Nutrition
- Commission 3.4 – Soil engineering and Technology
- Commission 3.5 – Soil degradation control, remediation, and reclamation
- Commission 3.6 – Salt-affected Soils

Chair and Vice-Chair of Division 3

Chair: Bal Ram Singh/Norway
1st Vice Chair: Bob REES, United Kingdom
2nd Vice Chair: Tom ASPRAY, United Kingdom

Commission Chair and Vice chair

3.1 Soil Evaluation and Land Use Planning	Chair	Ivan Vasenev/Russia
	Vice Chair	Jagdish Prasad, India
3.2 Soil and Water Conservation	Chair	Lillian ØYGARDEN, Norway
	Vice Chair	Nobuo TORIDE, Japan
3.3 Soil Fertility and Plant Nutrition	Chair	Bruno GLASER, Germany
	Vice Chair	Toru Fujiwara/Japan
3.4 Soil Engineering and Technology	Chair	Jiabao ZHANG, China
	Vice Chair	Laura E. PAULETT, Romania
3.5 Soil Degradation, Control, Remediation and Reclamation	Chair	Stefan NORRA, Germany
	Vice Chair	Junta Yanai, Japan
3.6 Salt Affected Soils	Chair	Tibor Tóth, Hungry
	Vice Chair	Ki-In Kim, South Korea

Working Groups (WG) Chair and Vice Chair

1. Acid Sulphate Soils	Chair	Anton Boman, Abo University, Finland
	Vice Chair	Vanessa Wong, Southern Cross University, Australia
2. Forest Soils	Chair	Zhi hong Xu, Griffith University, Australia
	Vice Chair	Chris Johnson, Syracuse University, USA
3. Paddy Soils	Chair	Mizuhiko Nishida, NARO Tohoku Agricultural Research Center, Japan
	Vice Chair	Bentio Heru Purwanto, Gadjah Mada University, Indonesia
4. Soils of Urban, Industrial, Traffic, Mining and Military Areas (SUITMA)	Chair	Kye-Hoon John Kim, The University of Seoul, Korea
	Vice Chair	Przemyslaw Charzynski, Nicolaus Copernicus University, Torun, Poland

Report from Division 3

Division chair Prof. Bal Ram Singh was chief editor of the book entitled "***Climate Impacts on Agricultural and Natural Resource Sustainability in Africa***". Springer Nature Switzerland AG, Pp 637, which came out in 2020. The book with 35 chapters focuses on agriculture in Africa, assesses innovative technologies for use on small farms, and address some of key Sustainable Development Goals (SDGs) to guide innovative response and enhanced adaptation methods for coping with climate change.

The division chair also worked with Division 4 and contributed to a common publication mentioned below.

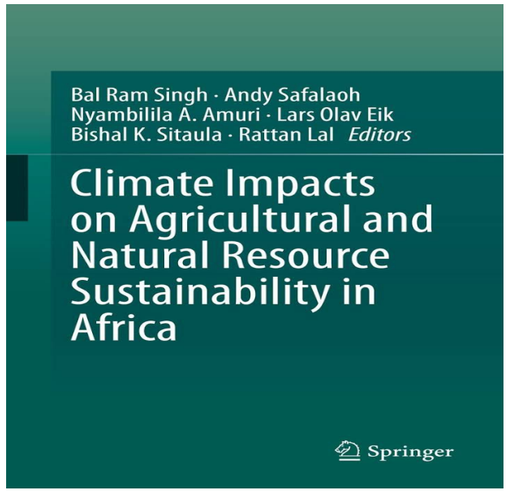
Brevik, E., L. Slaughter, ***B. R. Singh***, J. J. Steffan, D. Collier, P. I Barnhart, and P. Pereira. 2020. Soil and Human Health: Current Status and Future Needs. Air, Soil and Water Research.13:1-23.

In addition, division chair and some of the commission chairs participated in the IUSS Forum meetings held in 2020 and the division chair contributed to a publication mentioned below.

Lal R., E. C. Brevik, L. Dawson, D. Field, B. Glaser, A. E. Hartemink, R. HATANO, B. Lascelles, C. Monger, T. Scholten, ***B. R. Singh***, H. Spiegel, F. Terribile, A. Basile, Y. Zhang, R. Horn 15, T. Kosaki. and L. B. R. Sánchez. 2020. Managing Soils for Recovering from the COVID-19 Pandemic. Soil Syst., 4, 46: 1-15.

Division 3 Chair along with other three division chairs prepared a note on a special publication by IUSS on ***Managing Soils for Sustainable Agriculture – Present Situation and Future Challenges*** to be published as a special of an international journal. The work is in progress and expected to be completed in 2021.

A seminar in cooperation with Prof. Lillian ØYGARDEN, chair of Commission 3.2 and four organizations (on the right) was planned for 2020.



The topic of the seminar was "Soil and water conservation under changing climate in Northern or high-altitude conditions" and it was to be held at NMBU campus in October 2020. However, due to COVID19 restrictions on travel and large gatherings, it was postponed, and we hope to conduct it in the later part of 2021 or early 2022.

ESSC EUROPEAN SOCIETY for SOIL CONSERVATION

NJF

JORDFORENINGEN

International Union of Soil Sciences

Commission 3.1: Soil Evaluation and Land Use Planning

Dr. Jagdish Prasad delivered a talk on Mapping Soil Resources for Sustained Production on World Soil Day at ICAR- National Bureau of Soil Survey and Land Use Planning, Nagpur, India.
Dr. Jagdish Prasad delivered a lead lecture-Soil Resource Management for Sustained Production during National Web-Conference on Management of Resources for Improvement of Productivity, Biodiversity and Livelihood Security (29-30 July,2020) organized by C.S. Azad Agricultural University and Technology, Kanpur. He also delivered another lead lecture – Soil Health Management during National Seminar on Food and Nutritional Security in Climate Change Era: Challenges and Solution organized by Jananayak Chandrashekher University, Ballia (22 June, 2020).

Dr. Jagdish Prasad chaired a session (e-poster – Climate Change, Carbon Sequestration and Soil Health Management) during National e-Posters Olympiad "SOILS, BIOMES AND RESILIENCE TO CLIMATE CHANGE" organized by Soil Conservation Society of India (World Soils Day Celebration-2020) and scrutinized best poster presentation.
A revised criterion for suitability evaluation of Pomegranate-growing soils of Central India has been proposed. An Analytic Hierarchy Process has been applied to assess the soil-site suitability for cotton farming in the semi-arid regions of Central India.
To enhance the productivity and leaf quality of Mulberry in NEH region of India and productivity of Coconut in South India, soil characterization and suitability evaluation have been carried out to highlight the soil constraints and to help the growers (as an advisory service). Soil-site criteria has been revised (re-parameterization) for potato-growing soils of Western and Southern regions.

Dr. Jagdish Prasad delivering a lecture in the seminar by the ICAR-National Bureau of Soil Survey and Land Use Planning, Nagpur, India (© ICAR-National Bureau of Soil Survey and Land Use Planning)

Commission 3.2: Soil and Water Conservation

Report 2020

In 2020, due to COVID 19 outbreak – the activities in the commission have been lower than planned. Especially, the International seminar activities with a joint seminar in Norway between IUSS and ESSC (European Society of Soil conservation) had to be postponed.

The **main activities in 2020** have been participation in The IUSS Research Forum with planning of contributions for Inter congress Meeting and for Congress meeting:

- Participation at the online USS Inter Congress meeting in Glasgow in November for planning Congress Program
- Proposals from Commission 3.2 for joint program and activities with other divisions and commissions
- Proposed topic (1) for joint program: BMPs For Global Soil Erosion Control Under Extreme Events. Proposed topic (2): Best management practice for increased carbon storage and improved soil quality.
- Commission 3.2 planned to be involved in the task: Best Soil Management Practices to restore Soil Health, led by Division 3 (Bal Ram Singh). Commission 3.2 can contribute with the topic; Soil erosion and degradation caused by extreme events related to climate change.
- For specific program at Glasgow Congress for commission 3.2, it is suggested the topics:
  - Artificial drainage systems – new strategies for drainage design in changing climate
  - New strategies for best management practiced for reduced environmental impact.
- IUSS-Forum. Chair of commission 3.2 has participated in the Skype meetings in IUSS Forum in 2020, inter congress meeting (online) November with an outline and short summary for the topic BMP for global soil erosion control under extreme events.
- After the Inter Congress meeting further planning of the topics selected for IUSS congress.

Extreme events during winter period. Best management practice important to reduce erosion (© Lillian Øygarden)

Plans for 2021

The Commission 3.2 will continue planning for the Congress in Glasgow in 2022, with contributions for the Joint thematic program and for sessions for the Commission topics related to Soil and water conservation.
The activities – reported for 2020 – with further planning:

- Joint Program: BMPs For Global Soil Erosion Control Under Extreme Events. And: Best management practice for increased carbon storage and improved soil quality.
- Commission 3.2 proposals for program: Artificially drainage systems- new strategies for drainage design in changing climate. And: New strategies for best management practiced for reduced environmental impact.
- Participating in Nomination Committee for election of new members of Division and Commissions for next Congress period.

In 2021 the Commission 3.2 – together with chair of Division 3 – Professor Emeritus Bal Ram Singh, NMBU will plan and organize the postponed seminar, Soil, and water conservation under changing climate in Northern or high-altitude conditions. The seminar is planned as a seminar in Ås, Norway, planned together with ESSC (European Society of Soil Conservation). If it is not possible to arrange the seminar in Ås (due to Covid) the seminar will be arranged as a shorter webinar.

Topics

- Soil and water conservation under changing winter/climate conditions
- Soil quality challenges under Northern and high-altitude climatic changes
- New drainage design under changing weather conditions
- Soil functions and Ecosystem Services (under changing winter conditions)
- Best farming practices (for water management and soil conservation)
- Winter hardy crops under Nordic climate
- Monitoring, planning tools – new recommendations for advisory services.

Landscape in Ås, Norway: Agricultural landscape with different management practices influencing risk of soil erosion (© Lillian Øygarden)

Commission 3.3: Soil Fertility and Plant Nutrition

Activities 2020

Joint publication on the role of soils for the COVID-19 pandemic:

soil systems

MDPI

Review

Managing Soils for Recovering from the COVID-19 Pandemic

Rattan Lal [1,*], Eric C. Brevik [2], Lorna Dawson [3], Damien Field [4], Bruno Glaser [5], Alfred E. Hartemink [6], Ryusuke Hatano [7], Bruce Lascelles [8], Curtis Monger [9], Thomas Scholten [10], Bal Ram Singh [11], Heide Spiegel [12], Fabio Terribile [13], Angelo Basile [14], Yakun Zhang [6], Rainer Horn [15], Takashi Kosaki [16] and Laura Bertha Reyes Sánchez [17]

Soil Syst. 2020, 4, 46; doi:10.3390/soilsystems4030046

Participation at the IUSS Research Forum 6th May 2020 (Internet Meeting)
The following topics were discussed:

- activities proposed for the Glasgow conference
- soil water and drought management
- soil management and human nutrition
- climate resilient soils
- soils of extraterrestrial bodies.

Participation at the IUSS Research Forum 3rd August 2020 (Internet Meeting)
Details on the Mid conference meeting were discussed.

Joint publication on IUSS Sustainable Development Goals paper

No.	Sustainable Development Goal	Researcher
OVERALL	Introduction/Synthesis	Lal
1	No Poverty	
2	Zero Hunger	Lal, Ndzana
3	Good Health and Wellbeing	Singh, Glaser, Brevik
4	Quality Education	Dawson, Field, Brevik, Muggler
5	Gender Equality	Dawson (tentative), Brevik
6	Clean Water and Sanitation	Glaser, Hatano, Pan, J. Zhang
7	Affordable and Clean Energy	Brevik
8	Decent Work and Economic Growth	
9	Industry Innovation and Infrastructure	Lascelles
10	Reduced Inequalities	
11	Sustainable Cities and Communities	Norra, Yanai, Glaser
12	Responsible Consumption and Production	Spiegel
13	Climate Action	Monger, Lal, Glaser
14	Life Below Water	
15	Life on Land	Singh
16	Peace, Justice and Strong Institutions	
17	Partnerships for the Goals	
OVERALL	Connecting SDGs to "4p1000"	Arrouays (tentative)
OVERALL	Soil measurement and soil characterizations and SDGS	Hartemink, Zhang

Manuscript was submitted to Geoderma. Based on the reviews, we are discussing right now if the very long paper may be split into two separate ones.

Planned Activities 2021

Special publication by IUSS divisions – 2021

Managing Soils for Sustainable Agriculture – Present Situation and Future Challenges

Contribution of Division 3 – Soil Use and Management

1. *Soil Management for improved productivity and soil health for sustaining human health*
   Bruno Glaser, Amor Mtimet, Bal Ram Singh
2. *Soil degradation neutrality and land use change*
   Lillian Øygarden, Amor Mtimet, Remigio Paradelo, Devraj Chalise
3. *Agricultural and food residues nutrient and energy recovery in a circular economy*
   Remigio Paradelo, Bruno Glaser.

Commission 3.4: Soil Engineering and Technology

Activities during 2020

Events

1. Meeting on 5 December 2020, Country: China
   Activity: The chairman of the board of directors of Soil Science Society of China, as well as the chairman of the Soil Engineering and Technology Commission, IUSS, Prof. Jiabao Zhang pushed to establish the board of International Cooperation and Exchange Committee of Soil Science Society of China.
   The inaugural meeting was conducted via video conference on Dec. 5, 2020. Prof. Jiabao Zhang gave an opening speech and called for strengthening international cooperation and exchange of soil science.

Photo taken by the conference organizer, agreement on reusing received (© Commission 3.4)

2. Soil Engineering and Technology Working Group (SETWG) participated in the IUSS Forum Summer Meeting Minutes on 3rd August 2020 via internet, and later contributed to the writing of the forum paper "Soils and Sustainable Development Goals of the United Nations (New York, USA): An IUSS Perspective".

Planned activities for 2021

Date: 28-31, October 2021
Country: China
Activity: The first forum of soil science of China – American Soil Science Society will be held on 28-31 October 2021.

Commission 3.5: Soil Degradation Control, Remediation and Reclamation

Chair: Stefan Norra, Karlsruhe Institute of Technology, Germany, *stefan.norra@kit.edu*
Co-Chair: Junta Yanai, Kyoto Prefecture University, Japan, *yanai@kpu.ac.jp*

Activities 2020

Introduction

Many soils worldwide face severe stress due to contamination, nutrient depletion or over-fertilization, erosion, and urbanization. There is no terrestrial life without soils. They provide essential ecosystem services for human civilization. The purpose of this Commission is to develop and use our knowledge and understanding of soil properties and processes to ensure that human-modified/degraded soils may be remediated or reclaimed and returned to natural condition and, when necessary to provide food for the human being, productive uses. These last must be only intended when conducted under a sustainable approach.

Activities

Due to Corona crisis, worldwide mobility was intensively restricted, and conferences mainly took place in virtual formats. Also, research work related to field visits was limited. Nevertheless, Commission 3.5 decided to carry out monthly web conferences to exchange experiences and knowledge. For 2021 an online lecture program was developed that can be found in Annex 1. In 2020 the first meeting took place on October 9th. It was participated by:

- *Bill Butterworth*, Land Research Ltd., Great Britain
- *Georges Ndzana*, Faculty of Agronomy and Agricultural Sciences (FASA) University of Dschang, Cameroon
- *Stefan Norra*, Working Group Environmental Mineralogy and Environmental System Analysis, Karlsruhe Institute of Technology, Germany
- *Emilio Paradelo*, Department of Soil Science and Agricultural Chemistry, University of Santiago de Compostela, Spain
- *Eren Taskin*, Universita Cattolica del Sacro Cuore, Piacenza, Italy
- *Shareed Prasad Vista*, General Secretary, Nepalese Society of Soil Science
- *Junta Yanai*, Kyoto Prefectural University, Kyoto, Japan.

Contents were

1. The main content of this meeting was that the participants introduced to themselves and their work. Respective presentations are attached to the mail.
2. The Commission's aims have been discussed based on the text presenting the Commission on the IUSS homepage. One important issue the Commission's aims should also cover is preserving soils for biodiversity and wildlife to overcome the primary anthropogenic orientation. Additionally, also knowledge transfer and practical approaches should be addressed.
3. The idea of joint projects was discussed. The Commission could develop respective networks prior to project calls to react to those calls in time.
4. It was jointly stated that we need more frequent meetings to come in closer contact, but these meetings should be time limited. The participants agreed to meet monthly for one hour. The next meeting will take place on November 6th, 2020, at 11 am (Paris time).

Further meetings were carried out on Nov. 6th and Dec. 11th.
Junta Yanai represented the Commission at the Inter-Congress Meeting and gave a report that can be found in Annex 2.

Current active commission members

- *Bill Butterworth*, Land Research Ltd, Great Britain
- *Gian Franco Capra*, University of Sassari, Italy
- *Devray Chalise*, Nepal Agricultural Research Council
- *Ndzana Georges Martial*, University of Dschang, Cameroon
- *Mark E Hodson*, University of York, United Kingdom
- *Peter S. Hooda*, Kingston University London, Great Britain
- *Anna Karczewska*, Wrocław University of Environmental & Life Sciences, Poland
- *Giulia Maisto*, Universita' degli Studi di Napoli Federico II, Naples, Italy
- *Augustin Merino*, University of Santiago de Compostela, Spain
- *Felipe Yunta Mezquita*, Universidad Autónoma de Madrid, Spain
- *Amor Mtimet*, Senior Independent Expert, Tunesia
- *Stefan Norra*, Karlsruhe Institute of Technology, Germany
- *Remigio Paradelo Núñez*, Universidade de Santiago de Compostela, Spain
- *Jose Navarro Pedreño*, Universidad Miguel Hernández de Elche, Alicante, Spain

- *Francisco José Martín Peinado*, University of Granada, Spain
- *Rafael Blanco Spulveda*, University of Malaga, Spain
- *Eren Taskin*, Università Cattolica del Sacro Cuore, Piacenzy, Italy
- *Teresa Sauras Yera*, University of Barcelona, Spain
- *Junta Yanai, Kyoto* Prefecture University, Japan.

Further members are warmly welcomed!

Publications

Aguilar-Garrido, A.; Romero-Freire, A.; García-Carmona, M.; Martín Peinado, F.J.; Sierra Aragón, M.; Martínez Garzón, F.J. 2020. Arsenic fixation in polluted soils by peat applications. Minerals 10, 968; *https://doi.org/10.3390/min10110968*.

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Begum, Z. A., Rahman, I.M.M., Ishii, K., Tsukada, H. and Hasegawa, H. (2020) Dynamics of strontium and geochemically correlated elements in soil during washing remediation with eco-complaint chelators, Journal of Environmental Management 259, 110018.

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Selected conference contributions

Bezak, N., D. Chalise and Soil Erosion Modelling Team*. A global bibliometric perspective on soil erosion modelling. EGU General Assembly 2020 Conference Abstracts, 2919. 2020.

Chalise, D. and L. Lumar. Assessing the impacts of land cover change in soil erosion risk in the Nepal Himalayas. GEA International Conference, Montenegro. 2020.

Annex 1: Online lecture programme of Commission 3.5

Date	Subject	Name	Affiliation
22/01/2021	Urban Soils	Stefan Norra	Karlsruhe Institute of Technology, Germany
26/02/2021	Soil mineralogy and their protective role in the carbon sequestration in the tropical region.	Georges Ndzana	University of Dschang, Cameroon
26/03/2021	Soils contaminated with potentially toxic elements in Poland – status, environmental risk, and approaches to remediation	Anna Karczewska	Wrocław University of Environmental & Life Sciences, Poland
23/04/2021	Use of compost in environmental remediation	Remigio Paradelo Núñez	University of Santiago de Compostela, Spain
28/05/2021	Soil Microbes to Farmers Practices; Connecting Dots Through Soil Microbiology	Eren Taskin	University Cattolica del Sacro Cuore, Piacenza, Italy
25/06/2021	Reclamation and rational management of radiocesium contaminated agricultural soils in Japan	Junta Yanai	Kyoto Prefectural University, Japan
25/06/2021	Digital Soil Mapping of Nepal	Shree Prasad Vista	National Soil Science Research Center, Nepal

The conferences always start at 11 a.m. Central European Time (UTC + 1:00). Further lectures can follow, soil scientists are invited to contribute, please contact Stefan Norra (*stefan.norra@kit.edu*).

Please click the following link to participate in the lecture:
https://us02web.zoom.us/j/87963906468?pwd=QkNnWEpRaDI1VU1uZnpyNmgzektyQT09.

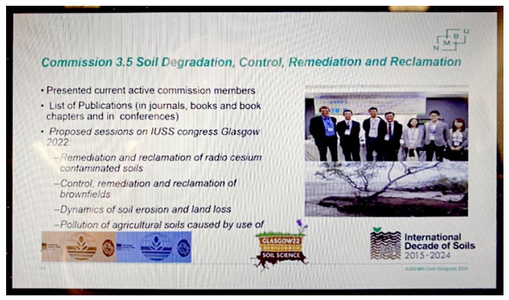
Annex 2: Report on Inter-Congress Meeting

Inter-Congress Meeting of International Union of Soil Sciences in 2020 – Toward the World Congress of Soil Science in Glasgow, United Kingdom, in 2022
By Junta Yanai

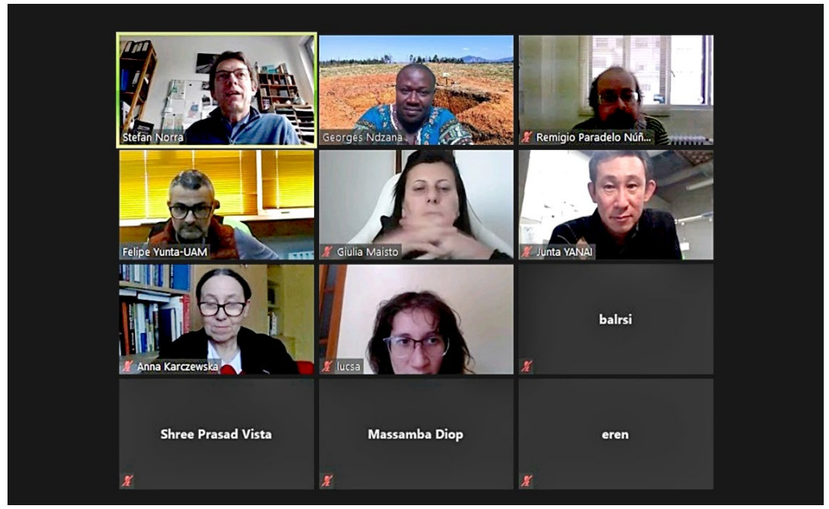
The IUSS Inter-Congress Meeting was held online from 18 to 23 of November 2020. As I attended the meeting as one of the representatives of Japan, please let me explain a little bit on the meeting, especially in relation to our Commission.

On November 18 (Wed), there was a session of Division Report. As there are 4 Divisions at present, Dr Bal Ram Singh, our Division Chair, reported on past achievements, the current situation, and future for Division 3. He explained the Commissions one by one and explained our Commission (3.5) as well. So, even though I had no chance to report for our commission, our activities were properly explained to the audiences.

For the proposal of Symposia during the WCSS2022, Bal Ram showed only tentative plan at the Session and he was requested to fix the exact plan very soon. So, I suppose he will announce the Commission members in Division 3 to finalize the symposium proposal. We need to be prepared for the request.



Above: Online meeting
Below: Information on our commission
(both: © Dr. Georges Ndzana)



Commission meeting
as webcon
(© Dr. Georges Ndzana)

Student course
in times of Corona
at the Campus of the
Karlsruhe Institute
of Technology
(© Stefan Norra)

Commission 3.6: Salt-affected Soils

1. Commission 3.6 Conference

Due to the pandemic the planned date of the organized conference was two times postponed.
Now the final dates are fixed and cannot be changed. As it is published in IUSS Alert 190 these are the final dates.
First IUSS Conference on Sodic Soil Reclamation
July 30 and Aug. 1, 2021; Changchun, China
Website: *http://ssr.csp.escience.cn*.

2. Global Symposium on Salt-Affected Soils

Commission 3.6 received an invitation to delegate a member of the Scientific Committee of Global Symposium on Salt-Affected Soils (GSSAS) symposium. The chairman will work on the preparation and other tasks related to the online meeting.

Working Group Acid Sulfate Soils

Activities during 2020:

- An update of active members of the working group was done during the spring of 2020, and currently the working group consist of 48 members.
- Members were invited to take part in two working group committees: 1) committee for harmonization of acid sulfate soil classification globally (15 members), and 2) committee for website development (5 members).
- Due to the corona situation, the planned conference in Adelaide, Australia was postponed for one year.
- During late 2020, the website committee was working on naming the website and the chosen name was *www.iasswg.com*.

Planned activities for 2021:

- Website development continues and the website will be made public during the spring of 2021.
- The classification committee will start working on the harmonization of acid sulfate soil classification and the plans are that this work will culminate during the conference in Adelaide, Australia 21-26 November.
- Arrangement of the 9th International Acid Sulfate Soils conference 21-26 November in Adelaide, Australia. ***It seems however likely that the conference is either arranged as a webinar or postponed until early 2022 due to very strict corona restrictions in Australia.***

The arrangement of the conference is coordinated by Professor Robert Fitzpatrick and Associate Professor Luke Mosley at the University of Adelaide. More information about the conference is found here: *https://biological.adelaide.edu.au/acid-sulfate-soil/iassc/*.

Working Group Forest Soils

- Due to the COVID-19 pandemics, the previously scheduled International Symposium on Forest Soils, October 2020, Hangzhou, China, has been delayed to October 2022.
- We are also hoping that the World Congress of Soil Science in Scotland, August 2022 will be held in time and there would be forest soil symposia to be held then.

Working Group Paddy Soils

Planned activities for 2021

PSWG is planning to support the 4th International Conference Organic Rice Farming and Production Systems which was planned to be held in Sendai, Japan, from 30 August to 2 September 2021, but postponed to 2022 because of COVID-19. Chair of PSWG joins the scientific committee of this conference. Main activity of PSWG in 2021 will be setting up this conference.

Working Group Soils of urban, industrial, traffic, mining, and military areas (SUITMA)

Due to COVID-19, the activities of WG SUITMA was not as active as planned.
However, there were three important activities in 2020.

1. ***The second newsletter of WG SUITMA was released.***
2. ***The special issue of JEQ***
   (journal of environmental quality) was published with editorial and five selected papers.
   The papers cover diverse topics that include urban soil properties, risk from contaminated soils, biological indicators for ecological functions, air deposition in urban gardens, and international summer field school opportunities. This section highlights research on anthropogenic soils conducted by the SUITMA community to promote better understanding and management of these soils.

3. ***The special issue of JSS***
(journal of soils and sediments) was published with editorial and twenty selected papers.
Twenty papers reflect several main and essential questions related to SUITMAs: (i) Contamination of anthropized areas is still a problem that affects many countries around the world, not only those generated by mining and industrial activities but also those resulting from new technologies and new materials, the most common of which are plastics (Choi et al. 2020). (ii) Being able to map urban soils is always a challenge, and new knowledge is needed to continue the remarkable work that has been done especially in large US cities (e.g., New York), with the definition of instrument assessment of soil quality, as well as appropriate classification strategies and systems. (iii) Providing information on the role of urban soils in major cycles is of the utmost importance in order to further strengthen knowledge on the capacity of SUITMAs to store elements of vital importance for humanity and the environment (e.g., C and P). (iv) SUITMAs also remain a very relevant tool for archeologists who, together with soil scientists, provide information on human history. (v) Managing SUITMAs to, for example, provide better living conditions in urban areas, also means being able to design and develop functional soils that can provide high level ecosystem services; green roofs and built floors are examples of the soils created by humans for humans and biodiversity.

Report of Division 4: The Role of Soils in Sustaining Society and the Environment

Report from the Division Chair, Damien J. FIELD

Working towards a successful World Congress.
Commissions and working groups of Division 4 presented at the research forum held on the Saturday at the inter-congress meeting, 21st November 2020. This included presentations on: the Human Health effects of soil, discussing the aspiration for international guidelines on soil education, and a focus on cultural patterns of understanding. Following on from the reporting of Division 4 at the inter-congress meeting in November 2020 and the involvement of its members in the special session work has continued in the Division to propose interdivisional and technical sessions for the World Congress to be held in Glasgow in 2022. At the inter-congress meeting I presented a draft including 2 inter-divisional sessions and over 10 technical sessions that would be led and delivered by this Division for consideration by the congress organisers. I would like to take this opportunity to thank the commission chairs for canvassing ideas for sessions and making proposals and, in particular, thank Christine Watson and Lorna Dawson who as the two Vice-chairs who have been making representation and communicating the Division and Commissions aspirations for its involvement in the World Congress.

Collaborations with the Divisions
The commissions and working group in Division 4 have been holding discussions with the other Divisions focused on producing a set or works that provide a vision for managing soils in the future, exploring some of the immediate and future challenges. This includes the role of soil securing society, how soil is central to the concept of community and true well-being relies on the health and connectedness of community, and the need to value those who study soil. Members of the Division have been also contributing to the research forum discussions and have been involved in its recent publication on soil and the SDG's, currently under review. The Division is also contributing to the discussion on the future of the research forums focused on making this a shared environment where the Division can showcase its work and achievements and play its role in developing and contributing to ideas that cross Divisional boundaries.

Impact of Covid-19
COVID-19 continued to have an impact globally since our last report. There has been some degree of return to holding meetings, conferences etc., and many of these have been held remotely as travel is still restricted and the impact of the pandemic is still severe. Many colleagues from Division 4 did contribute to a publication on the impact and recovery from COVID-19 from a soil perspective, see publication below. I wish to offer my best wishes and thoughts to my colleagues in the IUSS and Division 4 as we continue to navigate this challenging period.

Representations by the Division Chair
Due to COVID-19 restrictions events have been rescheduled during this period. I will now be presenting at EGU 2021 on education related material and providing a key-note at the joint Australian and New Zealand conference on society's connection with soil in July 2021. I have also been invited to edit a special edition on Enhancing Soil Connectivity through Education and Training for the Elsevier journal Soil Security, where I expect this division and members of the IUSS in general will make a significant contribution to.

Relevant Publications
Lal R., Brevik E. C., Dawson L., **Field D**., Glaser B., Hartemink A. E., Hatano R., Lascelles B., Monger C., Scholten T., Singh B. R., Spiegel H., Terribile F., Basile A., Zhang Y., Horn R., Kosaki T., Sánchez L. B. R. 2020. Managing Soils for Recovering from the COVID-19 Pandemic. *Soil Systems*, 4, 46, *https://doi:10.3390/soilsystems4030046*.

Pozza L., **Field D J**. 2020. The science of Soil Security and Food Security. *Soil Security*, 1, *https://doi.org/10.1016/j.soisec.2020.100002*.

Field D J. 2020. Sustaining Agri-Food Systems Framed Using Soil Security and Education *International Journal of Agriculture and Natural Resources*, 47, 249-260. *http://dx.doi.org/10.7764/ijanr.v47i3.2289*.

The following activities are reported from each of the Commissions.

Commission 4.1: Soils and the Environment

Events

During the General Assembly of the European Geoscience Union (vEGU2021: Gather Online; 19-30 April 2021; *www.egu21.eu/*) three sessions and one Union Symposium have been co-organized and co-chaired by Claudio Zaccone (Commission 4.1 Vice-chair).

1. SSS3.5/GM12 – Soils as records of past environmental conditions, climate change and anthropogenic impact. Conveners: Oren Ackermann, Anna Schneider, Kunshan Bao, Maria Bronnikova, Gaël Le Roux, Tobias Sprafke, Barbara Fiałkiewicz-Kozieł, Claudio Zaccone
2. SSS5.1/BG3/CL3.1 – Mechanisms of soil organic matter stabilization and carbon sequestration. Conveners: César Plaza, Claire Chenu, Beatrice Giannetta, Claudio Zaccone
3. SSS5.7/BG3 – Dynamics and functions of SOM pools under new and traditional soil amendments. Conveners: Claudio Zaccone, Sarah Duddigan, Anna Gunina, Layla Márquez San Emeterio, Yakov Kuzyakov, César Plaza
4. US1 – Integrating geoscience into the European Green Deal. Conveners: Ned Staniland, Chloe Hill, Maria-Helena Ramos, Claudio Zaccone.

Online-event "Online Sakura Science Program – Research Experiences in the field of Environmental Management"

Two soil scientists (Morihiro Maeda from Okayama University, Japan and D.A.L. Leelamanie from University of Ruhuna) organized an online event for student exchanges between Okayama University and University of Ruhuna – on March 1 and 2, 2021, which was financially supported by JST Sakura Science Plan. Three professors (Prof. Maeda, Prof. Mori, and Assoc. Prof. Somura) and 13 students from Okayama University, and Prof. Leelamanie and 8 students from University of Ruhuna participated in the event.

Group photo of the event (They took off their face masks only while taking this picture) (© Morihiro Maeda)

Conferences

1. Invited speech by M. Maeda (Session 4.1 Chair) at International Symposium on Agriculture and Environment (ISAE 2020), Ruhuna University, Mapalana, Sri Lanka, 14 February 2020.
2. Organized session (A-HW 32): Materials transport and nutrient cycles in watersheds; from headwaters to coastal seas, JpGU Meeting 2020, On-line, Japan, 12-16 July 2020.

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Commission 4.2: Soils, Food Security and Human Health

Also an article on Women in Precision Agriculture just came out: *https://www.springer.com/gp/book/9783030492434*

We have also recently developed the Tea Bag Index App, to engage citizens in soil observations:

Citizen Scientists can choose from 3 activities on the Tea Bag Index (TBI) App: 1) basic soil observations by recording soil colour, soil life and land use, 2) soil observations by studying soil texture using finger and spade samples, 3) TBI. The TBI records the degradation rates of buried tea bags (green tea and rooibos) within 3 months according to a standardized procedure. The method can easily be performed by Citizen Scientists such as students. The collected data is transferred to the database of the Global Tea Bag Index Network (*www.teatime4science.org*).

Schools can easily add the TBI app to their curriculum. Teaching materials (soil observation with all senses, spade test, soil texture with finger test, TBI) in the app expand the students' knowledge about soil and the global carbon cycle.

The Tea Bag Index App will contribute to a strong link between science and society by linking each of the activity categories to the Sustainable Development Goals (SDGs).

iOS: *https://itunes.apple.com/us/app/tea-bag-index-spotteron/id1465181150*.

Android: *https://play.google.com/store/apps/details?id=com.spotteron.teabagindex*.

Commission 4.3: Soils and Land use Change

Invited talk – Soil Health and Management EnviSMART

The Chair of the Commission 4.3 Soil and Land Use Change, Prof Chengrong Chen (Griffith University, Australia) delivered an invited talk- 'Increasing the agricultural and environmental resilience: what can the recycled organics do?' – on the online workshop – *Soil Health and Management EnviSMART, The University of Melbourne, 5 Nov 2020. Over 100 researchers, students and industry consultants attended online.*

World Soil Day celebration in Brisbane, Australia

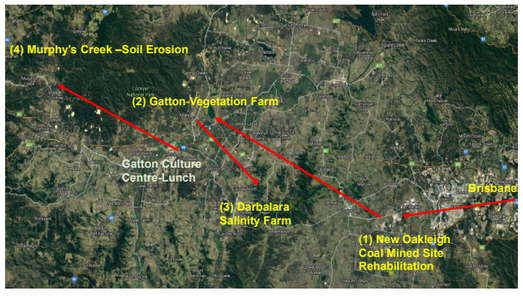
Prof Chengrong Chen (Chair of Commission 4.3 Soil and Land Use Change) joined the World Soil Day Celebration organised Soil Science Australia, Queensland Branch in Brisbane and delivered a key note talk on 'Building resilient soil ecosystems under environmental changes: Challenge and opportunity' Invited Talk for the World Soil Day. Soil Science Australia, Queensland Branch, Queensland Farmers Federation. 26 Nov 2020. Brisbane, Australia 2020. More than 80 farmers, land managers, consultant, university researchers and students from across Queensland attended this event.

Virtual field trip-Griffith University, Australia

The annual field trip (the Lockyer Valley, Queensland) for the course 'Land Degradation and Catchment Man-

Prof Sushila Chang, Prof Neal Menzies, The Hon Penelope Wensley, Dr Maryam Esfandbod, Dr Paul Greenfield, Prof Chengrong Chen (© Xiangyu Liu)

agement' (2020)) was carried out virtually due to the covid-19 pandemic. A team of researchers and lecturers from Griffith University, Department of Agriculture and Fishery, Queensland Government and mining industry (New Hope) joined the preparation field trip 13 Aug 2020, and we interviewed a number of local land managers and scientists and shot a video for the virtual field trip.



Impressions from the preparatory field trip (© Photos: Chengrong Chen)

Conferences, symposia etc

- Global Bioeconomy Summit 2020, 9th and 20th of November, Workshop: What is needed to foster the transformation in agriculture – from future scenarios to innovations – Agricultural Systems of the future: How should the agricultural landscape look like? By Sonoko Bellingrath-Kimura, *https://gbs2020.net/*.
- Invited talk at the GIL 2020 (Society of Information in Agriculture), 17-19th February 2020, Freising, Digitalisation in Agriculture – Chances for biodiversity, by Sonoko Bellingrath-Kimura.
- Invited talk at the Science and Technology Platform, Workshop on Food Security and Nutrition 3rd December 2020, Beijing & online, Digital technologies for improving ecosystem services and biodiversity in agricultural land uses, by Sonoko Bellingrath-Kimura.
- Invited talk at the Kansai Branch of the Japanese Society of Soil Science and Plant nutrition 3rd December 2020, Online, Agriculture 4.0 – Digital tools for sustainable agriculture, by Sonoko Bellingrath-Kimura.

Publications

Deng, M., Hou, M., Zhang, Q., Bellingrath-Kimura, S. D. (2020) Critical livestock densities and manure management for the typical paddy rice and corn cropping systems in an intensive livestock watershed, Japan. Agricultural Systems 177, Article 102722.

Mensah, A. D., Terasaki, A., Aung, H. P., Toda, H., Suzuki, S., Tanaka, H., Onwona-Agyeman, S., Omari, R. A., Bellingrath-Kimura, S. D. (2020) Influence of soil characteristics and land use type on existing fractions of radioactive 137Cs in Fukushima soils. Environments 7, 2, Article 16.

Weindl, I., Ost, M., Wiedmer, P., Schreiner, M., Neugart, S., Klopsch, R., Kühnhold, H., Kloas, W., Henkel, I. M., Schlüter, O., Bußler, S., Bellingrath-Kimura, S. D., Ma, H., Grune, T., Rolinski, S., Klaus, S. (2020) Sustainable food protein supply reconciling human and ecosystem health: a Leibniz Position. Global Food Security 25, Article 100367.

Thai, T. H., Bellingrath-Kimura, S. D., Hoffmann, C., Barkusky, D. (2020) Effect of long-term fertiliser regimes and weather on spring barley yields in sandy soil in North-East Germany. Archives of Agronomy and Soil Science 66, 13.

Thai, T. H., Omari, R. A., Barkusky, D., Bellingrath-Kimura, S. D. (2020) Statistical analysis versus the M5P machine learning algorithm to analyze the yield of winter wheat in a long-term fertilizer experiment. Agronomy 10, 11, Article 1779.

Society engagement

Selected as Commission member for "Soil protection" of the German Federal Environmental Foundation (2021-2023).

Upcoming events:

Landscape 2021 – Diversity for Sustainable and Resilient Agriculture, 20-22 September 2021 (online conference) *https://www.landscape2021.org*.

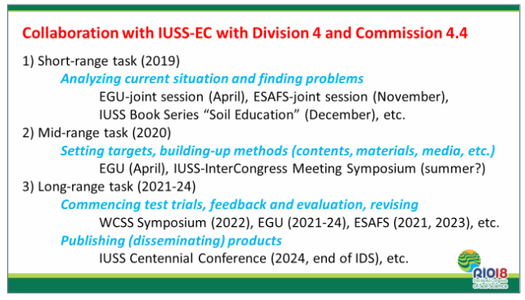
Commission 4.4: Soil Education and Public Awareness

Setting a strategy

In the meeting held in Rio de Janeiro WCSS 2018, the following activities and tasks were shown. Based on the tasks (see slides below), I would like to make a report of the activities, which were performed.

ESAFS2019 meeting

The meeting of ESAFS (East and Southeast Asia Federation on Soil) was held on Nov. 3-8, 2019 in Taipei, China. Hideaki Hirai, Masanori Saito, and Takashi Kosaki proposed the session of soil education as conveners described



Power point slides as presented at WCSS 2018 in Rio de Janeiro (© IUSS Division 4)

below. The title of the session was "Soil education for pre- and elementary-school children: Current issues towards setting an international standard" The purpose of the session is described below.

"In this session, we would like to share our experiences know-how, and teaching materials or tools for pre- and elementary-school kids. The ultimate aim is towards developing an international standard for soil education at elementary school level. Whilst there will be national differences in curriculum, culture, and teaching approaches, it is beneficial to collate them to identify a common direction for the development of international standard in soil education at elementary level. We also welcome contributions from system, strategy, and philosophy of soil education to facilitate a mutual understanding for the realization of an international standard."

Oral presentations in the session of soil education in which Hideaki Hirai was moderator were described as follows. 1) Demonstration Functions, Specific Characteristics and High Impression of Soil Museums of the World (Zueng-Sang CHEN, Taiwan, China), 2) Soil Education in the Philippines for Pre-Elementary and Elementary School Children, (Edna D. SAMAR, Philippines), 3) Soil Taxonomy of the Municipality of Maasim in Saranggani Province, Mindanao, Philippines. (Adeflor Garcia, Philippines). 4) Making Shiny Soil Balls is Popular with Children, but What Kind of Soil Balls Should We Make to Link to Soil Education? (H. Tanaka, C. Murakami, Y. Mitsuda, K. Fuchigami and H. Hirai, Japan), 5) Development and implement of soil curriculum in the senior high school in Taiwan, (Wen-Shu HUANG, Taiwan, China).

The poster presentations were listed as follows. 6) "SOIL EXHIBITION TOUR" – The soil education for general public and elementary school children. (W.Y. Tseng, Y.S. Yen, Y.S. Liao, W.C. Chiu, C.J. Fong and Hung-Yu Lai, Taiwan, China), 7) Soil education for pre- and elementary-school children towards setting an international standard. – How to convey the importance of topsoil to support life from the viewpoint of daily rice consumption. (H. Hirai, A. Deguchi, S. Shiraishi and T. Kosaki, Japan).

Events

EGU2020 assembly

Short Course cancellation and Poster session held at May 4th, 2020 (Live-chat meeting). (*https://meetingorganizer.copernicus.org/EGU2020/displays/35018*).

In the EGU2020 assembly, Hideaki Hirai, Keiko Mori and Damien field co-convened SC (Short Course: SC 3.18) entitled "Raising soil awareness from elementary school pupils to high school students: practices and/or skills" together with Taru Sanden, Cristine Muggler, Jacqueline Hannam and Takashi Kosaki. However, under the serious influence of Covid-19, the SC 3.18 was cancelled. Hideaki Hirai submitted an abstract to the session for SSS1 as an oral presentation, but the session was withdrawn because of the limited number of the abstracts. Then, the conveners settled the joint-session of SSS12.3/EOS2.4 composed of "Soil education out of eight presentations" and "Evidence syntheses in agro-environmental sciences out of ten presentations" as an online poster session on May 4th 2020. Hideaki Hirai, Mitsuru Toma and Ikuko Akahane from Japanese society of Soil Science and Plant Nutrition (JSSSPN) made an online poster presentation entitled "Analyses of interest and recognition of necessity on soil by elementary school pupils and junior high school students based on a questionnaire survey on soil in Japan". Two more online poster presentations from Japan were made entitled "How much do Japanese university students know about soil? – A survey of university students who received science education in Japanese schools" (Yokoo, E. et al.), and "Highlighting the importance of topsoil in human life through a soil education program (Masuda, A. et al.)". Damien Field submitted an abstract entitled "Do we need to new set of soil principles to guide the cross-sector engagement of soil education". Two presentations were made from Spanish society of Soil Science (SECS) entitled "How to give visibility to soil: attractive and innovative educational initiatives Spanish Society of Soil Science (SECS) (Montserrat Díaz-Raviña et al.)" and "An innovative and attractive comic to transmit the message of soil importance to the Society: Living in the soil (Montserrat Díaz-Raviña et al.)". One presentation from Taiwan, China appeared on the list of SSS12.3/EOS2.4 entitled "Soil Education for General Public and School Students in Taiwan, China (Hung-Yu Lai, et al.)". Hideaki Hirai proposed an international collaboration to facilitate soil education in the world to the attendees of Live-chat meeting at the session of SSS12.3/EOS2.4.

Publications

Soil Science Education: Global Concepts and Teaching, IUSS book (Editors: Takashi Kosaki, Rattan Lal, Laura Bertha Reyes Sánchez)

Soil education is one of the major topics to be enhanced and promoted in the International Decade of Soils 2015-2024 (IDS) project of the International Union of Soil Sciences (IUSS). The book described above has been just published by the IUSS to provide readers, who are interested in soils, geosciences, environment, ecosystems, art, etc. and may be teaching in schools at elementary through university levels, working at museums, educational or extension organizations or serving for NPOs, NGOs, etc., with a basic framework of soil and soil science education and a collection of good practices currently employed, so that the readers could learn and share whatever is best suited to their own condition. The book consists of three parts, i.e. *framing soil science education, good practices in soil education* and *future of soil and soil science education*. The first part contains tenets and framework of soil education in pre and primary school, under- and post-graduate students and the general public or citizens. The second includes practical methods for soil and soil science education from all over the world, i.e. 1 from Africa, 3 from Asia, 3 from Europe, 2 from North America, 5 from South America and 2 from Oceania, which have been proven useful, efficient and promising in their own environments and situations. The final part is devoted to discussing the challenges and the future of soil and soil science education. The IUSS is planning to distribute the above publication to a variety of societies so that the current contents and methods and the systems of soil and soil science education be criticized for further improvement towards promoting and enhancing research, education and public awareness of soils as one of the disciplines of geo- and bio-sciences in the future. (Takashi Kosaki, Rattan Lal, and Laura Bertha Reyes Sánchez, EGU2020-21359, *https://doi.org/10.5194/egusphere-egu2020-21359*). For example, in the first part of the book, Damien Field wrote Framing Soil Science Education, while Cristine Muggler did soil education in Brazil. In the last chapter, Damien Field, Eric Brevic, Hideaki Hirai, and Cristine Muggler wrote a piece on: Guiding the future of soil science education: informed by global experiences.

National Events

Symposium in Japan and introduction of the textbooks of soil education published in Japan since aiming at conveying the importance of soil to school children and general public.

The symposium entitled "Time to reconsider how to teach soil – Renovation of soil education for the future curriculum guidelines" was conducted in Aug 31st, 2018 at Nihon University, Kanagawa and published it. Please see the following publication list of the authors of Hirai, H. et al. (2019). Mini-symposium entitled "Towards an international standard for soil education – challenges for International decade of soils (IDS)" was held in Shizuoka, Japan on 5th 2019. Oral presentations by nine researchers of Takashi Kosaki, Ryousuke Hatano, Hiroaki Sumida, Mitsuru Toma, Keiko Mori, Ikuko Akahane, Maki Asano, Haruo Tanaka, Hideaki Hirai (Convener) were conducted. Among these presentations, it should be noted that the results of a student questionnaire survey on soil in Japan were summarized and introduced some results in EGU2020 assembly. In near future, it is necessary to publish it for the journal of Soil Science and Plant Nutrition belonging to the Japanese Society of Soil Science and Plant Nutrition (SSPN). In this year, Mitsuru Toma is now preparing for a mini-symposium related to the contents of soil education by reconsideration of curriculum guidelines for the Course of Study in Japan.

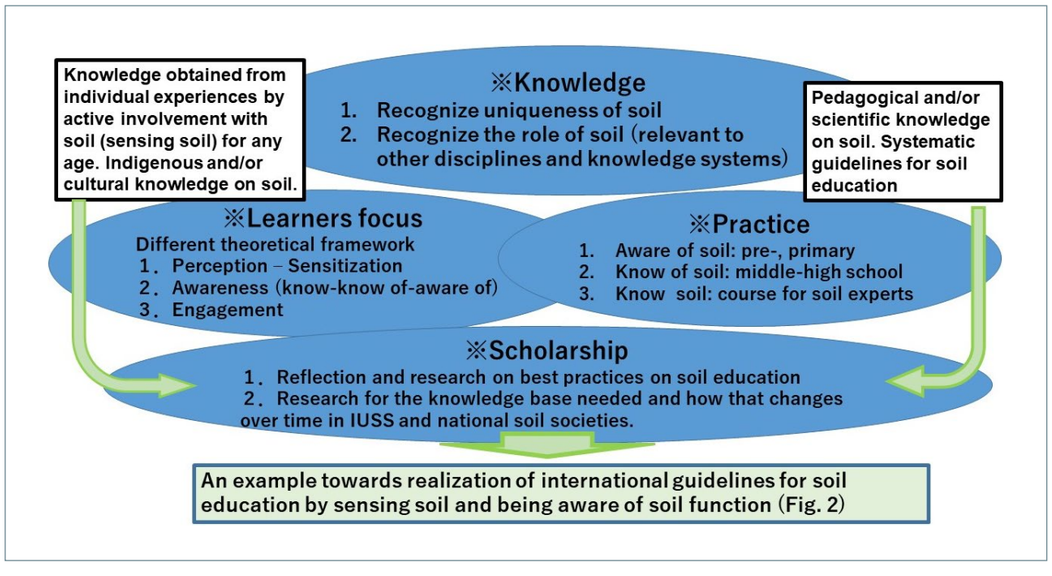
Yearly academic conference organized by Japanese society of Soil Science and Plant Nutrition was held from September 7 through September 9. In the first day of the conference the mini-symposium entitled "the contents of soil education by reconsideration of curriculum guidelines for the Course of Study in Japan." organized by Dr. Mitsuru Toma was held using internet facility called as Link biz. In all, seven on-line posters were presented in the mini-symposium. Hideaki Hirai made on-line poster presentation entitled "Contribution to realize the international guidelines for soil education through oral and/or poster presentations in EGU (European Geoscience Unions), ESAFS (East and Southeast Asia Federation of Soil Science Society), and IUSS by Japanese researchers." Three other on-line posters related to soil education were presented. Among those, Dr. Takashi Kosaki made a presentation entitled "Current status and issues of soil education activities in IUSS" and introduced the contents of the IUSS book for soil science education -Global Concepts and Teaching- which is due to be published within this year. It should be noted that an important Japanese textbook of soil education containing experimental methods to investigate the characteristics of soil was published in 2018 and 2019. The book title was "What is the difference between schoolyard soil and field soil? –aiming at growing seeds of science – (Mori K. 2018). Also, Fukuda (2019) published the technical book in Japanese entitled as "Development of soil education to foster soil literacy from the perspective of lifelong learning from childhood to adulthood." He is a pioneer of soil education in Japan and summarized his research works for many years to this book. These two books, which include many important topics in terms of teaching material of soil and proposal of the concept of soil literacy, are very important to realize the international guidelines for soil education.

Inter-congress meeting

Overview of the philosophy and content of Towards realization of international guidelines for soil education presented at the inter-congress meeting "***Towards realization of international guideline for soil education***" was presented by Hideaki Hirai in the research forum at the Inter-congress meeting on November 21, 2020. The slides were prepared with the help of Damien Field, Cristine Muggler, and Eric Brevik, who wrote Chapter 10 of Soil Sciences Education: Global Concepts and Teaching (edited by Takashi Kosaki, Rattan Lal, and Laura Bertha Reyes Sánchez) published in December 2020. The slides are available in full on the website of the Soil Education Committee in the Japanese Society of Soil Science and Plant Nutrition (*http://jssspn.jp/edu/archive/iuss2020_HideakiHirai.pdf*).

The first chapter of the book, Tenets in Soil Science Education, written by Dr. Lattan Lal, gives examples from the US, and the final chapter, guiding the future of soil science education informed by global experiences, provides directions for guiding soil science education in the future. According to Dr. Lattan Lal, soil science is rarely included in the K-12 education system in the US. He also noted that the inclusion of soil science in K-12 would contribute to the achievement of SDG #4, the goal of providing quality education, but would require the cooperation of state and federal governments. Next, it is the last chapter that provides a reference on the viewpoints for developing international guidelines for soil education. Based on this perspective, the direction of the international guidelines for soil education that contribute to Goal 4: Quality Education in SDGs is presented in the form of a conceptual diagram (Figure). Field et al. (2020) pointed out the importance of building future soil education from the four perspectives of Knowledge, Learners Focus, Practice, and Scholarship. I myself thought that the concept of international guidelines for soil education could be proposed where these four perspectives are integrated. Following this concept, we may be able to devise guidelines for soil education that are appropriate to the environmental and social realities of each country.

Knowledge can be divided into two parts: one is the content that recognizes the unique nature of soil (soil formation), and the other is the content about the role of soil (soil function). When developing guidelines, it is necessary to choose among these to educate about the unique properties and functions of soils. The next step is Practice, which can be divided into three stages. The three stages are "Aware of", "Know of", and "Know". By applying the selected knowledge to these three levels, it will lead to systematic education on which grade to teach the selected knowledge. In terms of grade levels, they correspond to pre-primary and primary, middle-high school, and course for soil experts, respectively. Next is the Learners focus, which can be divided into three stages. The first stage is the perception-sensitization stage, the second stage is the awareness stage, and the last stage is the engagement stage. These stages vary depending on the learner's environment and social situation. Guidelines for soil education could be developed from the two perspectives of knowledge and practice, but in this case, there would be no opportunity to realize the importance of soil that would be gained if one were to place oneself in the unique culture and environment of the region, and thus the knowledge gained may not be felt in order to understand soil in response to the unique environment of the region. The next stage is the Scholarship stage. This is the stage where the guidelines developed by each country are presented at international conferences and information is exchanged. The integration of the exchange of information on soil education guidelines from different countries will lead to the establishment of international guidelines. Next, I would like to present an overview of the guidelines for soil education in Japan, using photographs that show how they are being implemented.



Four dimensions that can be used to guide the future thinking, practice and successful outcomes of soil education. (Conceptual figure of ""Towards realization of international guideline for soil education" based on Field et al (2020))

Figure 1 shows the children actually touching and observing the soil profile that forms under the forest. Specifically, the children observed the soil from the surface to the subsoil and collected soil with different characteristics to conduct the experiment. Further experiments were conducted to observe the water retention and permeability that occurs when the soil from the different soil layers was placed in containers and water was added. Apart from the water retention and permeability experiments, we also conducted a series of experiments in which the collected 100 mL cylindrical tubes were submerged in water stored in a tank, and the bubbles generated (indicating the gas phase in the soil) were collected with a scalpel cylinder.

Figure 2 shows the practice of planting seedlings in a paddy field and harvesting rice. From the practice of drawing the area needed to produce the amount of rice consumed in a year on a paddy field, the children can realize the area of soil that supports their lives for a year. In addition, we dug up rice plants at harvest time along with the topsoil and conducted experiments to find out how many plants were needed to make rice balls or curry and rice, and how much weight of topsoil was needed.

Figure 1: Field engagement for sensing soil and aware of soil functions of holding water through air space. It needs to assign these efforts to the grades to be studied, i.e. in case of infant, 1st to 2nd graders for sensing soil, while 4th to 6th graders for doing experiments by instruments to learn scientific way of thinking (source: Hirai H. and Mori K. (2020).

Figure 2: Field engagement for sensing soil and rice plant by planting seedlings in paddy field and calculating topsoil weight and area to produce one rice ball. It needs to assign these efforts to the graders to be studied, based on a guideline of elementary school (source: Hirai H., Deguchi A., Shiraishi S. and Kosaki T. (2019) and Hirai H. and Mori K. (2020).

Future Events

Upcoming symposiums in Japan and presentations at ESAFS (East and South East Asia Federation of Soil Science Societies)

The principles and directions of international guidelines for soil education were introduced by Hirai (2020) at the inter-congress meeting, referring to Chapter 10 of Soil Sciences Education: Global Concepts and Teaching. In response, a symposium on international guidelines for soil education has been proposed for the Hokkaido Conference of the Japanese Society of Soil Science and Plant Nutrition.

A symposium on international guidelines for soil education was planned and proposed by the Society and Education Division of the Japanese Society of Soil Science and Plant Nutrition (Division chair: Hideaki Hirai) for the Hokkaido Conference of the Japanese Society of Soil Science and Plant Nutrition to be held in September 2021. The title of the symposium is "International Guidelines for Soil Education: Principles and Content". Toward the development of human resources who can create a sustainable society. Recently in March, the proposal for this symposium was approved by the Executive Committee of the Japanese Society of Soil Science and Plant Nutrition. It was also scheduled to be presented at ESAFS, but that international conference was postponed until 2022.

Events to commemorate the International Soil Day in 2020

Events to commemorate the International Soil Day, December 5, were held despite the Covid-19 pandemic in 2020. A video introducing the soil monolith was made and distributed at the National Museum of Nature and Science Tokyo and the Saitama Museum of Rivers, because it was not possible to observe the soil in the fields of Japan. The introduction of the Soil Monolith on the web was proposed by R. Hirayama, K. Mori, K. Fujii, and M. Asano at the National Museum of Nature and Science, and by K. Mori at the Saitama Museum of Rivers. The respective youtube channels of each of them are as follows.

National Museum of Nature and Science (in Japanese): *https://www.youtube.com/watch?v=tD9mtcoZ-io*

Saitama Museum of Rivers (in Japanese): *https://www.youtube.com/watch?v=9OQIAHRgD78*.

Publications

Hirai, H. (2020): An international standard for soil education -efforts and challenges from Rio de Janeiro to Glasgow through Vienna, Shizuoka and Taipei – In Nanzyo, M., Lal, L., Kawahigashi, M., Kaneko, N., Hirai, H., Inubushi, K., and Yamamoto, Y. (2020): Soil and sustainable development goals (SDGs) – Soil in Africa, Urban soil -, 91 (2), 87-88. (In Japanese) This document was produced based on the presentation conducted in open symposium by Science Council of Japan held in September 2nd, 2019 at Tokyo, Japan.

Hirai H., Toma, M. and Akahane, I. (2020): Analyses of interest and recognition of necessity on soil by elementary school pupils and junior high school students based on a questionnaire survey on soil in Japan. EGU2020-14833, *https://doi.org/10.5194/egusphere-egu2020-14833*, EGU General Assembly 2020, © Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.

Yokoo, E., Masuda, A., Deguchi, A., and Hirai, H. (2020): How much do Japanese university students know about soil? A survey of university students who received science education in Japanese schools. EGU2020-4029, *https://doi.org/10.5194/egusphere-egu2020-4029*, EGU General Assembly 2020, © Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.

Masuda, A., Yokoo A., Hirai, H., and Deguchi, A. (2020): Highlighting the importance of topsoil in human life through a soil education program. EGU2020-4030, *https://doi.org/10.5194/egusphere-egu2020-4030*, EGU General Assembly 2020, © Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.

Hirai, H. (2020): 土壌教育, 土壌学概論 (犬伏和之・白鳥豊編) Soil education, In Inubushi, K and Shiratori, Y (eds.) "Introduction to Soil Science (revised version), pp. 180-186, Tokyo, Japan (in Japanese)

Hirai, H. (2020): Contribution to realize the international guidelines for soil education through EGU, ESAFS, and IUSS, Abstracts of the Annual Meetings, Japanese Society of Soil Science and Plant Nutrition, Vol. 66, 143. (in Japanese).

Hirai, H. and Mori, K. (2020): Development of a field-based soil educational program "Where and how does your food grow?" based on the results of a student questionnaire survey on soil and rice, In Kosaki, T., Lal, L., and Sanchez, L.B.R. (eds.) "Soil Sciences Education: Global Concepts and Teaching", Catena-Schweizerbart, Stuttgart, 77-85.

Mori, K., Hirai, H. and Kosaki, T. (2020): Guidelines for introducing essence of soil science in pre and primary school children, In Kosaki, T., Lal, L., and Sanchez, L.B.R. (eds.) "Soil Sciences Education: Global Concepts and Teaching", Catena-Schweizerbart, Stuttgart, 21-30.

Field, D., Brevik, E., Hirai, H., and Muggler, C. (2020): Guiding the future of soil science education: informed by global experiences. In Kosaki, T., Lal, L., and Sanchez, L.B.R. (eds.) "Soil Sciences Education: Global Concepts and Teaching", Catena-Schweizerbart, Stuttgart, 191-198.

Hirai, H. (2021): Towards realization of international guidelines for soil education. Presented in (*http://jssspn.jp/edu/archive/iuss2020_HideakiHirai.pdf*) Access date: 2021.03.21.

Commission 4.5: History, Philosophy, and Sociology of Soil Science

By Eric Brevik, chair and Thomas Sauer, vice-chair (2018-2022)

Commission 4.5 seeks to understand how the soil science field has developed over time, including changes in the philosophical underpinnings of the discipline and how it has been viewed and interacted with society.

Commission activities in 2020-2021

This past year has been a difficult one, as it has been for people all over the world, as events were cancelled or postponed due to COVID-19. This reduced the commission's overall activity level as regards conference attendance and organization. Among the division chair's plans for 2020-2021, a planned session at the Eurosoil Conference, *Cultural understanding of soils. Results from an inter-cultural project*, was delayed until 2021 and Eurosoil has now been converted to a virtual conference that will take place in August 2021. This session is being organized in collaboration with Nikola Patzel and the Cultural Patterns Working Group, and Eric Brevik is presenting in it as well. Eric Brevik has a presentation titled "International Gender Equity in Soil Science: A Social Equity Issue", in collaboration with Lorna Dawson and Laura Bertha Reyes Sanchez, that will be presented at the European Geosciences Union meeting in April 2021 and a presentation titled "Communicating the importance of soils to human health: New options and opportunities" that will be presented at the Global Symposium on Soil Biodiversity, also in April 2021.

A symposium on *History and Future of Pedology* was organized by Maxine Levine, Curtis Monger, Alfred Hartemink, Eric Brevik and Craig Rasmussen at the 2020 Soil Science Society of America Meeting. Jodi Johnson-Maynard, Eric C. Brevik, and Karen Vaughn also organized a session titled *COVID-19 Impacts on Higher Education: Concerns and Strategies to Adapt* at the 2020 Soil Science Society of America meeting, and Eric Brevik gave presentations in both these SSSA sessions, and also gave a presentation titled "Soils and Culture: Exploring the Links" in collaboration with Nikola Patzel, Sabine Grunwald, and Christian Feller.

Collaboration

Commission 4.5 is cooperating with the Cultural Patterns of Soil Understanding Working Group (Nikola Patzel, chair) in developing a book on Soil Culture as part of the IUSS book series. This book has been delayed a bit as we needed to find a new publisher, but we now have an agreement with Springer and expect to publish the project in 2021. All but about 3 or 4 chapters are complete and accepted.

Division 4 related contributions

Journal Articles:

Brevik, Eric C., April Ulery, and Amy Smith Muise. 2021. Pivoting to online laboratories due to COVID-19 using the "Science of Agriculture" digital tools: A case study. Natural Sciences Education. *https://doi.org/10.1002/nse2.20045*.

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Brevik, Eric C., Lorna Dawson, and Laura Bertha Reyes Sanchez. 2021. International Gender Equity in Soil Science: A Social Equity Issue. Geophysical Research Abstracts. EGU21-17.

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Dawson, L.A. (2020) A grain of truth: forensic ecology applied to the criminal justice system. *Invited Lecture to The Botanical Society of Scotland, Royal Botanic Gardens, Edinburgh, 20 February 2020.*

Dawson, L.A. (2020) Natural justice: delivering to the criminal justice system. *Royal Geographical Society, Invited Lecture to Senior Schools.* February 2020.

Dawson, L.A. (2020) Trace evidence analysis. *Training to BSc Honours Undergraduates, Abertay University Forensic Science Department,* 17 February 2020.

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Grunwald, Sabine. 2021. Transpersonal and transcultural perspectives to achieve soil/land degradation neutrality. Eurosoil 2021, Geneva.

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Working Group Cultural Patterns of Soil Understanding

Report for IUSS: WG activities in 2020-21

All active members of this working group, these are about 30 people, are amongst the 43 authors of our book on Cultural Understanding of soils. These colleagues put a lot of effort into their detailed case studies and other chapters on the topic. In the context of this, an intensive scientific exchange took place within and author teams and with the editors. The editors (Nikola Patzel, Sabine Grunwald, Eric Brevik, Christian Feller) held around 30 video conferences during the reporting period.

On 7 October 2020, Nikola Patzel presented the working group and book at the symposium "Soils: The Living Fabric of Health" (NYC Urban Soils Institute USI together with University of Maryland).

See also the report from Commission 4.5 for related activities.

Publications in the field

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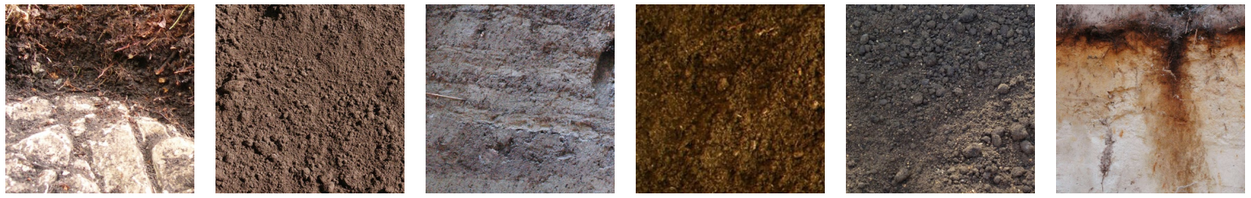
Brevik, Eric C., Lorna Dawson, and Laura Bertha Reyes Sanchez. 2021. International Gender Equity in Soil Science: A Social Equity Issue. Geophysical Research Abstracts. EGU21-17.

Brevik, Eric C., Lindsey Slaughter, Bal Ram Singh, Joshua J. Steffan, David Collier, Paul Barnhart, and Paulo Pereira. 2021. Communicating the importance of soils to human health: New options and opportunities. Global Symposium on Soil Biodiversity.

Brevik, Eric C., Sabine Grunwald, and Jeffrey Homburg. 2021. Native American origin myths including soil or Earth: Prehistory to present. Eurosoil 2021, Geneva.

Patzel, Nikola, Eric C. Brevik, Sabine Grunwald and Christian Feller. 2020. Soils and Culture: Exploring the Links. Soil Science Society of America Annual Meeting Abstracts.



International Decade of Soils (2015-2024)

World Soil Day 2020

Words from Laura Bertha Reyes Sánchez during the WSD Celebration from FAO headquarters

Rome, December 5, 2020

This year, in the framework of the World Soil Day, the Global Soil Partnership of FAO and the educative project THE IUSS GOES TO THE SCHOOL started an EDUCATIVE JOINT ACTION, launching a scientific booklet contest for children on Soil Biodiversity with the motto *Keep soil alive, protect soil biodiversity*.

And from the Global Soil Partnership of FAO and THE IUSS GOES TO THE SCHOOL we are very happy with your amazing response from the Soil Science Community through national societies, institutions, and organizations.

I am convinced that it is as important to speak and write as scientists for our peers, as it is to speak and write for the future citizens of the world, if we want to put the soil resource on the World Agenda.

For that reason, the educational project THE IUSS GOES TO THE SCHOOL and the Global Soil Partnership of FAO have the firm determination to move soil science forward to educate and raise awareness in children and young people at school-age, and we want to invite all of you to participate in the next actions as a shared responsibility, and a priority task for the whole Soil Science community.

Celebrating the World Soil Day 2020, the educative Project THE IUSS GOES TO THE SCHOOL gives away a virtual space to all children around the world inviting them to take care of the Soils of their Nations. I invite you to explore it together with your children; *www.iuss-goes-to-school.org.mx*.

And because #TogetherWeAreStronger we will be sharing educative activities and materials with the GSP of FAO: *http://www.fao.org/global-soil-partnership/en/*.

We are kindly inviting all of you to work with us!!

Slide from the World Soil Day celebrations at FAO, Rome, announcing IUSS President Laura Bertha Reyes Sánchez in the top right corner (© IUSS)

World Soil Day 2020 at a glance

Concerted action across up to 105 countries and hundreds of million participants is what makes World Soil Day one of the most celebrated UN Observances. For its latest edition *'Keep soil alive, Protect soil biodiversity'*, more than 780 events brought together governments, businesses, NGOs, youth, the media, and the public. Rome, New York, Bangkok, Abu Dhabi, Moscow held official ceremonies while twenty-one FAO regional, sub-regional and country offices actively supported the campaign.

Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1370580/*.
[From: Global Soil Partnership Newsletter no 31, February 2021]

The IUSS GOES TO SCHOOL Project

THE IUSS GOES TO THE SCHOOL logo launched

On December 5th 2020 celebrating the WSD the IUSS logo for the project THE IUSS GOES TO THE SCHOOL was launched.

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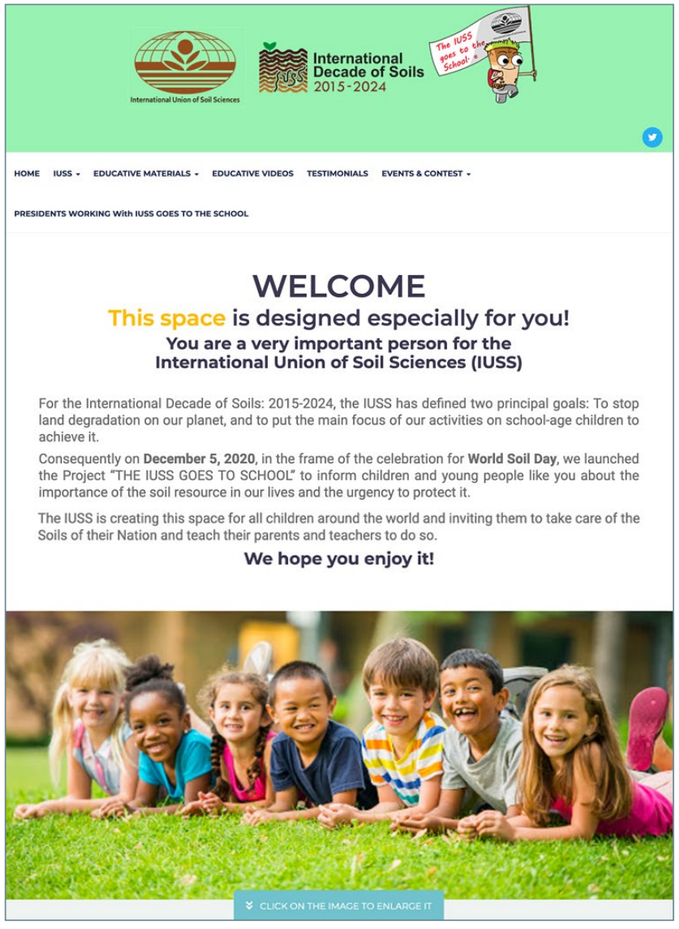
Stop Soil Degradation and the IUSS educative project to achieve it

On December 5th 2015, celebrating the World Soil Day and the International Year of the Soils, the International Union of Soil Sciences, through the Vienna Declaration, launched the "International Decade of Soils: 2015-2024[1]", defining as two of its most important tasks to stop the land degradation on our planet, and to put the main focus of our activities on school-age children[2] to achieve it.
In line with these main goals, on **December 5, 2020**, in the frame of the celebration for the **World Soil Day** the IUSS launched the Project "THE IUSS GOES TO THE SCHOOL" with the objective of informing children and young people about the importance of the soil resource in our lives and the urgency to protect it.
The IUSS created a space for all children around the world inviting them to take care of the soils of their nations and to teach their parents and teachers to do so.
"THE IUSS GOES TO THE SCHOOL" educative project also seeks to involve soil scientists through their direct participation in soil science educational activities and awareness-raising of future citizens of the world, in order to really set their eyes, brain, feelings and hearts on The Soil.



The IUSS GOES TO THE SCHOOL website (source: *https://www.iuss-goes-to-school.org.mx/*)

[1] Horn, R. WSD 2015, Vienna and 2017, Rome, Italy.
[2] International Decade of Soils Programme. 2016. IUSS Inter-Congress Meeting Document, p.121-123.

The IUSS educative project invites you to visit and explore *www.iuss-goes-to-school.org.mx* to collaborate on it. Soil Sciences Societies and organizations who have already joined the project can be found at *http://www.iuss-goes-to-school.org.mx/ourpartners/* and the soil sciences educative projects already collaborating are presented at *http://www.iuss-goes-to-school.org.mx/soil-sciences/*.
We invite all National Soil Science Societies to join us in this educational effort!

On December 5th 2020 celebrating the WSD
Celebrating the World Soil Day, the educative Project "THE IUSS GOES TO SCHOOL" offers:

- A virtual space to all children around the world inviting them to take care of the Soils of their Nations: *www.iuss-goes-to-school.org.mx*.
- To children from Poland, the Polish version of the Book "*Living in the Soil*" (Chrońmy gleby), in collaboration with the Soil Science Societies of Spain and Poland.
- To all children speaking English and Spanish:
  a. The Book "Vermicomposting for school children"
  b. The Book "Perfilito, … A very lucky boy" as a collaboration between countries from the Latin American Soil Science Society.
  c. A set of Crop Cards inviting them to produce their own food in English, Spanishm German and some of them are also in French language; *http://www.iuss-goes-to-school.org.mx/crop-cards/*.
- To all children around the world and in collaboration with FAO as our partner, as a result of our collaboration, a selection of these booklets in English online both in the IUSS Web site as in *www.iuss-goes-to-school.org.mx/contest/*.

IUSS-FAO Children's Book Contest
(source: *www.iuss-goes-to-school.org.mx/contest/*)

IUSS – FAO – GSP Children's book on Soil Biodiversity

IUSS and FAO launched a children's book contest on Soil Biodiversity

In the framework of World Soil Day 2020, the Food and Agriculture Organization of the United Nations (FAO), the International Union of Soil Sciences (IUSS), the educative project "THE IUSS GOES TO THE SCHOOL", and the Global Soil Partnership (GSP) launched a children's book contest on Soil Biodiversity with the motto "Keep soil alive, protect soil biodiversity". The book contest on soil biodiversity has given visibility to the importance of soil organisms and raised awareness on the urgency of protecting soil biodiversity. The soil biodiversity book competition highlights the importance of soil organisms and raises awareness of the urgent need to protect soil biodiversity among a young audience (children aged 6-11 years).


International Decade of Soils 2015-2024

SOCIEDAD MEXICANA DE LA CIENCIA DE SUELO

COMISIÓN DE EDUCACIÓN Y ENSEÑANZA DE LA CIENCIA DEL SUELO

El proyecto educativo "Así son los Suelos de mi Nación", como participante del proyecto educativo "LA IUSS VA A LA ESCUELA", invita a niños y jóvenes a participar en el:

XV Simposio de Innovaciones Educativas en la Enseñanza de la Ciencia del Suelo

conforme a la siguiente CONVOCATORIA:

6 y 7 de Octubre

Objetivo: Difundir y divulgar los trabajos de investigación que realizan los niños de México en sus diferentes niveles educativos básicos relacionados con la Ciencia del Suelo, así como fomentar el acercamiento entre las instituciones de educación básica y los expertos en el tema.

BASES:

Las categorías y temáticas:

•Preescolar, 1º a 3º de Primaria:
Tema: El suelo y la biodiversidad
Tipo de trabajo: Dibujo con la explicación de la ilustración escrita o descrita por los niños.
•4º a 6º de Primaria:
Tema: El suelo y la producción de alimentos
Tipos de trabajos: Cuento, Historieta, Poema, Canción.
•Secundaria:
Temas: El suelo y los objetivos del desarrollo sustentable, el suelo y el cambio climático.
Tipos de trabajos que se solicitan: Infografías, juegos de mesa, obras de teatro con títeres.
•Preparatoria:
Temas: El suelo y los objetivos del desarrollo sostenible, el suelo y el cambio climático.
Tipos de trabajos: Infografías, apps móviles, juegos de mesa, obras de teatro con títeres.

Registro

Los interesados en registrarse en las categorías: de **Preescolar hasta Secundaria**, deben realizar una pre-inscripción a la siguiente liga **https://forms.gle/Gw95YcYZywKrwaw88.** A partir de esta pre-inscripción el Comité académico de cada categoría seleccionará los trabajos que podrán ser presentados de forma virtual en el Simposio.

Los interesados en registrarse en la categoría de **Bachillerato** deben enviar un resumen de 300 palabras como máximo al siguiente correo electrónico: **simposio.suelo@gmail.com** Las características del resumen y plantilla las puedes consultar en la siguiente liga https://drive.google.com/file/d/1rM47yWtYhZ2mV70lenONTO_PugQEm-Vx/view?usp=sharing

Resultados

Los resultados de todas las categorías serán dados a conocer vía correo electrónico a todos los participantes el **16 de agosto.**
Los trabajos de las categorías: Preescolar hasta Secundaria, deberán enviar su propuesta final el **24 de septiembre** en un video en power point con duración mínima de 5 minutos y máxima de 10 minutos.

Presentación virtual de los trabajos:

Los trabajos de preescolar hasta secundaria se presentarán en video; es importante que estén presentes los alumnos con sus profesores, padres o tutores para auxiliarlos en responder preguntas sobre sus trabajos.
Los jóvenes de bachillerato presentarán en power point de forma oral con un tiempo de exposición de 10 minutos.

Fechas importantes:
Pre-Registro y envío de resumen: 9 de agosto
Resultados: 16 de agosto
Envío de videos de las categorías de preescolar a secundaria: 24 de septiembre

Todos los participantes contarán con su Constancia de ponentes.

Informes: comision.educacion.smcs@gmail.com, simposio.suelo@gmail.com
Costo: Gratuito
#EducarParaConservar #SuelosUnMundoPorDescubrir #EdafólogosEnseñando

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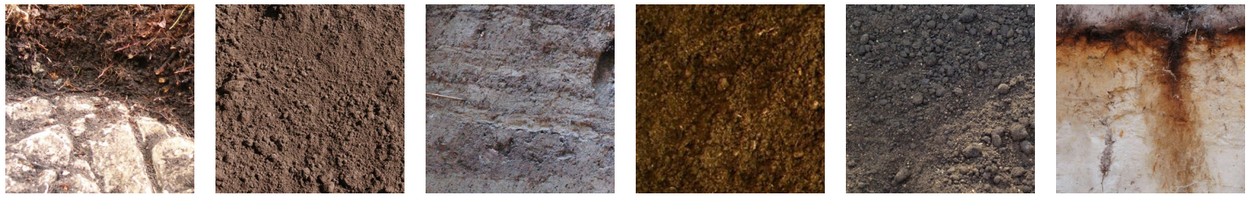
IUSS and FAO launched Children's book "The magical world of soil biodiversity"

During the Opening Day of the Global Symposium on Soil Biodiversity (GSOBI21), 'Keep soil alive, protect soil biodiversity', a science-policy meeting that took place from 19-22 April 2021, IUSS and FAO launched their children's book "The magical world of soil biodiversity". This collection of 10 stories includes the best entries received from a total of 97 books spanning over 75 countries.
In the framework of World Soil Day 2020, the Food and Agriculture Organization of the United Nations (FAO), the International Union of Soil Sciences (IUSS), the educative project "THE IUSS GOES TO THE SCHOOL", and the Global Soil Partnership (GSP) launched a children's book contest on Soil Biodiversity with the motto "Keep soil alive, protect soil biodiversity". The book contest on soil biodiversity has given visibility to the importance of soil organisms and raised awareness on the urgency of protecting soil biodiversity. The soil biodiversity book competition highlights the importance of soil organisms and raises awareness of the urgent need to protect soil biodiversity among a young audience (children aged 6-11 years).
Presentation given by Laura Bertha Reyes Sánchez, IUSS President 2021-2022: *laura_book_presentation.pdf*
Discover and download the book: *https://doi.org/10.4060/cb4185en*.
Read more about *"The IUSS goes to school"*.

Mexican Soil Science Society and "THE IUSS GOES TO THE SCHOOL"

The educational projects "Thus are the Soils of my Nation", as a participant in "THE IUSS GOES TO SCHOOL", invites children and young people to participate in the: online XV Symposium on Educational Innovations on Teaching Soil Science, to be held on October 6 and 7 according to the attached Call and poster, within the 45 Mexican Congress of Soil Science.
Read more: *www.iuss-goes-to-school.org.mx* and *www.slcs.org.mx*.



Conference and Meeting Reports

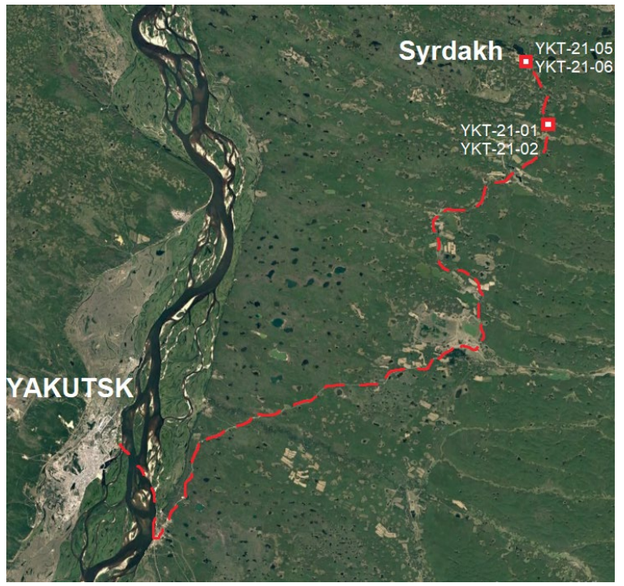
CryoWiSt: Winter State of Cryosols

By Dr. Aleksei Lupachev, Chair IUSS Cryosol Working Group,

IUSS Stimulus Fund 2020 – Cryosol Working Group scientific report

Cryogenic and permafrost-affected soils spend in a thawed state only around 2-3 months per year. And more of that – different soil horizons stay in the positive temperatures for different period of time: the uppermost horizons in the zone of continuous permafrost begin to thaw around late May – early June while the lowermost supra-permafrost
horizons thaw only in the late August and in 2-3 weeks they began to refreeze again. Thus, the considerable period of "Cryosol life" annually coincide with the refreezing of the active layer during the extremely cold winters. This process affects nearly all the morphological, biological and physico-chemical properties of permafrost-affected soils (cryogenic texture and soil structure forming; the accumulation and redistribution of exchangeable cations and anions; the cryogenic dessication of the central mineral parts of the profile etc.). Only few papers are devoted to the studying of these extremely significant pedogenic processes that occur while Cryosols annually freeze and thaw.

Despite the COVID logistical restrictions, Cryosol Working Group members could organize a short soil science field-class in March 2021 using the logistical facilities of the Ammosov's North-East Federal University (Yakutsk,



Fieldwork route and core sites (© Aleksei Lupachev)

Dr. Stanislav Gubin and Dr. Petr Danilov (© Aleksei Lupachev)

Sakha Republic, Russian Federation) in the region of the Lena-Amga interfluve (Syrdakh, Central Yakutian Plain). The key site is situated around 120 km from Yakutsk, on the right bank of the Lena River and represents the wide range of natural and agricultural types of permafrost-affected soils of the Central Yakutia. The mean multiannual depth of the snow cover here does not exceed 60-80 cm and provides the opportunity of powered auger drilling cores of the soil profiles up to the nearly maximal active layer thickness (1.5-2 meters).

This fieldwork was conducted by soil and permafrost scientists from the Institute of Physico-Chemical and Biological Problems in Soil Science, Russian Academy of Sciences, Puschino Scientific Center (Dr. Aleksei Lupachev and Dr. Stanislav Gubin) and the Institute of the Applied Ecology of the North, Ammosov's NEFU (Dr. Petr Danilov). Cryopedologists visited local school in Syrdakh settlement where pupils of GEOQUANTUM study group reported the results of permafrost monitoring and ecological studying of the settlement surroundings that they conduct for more than four years in cooperation with different scientific and educational organizations of Yakutia and international colleagues. Together young and experienced scientists discussed the issues of permafrost degradation, ecosystem changing and different aspects of anthropogenic influence on fragile nature of the North. The head of GEOQUANTUM, Marianna Petrova and the group member, Sergei Sadovnikov, underlined the climatic, hydrological, geomorphological and other environmental changes that directly affect the way of natural resources management in the region – agriculture, fishing and hunting, building construction etc.

Indoor seminar and outdoor field class with pupils of Syrdakh local school (© Aleksei Lupachev)

The indoor seminar was followed with an outdoor field class where school kids have participated in studying of cryogenic soils – drilling soil cores, describing and sampling them. All of these procedures were accompanied with open-air lectures explaining the fundamental and applied value of such work. Pupils became acquainted with different cryopedological processes and features of Cryosols such as soil structure and cryogenic texture, morphological forms of organic matter, ice segregation and cryogenic desiccation, water-soluble salts migration, gleyization and many others. Four soil-permafrost cores were sampled for further studying of the meso- and micromorphological structure of thin sections and analysis of the basic chemical properties of Cryosols during the winter period in order to compare them with the results of the previous studies of the very same soils but being in a thawed state during the summer period.

Interdisciplinary seminar with academic colleagues (© Aleksei Lupachev)

The preliminary morphological analysis of the sampled cores have shown the extremely dryness and almost full absence of the ice segregation and salt secretion which can be explained both by the lack of summer precipitation that was recorded during the summer 2020 and cryogenic desiccation that followed during the 2020-2021 winter period. Only central and lowermost soil horizons have shown more or less expressed cryogenic texture with massive, micro- and mesoschlieren ice segregation. Contrary to the summer field observations, no visible salt secretion was obtained in the superficial soil horizons as well as in the lower mineral mass of the soil profile (e.g. along the root pathways or the interaggregate pores). The results of the latest and multiannual Cryosol and Ice Complex deposits studying were discussed at the seminar with academic colleagues from Ammosov's NEFU and IBPC SB RAS. The samples from the Cryosol cores are now under the laboratory microscopical and chemical analysis in the Institute of Physico-Chemical and Biological Problems in Soil Science (Puschino) and in the Institute of the Applied Ecology of the North, Ammosov's NEFU (Yakutsk). We expect that the data that we will obtain soon will shed more light on the almost unknown winter state of Cryosols which takes around two-thirds of their evolution life.

XXIV Dokuchaev Conference for Young Scientists "Soil Science in a Digital Society"

The International Scientific Conference XXIV Dokuchaev Conference for Young Scientists "**Soil Science in a Digital Society**" took place at the Saint Petersburg State University and the Dokuchaev Central Soil Science Museum on March 1–3, 2021 in St. Petersburg.

XXIV Dokuchaev Conference for Young Scientists has been devoted to an actual problem of modern society – the application and the development of digital technologies in soil science, and Year of science and technology in Russia. At the present stage, innovations are the main driving force behind the progress of world civilization. The use of information technologies in soil science makes it possible to study the current state of soils and the dynamics of changes in the main indicators of fertility for a given period of time, to assess soil resources at the present stage, to develop the soil monitoring methodology, including the structure and the content of databases, the mapping of fertility indicators, to develop recommendations for fertilizer application based on cartographic models and attributive information of arable soils. The information and the analytical system, digital soil models of the study area, allow accumulating, analyzing, generalizing information, as well as developing recommendations based on the results of soil monitoring.

XXIV Dokuchaev Conference for Young Scientists have been devoted to the anniversary date the 175th anniversary of the V.V. Dokuchaev's birth – the founder of soil science.

The organizing committee of the conference was represented by students, Ph.D. students and young scientists of the St. Petersburg State University and the Dokuchaev Central Soil Science Museum.

About 200 conference applications were received from students, Ph.D. students, young scientists, as well as 30 from school children. Applications came from almost all regions of Russia (Moscow, St. Petersburg, Rostov-on-Don, Krasnoyarsk, Kazan, Yakutsk, Tyumen, Vladivostok, Novosibirsk, Nizhny Novgorod, etc.), as well as from countries of near and far abroad, including Czech Republic, Turkey, Italy, Ukraine, Belarus, Kazakhstan, Uzbekistan.

By the beginning of the XXIV Dokuchaev conference, Russian and English versions of the program, as well as a collection of conference materials, were posted on the conference website.

The Plenary Session of the conference (© Zakharova M.K.)

The Opening and the Plenary Session of the conference took place on March 1 in the Saint Petersburg State University. For the first time, the opening of the conference was on-line. Video conference was with language interpretation.

The Plenary Session has been opened Chairman of the Organizing Committee, Professor at the Department of Soil Science & Soil Ecology of the St. Petersburg State University, scientific adviser of the Dokuchaev Central Soil Science Museum, Vice-President of the Dokuchaev Soil Scientists Society (Russia), Dr. Aparin B.F. The following people addressed the conference participants with welcoming words: Director of the Institute of Earth Sciences of the St. Petersburg State University, Vice-President of the Russian Geographical Society, Dr., Professor (Russia), Chistyakov K.V.; President of the Dokuchaev Soil Scientists Society, President of the Faculty of Soil Science of the Moscow State University, Corresponding Member of the Russian Academy of Sciences (RAS), Dr., Professor (Russia) Shoba S.A.; Director of the V.V. Dokuchaev Soil Science Institute, Academician of the RAS, Dr., Professor (Russia) Ivanov A.L. Heads of soil institutes in Russia and foreign countries addressed the conference participants with welcoming words:

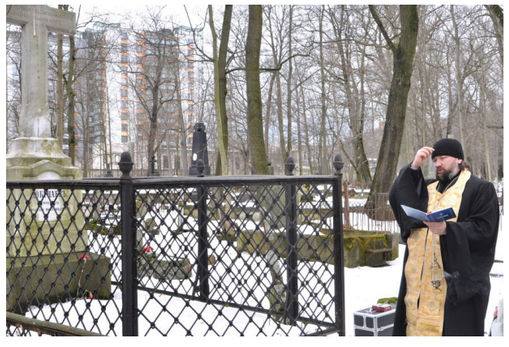
- *Alekseev A.O.,* Director of the Institute of Physico-chemical and Biological Problems of Soil Science of the RAS, Corresponding Member of the RAS, Dr. (Russia);
- *Androkhanov V.A.,* Acting Director of the Institute of Soil Science and Agrochemistry, Siberian Branch of the RAS, Dr. (Russia)
- *Mammadov G.Sh.,* Director of the Institute of Soil Science and Agrochemistry of the Azerbaijan National Academy of Sciences (ANAS), Academician of ANAS, Dr., Professor (Azerbaijan)
- *Lapa V.V.,* Director of the Institute of Soil Science and Agrochemistry of the National Academy of Sciences of Belarus (NASB), Honored Scientist of Belarus, Academician of NASB, Dr., Professor (Belarus)
- *Suleymanov B.U.,* Chairman of the board of the Kazakh U. Uspanov Research Institute of Soil Science and Agricultural Chemistry, Academician of the Academy of Agricultural Sciences of Kazakhstan (AASK), Dr., Associate Professor (Kazakhstan)
- *Baibagyshov E.M.,* Rector of Naryn State University named after S. Naamatov, President of the Kyrgyzstan Soil Scientists Society named after academician A.M. Mamytov, Ph.D., Acting Professor (Kyrgyzstan)
- *Bobomurodov Sh.M.,* Director of the Research Institute of Soil Science and Agrochemistry, Dr. (Uzbekistan)
- *Gafurova L.A.,* Director of the AgroEcoBiotechnology Center, National University of Uzbekistan named after Mirzo Ulugbek, Dr., Professor (Uzbekistan).

Invited talks have been given by:

- *Laura Bertha Reyes Sánchez,* IUSS President, academic of the Faculty of Higher Studies Cuautitlán, National Autonomous University of Mexico, Dr. (Mexico) "The educational project of the IUSS in a digital society"
- *Ivanov A.L.,* Director of the V.V. Dokuchaev Soil Science Institute, Academician of the RAS
- *Maslov A.E.,* Head of the Situational Analytical Center of Soil and Land Resources of Russia, V. V. Dokuchaev Soil Science Institute (Russia) "Digital farming in Russia".

An important event for the conference participants was a visit to the Smolensk cemetery, a memorial service and laying flowers on the graves of the founder of soil science V.V. Dokuchaev, his wife Anna Yegorovna and her mother A.I. Sinkler. A visit to the Smolensk cemetery took place on March 1 at 2 p.m. Laying flowers were with live stream on Zoom.

Visit to the Smolensk cemetery (© Zakharova M.K.)



Memorial service (© Zakharova M.K.)

The Plenary session ended with reports: Director of the Dokuchaev Central Soil Science Museum, Ph.D., Associate Professor at the Department of Soil Science & Soil Ecology of the St. Petersburg State University Sukhacheva E.Yu. "Popularization of knowledge about soil is the most important task of modern soil science"; Director of the Novodugino Local History Museum named after V.V. Dokuchaev Tanskaya E.I. "V.V. Dokuchaev Memorial Day in the homeland"; researchers of the Dokuchaev Central Soil Science Museum (Zakharova M.K., Timofeeva Yu.R., Aparin B.F., Rusakova E.A.) "Recognition. To the 175th anniversary of the birth of V.V. Dokuchaev"; and also SPbU Media Center report about the Dokuchaev Central Soil Science Museum "In the kingdom of soils".

On-line meeting of the school session "Soil is life" took place on March 2 from 10 a.m to 1 p.m. at the St. Petersburg State University. 11 reports out of 14 announced by participants from Irkutsk, Volgograd, Kazan, St. Petersburg, Moscow, Ufa and Kazakhstan were heard. The topics of the reports were wide. Issues of the soil diversity, the soil monitoring, the soil biotesting, the accumulation of radioactive elements by plants from soil, the determination of humus in soil, the assessment of salt pollution, the application of IoT technologies in soil science were discussed.

An exhibition the Vasily Dokuchaev's 175th anniversary took place on March 2 (author Rusakova E.A.).

The idea of the exhibition is to highlight the scale of the V.V. Dokuchaev personality through a prism of the perception and the comparison by visitors of achievements of the scientist, confined to certain stages in life, with their own successes. V.V. Dokuchaev's biography, passed through his own life experience, allows visitors to better imagine the scale of the first soil scientist, and imbued with respect for his weighty scientific heritage.

The exhibition will provide an insight into the pioneer's extensive and all-around activities in the field of comprehensive soil and environmental studies.

An exhibition the Vasily Dokuchaev's 175th anniversary (© Zakharova M.K.)

On-line meetings of student sessions took place on March 2-3 at the St. Petersburg State University.

1. Soil in a changing environment.
   17 reports out of 22 announced were heard.
2. Soil resources and sustainable soil use.
   14 reports out of 21 announced were heard.
3. Soil is a multifunctional system.
   9 reports out of 19 announced were heard.
4. Prefabricated session: Agrochemistry and harvest in numbers, Information technologies in soil science, Soil in a changing environment.
   11 reports out of 19 announced were heard.
5. Poster session. 1
   2 reports out of 18 announced were heard.

For everyone who came to the conference, a face-to-face meeting was at the Dokuchaev Central Soil Science Museum. A face-to-face meeting was with live stream on Zoom. 26 reports out of 33 announced were heard. 25 reports were presented face-to-face, 1 – online.

Issues of the development of information technologies in soil science, the digital soil mapping and the application of GIS technologies, the multifunctionality of a soil system, the content and the distribution of heavy metals and radioactive elements in soils, the soils geographic distribution, soils changes under the influence of natural environmental factors and anthropogenic pressure, a place of soils in the modern classification, the intensification of agriculture and rational use of soils, the use of various fertilizers, biological products, for growing crops were discussed in student sessions.

89 student reports were heard at the conference.

Most of the conference participants were from Moscow – 37 people (Lomonosov Moscow State University, Russian Timiryazev State Agrarian University, Peoples' Friendship University of Russia). From Saint-Petersburg were 10 people (St. Petersburg State University, Dokuchaev Central Soil Science Museum, Agrophysical Research Institute, Saint-Petersburg State Agrarian University). From Pushchino, Moscow region – 7 people (Institute of Physicochemical and Biological Problems of Soil Science of Russian Academy of Sciences (RAS), Pushchino State Institute of Natural Sciences, Federal Research Center "Pushchino Scientific Center for Biological Research of RAS, Institute for Fundamental Problems of Biology of RAS). From Rostov-on-Don – 8 people (Southern Federal University, Federal Research Centre The Southern Scientific Centre of RAS). From Perm – 4 people (Perm State Agro-Technological University named after Academician D.N. Pryanishnikov). From Syktyvkar – 3 people (Pitirim Sorokin Syktyvkar State University). From Novosibirsk – 2 people (Novosibirsk SAU). From Rassvet village, Rostov region – 2 people (Federal Rostov Agricultural Research Centre).

Also among the young scientists were speakers from the countries of near and far abroad:

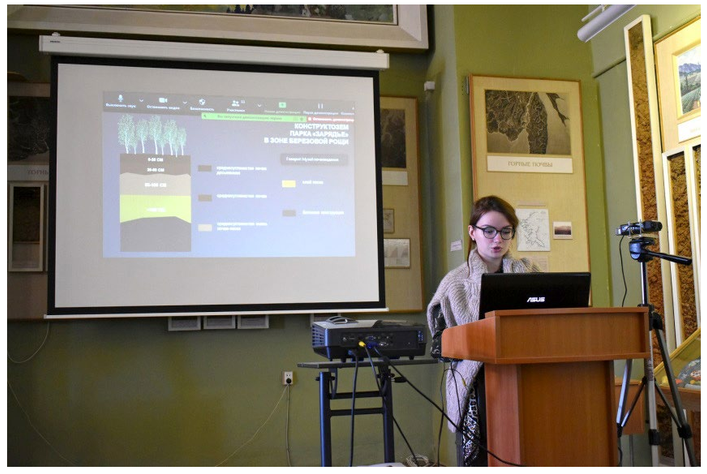
- IGDIR University, Igdir, Turkey
- Universita di Pavia, Pavia, Italy
- Mendel University in Brno, Blansko, Czech Republic
- Mendel University in Brno, Náměšť nad Oslavou, Czech Republic
- Belarusian State Agricultural Academy, Gorki, Belarus.

Chairmen and secretaries of the student sessions were Bachelor's students Leont'ev A.A., Gavrilenko M.D., Napol'skih Yu.M., Master's students Ivanov E.D., Zaripova K.M., Holostov G.D., Smirnova K.A., Ph.D., students Fedorova M.E., Zharkih I.A. at the Department of Soil Science & Soil Ecology of the St. Petersburg State University; researchers of the Dokuchaev Central Soil Science Museum Timofeeva Yu.R., Lazareva M.A., Mingareeva E.V.

The reports of the conference participants were assessed by the jury on the basis of the criteria developed by the organizing committee: the consistency, the completeness and the specifity of presented data, the topicality of research, the justification of the application of used methods, the quality of presented material, the richness of presentation and its technical quality, the knowledge of material and the literacy of presentation, the conformation to speaking time and answers on questions.

Based on results of the sessions, the best reports were awarded places and diplomas of I, II and III degrees, and also were selected reports recommended for publication in a periodical of the St. Petersburg State University and the Dokuchaev Central Soil Science Museum "Materials for the study of Russian soils" (Issue 14 (41)).

All speakers were awarded certificates of the Dokuchaev Conference for Young Scientists' participants, and school



Face-to-face report of the conference participant (© Zakharova M.K.)

session's participants – diplomas, the design of which was specially developed by Ph.D. student of the Department of Soil Science & Soil Ecology of the St. Petersburg State University Zakharova M.K.

At the closing of the conference on March 3, 2021, secretary of the conference Lazareva M.A. and chairmen of the sessions summarized results. The high methodological level of participants' research and the topicality of topics were noted.

Also, at the suggestion of the conference organizing committee, the participants were unanimously decided:

1. To thank:
   - staff of the public relations department of the St. Petersburg State University for the organization and the technical support of the conference and the Plenary session at the St. Petersburg State University;
   - heads of the soil institutes in Russia and foreign countries for the speaking at the Plenary Session of the St. Petersburg State University;
   - members of the conference organizing committee for the organizing of the XXIV Dokuchaev Conference for Young Scientists.
2. To continue a tradition of the annual "Dokuchaev Conference for Young Scientists" organizing and to hold the next XXV Anniversary Dokuchaev Conference for Young Scientists in 2022.
3. To post information about the XXIV Dokuchaev Conference for Young Scientists on the websites:
   - Dokuchaev Conference for Young Scientists (*http://www.dokuchaevskie.ru/*);
   - Department of Soil Science & Soil Ecology of the St. Petersburg State University (*http://soil.spbu.ru/*);
   - Dokuchaev Central Soil Science Museum. (*http://музей-почвоведения.рф/*).

And also on social networks:

- Facebook, "Dokuchaev Conference for Young Scientists" (*https://www.facebook.com/groups/299055950621291/*);
- Instagram, "dokuchaevskie.spb" (*https://www.instagram.com/dokuchaevskie.spb/*).

Chairman of the Organizing Committee, Professor at the Department of Soil Science & Soil Ecology of the St. Petersburg State University, scientific adviser of the Dokuchaev Central Soil Science Museum, Vice-President of the Dokuchaev Soil Scientists Society (Russia), Dr. Aparin B.F.
Executive Secretary: Mingareeva E.V.
Secretary: Lazareva M.A.

The closing of the conference
(© Zakharova M.K.)

Information about the International Scientific Conference "XXV Dokuchaev Conference for Young Scientists" «Soil is life»

The conference will take place on March 1–3, 2022 at the Saint Petersburg State University and the Dokuchaev Central Soil Science Museum in St. Petersburg (Russia). Conference form will be face-to-face reports with live stream on Zoom and on-line. Languages of the conference will be Russian and English. Topic of the conference will be «Soil is life».

Directions of the conference:

1. Soil degradation and recultivation;
2. Soil ecosystem services;
3. Soil conservation farming;
4. Healthy soil – healthy nation;
5. Popularization of soil science;
6. School session: «Soil and ecosystems».

Issues of the providing by soils of plants', animals' and people' life and health, the importance of living organisms for soil formation, interactions of mineral, organic substances and living organisms in the soil, the composition and properties of soils, the soil diversity and the geographical distribution of soils, functional relationships in nature, ecosystem functions of soils, the soil-saving crop cultivation, the soil destruction both as a result of natural processes and under the influence of irrational human actions, the protection of soil from its destruction, the fight against fertility decline, soil restoration, the spread and the application of soil knowledge will be considered. The conference will be devoted to the 25th anniversary of the Dokuchaev Conference for Young Scientists and the International Decade of Soils.

Detailed information about the annual Dokuchaev Conference for Young Scientists you can find on the conference's website: *http://www.dokuchaevskie.ru/*. Information letter about the XXV Dokuchaev Conference for Young Scientists will be posted on the website on June 30.

Chairman of the Organizing Committee, Professor at the Department of Soil Science & Soil Ecology of the St. Petersburg State University, scientific adviser of the Dokuchaev Central Soil Science Museum, Vice-President of the Dokuchaev Soil Scientists Society (Russia), Dr. Aparin B.F.
Executive Secretary: Mingareeva E.V.
Secretary: Lazareva M.A.

Mexican Soil Judging Contest

By Axel Cerón González, chairman, National Autonomous University of Mexico

Final Report

Introduction

Contest: What is it?

The **Mexican Soil Judging Contest** *(Concurso Mexicano de Evaluación de Suelos,* in Spanish) is a training activity, which looks for sharing Soil Science with young people through soil description, classification, and its evaluation of capacity, ecosystem functions, and vulnerability, based on environmental proxies. These activities have been carried out since 2014 in the international scope, and since 2018 in Mexico.

The Contest: CMES2020

The **CMES2020** was organized by a multidisciplinary team with Axel Cerón González and Prof. Elizabeth Solleiro Rebolledo as Chairman and Scientific Chairman, respectively. The first important action taken for the CMES2020 was the change of name to **Concurso Mexicano de Evaluación de Suelos**. In this way, a new logo was adopted showing with a lot of pride Mexican geography and simulates soil organization in horizons.
The new logo characterizes itself for its simplicity and easy message.

Nevertheless, 2020 posed a logistic challenge because the current pandemic stopped any possibility to have a contest in person. For this reason, CMES2020 emigrated to online version, to keep its annual promotion. In the CMES2020's framework and with solid commitment to promote Soil Science education, two more projects were developed: ***Edafografias*** (infographics on Soil Science topics) and **1st International Soil Judging Workshop** (*1er Curso Internacional de Evaluación de Suelos*, in Spanish).

Organizing Committee

Edafografías, **1st International Soil Judging Workshop** (**CIES2020**), and **3rd Mexican Soil Judging Contest** (**CMES2020**) were organized by Youth Action Commission of the Mexican Soil Science Society (SMCS, for its acronym in Spanish), and the Institute of Geology of National Autonomous University of Mexico (UNAM, for its acronym in Spanish). The organizing committee was constituted by eleven collaborators (Table). CMES2020 had the support of Institute of Geography (UNAM) and Latin American Soil Science Society as well.

Organizing Committee of the three projects: collaborators, institutes of adscription, and email contact.

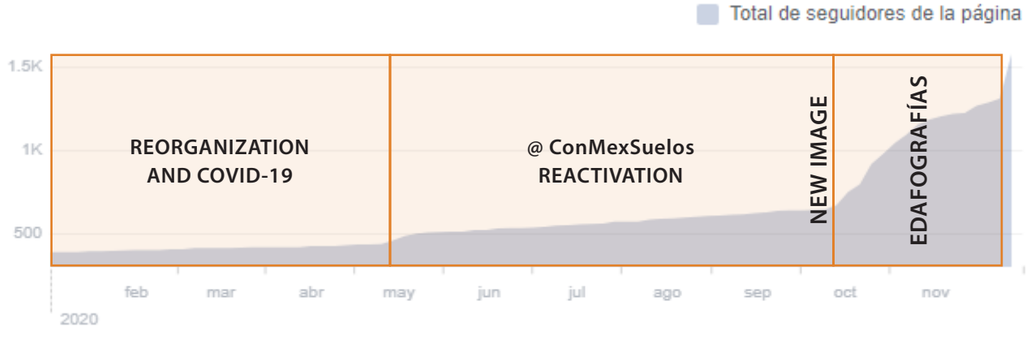
Name	Institute of adscription	Email
Axel Cerón González **Chairman**	National Autonomous University of Mexico	*axelc@ciencias.unam.mx*
Elizabeth Solleiro Rebolledo **Scientific Chairman**	National Autonomous University of Mexico	*solleiro@geologia.unam.mx*
Luis Daniel Olivares Martínez **Vicechairman**	Michoacan University of San Nicolas de Hidalgo	*ldolivares@enesmorelia.unam.mx*
Martha D. Bobadilla Ballesteros **Organizing Committee**	National Autonomous University of Mexico	*daniela.bobadilla@ciencias.unam.mx*
Daniela F. Vargas Rodríguez **Organizing Committee**	National Autonomous University of Mexico	*dafervaro@ciencias.unam.mx*
Carmina Gámez Barajas **Organizing Committee**	Colegio de Postgraduados	*elvicazaragoza@gmail.com*
Judith Amador Sierra **Organizing Committee**	Technological University of Rodeo	*yuama_1991@gmail.com*
Jesús Aceves Romero **Marketing Campaign**	National Autonomous University of Mexico	*jesusacevesr@gmail.com*
Alejandro Silva Esquivel **Technological Support**	National Autonomous University of Mexico	*asilva@geologia.unam.mx*
José Irán Márquez Rubio **Design**	National Autonomous University of Mexico	*irannmarquez@gmail.com*
Alfredo A. Miguel Sánchez **Design**	National Autonomous University of Mexico	*daniel.alfamol@gmail.com*

Results

New image, more impact

The CMES' new logo was released in early October 2020, just in its first two months and based on Facebook's statistics, it had an impact on more than 130,000 people. Its vitality and power make it worthy of being preserved for the next CMES' logos. Likewise, the logo was made to have minimum adaptations for the following CMES editions.
It is important to highlight that in early January 2020 when the current CMES' administration started, the official Facebook (@ConMexSuelos) had 389 followers according to Facebook's data. Keeping in mind that @ConMexSuelos was released in August 2018, it grew at a rate of 22.88 followers per month. From January to November 29th (a day before of the "**1st International Soil Judging Workshop**"), @ConMexSuelos had 1,311 followers, an increase of more than 330% it means that the page grew at a rate of 92.20 followers per month, even considering inactivity months because of coronavirus and reorganization of CMES (Figure).

Official logo of Mexican Soil Judging Contest with adaptations for its third edition



@ ConMexSuelos: growth of total followers (January 1st – November 29th, 2020)

Edafografías

The **Edafografías** (in English *Edafografías* could be translated as *Pedographics*) project helped to make CMES2020 visible on social media, and it worked as a key aspect to share Soil Science with society. Edafografías were released in October 2020, and in its first season it consisted of 23 sheets, some Edafografias are:

- ¿Qué es el suelo? *(What is soil?)*
- Factores formadores del suelo *(Soil forming factors)*
- ¿Cómo describir el perfil del suelo? *(How to describe a soil profile?*)
- Procesos redox en suelos *(Redox processes in soil)*
- Yeso en suelos *(Soils with gypsum)*
- Yeso en suelos de humedales *(Wetland soils with gypsum)*
- Carbonatos secundarios *(Pedogenic carbonates)*
- Ácidos fúlvicos, húmicos y huminas *(Fulvic acid, humic acid, and humin)*
- Cutanes de arcilla *(Clay coatings)*
- Agrocutanes (Spanish and English version, *Impure clay coatings*).

Among the Edafografias with the greatest impact we can point out "**¿Qué es el suelo?**" to 9,149 people; "**Yeso en suelos**" to 6,034 people; and "**Procesos redox en suelos**" to 5,447 people. It is remarkable that "**Agrocutanes**" Edafografía had its versions in Spanish and in English ("**Impure clay coatings**", its translation). The translated version was shared into academic groups in which English is the common language, this action gave visibility to CMES2020 in the international scientific community. Finally, it is important to say that Edafografías (text, photographs, diagrams, and design) are CMES' intellectual property.

1st International Soil Judging Workshop

The **1st International Soil Judging Workshop** (**CIES2020**) was integrated by 16 professors from Mexico, Spain, Russia, Germany, and the United States, with three general themes and one workshop. The Workshop topics were soil genesis, classification, evaluation, and geography. Particularly, CIES2020 was focused mainly on soil memory, soil organic matter, and soil hydrology. The CIES2020 was held from November 30th to December 4th, 2020.

Theme 1. Soil: infinite source of information

Theme 1 was inaugurated by Prof. Carmen Gutiérrez Castorena who made emphasis on keep following dokuchavian's legacy to clearly understand the rules of soil formation phenomenon and assure the right land use. Afterwards, Prof. Christina Siebe Grabach characterized soil as a natural body, three-dimensional, dynamic, complex, and active in time and space; furthermore, she remarked that 1 cm of soil requires between 100 and 400 years to be formed. The challenge of contemporary Soil Science led a warm discussion. To conclude Theme 1, Prof. Juan Luis Mera mentioned the necessity of soil analysis' data for a well-taken decision in the agronomic scope.

The schedule of the 1st International Soil Judging Workshop

Theme 2. Soils in space and time

Theme 2 was divided into three sections. The **first section** was started by Prof. Pavel Krasilnikov who took up the beginnings of dokuchavian Soil Science to put on the table concepts like *soil zonality*. He also led us to soil geography to show soil-thematic cartographies of Mexico, the United States, and Ghana. The end of his conference was about an interesting topic: *soil diversity*. Immediately, Prof. Peter Schad shared the World Refence Base (2015) structure, and he exemplified different soil groups around the world, from Mexico to Brazil and Germany. To unify both interventions and for a great finale, Prof. Carlos Omar Cruz Gaistardo broached landscape analysis and WRB soil classification under GIS structure and cartographic logics. He also emphasized discerning between soil description and evaluation.

The **second section** was opened by Prof. Sergey Sedov who did not miss opportunity to emphasize that soils are bodies able to keep information about their present-and-past forming processes, under neo-dokuchavian vision: the *soil memory*. For this reason, to determine land potential it is essential to take in account relict soil properties. Subsequently, Prof. Bruno Manuel Chávez Vergara highlighted that Soil Organic Matter (SOM) is a cause and result of multiple environmental processes, therefore it is necessary to study SOM by a bio-geo-chemistry perspective. He pointed out that SOM time return to soil was reduced by 13.5% just in the 1860-2000 period, because of land use changes and global warming. Finally, Prof. Alberto Gómez-Tagle Chávez introduced us to soil humidity aspects and its importance for regional understanding of environmental conditions through hydromorphic setting and soil properties. He remarked soil essentiality for water cycle and hydric transfer in soil-biota relationship.

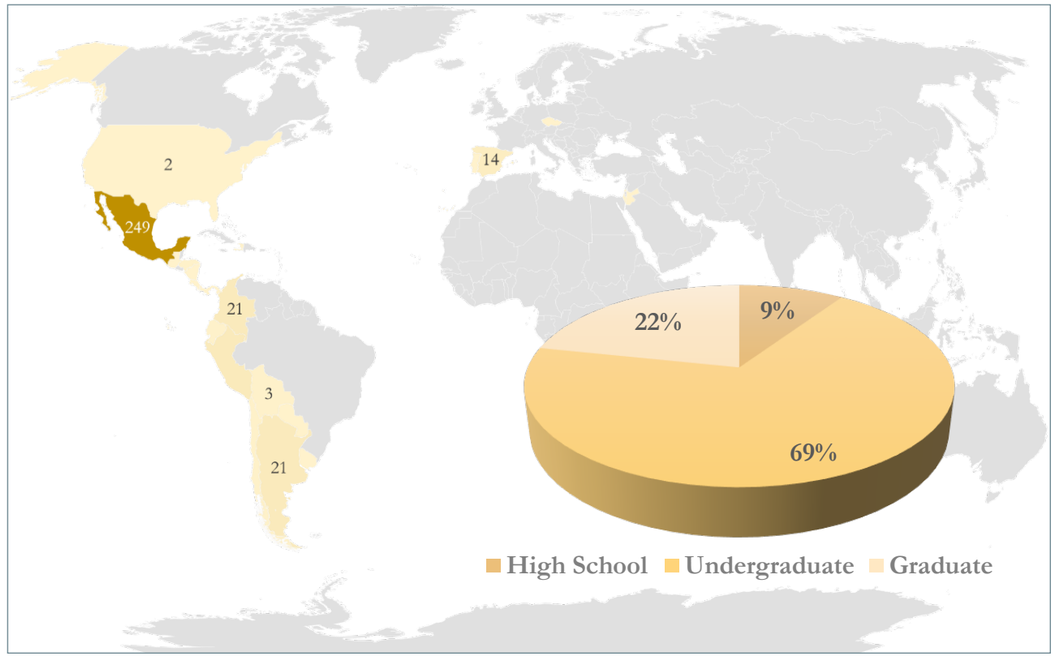
In the **third section**, Prof. Norma Eugenia García Calderón emphasized soil multifunctionality and she showed us that soil ecosystem role is under anthropo-pressure. She introduced two important visions to evaluate soil by its function in the Anthropocene, and as the "critical element" of the *Critical zone*. Next, Prof. Rosa María Poch deepen in soil as a landscape continuum, in this way it cannot be treated as an independent *object*. Besides, she summits the importance of soil micromorphology to analyze environmental processes. To conclude the third section and the Theme 2, Prof. Elizabeth Solleiro Rebolledo remarked the importance of soil and sedimentary memories as information sources to environmental reconstruction of the landscape. In addition, she made an analogy between youth, adulthood, and old age according to soil formation time characteristics.

Theme 3. Soil evaluation

The **Theme 3** started with a casual conversation of the Spanish team's experience about the 3rd International Soil Judging Contest (Rio de Janeiro, 2018). For this reason, Profs. Alba Catalán, Mar Carreras, Íker Hernández, and Alberto Lázaro talked about their learning process before-during-and-after the International Contest. They animated to Latin American students to participate in the next International Soil Judging Contest that will be held in Glasgow (2022). Later on, Prof. Carlos Ortiz Solorio emphasized that soil has no profession, its use depends on political decisions. Moreover, he encouraged to stop using antique terms and to keep in concordance with contemporary Soil Science. The ending of the Workshop was held by Prof. Silke Cram who clarify that sustainable cities are not possible if they do not understand their own soil. She concluded that urban soils are essential for human health, they are also necessary for the mitigation and recovery of emergent diseases such as the actual COVID-19.

Participants

The Workshop had 357 official-registered participants, and it was streamed on Zoom and Facebook (@ConMexSuelos). Nonetheless, in its first day it had an impact on more than 12,000 people on @ConMexSuelos. In Mexico, 29 of the 32 States attended the Workshop. In Latin America it is remarkable for their number of participants Peru, Argentina, Colombia, and Spain. Outside of Latin America there were participants from Israel, Czech Republic, Portugal, and the United States (Figure below). The Workshop was attended mainly by undergraduate students (Figure/chart), and the main age range was between 21 and 25-year-old.



CIES2020's official-registered participants by country. a. Academic level

3rd Mexican Soil Judging Contest

The **CMES2020**'s selection process was opened to Latin America, and it closed with 90 registered-people. There were participants from 18 countries Mexico included. Nevertheless, it was well-finished by 26 participants. The CMES2020 was structured in two sections: practical part and theorical part. The practical part was about soil analysis, classification, evaluation, and interpretation of real soil data. All the participants had to do it in a maximum of 50 minutes. The theorical part consisted of automatized questions about learnt topics in the CIES2020. The CMES2020 was held on December 5th, 2020.

Winners

The winners were distributed between three countries: Mexico, Israel, and Chile, due to the international impact of the CMES2020. Nonetheless, the CMES2020 had not only impact on Latin America, but outside of it, promoting Soil Science in Spanish around the world. The winners were:

1st place. Xochitl Tapia Sanchez, National Autonomous University of Mexico (Mexico)

2nd place. Erick Lopez Mendoza, National Autonomous University of Mexico (Mexico)

3rd place. Dafna Casaretto, Bar Ilan University (Israel)

The programme of the 3rd Mexican Soil Judging Contest

4th place. Anael Videla Delaigüe, Catholic University of the North (Chile)

5th place. Cristina E. Vázquez Xicoténcatl, National Autonomous University of Mexico (Mexico).

Awards

The awards were provided by Prof. Elizabeth Solleiro Rebolledo, Institute of Geology – UNAM, Instituto of Geography – UNAM, and Mexican Soil Science Society. Each award pack consisted of fieldwork materials and books.

The winners of the 3rd Mexican Soil Judging Contest

Closure

The CIES2020 and CMES2020 closure ceremonies were held on December 5th at the ending of the CMES2020, in the framework of the **World Soil Day**. The scope of the activities and the winners of the CMES2020 were announced at the closure ceremony. The ceremony counted with the principal promoters of these activities: Prof. Ricardo Barragán Mazón (Institute of Geology – UNAM, Principal), Prof. Fabián Fernández Luqueño (Mexican Soil Science Society, Technical Secretary), Prof. Laura Bertha Reyes Sánchez (International Union of Soil Sciences, President), Axel Cerón González (CMES2020, Chairman), and Prof. Elizabeth Solleiro Rebolledo (CMES2020, Scientific Chairman). The Closure ceremony was moderated by Martha D. Bobadilla Ballesteros (CMES2020, Organizing Committee).

Some conclusions

Image and name

- The visibility that CMES has gained is associated with its current name and image. Therefore, it is vitally important to maintain them so as not to hinder its presence.
- During all the marketing campaign there was faithfulness to an aesthetics that was made for the CMES2020, which included fonts, background designs, and colors. This decision made possible the easy distinction of the CMES2020.

Edafografías

- @ConMexSuelos woke up from its 2-year-lethargy thanks to Edafografias.
- They promoted to the CMES2020 and the activities of the Youth Action Commission.
- They attracted people to the CIES2020 and CMES2020.

1st International Soil Judging Workshop

- A well-thought curatorship and a high professor's diversity in interesting contemporary Soil Science topics, were the basis of an active discussion during the Workshop.
- The Workshop was held simultaneously on Zoom and Facebook. Likewise, each session was recorded, and we are currently working on generating a free playlist for YouTube. This action will set a historic milestone for the development of the teaching of contemporary Soil Science in Spanish.
- For the first time, a former team of the International Soil Judging Contests shared their experiences in these kinds of events. In this way, the promotion for the next International Soil Judging Contest (Glasgow, 2022) within Latin Americans began. It is necessary to highlight that in these activities the Latin American presence has been relegated to Mexico, Brazil, and Spain in the last 6 years.

3rd Mexican Soil Judging Contest

- The Contest proposed soil memory as a new way to soil evaluation.
- It also incorporated into soil organic matter and soil carbon store as pertinent evaluations to face up the current global change, and as easy estimations in the field.
- It updated to soil-hydrological evaluation from the past handbooks prepared for the International Contests. It also incorporated relevant aspects for soil-hydrological evaluation in the field such as soil water repellency.

Soil Judging Handbook

Vargas-Rodríguez, D.F., Cerón-González, A., Olivares-Martínez, L.D., Bobadilla-Ballesteros, M.D. (2020). Manual de Evaluación de Suelos. Énfasis en Memoria Edáfica, Materia Orgánica e Hidroedafología. Sociedad Mexicana de la Ciencia del Suelo. Available on: *https://bit.ly/37izkDd*.

@ConMexSuelos

- @ConMexSuelos had more than 1,750 followers in mid-December 2020. It means a growth rate of 114.41 followers per month during the 2020's administration. Just in the first two weeks of December 2020, @ConMexSuelos grew at a rate of 225.5 followers per week. In other words, @ConMexSuelos continues increasing its impact on Facebook.

Axel Cerón González
Chairman

Report of Soil Science Conference of Malaysia (SOILS 2020)

Prepared by ChM. Rozita Ahmad, Chair Organising Committee SOILS 2020, Forest Research Institute Malaysia

Introduction

The Soil Science Conference of Malaysia 2020 also known as SOILS 2020 was successfully organised on 6 to 8 October 2020 at Holiday Villa, Johor Bahru in Johor, Malaysia. The conference was officiated on 6 October by Chief Minister of Johor, Datuk Ir Hasni Mohammad. The three day conference was organised by the Forest Research Institute Malaysia (FRIM) and the Malaysian Society of Soil Science (MSSS) with the support of the International Union of Soil Sciences (IUSS). The previous date for the conference, 7 to 9 April 2020, had to be postponed and rescheduled six months later due to the Covid-19 pandemic.

The objectives of SOILS 2020, themed "Soil Management towards Plant Productivity and Environmental Sustainability", are to promote good practices and multidisciplinary approaches for increasing yields and enhance appreciation for the roles and importance of soil in relation to various economic and environmental aspects. The conference served as a platform for participants to share research findings, experiences and discuss important issues and solutions related to soil management towards improvement of crop and plant performances in protecting the key roles of soils while sustaining the environment.

The theme also resonates with the FAO World Soil Day's theme, "Keep soil Alive, Protect Biodiversity", aimed at raising awareness on the importance of maintaining healthy ecosystems and human well-being by addressing the growing challenges in soil management.

Datuk Hasni also launched two books written by FRIM Scientists, entitled "Correlation of Soil Types and Tree Species Distribution for Peninsular Malaysia" and "Life Journey of Rengam Under the Feet". The former provides a good guide for tree species selection based on soil suitability of a particular site, while the latter is a book for children about the effects of human activities on soil.

Delegates

The event was attended by more than 110 participants and invited speakers comprising experts, researchers and entrepreneurs from Malaysia as well as from Japan, Fiji and Indonesia who joined through online channel and video presentations. Breakdown of participants and invited speakers from different agencies and universities attending the conference:

No.	Country	Agency	Num
1	Malaysia	Forest Research Institute Malaysia (FRIM)	33
		Universiti Putra Malaysia (UPM)	27
		Malaysia Agricultural Research and Development Institute (MARDI)	7
		Malaysian Palm Oil Board (MPOB)	2
		Malaysian Plam Oil Council	1
		Malaysia Cocoa Board	1
		Forestry Department of Peninsular Malaysia	1
		Universiti Malaysia Pahang (UMP)	3
		Universiti Sains Malaysia (USM)	1
		Universiti Malaya (UM)	1
		Universiti Teknologi Mara (UiTM)	2
		Universiti Malaysia Sabah (UMS)	2
		Risda Estate Sdn Bhd	3
		Wild Asia	1
		United Plantations Bhd (UP)	3
		Sime Darby Research Sdn. Bhd.	4
		Behn Mayer Agricare (M) Sdn Bhd	3
		Lembaga Kenaf dan Tembakau Negara (LKTN)	2
		FELDA	3
		Mega Agro Sejahtera Sdn Bhd	2
		Diversatech Fertilizer Sdn Bhd	2
		AM Gemilang	2
		Param Agriculture Soil Survey (M) Sdn Bhd	1
2	Fiji	Koronivia Fiji National University	1
3	Indonesia	Universitas Riau	2
		Brawijaya University	2
4	Japan	Aichi University	1
		Kyoto University	1
		Total number	**114**

Scientific and technical programme

The scientific and technical programme comprised 21 oral presentations and 58 posters. The conference had two keynote papers from the IUSS President, Professor Dr Takashi Kosaki as well as member of the East and Southeast Asia Federation of Soil Science Societies (ESAFS), Professor Dr Shinya Funakawa. Two plenary papers were presented by MARDI, Dr Wan Abdullah Wan Yusoff, a Senior Researcher and Xaviar Arulandoo, an agronomist consultant.

The scientific and technical programme was divided into six sessions as follows:

1. Soil in greater landscape and forests
2. Soil fertility and health
3. Soils in anthropocene
4. Soil biodiversity and ecology
5. Soil bioremediation and environment
6. Soil management in plantations.

Oral presentations were given in three different modes, which were oral, video and live conferencing. Video and live conferencing were conducted by international speakers and local presenters from Sabah and Sarawak. Five best posters and one best oral presenter awards were given based on the quality of papers and research coherence. Hardcopies of Proceedings of SOILS 2020 were printed and distributed to participants.

Post – conference tour (PCT)

A post-conference tour for participants was held on 8 October 2020. A total of 40 participants including 15 students selected under IUSS Stimulus Fund joined the tour. The PCT to Rubber Research Institute Malaysia (RRIM) in Kota Tinggi, Johor was arranged to study two soil pedons. All participants were given a tour bulletin during the visit. The morphology properties and soil classification were determined based on the soil profile description and analysis on data of the soil pedons. Soil management and practices as well as crop suitability were also discussed. The tour ended with visit to KEJORA agricultural farm in Bandar Penawar, Johor.

Impact

SOILS 2020 received media coverage from Utusan online, Johor Press, Guang Ming Daily and Oriental Daily News. The event received nearly 500 likes and good comments in social media.

IUSS Stimulus Fund

A total 15 students were selected from 21 applications for the IUSS stimulus fund. The extended abstracts submitted were evaluated by three independent judges based on language, originality, clarity, topics related to soil science and research coherence. Successful applicants were awarded the subsidized registration fee of RM 350 and the fee for the post conference tour was waived. List of IUSS Stimulus Fund recipients is as below:

No.	Name	Institution
1.	Afieqah Mohd Zulkefly	Universiti Putra Malaysia
2.	Tan Shu Qing	Universiti Putra Malaysia
3.	Chew Cindy	Universiti Putra Malaysia
4.	Ng Ji Feng	Universiti Putra Malaysia
5.	Ira Carlbrenie Simol	Universiti Putra Malaysia
6.	Carlina Freddie Simol @ Rachellynna	Universiti Putra Malaysia
7.	Alicia Vanessa Jeffary	Universiti Putra Malaysia
8.	Intan Nadhirah Masri	Universiti Putra Malaysia
9.	Patahayah Mansor	Universiti Putra Malaysia
10.	Saidu Abdullahi	Universiti Sains Malaysia
11.	Nur Fudhla Aminah Bujang	Universiti Teknologi Mara
12.	Asfarinawati Ambas	Universiti Malaysia Sabah
13.	Rachmiwati Yusuf	Universitas Riau, Indonesia
14.	Reni Ustiatik	Brawijaya University, Indonesia
15.	Siska Nurfitriani	Brawijaya University, Indonesia

Due to the Covid-19 situation and compliance to Standard Operating Procedures (SOPs) outlined by the National Security Council, entry of international participants into Malaysia was restricted. Therefore, another three students were selected from Malaysia, to replace the previously selected students from Indonesia, for the waived PCT fee under IUSS Stimulus Fund. They were Nuraini Shafinaz Mohd Anuar (UPM), Izzah Abd Hamid (UPM) and Mohd Hairy Azwan (UiTM).

The IUSS and IDS 2015-2024 logos were included in publicity materials during promotion activities and events of SOILS 2020 as follows:

1. Brochure
2. Poster SOILS during AgriMy exhibition in September 2019
3. Backdrop
4. Bunting
5. SOILS 2020 souvenir programme
6. Proceedings SOILS 2020
7. Soil tour bulletin.

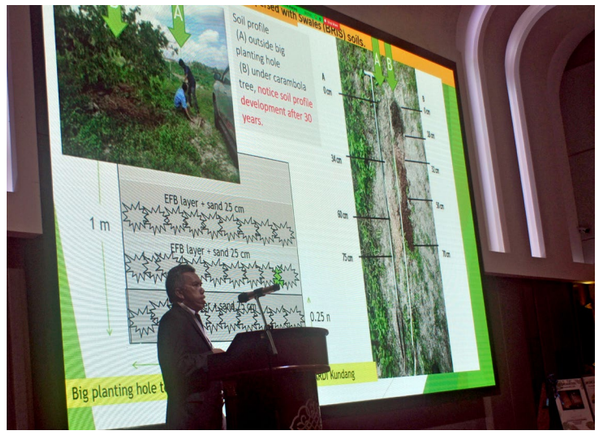
Photos during SOILS 2020

The Arrival of Chief Minister of Johor, Datuk Ir Hasni Mohammad at Holiday Villa, Johor Bahru (© FRIM)

Opening speech by Datuk Ir Hasni Mohammad (© SOILS2020)

Participants had their temperature check and scanned QR code upon arrival (© SOILS2020)

Video presentation by keynote speaker, Professor Shinya Funakawa from Kyoto University (© Rozita Ahmad)

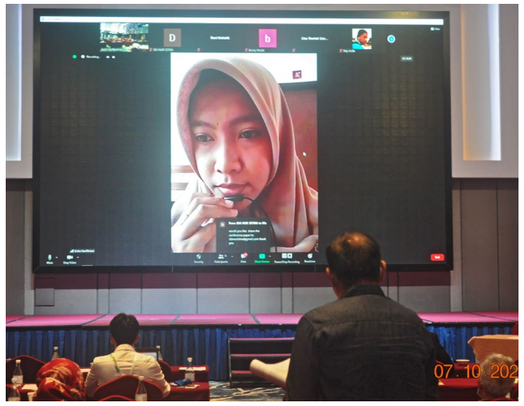


Plenary presentation by Dr Wan Abdullah from MARDI (© SOILS2020)

Presentation from Sime Darby Research, Shamsol Nidzam (© SOILS 2020)

Presentation by Dr Vijandran from UP (© SOILS 2020)

Live presentation by Dr Latifah Omar from Sarawak (© SOILS 2020)



Live Q&A session to participant from Indonesia (© SOILS 2020)

Left and right: Q&A session (© SOILS 2020)

Photos during post-conference tour

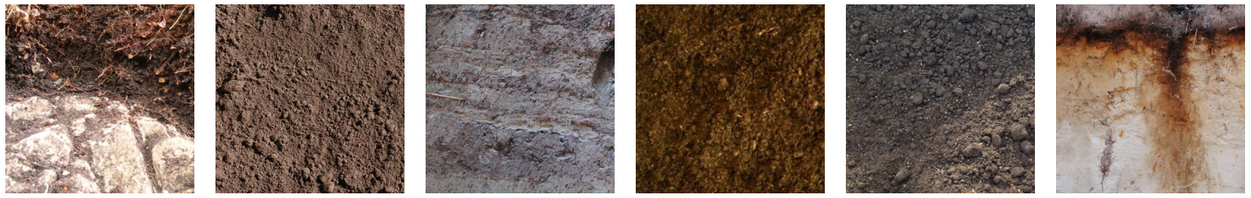
Participants had their temperature check and scanned QR code upon arrival at RRIM, Kota Tinggi (© SOILS 2020)

Briefing by soil coordinator, Dr Safa from UPM together with En Mohamad Fakhri from FRIM (© SOILS 2020)

Participants examining the soil pedon (© SOILS 2020)

Left & below: Participants visit KEJORA agricultural farm in Bandar Penawar, Johor (© Rozita Ahmad)

Group photo of PCT participants (© SOILS 2020)



IUSS Alerts

December 2020 – May 2021

Information for and from the global soil science community

IUSS Alerts are e-mailed to more than 2,800 individual subscribers and 80 national soil science societies globally. Please forward the IUSS Alerts to your friends and colleagues. Send information for IUSS Alerts to *iuss@umweltbundesamt.at*. Below are still relevant contributions that appeared in the IUSS Alerts between December 2020 and May 2021.

Multispectral reflectance data LUCAS 2015 are available

Last October, ESDAC announced the release of the LUCAS 2015 soil dataset. Now, also the Multispectral reflectance data are available for the 20,000+ soil samples of the LUCAS 2015 SOIL campaign. These data, together with the spectral library of the LUCAS 2009 SOIL campaign, will allow scientists to explore the potential of soil spectroscopy for determining accurately soil properties and demonstrate its operational robustness.
Read more: *https://esdac.jrc.ec.europa.eu/content/lucas2015-topsoil-data*.
[From ESDAC Newsletter No 126 (December 2020)]

Check out the Soil Biodiversity Observation Network

Humans depend on living soil resources for their nutrition, recreation, and health needs. Yet, the current and future response of global soil biodiversity to human activities and the consequences for ecosystems and their essential functions remains unknown. Implementing operational and sustained programs to detect changes to soil biodiversity and ecosystem functioning as a result of human activities is critical to understanding and managing impacts on natural capital and ecosystem services.
Constituted as a global *Soil Biodiversity Observation Network (Soil BON)*, this group is working in partnership with the Global Soil Biodiversity Initiative (GSBI) and other international partners to make soil biodiversity and ecosystem function observations available to ensure living soil resources are sustainably conserved and managed.
Read more: *https://www.globalsoilbiodiversity.org/news-2/2020/11/23/soil-bon-collaboration*.
[From GSBI Newsletter – December 2020]

Take a Survey on Functional Traits of Soil Fauna

Please consider taking the following survey from Dr. Anton Potapov of EUdapobase, a COST Action Plan, if you use or are planning to use traits of soil fauna in your research. It should take about 5-10 minutes to complete. Feel free to disseminate the survey to your fellow soil researchers.
Take the survey: *https://docs.google.com/forms/d/e/1FAIpQLSePezp8io1fbjj0yj6P64zN5mbri1zX1m_XnYU-JZWOHxdpQQ/viewform*.
[From GSBI Newsletter – December 2020]

Soil arthropod mesofauna takes the stage: advances from whole-community haplotype-level metabarcoding

Our understanding of the spatial structure and the underlying processes of community assembly of soil biodiversity have increased dramatically in the last years. However, this knowledge is still strongly unbalanced across taxonomic groups, a situation which hampers the development of an integrative framework for soil biodiversity. In particular, there is a pronounced shortage for soil arthropods, in part because the implementation of high-throughput sequencing to this soil biodiversity fraction has seen comparative little and delayed progress in adapting and exploiting these tools.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2020/11/15/soil-arthropod-mesofauna-takes-the-stage-advances-from-whole-community-haplotype-level-metabarcoding*.
[From GSBI Newsletter – December 2020]

Soil Biodiversity for Kids

Check out the new special collection in Frontiers for Young Minds on soil biodiversity. This collection includes an article by Felix Gottschall and colleagues on the importance of conserving soil biodiversity called, "Can we save the beast by conserving the beauty?"
Read more: *https://kids.frontiersin.org/article/10.3389/frym.2020.547740*.
[From GSBI Newsletter – December 2020]

Sounding Soil

Initiated by Markus Maeder, a Swiss musicologist, 'Sounding Soil' is an interdisciplinary research project that studies the sounds of the ground. To put it simply, this project, which will end in 2021, analyses how and why soils emit different sounds depending on their use.
The interim assessment is as follows: the greater the

diversity of organisms living in the soil, the more complex the sound it emits.
'Sounding Soil' is a project involving six institutions: the Zurich University of the Arts (ZHdK), the Foundation for Ecological Development Biovision, the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), the National Soil Observatory (NABO), the Institute for Terrestrial Ecosystems (ETH Zurich) and the Research Institute for Organic Agriculture (FiBL).
Listen to the sounds of soil:
https://www.soundingsoil.ch/en/.
[From *Le Monde de l'Agriculture Régénérative*, December 2020, original article only available in French]

The Global Soil Doctors Programme

Soil Doctors are champion farmers who assist and train farmers in their community.
The Global Soil Doctors Programme provides soil doctors with training, educational material and soil testing kits to build capacity on the principles of soil science and promote the practice of sustainable soil management. They become the focal points to associations involved in promoting the global programme and work closely with government agencies, research centers, soil science societies, universities, NGOs, and more.
Read more: *http://www.fao.org/global-soil-partnership/pillars-action/2-awareness-raising/soil-doctor/en/*.

Movie 'Keep soil alive'

Our mission: Keep #Soil alive! Let's focus on protecting our soils before this process becomes irreversible.
Watch the movie: *https://tinyurl.com/y2rg94ak*.

IUSS Bulletin 137 online

IUSS Bulletin 137 (94 pages) was published on the IUSS website early January 2021. The avid reader awaits an update on the further preparations for the 22nd World Congress of Soil Science (WCSS22), news from national and regional Soil Science Societies, followed by an account of World Soil Day 2020 and the presentation of THE IUSS GOES TO SCHOOL project. In the beginning of December 2020 a new sub-site was created on the IUSS website, in which recent activities of this initiative are described: *https://www.iuss.org/international-decade-of-soils/the-iuss-goes-to-the-school/*. Information on the IUSS educative project "Thus are the soils of my Nation" (#TheSoilIsLife), which aims at stopping soil degradation, and on the IUSS – FAO-GSP Children's book contest on Soil Biodiversity round off the section on soil education and awareness raising. This is followed by conference and meeting reports, articles from the IUSS alerts, new publications and an article on an extraordinary documentary about soils with the title 'Kiss the Ground'.
Read more: *https://www.iuss.org/publications/iuss-bulletins-archive-since-1952/*.

Land-applying forest residues restores soil acidity

Soil acidification, a major issue responsible for agricultural land degradation, affects 50% of arable soils in many countries, including Canada and the United States. Land application of forest-derived residues is one solution for correcting soil acidity – and these forest-derived residues are widely available.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/10.1002/csan.20343*.
[From: ASA-CSSA-SSSA Science Policy Report: 20 January 2021]

Webinar on Soil Governance

To mark the launch of the SoiLEX platform, the FAO Global Soil Partnership (GSP) organized a webinar on soil governance on 13 January 2021. The webinar included a high-level opening, presentations on how to improve soil governance, the presentation of the SoiLEX platform and a question and answer session with all panelists. The webinar brought together 824 participants from more than 160 countries and was a milestone in the promotion of soil governance around the world. The discussion generated considerable interest in the implementation of legal instruments related to soil protection in different countries. The SoiLEX is a global database on national legislation on soil that aims to facilitate access to existing legal instruments and to bridge the gap between soil stakeholders. The new online platform facilitates the search for national soil legal instruments, the understanding of legal areas relevant to soil management and protection as well as the exchange of experiences in soil governance between countries and regions.
To know more: *http://www.fao.org/global-soil-partnership/resources/events/detail/en/c/1364883/*.
[From: Global Soil Partnership Newsletter no 30, 22 December 2020]

Global Soil Doctors questionnaire

Interested in the Global Soil Doctors Programme? The first step in the implementation of the *Global Soil Doctors Programme* at the local level is the identification of potential promoters. To determine whether your institution or project is suitable to implement the Global Soil Doctors programme, please answer this short questionnaire:
EN: *https://bit.ly/3gPXJ7z*; ES: *https://bit.ly/34edVdP*
FR: *https://bit.ly/3oV4RCo*
Any questions? *soil-doctor@fao.org*
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1364945/*.
[From: Global Soil Partnership Newsletter no 30, 22 December 2020]

Launch of the International Network on Fertilizer Analysis

In relation to the implementation of the International Code of Conduct for the Sustainable Use and Management of Fertilizers and in response to the request to look into the harmonization of methods for fertilizer analysis, the Global Soil Partnership decided to launch the International Network on Fertilizer Analysis (INFA) on 8 and 9 December 2020. The meeting, attended by about 290 people from 89 countries established the network and defined its main areas of work.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1364771/*.
[From: Global Soil Partnership Newsletter no 30, 22 December 2020]

Nasa's Curiosity rover: 3,000 days on Mars

The US space agency (Nasa) is about to put its latest rover, Perseverance, on Mars. But we shouldn't forget that the existing robot, Curiosity, is still there and working well following its landing in equatorial Gale Crater back in 2012. Curiosity celebrates 3,000 Martian days, or Sols, on the surface of the Red Planet on Tuesday. The Mission Science Team has collected together a series of pictures that record some of the rover's major achievements.
We all know Mars as the Red Planet, we see that in the night sky. However, as our drill tailings gallery shows, once we drill just a small depth in to the interior, Mars can be very different. We have drilled successfully 29 times now and the sediments show a range of hues from ochre-red to blue-grey reflecting the minerals and fluids that passed through the ancient rocks. Drilling allows us to get through the top most, oxidized surface that has been most exposed to cosmic radiation.
Read more: *https://www.bbc.com/news/science-environment-55562150?fbclid=IwAR1YEtWxHW-pt8jhBOPC42iJlBKkBxJAyF2Dzcyw4aHPlLYkafp2Rw4O5Qg*.

GSBI Blog "Beneath Our Feet": The scent of earth – a connection between sporulating soil bacteria and springtails

When digging into soil, we uncover the fragrance of earth that many of us associate with gardening, agriculture or a walk in the forest. The earthy smell is so familiar to us and common on our planet that we might not think about it as anything more than a meaningless whiff. However, the volatile compounds we smell often have a biological function for those that release or those that detect the compounds. So, what about that earthy scent of soil? Could it have an ecological significance?
The smell of soil derives largely from the two characteristic volatile organic compounds (VOCs) geosmin and 2-methylisoborneol, which have long been known to be produced by soil bacteria of the genus Streptomyces.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2020/12/22/the-scent-of-earth-a-connection-between-sporulating-soil-bacteria-and-springtails*.
[From GSBI Newsletter – January 2021]

SciDataCon/International Data Week 2021: Call for Sessions and Invitation to Sponsors and Partners

SciDataCon 2021 is an integral part of International Data Week (IDW) 2021, which will be held both virtually and onsite in Seoul, Republic of Korea, on 8–11 November 2021. IDW 2021 will also feature the CODATA 2021 General Assembly on 12-13 November 2021.
The overarching theme of IDW 2021 and SciDataCon is Data to Improve our World. In our post-pandemic future, humanity has an opportunity and obligation to address major challenges, including climate change, sustainable development, and disaster risk reduction. The digital revolution and the 'Fourth Industrial Revolution', the methods and practices of Open Science, and of FAIR data and services, give humanity the tools to do so. Embracing these possibilities requires engagement with society, rigorous research methods, and good practice in data science and data stewardship. The theme Data to Improve our World explores the nexus of these issues.
Session proposals should be submitted at:
http://www.scidatacon.org/IDW2021/.
The deadline for proposals is 31 March 2021
Conference website: *https://www.scidatacon.org/*.

Healthy soils – consultation on new EU soil strategy

Soils are essential ecosystems that deliver valuable services such as the provision of food, energy and raw materials, carbon sequestration, water purification and infiltration, nutrient regulation, pest control and recreation. Therefore, soil is crucial for fighting climate change, protecting human health, safeguarding biodiversity and ecosystems and ensuring food security. Healthy soils are a key enabler to achieve the objectives of the European Green Deal such as climate neutrality, biodiversity restoration, zero pollution, healthy and sustainable food systems and a resilient environment. The EU Biodiversity Strategy for 2030 announced the update of the 2006 EU Soil Thematic Strategy to address soil and land degradation in a comprehensive way and to help achieve land degradation neutrality by 2030. The Biodiversity Strategy for 2030 highlights that it is essential to step up efforts to protect soil fertility, reduce erosion and increase soil organic matter. Significant progress is also needed on identifying contaminated sites, restoring degraded soils, defining the conditions for their good ecological status and improving the monitoring of soil quality.
All citizens and organisations are welcome to contribute to this consultation.
Feedback period: 02 February 2021 – 27 April 2021 (midnight Brussels time).
Read more: *https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12634-New-EU-Soil-Strategy-healthy-soil-for-a-healthy-life/public-consultation?fbclid=IwAR1I73LOUvAvcmpb-luGBK1OvBGdz1RHAK0JM7m9rZKEwkJc5APLWphdD8o*.

Planting crops – and carbon, too

President Biden says farmers can adopt agricultural methods that help fight climate change. Maryland farmer Trey Hill has been trying. While his grandfather, who started the family farm along the Chesapeake Bay, always planted in the spring in a clean field, in Hill's approach to farming, "you never want to see the ground."
Read more: *https://www.washingtonpost.com/graphics/2021/climate-solutions/climate-regenerative-agriculture/*.
[From: ASA-CSSA-SSSA Science Policy Report: 3 February 2021]

Funeral of Australia's first national soil advocate

Former governor-general Michael Jeffery of Australia was farewelled as 'warrior king' at a state funeral. After 35 years in the army, he was most recently known for his advocacy for soil health, and was appointed in 2012 by then-prime minister Julia Gillard as the country's first national advocate for soil health.
After more than a decade of work, his recommendation to adopt a national objective to restore soil health to ensure future food security was committed to by Prime Minister Scott Morrison.
Read more: *https://www.abc.net.au/news/2020-12-29/former-governor-general-michael-jeffery-state-funeral/13018758*.

Mercury (Hg) distribution in European topsoils

Mercury (Hg) distribution in topsoil (0-20cm) is influenced by climate, soil properties, vegetation. In addition to the natural factor, mercury has high values close to past mining activities and coal combustion sites. High Overall, the stock of Hg in EU topsoil is estimated to c.a. 44.8 Gg with a median concentration of 38.3 µg kg^{-1}; 10% of the area exceeds the 84.7 µg kg^{-1} and 209 Hg hotspots (top 1%) have been identified with concentrations >422 µg kg^{-1}. In a detailed investigation, 42% of the hotspots were associated with well-known mining activities while the rest can be related either to coal combustion industries or local diffuse contamination. In total 209 hotspots were identified, defined as the top percentile in Hg concentration (>422 µg kg^{-1}). 87 sites (42% of all hotspots) were associated with known mining areas. The sources of the other hotspots may relate to unmined geogenic Hg or industrial pollution. In a recent research study we present soil Hg concentrations from the LUCAS topsoil (0–20 cm) survey mapped with Deep Neural Network (DNN) learning model.
Download data: *https://esdac.jrc.ec.europa.eu/content/mercury-content-european-union-topsoil*.
[From ESDAC Newsletter No 127 (Jan – Feb 2021)]

Land degradation in global arable lands

Land degradation is a global environmental issue that affects the world's arable lands on a large scale, thus threatening global food production systems. In a recent study, we analysed the land degradation footprint on global arable lands, using complex geospatial data on certain major degradation processes, i.e. aridity, soil erosion, vegetation decline, soil salinization and soil organic carbon decline. By applying geostatistical techniques that are representative for identifying the incidence of the five land degradation processes in global arable lands, results showed that aridity is by far the largest singular pressure for these agricultural systems, affecting ~40% of the arable lands' area, which cover approximately 14 million km^2 globally. Also, it was found that soil erosion is the major land degradation process, affecting ~20% of global arable systems.
Read more: *https://esdac.jrc.ec.europa.eu/content/land-degradation-global-arable-lands*.
[From ESDAC Newsletter No 127 (Jan – Feb 2021)]

Bangladesh: Soil4Nutrition project

As part of the Soils for Nutrition project, the FAO Global Soil Partnership promotes sustainable soil management practices to improve the nutritional quality of locally produced foods to address micronutrient deficiencies in local populations.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1373483/*.
[From: Global Soil Partnership Newsletter no 31, February 2021]

Sustainable Soil Management in Uganda and Rwanda

GSP in collaboration with the FAO representations in Uganda and Rwanda, South and Triangular Cooperation Division (PST) of FAO, Embassies of China to Uganda and Rwanda, and national partners in terms of ministries of agriculture, soil institutes, soil laboratories and universities have launched two projects to strengthen national capacities on sustainable soil management (SSM) to improve food security through increased agricultural productivity and nutrition.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1371498/*.
[From: Global Soil Partnership Newsletter no 31, February 2021]

Launch of the Armenian Soil Information System

The launch of the Armenian Soil Information System (ArmSIS) represents a step forward in the assessment of soil resources to guide the development of policies to prevent soil degradation. At the request of the Ministry of Economy of Armenia, ArmSIS is the result of a joint effort by FAO GSP, Armenian National Agrarian University, Centre of the Agricultural Services and Institute of Geological Sciences. ArmSIS's establishment was financially supported by the Russian Federation.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1371495/*.
[From: Global Soil Partnership Newsletter no 31, February 2021]

Network on Salt-affected Soils

The International Network of Salt-Affected Soils (INSAS) aims to facilitate the sustainable and productive use of salt-affected soils for food security, agricultural sustainability and climate change adaptation and mitigation.
Read more:
http://www.fao.org/global-soil-partnership/insas.
[From: Global Soil Partnership Newsletter no 31, February 2021]

A wealth of information on the world's ants

Ants are one of the most prominent soil macroarthropods. They live almost anywhere on land (except Antarctica and some isolated islands), and most of them nest underground, modifying soil ecosystems in the process. It has been estimated that ants make up 15-20% of the terrestrial animal biomass on Earth. Through subterranean nest excavation and maintenance, they are heavily involved in providing essential soil ecosystem services for humans (such as improving soil structure and increasing organic matter content on marginal land).
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2021/1/22/a-wealth-of-information-on-the-worlds-ants*.
[From GSBI Newsletter – February 2021]

New Podcast called Life in the Soil

Check out the new "Life in the Soil" podcast series by Dr. Matthias Rillig and colleagues!

- Episode 1: Living soil – A habitat hidden from view
- Episode 2: Fungi – The kingdom of mushrooms, spores, and networks
- Episode 3: The soil food web – A jungle in tiny dimensions.

Listen to the podcast: *https://soundcloud.com/mrillig*.
[From GSBI Newsletter – February 2021]

Speaking up for diversity in science: ISC launches podcast series

The ISC is partnering with Nature and its 'Working Scientist' podcast, highlighting all aspects of diversity in science – asking why diversity matters, why diversity makes for better science, how to integrate diverse voices and different perspectives in research, and how to promote inclusion of less well represented or marginalized groups in science settings. The series forms part of the outputs for the ISC's project 'Combating systemic racism and other forms of discrimination in science'.
Listen to the first episodes: *https://council.science/podcast/nature-working-scientists/*.

Soil erosion is unlikely to drive a future carbon sink in Europe

In the past, people always thought that soil erosion driven by climate would lead to a C sink in the near future. In this paper, a biogeochemistry-erosion model framework was used to quantify the impact of future climate on the C cycle. The result challenge the idea mentioned before.
Read more: *https://advances.sciencemag.org/content/4/11/eaau3523?fbclid=IwAR2lzOsansupV_OFwg8wP3QXaQh8zCfLVa66LIsacN7UCC5Ic9RPbCVIlwM*.

Soil Pollution Report

United Nations Environment Assembly of the United Nations Environment Programme edited report on Progress in the implementation of resolution 3/6 on managing soil pollution to achieve sustainable development. The release of the report is planned for during *#WorldEnvironmentDay* celebration on 5th June.
Read more: *https://wedocs.unep.org/bitstream/handle/20.500.11822/34634/K2002611.pdf?sequence=54&isAllowed=y&fbclid=IwAR39oG9d-HhrFh9_iKD6wqpMQ_sK3G5tnxgOmMY3si3WJ4HO0uGP2JuU6K0*.

Healthy soil definition

The concept of what is a healthy soil was not officially defined until now, although it has been used for a decade. "The ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems" by the Intergovernmental Technical Panel on Soils.
Read more: *http://www.fao.org/3/cb1110en/cb1110en.pdf?fbclid=IwAR2vdhpARKpUJXJdklXtqNsU7PFkUlw9adQ9zLvUck3gp2Rsjrp7HI07JSo*.

New infographic on soil and SDGs

A *#HealthySoil* is capable of providing most terrestrial ecosystem services and contributes to achieve the SDGs and human well-being.
Read more:
http://www.fao.org/3/cb1928en/CB1928EN.pdf page 128.

Why is pH so important and a sign of soil health

It influences the availability of nutrients in the soil and the health of the animals and plants that live in it.
Find out more on soil pH
http://www.fao.org/3/ca7162en/ca7162en.pdf .

Arable lands under the pressure of multiple land degradation processes. A global perspective

While agricultural systems are a major pillar in global food security, their productivity is currently threatened by many environmental issues triggered by anthropogenic climate change and human activities, such as land degradation. However, the planetary spatial footprint of land degradation processes on arable lands, which can be considered a major component of global agricultural systems, is still insufficiently well understood. This study analyzes the land degradation footprint on global arable lands, using complex geospatial data on certain major degradation processes, i.e. aridity, soil erosion, vegetation decline, soil salinization and soil organic carbon decline.
https://www.sciencedirect.com/science/article/abs/pii/S0013935120315966?fbclid=IwAR2RurUQFbNcJk-IBRZOkPSAzOEZr9n16MmHUocdBgp8-uhxdf_mnZfuLqM.

African Scientists Directory

A kind reminder to all ISC Members to consider consulting the African Scientists Directory, which was launched in 2020, should you be looking for an African voice to advance your science or to strengthen your scientific union or organization. We encourage all individuals with scientific expertise who are based in Africa to join the directory, and encourage our Members to share the link with their networks:
https://africanscientists.africa/.
[From: ISC Newsletter, 1 March 2021]

NSF Agricultural Microbiome RCN Requests Feedback

The NSF-funded Agricultural Microbiomes Research Coordination Network (Ag Microbiomes RCN) is launching a community-wide survey to assess the current state of the science. This 10-minute survey will build engagement within this research community.
Complete the survey:
https://umn.qualtrics.com/jfe/form/SV_4I0PPZqYL0hs7Jk.
[From: ASA-CSSA-SSSA Science Policy Report:
3 March 2021]

More than one-third of corn belt farmland has completely lost its carbon-rich topsoil

According to University of Massachusetts Amherst research, the U.S. Department of Agriculture has significantly underestimated the true magnitude of farmland erosion. In a new paper published in the Proceedings of the National Academy of Sciences, research conducted by UMass Amherst graduate student Evan Thaler, along with professors Isaac Larsen and Qian Yu in the department of geosciences, developed a method using satellite imagery to map areas in agricultural fields in the Corn Belt of the Midwestern U.S. that have no remaining A-horizon soil.
Read more: *https://scitechdaily.com/more-than-one-third-of-corn-belt-farmland-has-completely-lost-its-carbon-rich-topsoil/*.
[From: ASA-CSSA-SSSA Science Policy Report:
17 March 2021]

Legumes get help from soil biodiversity to reduce effects of climate change

Global environmental change, including factors such as drought, nitrogen (N) deposition and warming, has been shown to threaten plant and soil biodiversity. It is well known that global change can dramatically alter plant community composition, and reduce ecosystem functions as a result of plant diversity loss. However, whether soil biodiversity loss can further influence plant community responses to global change is still poorly understood.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2021/2/15/legumes-get-help-from-soil-biodiversity-to-reduce-effects-of-climate-change*.
[From GSBI Newsletter – March 2021]

Next Episode of "Life in the Soil" Podcast Available

Check out the latest episode of "Life in the Soil": Methods – How to Explore a Microscopic World by Dr. Matthias Rillig and colleagues.
Listen to the podcast: *https://soundcloud.com/mrillig/life-in-the-soil-ep4-methods*.
[From GSBI Newsletter – March 2021]

PERSAM tool for predicting environmental concentrations of pesticides in topsoil

In support of the EFSA Guidance Document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil (EFSA, 2017) and following valuable input from the PERSAM users, the software tool has been updated and a new version is now available on the ESDAC website. The PERSAM tool assists the users in performing calculations using the analytic model.
Read more: *https://esdac.jrc.ec.europa.eu/content/european-food-safety-authority-efsa-data-persam-software-tool*.
[From ESDAC Newsletter No 129 (April 2021)]

SOLACE project: Understanding the links between Soil pollution and CancEr

SOLACE is a JRC Exploratory Research Project that will investigate potential relationship between the occurrence of specific cancers and levels of soil pollution. The Project aims to develop a methodology that moves from measures of concentrations of carcinogenic substances in soil towards the identification of hazards and risk analysis that may help explain eventual potential pathways that cause cancers (i.e. soil-plant-food, erosion by wind and water, etc.). The project will investigate the potential links between contaminated soils as an environmental driver for cancer cases.
Read more: *https://esdac.jrc.ec.europa.eu/projects/solace*.
[From ESDAC Newsletter No 129 (April 2021)]

Soil erosion modelling: A global review and statistical analysis

To gain a better understanding of the global application of soil erosion prediction models, we comprehensively reviewed relevant peer-reviewed research literature on soil-erosion modelling published between 1994 and 2017. We aimed to identify (i) the processes and models most frequently addressed in the literature, (ii) the

regions within which models are primarily applied, (iii) the regions which remain unaddressed and why, and (iv) how frequently studies are conducted to validate/evaluate model outcomes relative to measured data. To perform this task, we combined the collective knowledge of 67 soil-erosion scientists from 25 countries. The resulting database, named 'Global Applications of Soil Erosion Modelling Tracker (GASEMT)', includes 3,030 individual modelling records from 126 countries, encompassing all continents (except Antarctica).
Read more: *https://www.sciencedirect.com/science/article/pii/S004896972101562X?fbclid=IwAR1_xkvOypKIuVyYJoSqbsKJtrSwVgImcui2_XU3LYHgHQERzrsfRaOIhOU*.

Perenniality and crop diversity enhance soil health

Soil health has received heightened interest because of its association with long-term agricultural sustainability and ecological benefits. However, which practices are most effective at improving soil health indicators over time? To answer this, researchers measured soil health across the Biofuel Cropping Systems Experiment located at the Kellogg Biological Station in Michigan. Established in 2008, the Experiment consists of 10 systems increasing in diversity and perenniality, including four no-till annual crops, two monoculture perennials, and four polyculture perennials. The study found that nine years post-establishment, crop diversity enhanced soil health in both annual and perennial systems.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/10.1002/csan.20414*.
[From: ASA-CSSA-SSSA Science Policy Report: 31 March 2021]

One of Earth's giant carbon sinks may have been overestimated

The storage potential of one of the Earth's biggest carbon sinks – soils – may have been overestimated, research shows. This could mean ecosystems on land soaking up less of humanity's emissions than expected, and more rapid global heating. Soils and the plants that grow in them absorb about a third of the carbon emissions that drive the climate crisis, partly limiting the impact of fossil-fuel burning. Rising carbon dioxide levels in the atmosphere can increase plant growth and, until now, it was assumed carbon storage in soils would increase too. But the study, based on over 100 experiments, found the opposite.
Read more: *https://www.theguardian.com/environment/2021/mar/24/soils-ability-to-absorb-carbon-emissions-may-be-overestimated-study*.
[From: ASA-CSSA-SSSA Science Policy Report: 31 March 2021]

How microbes in permafrost could trigger a massive carbon bomb

For most of human history, permafrost has been Earth's largest terrestrial carbon sink, trapping plant and animal material in its frozen layers for centuries. It currently stores about 1,600 billion tons of carbon – more than twice the amount in the atmosphere today. But thanks to rising temperatures, permafrost is fracturing and disappearing, leaving behind dramatic changes in the landscape. Scientists are becoming increasingly worried that the thaw will lead to an epic feast for bacteria and archaea that produce carbon dioxide and methane.
Read more: *https://www.nature.com/articles/d41586-021-00659-y*.
[From: ASA-CSSA-SSSA Science Policy Report: 31 March 2021]

Is atmospheric chemosynthesis an overlooked microbial process in soil?

In Antarctica, soil bacteria dominate and drive ecosystem processes, particularly carbon and nitrogen cycling. In Eastern Antarctica, a proportion of bacteria appear to survive the freezing and severe carbon and moisture-limited conditions by depending on a hydrogen-oxidation strategy that energetically supports primary production via a new lineage of RuBisCO, Type 1E. This novel mode of chemoautotrophy, coined 'atmospheric chemosynthesis', is distinct from photosynthesis or geothermal chemotrophy where the consumption of ubiquitous trace levels of atmospheric gases (H_2, CO & CO_2), provide the energy and carbon needs for bacteria to literally 'live on air'.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2021/3/31/vduifagjefcrr6qgjdgvqcvzgldvvy*.

We've got carbon capture all wrong

Carbon capture is viewed by many as a last resort. These 'negative emissions technologies' store or sequester more greenhouse gas emissions than they produce. These come in two main forms: nature-based solutions such as reforestation and afforestation, and more technological solutions such as direct air carbon capture and storage, enhanced weathering, biochar, and soil carbon sequestration. As a 2020 report from the International Energy Agency argues, carbon capture, utilization and storage technologies are a critical part of 'net-zero' goals because they enable key sectors to reduce their emissions directly, but also help to balance some of the more intractable emissions.
Read more:
https://www.wired.co.uk/article/carbon-capture.
[From: ASA-CSSA-SSSA Science Policy Report: 14 April 2021]

Biodiversity and ecosystem functioning in soil: The dark side of nature and the bright side of life

Darwin not only revealed the origin of species in the evolutionary playground of Planet Earth, but also made us aware that the soil fauna actually acts as an engine of ecosystem functioning (Darwin 1881). This message was largely lost on the mainstream ecologists for more than 100 years (out of sight–out of mind?).
Read more: *https://link.springer.com/article/10.1007/s13280-021-01507-z*.
[From GSBI Newsletter – April 2021]

Next Episode of "Life in the Soil" Podcast Available

Check out the latest episode of "Life in the Soil": Soil and Global Change – The Multiple Impacts of Human Action by Dr. Matthias Rillig and colleagues.
Listen to the podcast: *https://soundcloud.com/mrillig/life-in-the-soil-ep5-global-change?in=mrillig/sets/life-in-the-soil-podcast*.
[From GSBI Newsletter – April 2021]

Global Applications of Soil Erosion Modelling Tracker (GASEMT)

The GASEMT database provides comprehensive insights into the state-of-the-art of soil erosion models and model applications worldwide. This database intends to support the upcoming country-based United Nations global soil-erosion assessment in addition to helping inform soil erosion research priorities by building a foundation for future targeted, in-depth analyses. GASEMT is an open-source database available to the entire user-community. GASEMT is a result of reviewing 8471 scientific articles, selecting 3030 records and extracting 49 fields relevant to modelling. It is a collective effort of 67 soil-erosion modelers from 25 countries. The database is released together with two research articles: a) A global review of soil erosion models b) A bibliometric analysis.
Read more: *https://esdac.jrc.ec.europa.eu/content/global-applications-soil-erosion-modelling-tracker* and *https://www.sciencedirect.com/science/article/pii/S0013935121003819*.
[From ESDAC Newsletter No 130 (May 2021)]

In Memoriam: Daniel Hillel

The World Scientific Publishing (WSP) Family extends its deepest condolences to Dr. Michal Artzy and the family, friends and colleagues of Dr. Daniel Hillel, 2012 World Food Prize Laureate and WSP author, who passed away on March 9, 2021.
For his achievement that earned him the World Food Prize, Dr. Hillel proved that plants grown in continuously moist soil, achieved through micro-irrigation, produce higher yields than plants grown under flooding or sprinkler irrigation. Using less water in agriculture per unit of land not only conserves a scarce resource in arid and semi-arid regions, but also results in significantly "more crop per drop". Expanding on these scientific findings, Hillel went on to promote water-use efficiency in dozens of countries around the world, working for and with international agencies and organizations. Dr. Hillel was also a dedicated teacher who, through his signature textbooks, literally taught thousands of students the fundamentals (or as he would say, "Da Mental Fun") of soil and water processes.
Read more: *https://www.worldscientific.com/do/10.1142/news20210322.282560/full/*.

Interactive soil biodiversity area: The State of Knowledge of Soil Biodiversity

Enter a hidden world
Our well-being is highly dependent on biodiversity and the ecosystem services it provides. Yet the loss of soil biodiversity is considered one of the main global threats to soils in many regions of the world.
Read more: *http://www.fao.org/home/digital-reports/soil-biodiversity/en/*.

Pesticides and Soil Invertebrates: A Hazard Assessment

Agricultural pesticide use and its associated environmental harms is widespread throughout much of the world. Efforts to mitigate this harm have largely been focused on reducing pesticide contamination of the water and air, as runoff and pesticide drift are the most significant

sources of offsite pesticide movement. Yet pesticide contamination of the soil can also result in environmental harm. Pesticides are often applied directly to soil as drenches and granules and increasingly in the form of seed coatings, making it important to understand how pesticides impact soil ecosystems. Soils contain an abundance of biologically diverse organisms that perform many important functions such as nutrient cycling, soil structure maintenance, carbon transformation, and the regulation of pests and diseases.
Read more: *https://www.frontiersin.org/articles/10.3389/fenvs.2021.643847/full*.

Global Risks Scientists' Perceptions survey

The International Science Council is requesting experts to join a growing community of leading scientists working on global risks by participating in the 2021 Future Earth – ISC Global Risks Scientists' Perceptions survey. All scientists with expertise in environmental, societal, geopolitical, technological, or economic risks are invited to be self-nominated by 30 May 2021 via the online form available at *https://council.science/global-risks-scientists-perceptions-survey-2021/*. All nominees will receive the Global Risks Scientists' Perceptions survey in June 2021.
[From: ISC Newsletter, 11 May 2021]

International Year of Caves and Karst

On the occasion of the International Year of Caves and Karst (2021–2022) – dedicated to "exploring, understanding and protecting" this fascinating world within our world – ISC Members, the International Union of Speleology (UIS), invites all ISC Members to discover how caves and karst affect our lives, to participate in the numerous activities or to get involved as a partner. "Everyone around the world is affected by caves and karst, but few know it. Many streams important to communities and agriculture flow from karst springs. Each day we make new advances in cave and karst science to benefit our daily lives, and better understand how we already benefit from caves and karst. But few people understand the value of caves and karst, which is why the International Year of Caves and Karst is so important." – Dr. George Veni, UIS President.
Read more: *https://council.science/current/news/year-caves-karst-2021-22/*.
[From: ISC Newsletter, 11 May 2021]

Protecting scientific freedom and responsibility

At a time when scientific research is of paramount importance to human and environmental well-being, the ISC is gravely concerned by reports from various countries which suggest that threats to scientific freedom are on the increase. For science to progress efficiently and for its benefits to be shared equitably, scientists must have the right to scientific freedom. Read the full statement by the Council's Committee for Freedom and Responsibility in Science, and find out more about how the Council works to protect scientists' rights.
Read more: *https://council.science/current/news/statement-on-concerns-for-scientific-freedom-around-the-world/*.
[From: ISC Newsletter, 28 May 2021]

Working scientists podcast combatting racism in science systems

In the past year the issue of systemic racism has been thrown into sharp focus in societies across the world. The institutions and practices of the science community are not immune to this kind of discrimination. In this final episode of the podcast series, we explore what can be done to combat racism in science.
Read more: *https://council.science/current/blog/working-scientist-podcast-combatting-racism-in-science-systems/*.
[From: ISC Newsletter, 28 May 2021]

Do soil health tests match farmer experience?

Soil health testing offers a new paradigm for managing soils to support key ecosystem functions that can increase environmental sustainability. These tests have been tailored to detect differences in soil management practices, often based on data from controlled experimental trials, which do not reflect the large field variability seen on working farms. New research in the Soil Science Society of America Journal assesses whether soil health test scores align with farmers' experiences of their self-identified "best" and "worst" fields across three distinct cropping regions in Michigan. To translate soil health testing into on-farm management decisions, the results should reflect soil differences across farmer's fields.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/10.1002/csan.20463*.
[From: ASA-CSSA-SSSA Science Policy Report: 26 May 2021]

Soil biodiversity science – policy meeting

The Global Soil Biodiversity Initiative (GSBI) partnered with the UN Food and Agriculture Organization (FAO), the Global Soil Partnership (GSP), and others to host the Global Symposium on Soil Biodiversity held virtually from Rome, Italy April 19–22. Over 4,800 attendees were present for the opening plenary, and over 100 talks were given by scientists, growers, and policy-makers over the four-day event.
Read more: *http://www.fao.org/about/meetings/soil-biodiversity-symposium/about-the-symposium/en/*.
[From GSBI Newsletter – May 2021]

Uncompact This: LandPKS loosens up valuable soil information

Soil scientists, farmers, citizen scientists, rangeland managers, and educators who work in soil monitoring programs around the world have a common problem: how does one find out exactly what type of soil one is standing on? Soil maps are imprecise, and lab measurements of soils, such as of soil pH and organic matter, are inaccessible to most.
The Land Potential Knowledge System, or LandPKS, was conceived as a tool to empower scientists and land managers of all kinds to characterize soil type efficiently and accurately to better inform their management decisions.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2021/5/2/decompacting-soil-data-landpks-loosens-up-valuable-soil-information*.
[From GSBI Newsletter – May 2021]

Next Episode of "Life in the Soil" Podcast Available

Methods – How to Explore the Microscopic World of Soil
If you dig out a handful of soil, or a whole bucket full, what do you see? Really, not that much? Well, yes, that's one reason the study of soil is such a challenge.
Listen to the podcast: *https://soundcloud.com/mrillig/life-in-the-soil-ep4-methods*.
[From GSBI Newsletter – May 2021]

SOILBOOK – The special book of soils

SOILBOOK is a digital, free and continuously growing "book of soils" that allows registered users to record soil profiles anywhere and at any moment. For this purpose, a variety of tools are available enabling users to swiftly upload soil images, embed geographical data and describe recorded features and details. In addition, it is possible to browse through already existing entries, create own thematic collections and add favourites.
The objective of SOILBOOK is to raise awareness for the diversity and the increasing vulnerability of soils, as well as to promote exchange among users worldwide.
SOILBOOK is a platform designed to give global insights into the fascinating landscape beneath our feet.
Read more: *www.soilbook.info*.

A Digital Success: Soil Biodiversity Symposium

The Symposium was held on 19-22 April 2021 in a virtual format. Around 5000 participants from over 161 countries attended the event, focusing on catalyzing efforts to reduce soil biodiversity loss, one of the most significant threat to our planet's soils. Building off the State of Knowledge of Soil Biodiversity, and thanks to extensive discussions held over 150 scientific presentations, participants agreed to execute the Implementation Plan of the "International Initiative for the Conservation and Sustainable Use of Soil Biodiversity" and to establish the Technical Network on Soil Biodiversity (NETSOB), and its Global Soil Biodiversity Observatory. Both the Outcome document and its Proceedings are under finalization. The press coverage reached 402 million readers while on social media, dedicated content reached 37 million accounts.
Read more: *http://www.fao.org/about/meetings/soil-biodiversity-symposium/resources/presentations/en/*.
[From: Global Soil Partnership Newsletter No.32, May 2021]

INSAS – 1st meeting

Did you know that #SoilSalinization takes up to 1.5 million ha of farmland per year out of production?
The 1st meeting of the International Network on Salt-affected Soils was held on 14-15 April 2021.
Read more: *http://www.fao.org/global-soil-partnership/insas/insas-first-meeting/en/*.
[From: Global Soil Partnership Newsletter No.32, May 2021]

NASOLANs database

NASOLANs' recently launched database provides information at country level regarding the status of the National Soil Laboratory Networks, the registered laboratories, the analyses they perform and their challenges.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1391119/*.
[From: Global Soil Partnership Newsletter No.32, May 2021]

GSOCseq map

The GSOCseq has entered the data collection phase! Through their national GSOCseq layers and reports, member countries are unravelling the potential of soils to sequester Soil Organic Carbon.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1398770/*.
[From: Global Soil Partnership Newsletter No.32, May 2021]

Soil Organic Matter (SOM) fractions

Soil carbon sequestration is seen as an effective means to draw down atmospheric CO_2, but at the same time warming may accelerate the loss of extant soil carbon. By separating soil carbon into particulate and mineral-associated organic matter (POM and MAOM, respectively) aids in the understanding of its vulnerability to climate change and identification of carbon sequestration strategies. Arable and coniferous forest soils contain the largest and most vulnerable carbon stocks when cumulated at the European scale. In a recent publication in Nature Geoscience, we show a lower carbon loss from mineral topsoils with climate change (2.5 ± 1.2 PgC by 2080) than -previous estimates. Therefore, we urge the implementation of coniferous forest management practices that increase plant inputs to soils to offset POM losses and the adoption of best management practices to avert the loss in arable soils. Data are available in ESDAC.
Read more: *https://esdac.jrc.ec.europa.eu/content/soil-organic-matter-som-fractions*.
[From ESDAC Newsletter No 131 (Jun 2021)]

Update of PERSAM tool (new version v3.0.6)

There is a new version v3.0.6 of the PERSAM tool that contains a small bug fix: there were problems with starting the calculation for projects imported using the 'Import project(s)' functionality. This is solved and the issue does not occur anymore. The User Manual remains unchanged, so the one for version v3.0.5 applies.
Check it out on the PERSAM page. PERSAM is used by regulatory offices and industry for predicting environmental concentrations of pesticides in top-soil.
In support of the EFSA Guidance Document for predicting environmental concentrations of active substances of plant protection products in soil (EFSA, 2017).
Read more: *https://esdac.jrc.ec.europa.eu/content/european-food-safety-authority-efsa-data-persam-software-tool*.
[From ESDAC Newsletter No 131 (Jun 2021)]

Upcoming Conferences & Meetings

Due to the Corona pandemic and ensuing travel restrictions most of the events planned for 2020 had to be cancelled or postponed. This continued to some extent in 2021.
For a current list of upcoming events, please consult the IUSS website: *https://www.iuss.org/meetings-events/*.

2021

First IUSS Conference on Sodic Soil Reclamation

July 30 and Aug. 1, 2021; Changchun, China
Meeting in person and online
!Postponed from Sept. 2020!
Deadline for abstract submission: June 1, 2021
Deadline for full text of paper: July 1, 2021
New: Registration fee is waived for foreign online participants!
Website: *http://ssr.csp.escience.cn*.

International Colloquium on Soil Zoology

16-21 August 2021 *!new date!*
Bolzano, South Tyrol, Italy
Early bird registration: 1 March – 31 May 2021
Website: *https://icsz2020.eurac.edu/*.

Eurosoil 2021 goes virtual

23-27 August 2021, virtual congress
The objective of Eurosoil 2021 is to bring together, in a safe online space, leading research scientists working on soil related topics and stakeholders dealing with issues of public concern, such as soil degradation and consequences of climatic changes. The important bridging role of soil practitioners to translate scientific knowledge into practice will be emphasised during the virtual edition of Eurosoil 2021.
Regular Registration Deadline: 18 August 2021
Conference website: *https://eurosoil-congress.com/*.

International workshop "Soil Conservation and environmental protection"

6-8 September 2021
Online
Recently, the European Court of Auditors (ECA) highlighted that Europe has a reference legislation for safeguarding water and air quality and that no legislation, until now, concerns soil quality. Moreover, in the last ten years the areas at desertification risk have increased by approximately 1.8 million hectares. The goal of the workshop is to provide methodologies, tools and data to land managers and administrators aiming at a sustainable management and conservation of the soil, a primary and limited resource.
Deadline for abstract submission: June 15, 2021
Read more: *https://scienzadelsuolo.org/congressi.php*.

III International and XV National Congress of Serbian Society of Soil Science

Soils For Future Under Global Challenges
21-24 September 2021, Sokobanja, Serbia
The purpose of this meeting, jointly organized by the Serbian Society of Soil Science and the University of Belgrade, Faculty of Agriculture, is to bring together researchers and scientists interested in soil science, soil-plant-atmosphere continuum, sustainable land use, soil degradation, soil and water conservation, and soil socio-economic pathways, to address recent research results and to present and discuss their ideas, theories, technologies, systems, tools, applications, progress and experiences.
The papers will be published in the Book of Proceedings.
The event will be held with both in-person and online sessions, while observing all applicable safety measures.
Abstract submission deadline: June 1, 2021
Congress website: *https://congress.sdpz.rs/*.

Global Symposium on Salt-Affected Soils

October 27-29, 2021
Tashkent, Uzbekistan
The IUSS together with FAO-GSP and the Government of Uzbekistan invites you to participate in the Global Symposium on Salt-Affected Soils.
Read more: *http://www.fao.org/global-soil-partnership/resources/events/detail/en/c/1264612/*.

International Conference for Women in Science Without Borders

3-5 November 2021, Nairobi, Kenya

The University of Embu will host the 6th International Conference for Women in Science Without Borders from November 3rd to 5th 2021 in Nairobi. Women in Science Without Borders (WISWB) is a gender-inclusive initiative and network of scientists from over 60 countries worldwide. This is a conference series held annually under the World Forum for Women in Science (WFWS). The conference will be an opportunity to highlight the role of science in building a sustainable future for all through science, technology, and innovation.

Early registration deadline, June 30.

Read more: *https://awardfellowships.org/news/the-sixth-international-conference-for-women-in-science-without-borders/*.

[From: ASA-CSSA-SSSA Science Policy Report: 26 May 2021]

2021 ASA, CSSA, SSSA International Annual Meeting

A Creative Economy For Sustainable Development

7-10 Nov. 2021

Salt Lake City, Utah, USA

Join us for the American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and Soil Science Society of America (SSSA) International Annual Meeting.

Interested in presenting? Anyone can submit and most are accepted! Gain professional recognition and presentation experience, all while expanding your CV/vita, sharing information for all to succeed, and fostering collaborations with your peers. Don't have the detail you need to submit an abstract? No problem! Abstracts at this point are simply "holding slots" that reserve your spot in the desired session. Submit now and update later!

Registration opens: April 15, 2021

Final abstract submission deadline: July 13, 2021

Read more: *https://www.acsmeetings.org*.

1st International Joint Congress on "Sustainable Management of Cultural Landscapes in the context of the European Green Deal"

10-14 November 2021

Location: Santo Stefano di Camastra, Sicily, Italy

!Postponed from October 2020!

Details: On behalf of the ESSC (*European Society for Soil Conservation*), the EURECYS (*European Ecocycles Society*) and the Organizing Committee, we are pleased to invite you to attend the 1st International Joint Congress on "Sustainable Management of Cultural Landscapes in the context of the European Green Deal".

The objective of the congress is to shed new light on critical issues concerning the exploitation of ecosystem services, conservation of cultural heritage and to assess new perspectives to the future development of the cultural landscapes in the context of the European Green Deal.

The Congress is open to scientists, students, educators, managers, policy and decision-makers. It will consist of invited lectures, scientific sessions with oral and poster presentations, and a scientific and cultural excursion.

Contact: Prof. Carmelo Dazzi, *carmelo.dazzi@unipa.it*.

Deadline for submission of abstracts is 31st of July 2021

Website:

https://www.ecocycles.net/ESSC-EURECYS-Congress/.

2022

XXV Dokuchaev Conference for Young Scientists – Soil is life

1–3 March 2022, St. Petersburg, Russia

The conference form will be face-to-face reports with live stream on Zoom and on-line. Languages of the conference will be Russian and English. Issues of the providing by soils of plants', animals' and people's life and health, the importance of living organisms for soil formation, interactions of mineral, organic substances and living organisms in the soil, the composition and properties of soils, the soil diversity and the geographical distribution of soils, functional relationships in nature, ecosystem functions of soils, the soil-saving crop cultivation, the soil destruction both as a result of natural processes and under the influence of irrational human actions, the protection of soil from its destruction, the fight against fertility decline, soil restoration, the spread and the application of soil knowledge will be considered.

An information letter will be posted on the website on June 30.

Read more: *http://www.dokuchaevskie.ru/*.

The Soil Classification Congress of the IUSS Commission Soil Classification in Mexico

Postponed to March/April 2022:

The new dates are:

- March 24: Arrival at Monterrey airport and transfer to Cuatro Ciénegas.
- March 25-29: Field Workshop from Cuatro Ciénegas to Querétaro.
- March 30-April 1: Conference in Querétaro (abstract submission until November 30).
- April 4-9: Additional courses: course soil classification and course soil quality indicators.

The website will be updated soon: *http://iscc2020.org/v*

Global Conference on Sandy Soils

30 May – 3 June 2022

!postponed from 2020!

University of Wisconsin-Madison, USA

Deadline for Abstract submission is March 31, 2022.

The papers from the conference will be published in the Progress of Soil Science Series (Springer).

Read more: *https://sandysoils.org/*.

ISCRAES 2022 – The 2nd International Symposium on Climate-Resilient Agri-Environmental Systems

7-10 June 2022, Dublin, IRELAND

The main theme "Implementing the New Green Deal: The Path Towards Sustainable Agriculture", is to achieve a sustainable Europe and the planet by tackling current environmental, climate, and societal challenges faced by the world.

Abstract submission deadline: December 31, 2021.

Early bird registration deadline: January 31, 2022.

Symposium website: *https://www.iscraes.org*.

Contact email: *info@iscraes.org*.

Download flyer: *https://www.iuss.org/media/iscraes_2022_flyer_03-04-22.pdf*.

10th International Symposium on Forest Soils – ISFS 2022

Forest Soils under Global Change:
Processes, Biodiversity and Ecological Services
October 17-21, 2022, Hangzhou, P. R. China.

The objectives of this conference are

1) to bring together scientists, educators and practitioners working in the areas of forestry, forest soil science and global change biology to discuss issues of common interest, and to present the most up-to-date research findings on forest soil properties, processes, biodiversity and ecological services under the influence of global change;

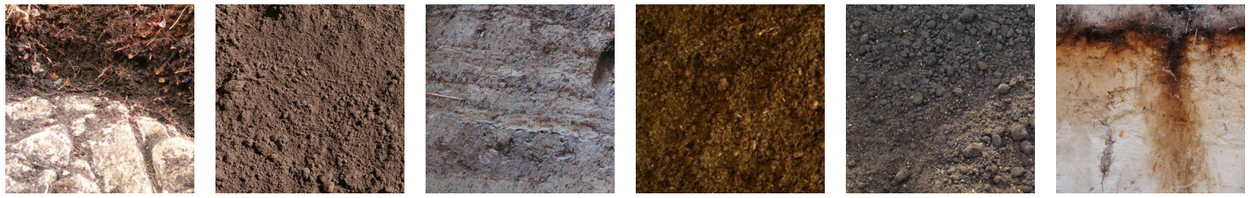
2) to facilitate the development of international linkages, scientific exchange and strategic alliances in forest soils research and education; and

3) to discuss policy implications of forest management practices and climate change impacts on soil properties, forest productivity, and ecosystem processes and services.

Deadline for Submission of Abstracts: May 30, 2022

Read more: *http://isfs2021.csp.escience.cn/*.

For the complete list of upcoming events, please see the event calendar on the IUSS website:
https://www.iuss.org/meetings-events/



New Publications

Soil Sciences Education: Global Concepts and Teaching

Edited by Takashi Kosaki, Rattan Lal, Laura Bertha Reyes Sánchez. Published in the CATENA series GeoEcology essays in December 2020; 198 pages, 96 figures, 28 tables, 17 x 24 cm, US-ISBN: 1-59326-272-8, ISBN 978-3-510-65523-6. The book can be ordered from the IUSS Secretariat (*iuss@umweltbundesamt.at*) at the price of EUR 29.90 (plus shipping costs); reduced price for IUSS members: EUR 25.00 (plus shipping costs).

Who knows, knows of, or even has awareness of soils? If many more people knew about soils, the land surface, which soil, water, flora, fauna and ourselves inhabit, our planet could not have suffered from the variety of global environmental problems that it suffers from today.

The International Union of Soil Sciences has identified education and public awareness of soils and soil sciences as one of the most important goals of the International Decade of Soils 2015-2024, which is reflected in this book. This book addresses readers primarily involved in teaching soils, geosciences, environment, ecosystems, art etc., in schools, and who serve at museums, educational or extension organizations, NPOs, NGOs, etc. Its authors provide a basic framework and a collection of good practices currently used in soil and soil sciences education to make students aware of soils and their importance. Specifically, this publication strives to enable readers to learn and share whatever is best suited to fit their particular requirements.

This book consists of three parts. Part I comprises concept, philosophy and tenets of soil sciences education for formulating its curricula at different levels from preschool children to adult citizens. Part II is a collection of good practices of soil sciences education which have been indigenously developed, tested and proven to be useful and efficient in countries all over the world, i.e., four from Africa and Asia; three from Europe; seven from North and South America; and two from Oceania. The material presented in the book provides a good start for promoting soil and soil sciences to children, students, the general public and policy and decision makers globally. Part III is dedicated to guiding the future of soil sciences education based on past and current experiences.

Read more:
http://www.schweizerbart.com/9783510655236.

2020 Soil science challenges in a new era: A transdisciplinary overview of relevant topics.

By Rodrigo-Comino, Jesus; López-Vicente, Manuel; Kumar, Vinod; Rodríguez-Seijo, Andrés; Valkó, Orsolya; Rojas, Claudia; Reza Pourghasemi, Hamid; Salvati, Luca; Bakr, Noura; Vaudour, Emmanuelle; Brevik, Eric C.; Radziemska, Maja; Pulido, Manuel; Di Prima, Simone; Dondini, Marta; de Vries, Wim; Santos, Erika S.; Mendonça-Santos, Maria de Lourdes; Yu, Yang; Panagos, Panos.
In: Air, Soil and Water Research. 13: 1–17
Read more: *http://doi.org/10.1177/1178622120977491*.

State of Knowledge of Soil Biodiversity – Status, challenges and potentialities. Report 2020.

By FAO, ITPS, GSBI, SCBD and EC. Dec. 2020. Rome, FAO. 618 pages, ISBN 978-92-5-133582-6, *https://doi.org/10.4060/cb1928en*.

There is increasing attention to the importance of biodiversity for food security and nutrition, especially above-ground biodiversity such as plants and animals. However, less attention is being paid to the biodiversity beneath our feet, soil biodiversity, which drives many processes that produce food or purify soil and water. This report is the result of an inclusive process involving more than 300 scientists from around the world under the auspices of the FAO's Global Soil Partnership and its Intergovernmental Technical Panel on Soils, the Convention on Biological Diversity, the Global Soil Biodiversity Initiative, and the European Commission. It presents concisely the state of knowledge on soil biodiversity, the threats to it, and the solutions that soil biodiversity can provide to problems in different fields. It also represents a valuable contribution to raising awareness of the importance of soil biodiversity and highlighting its role in finding solutions to today's global threats.

Read more: *http://www.fao.org/3/cb1928en/CB1928EN.pdf?fbclid=IwAR03GC7gCaeoJEUejI7pEYe8S0yYhpyWBKofo3fhhwLvFw6HbmOjKF9LYVo*.

Safeguarding our food supply against Covid-19 and climate change

Edited by acatech. Published in the acatech IMPULSE series on 15 October 2020 by acatech.

The coronavirus crisis has highlighted the strengths and weaknesses of our food supply. In view of the threats posed by climate change, we must ensure that it is even better equipped to cope with future crises, according to a group of experts at acatech – National Academy of

Science and Engineering. The experts recommend the adoption of a sustainable agricultural intensification model that combines principles of organic and conventional farming, supported by new technologies. The decisions required to promote this model should be taken as part of the forthcoming reform of the European Union's Common Agricultural Policy (CAP).
Download the whole document: *https://en.acatech.de/publication/a-resilient-and-sustainable-food-supply/*.

SSSA Publishes New Book | Guidelines for Analysis and Description of Soil and Regolith Thin Sections, Second Edition

By *Georges Stoops*. First published 20 November 2020 in the Book Series *ASA, CSSA, and SSSA Books*,
 Print ISBN:9780891189756 | Online, ISBN:9780891189763 | DOI:10.1002/9780891189763.
The new book from SSSA is a revised guide to the study and of soil and regolith thin sections. A specialized system of terms and concepts must be used to accurately and effectively distinguish and name the microscopic features of soils and regoliths. With a comprehensive, consistent terminology at their disposal, researchers may compare, store and discuss new data easily and with less risk of error. The second edition of "Guidelines for Analysis and Description of Soil and Regolith Thin Sections" has been assembled to address this need, offering a practical system of analysis and description to those working with soil and regolith materials.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/book/10.1002/9780891189763*.
[From: ASA-CSSA-SSSA Science Policy Report: 9 December 2020]

Techniques for Work with Plant and Soil Nematodes

Edited by: Roland N Perry, University of Hertfordshire, UK, David Hunt, CABI, UK, Sergei A Subbotin, California Department of Food and Agriculture, USA. December 2020 | Hardback | 320 Pages | 9781786391759; November 2020 | ePDF 9781786391766 | ePub 9781786391773. Price hardback £95.00 | €110.00 | $130.00; price ePDF from VitalSource: £95.00 | €110.00 | $130.00.
Plant-parasitic and free-living nematodes are increasingly important in relation to food security, quarantine measures, ecology (including pollution studies), and research on host-parasite interactions. Being mostly microscopic, nematodes are challenging organisms for research. *Techniques for Work with Plant and Soil Nematodes* introduces the basic techniques for laboratory and field work with plant-parasitic and free-living soil-dwelling nematodes.
Written by an international team of experts, this book is extensively illustrated, and addresses both fundamental traditional techniques and new methodologies. The book covers areas that have become more widespread over recent years, such as techniques used in diagnostic laboratories, including computerized methods to count and identify nematodes. Information on physiological assays, electron microscopy techniques and basic information on current molecular methodologies and their various applications is also included.
Read more: *https://www.cabi.org/bookshop/book/9781786391759/*.

Soil Metagenomics

By By T.C.K. Sugitha, Asish K. Binodh, K. Ramasamy, U. Sivakumar. 1st Edition published December 16, 2020 by CRC Press, 276 Pages 40 B/W Illustrations, ISBN 9780367693961, price hardback GBP £71.99, price VitalSource eBook: Purchase eBook – £35.99, 6 Month Rental – £22.50.
This book focuses on the recent advents and technological breakthroughs in metagenomic approaches coupled with their applications in agriculture. The intended audience include soil and environmental microbiologists, molecular biologists and policy makers. The book expertly describes the latest fourth generation metagenomic technologies from sample collection to data analysis, metatranscriptomic, metaproteomic and metabolomics studies.
Read more: *https://www.routledge.com/Soil-Metagenomics/Sugitha-Binodh-Ramasamy-Sivakumar/p/book/9780367693961*.

The Soil-Human Health-Nexus

Edited By Rattan Lal, published December 20, 2020, by CRC Press, 350 pages, 29 Color & 34 B/W Illustrations, ISBN 9780367422134, price: paperback GBP 66.99, hardback GBP 150.00; VitalSource eBook purchase GBP 60.29, 6-month rental GBP 33.50, 12-month rental GBP 40.20.
The term "soil health" refers to the functionality of a soil as a living ecosystem capable of sustaining plants, animals, and humans while also improving the environment. In addition to soil health, the environment also comprises the quality of air, water, vegetation, and biota. The health of soil, plants, animals, people, and the environment is an indivisible continuum. One of the notable ramifications of the Anthropocene is the growing risks of decline in soil health by anthropogenic activities. Important among these activities are deforestation, biomass burning, excessive soil tillage, indiscriminate use of agrochemicals, excessive irrigation by flooding or inundation, and extractive farming practices. Soil pollution, by industrial effluents and urban waste adversely impacts human health. Degradation of soil health impacts nutritional quality of food, such as the uptake of heavy metals or deficit of essential micronutrients, and contamination by pests and pathogens. Indirectly, soil health may impact human health through contamination of water and pollution of air.
Part of the *Advances in Soil Sciences* series, this informative volume covering various aspects of soil health appeals to soil scientists, environmental scientists and public health workers.
Read more: *https://www.routledge.com/The-Soil-Human-Health-Nexus/Lal/p/book/9780367422134* .

Soil erosion: Special Issue published in the International Soil and Water Conservation Journal

Edited by Richard Cruse, Costanza Calzolari, Lucia Anjos, Nigussie Haregeweyn, Clara Lefèvre, published in December 2020, Volume 8, Issue 4, pages 333-452
The special issue of the Global Symposium on Soil Erosion, 15-19 May 2019, Rome, FAO entitled "Soil erosion assessment tools and data; creation, consolidation, and harmonization" presents advances in soil erosion research with a focus on new tools that are being used to assess soil erosion rates. This publication includes eleven selected contributions dealing with erosion indicators' improvement, the use of remote sensing, nuclear techniques and geochemical fingerprinting.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1363303/*.
Download the article: *https://www.sciencedirect.com/journal/international-soil-and-water-conservation-research/vol/8/issue/4*.
[From: Global Soil Partnership Newsletter no 30, 22 December 2020]

Understanding and improving crop root function

Edited by Peter Gregory, University of Reading, UK. Published 19 January 2021 by Burleigh Dodds Science Publishing, 686 pages, ISBN-13: 9781786763600, price hardback GBP 180.00, also available as eBook from VitalSource.
Recent decades have seen a dramatic increase in research on plant roots. A deeper understanding of the complex ways roots interact with soils is making it possible to 'design' roots to optimise nutrient/water uptake in low-input environments, as well as deliver other benefits such as improved soil health and reduced nutrient leaching. Continued research is needed in this important area so that it can contribute to more sustainable, 'climate-smart' crop production.
Understanding and improving crop root function features authoritative reviews of current research in all aspects of root science, including root growth regulators, root anatomy, nutrient acquisition and root system architecture. This collection discusses the responses of plant roots to abiotic and biotic stresses and how understanding nutrient uptake can be exploited to optimise root function. The book concludes with a dedicated section on methods used to improve crop root function and crop nutrient use efficiency, such as the use of plant growth-promoting rhizobacteria (PGPR).
Read more: *https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-89122*.

Sclerotia Grains in Soils

Edited by Makiko Watanabe. 1st edition published in the series Progress in Soil Science on 12 February 2021 by Springer, 212 pages, 78 b/w illustrations, 25 in colour, eBook ISBN 978-981-334-252-1; DOI 10.1007/978-981-33-4252-1, Hardcover ISBN 978-981-334-251-4, price eBook: 96,29 € | £87.50 | $109.00; hardcover: 119,99 € | £109.99 | $149.99.
This book introduces what sclerotia grains are, and where and how they exist in soils, by compiling the results obtained from the studies on fungal sclerotia formed by *Cenococcum geophilum* (Cg) and related species, the visible black small grains persistent for a few thousand to ten thousands of years in forest soils and sediments. The chapters contain the results and discussions on the ecological distribution and regulating factors, characteristics, and function of Cg sclerotia grains, carried out by researchers from soil geography, soil science, soil microbiology, physiology, forestry, analytical chemistry, environmental chemistry, material science, and related disciplines.
Read more:
https://www.springer.com/de/book/9789813342514.

Protocol for Sustainable Soil Management

The protocol constitutes a fundamental tool to assess if any intervention implemented in the field, such as improvement of productive systems, innovation and new technologies, ecosystem restoration and carbon sequestration, is carried out in a sustainable manner according to the definition of sustainable soil management. In practical terms, the protocol provides key indicators and a set of tools to assess soil functions based on its physical, chemical and biological properties.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1370578/*.
[From: Global Soil Partnership Newsletter no 31, February 2021]

Understanding and improving crop root function – now 20% discounted for IUSS members

Edited by Peter Gregory, University of Reading, UK.
Published 19 January 2021 by Burleigh Dodds Science Publishing, 686 pages, ISBN-13: 9781786763600, price hardback GBP 180.00, also available as eBook from VitalSource.
Recent decades have seen a dramatic increase in research on plant roots. A deeper understanding of the complex ways roots interact with soils is making it possible to 'design' roots to optimise nutrient/water uptake in low-input environments, as well as deliver other benefits such as improved soil health and reduced nutrient leaching. Continued research is needed in this important area so that it can contribute to more sustainable, 'climate-smart' crop production.
The publishers offer a 20% discount for all members of IUSS. Should you be interested, the discount code is IUSSCR20. It is valid until 31st March 2021.
Read more: *https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-89122*.

Essentials of Soil Science now also as e-book

The book Essentials of Soil Science (Soil formation, functions, use and classification (World Reference Base, WRB)) by Winfried E. H. Blum, Peter Schad and Stephen Nortcliff was published in 2018 by Borntraeger Science Publishers. It presents a concise (170 pages) and comprehensive introduction to soil science.
Now, it is also available as e-book:
https://www2.ciando.com/ebook/bid-2877582.

The Soils of Japan

Edited by Hatano Ryusuke, Shinjo Hitoshi, Takata Yusuke.
1st ed. Published in March 2021 by Springer, XXIII, 372 p. 248 illus., 140 illus. in colour, ISBN 978-981-15-8229-5, price hardcover 139,99 € | £119.99 | $169.99, eBook: 117,69 € | £95.50 | $129.00.
This book provides an overview of the distribution, properties, and function of soils in Japan. First, it offers general descriptions of the country's climate, geology, geomorphology, and land use, the history of the Japanese soil classification system and characteristics and genesis of major soil types follow. For each region – a geographic/administrative region of the country – there is a chapter with details of current land use as well as properties and management challenges of major soils. Maps of soil distribution, pedon descriptions, profile images, and tables of properties are included throughout the text and appendices.
Read more:
https://www.springer.com/de/book/9789811582288.

The Soils of Aotearoa New Zealand

By Hewitt, Allan E., Balks, Megan R., Lowe, David J.;
1st edition published in March 2021 by Springer, XX, 332 p. 192 illus., 147 illus. in colour, ISBN 978-3-030-64763-6, price hardcover £ 119,99 | CHF 165,50 | 139,99 €.
This book offers an introduction to the soils of Aotearoa New Zealand, structured according to the New Zealand soil classification system. Starting with an overview of the importance and distribution of New Zealand soils, it subsequently provides essential information on each of the 15 New Zealand soil orders in separate chapters. Each chapter, illustrated with diagrams and photographs in colour, includes a summary of the main features of the soils in the order, their genesis and relationships with landscapes, their key properties including examples of physical and chemical characteristics, and their classification, use, and management. The book then features a chapter on soils in the Ross Sea region of Antarctica and concludes by considering New Zealand soils in a global context, soil-formation pathways, and methods used in New Zealand to evaluate soils and assist in land-management decisions.
Read more:
https://www.springer.com/de/book/9783030647612.

Sustainable Management of River Oases along the Tarim River/China (SuMaRiO)

Ed.: Bernd Cyffka; Markus Disse; Florian Betz (2021).
Published by Schweizerbart in March 2021 in the series *Konzepte für die nachhaltige Entwicklung einer Flusslandschaft*, volume 13, ISBN 978-3-510-65432-1, 208 pages, 126 figures, 32 tables, price: 49.90 EUR.
This book discusses approaches to sustainable management of river oases along the Tarim River located in Xinjiang (northwest China). The Tarim Basin is one of the most arid regions in the world. Originating from the snow and glacier melt in the mountains it is the only relevant source of freshwater in this extreme environment – both for anthropogenic needs in agriculture and the natural ecosystems of the Tarim River floodplains.
11 German and 6 Chinese universities and research institutes have formed the SuMaRiO consortium (Sustainable Management of River Oases along the Tarim River) to investigate sustainable water- and land-management strategies for this region.
Read more: *https://www.schweizerbart.de/9783510654321/Sustainable_Management_of_River_Oases_alv*

Naissance et évolution des sols (Birth and Evolution of Soils)

By Denis Baize. Quae Editions, specialized in scientific and technical books, has recently published in French *Naissance et évolution des sols* (Birth and Evolution of Soils). 160 pages, price: 25 EUR, ebook 16.99 EUR.
This book will allow you to discover what is called pedogenesis: the birth and development of soils. Their formation, the role of mineral constituents, the factors and main processes of pedogenesis at work in our temperate climates are explained here simply.
Read more: *https://www.quae.com/produit/1669/9782759232659/naissance-et-evolution-des-sols*.

The Australian Soil Classification

By R Isbell, National Committee on Soil and Terrain. Third Edition, published March 2021 as volume 4 in the series *Australian Soil and Land Survey Handbooks* by CSIRO Publishing. ISBN: 9781486314775 | 192 pages | 245 x 170 mm, price paperback $ 59.99.
The print edition of this essential reference is flexibound for field work. It is also available as a free eBook.
This third edition provides major updates to the knowledge on Australian soils, including a new soil Order, the Arenosols.
Read more: *https://www.publish.csiro.au/book/8016?jid=SOI210316&xhtml=69AB76B2-B14B-4530-BA73-B06C03D01825*

The magical world of soil biodiversity – A collection of 10 children's stories from around the world

Published by FAO and IUSS, Rome, Italy, 2021. 168 pages, ISBN: 978-92-5-134249-7.
In the framework of World Soil Day 2020, the Food and Agriculture Organization of the United Nations (FAO), the International Union of Soil Sciences (IUSS), and the Global Soil Partnership (GSP) launched a children's book contest on Soil Biodiversity with the motto "Keep soil alive, protect soil biodiversity". The book contest on soil biodiversity has given visibility to the importance of soil organisms and raised awareness on the urgency of protecting soil biodiversity. The soil biodiversity book competition highlights the importance of soil organisms and raises awareness of the urgent need to protect soil biodiversity among a young audience (children aged 6-11 years). This collection of 10 stories includes the best entries received from a total of 80 books spanning over 60 countries.
Read more: *https://www.iuss.org/newsroom/*.
Download the pdf: *http://www.fao.org/documents/card/en/c/cb4185en*.

Fieldwork Ready: An Introductory Guide to Field Research for Agriculture, Environment, and Soil Scientists

By Sara E. Vero, published in March 2021, 272 Pages, paperback ISBN: 978-0-891-18375-4, price USD 55.00, eBook ISBN: 978-0-891-18380-8, price USD 44.00.
Discover how to plan, conduct, and interpret field research with this essential new guidebook.
Good field research is the driving force behind advancement in the agronomic, environmental, and soil sciences. Nevertheless, many undergraduate and graduate scientists have limited opportunity to develop hands-on experience before undertaking projects in the field. With *Fieldwork Ready*, Dr Sara Vero maps out the fundamental principles, methods, and management techniques that underpin this crucial practice, offering trainee researchers an accessible introduction to the world of on-site investigation.
Read more: *https://www.wiley.com/en-us/Fieldwork+Ready%3A+An+Introductory+Guide+to+Field+Research+for+Agriculture%2C+Environment%2C+and+Soil+Scientists-p-9780891183754*.

Hydrogeology, Chemical Weathering, and Soil Formation

Edited by Allen Hunt, Markus Egli and Boris Faybishenko. Published by the American Geophysical Union in April 2021, 288 Pages, ISBN 978-1-119-56396-9, price hardback: USD 199.95, eBook ISBN 978-1-119-56400-3, price USD 160.00.

This book explores soil as a nexus for water, chemicals, and biologically coupled nutrient cycling. Soil is a narrow but critically important zone on Earth's surface. It is the interface for water and carbon recycling from above and part of the cycling of sediment and rock from below. *Hydrogeology, Chemical Weathering, and Soil Formation* places chemical weathering and soil formation in its geological, climatological, biological and hydrological perspective.

Volume highlights include the evolution of soils over 3.25 billion years, basic processes contributing to soil formation, how chemical weathering and soil formation relate to water and energy fluxes, the role of pedogenesis in geomorphology, relationships between climate soils and biota; soils, aeolian deposits, and crusts as geologic dating tools; impacts of land-use change on soils.

Read more: *https://www.wiley.com/en-us/Hydrogeology%2C+Chemical+Weathering%2C+and+Soil+Formation-p-9781119564003*.

Bioremediation Science: From Theory to Practice

Edited by Amitava Rakshit, Manoj Parihar, Binoy Sarkar, Harikesh B. Singh, Leonardo Fernandes Fraceto. 1st edition published May 21, 2021 by CRC Press, 360 Pages, 8 Color & 40 B/W Illustrations, ISBN 9780367343965, price hardback GBP 15.00, VitalSource eBook GBP 31.49, 6 month rental GBP22.50, 12 month rental GBP 27.00.

This book provides state of the art description of various approaches, techniques and some basic fundamentals of bioremediation to manage a variety of organic and inorganic wastes and pollutants present in our environment. A comprehensive overview of recent advances and new development in the field of bioremediation research are provided within relevant theoretical framework to improve our understanding for the cleaning up of polluted water and contaminated land. The book is easy to read and language can be readily comprehended by aspiring newcomer, students, researchers and anyone else interested in this field. Renowned scientists around the world working on the above topics have contributed chapters. In this edited book, we have addressed the scope of the inexpensive and energy neutral bioremediation technologies. The scope of the book extends to environmental/agricultural scientists, students, consultants, site owners, industrial stakeholders, regulators and policy makers.

Read more: *https://www.routledge.com/Bioremediation-Science-From-Theory-to-Practice/Rakshit-Parihar-Sarkar-Fraceto-Singh/p/book/9780367343965*.

Nature, biodiversity and health: an overview of interconnections

Published by WHO/Europe, 2021. 31 pages, ISBN 978 92 890 5558 1; available online.

In recognition of the International Day for Biological Diversity on 22 May, WHO/Europe has published today its first report on nature, biodiversity and health together with the WHO Collaborating Centre on Natural Environments and Health at the University of Exeter (UK).

It includes a chapter on soil, agriculture, nutrition and food security.

Urbanization, land use, global trade and industrialization have led to profound and negative impacts on nature, biodiversity and ecosystems across the world. The ongoing depletion of natural resources not only affects environmental conditions but also has an enormous impact on the well-being and security of societies. This report provides an overview of the impacts of the natural environment on human health. It presents the ways nature and ecosystems can support and protect health and well-being, and describes how nature degradation and loss of biodiversity can threaten human health. It is targeted at readers who do not have extensive experience with the links between nature and health. While the overview report aims primarily to inform professionals and decision-makers in the health and environment sectors, it will also be of relevance for other sectors involved with the protection, management and use of nature and biodiversity.

Download: *https://apps.who.int/iris/bitstream/handle/10665/341376/9789289055581-eng.pdf*.

Read more: *https://www.euro.who.int/en/health-topics/environment-and-health/urban-health/publications/2021/nature,-biodiversity-and-health-an-overview-of-interconnections-2021*.

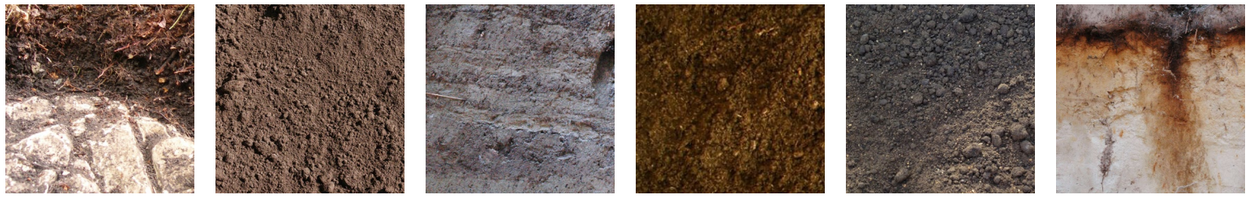
WSD 2020 campaign report

World Soil Day (WSD) 2020 'Keep soil alive, protect soil biodiversity' was celebrated in 105 countries with over 780 events. Media coverage reached 891 million also thanks to BBC, Al Jazeera, and the New York Times. On Twitter #WorldSoilDay reached 308 million users.

A thousand thanks to all participants!

Read more: *http://www.fao.org/3/cb3455en/cb3455en.pdf* .

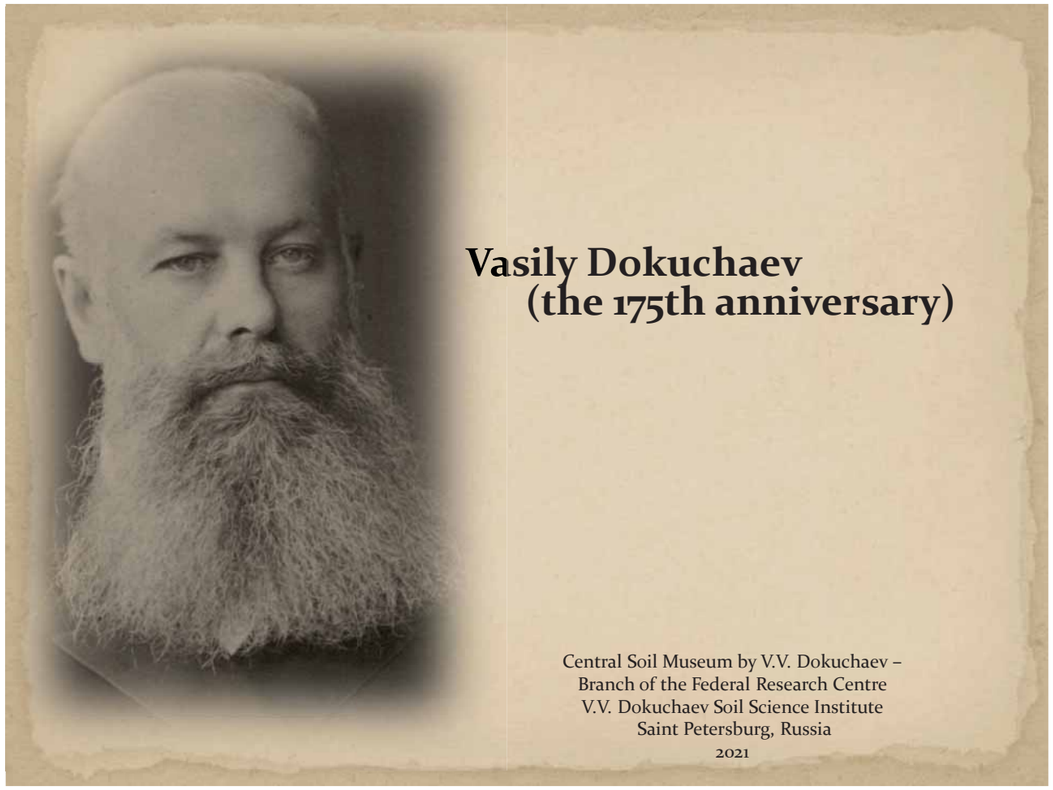
[From: Global Soil Partnership Newsletter No.32, May 2021]



Miscellaneous

Vasily Dokuchaev (the 175th anniversary)

Central Soil Museum by V.V. Dokuchaev – Branch of the Federal Research Centre V.V. Dokuchaev Soil Science Institute, Saint Petersburg, Russia 2021



Vasily Vasil'evich Dokuchaev is commonly regarded as the father of soil science. He developed soil science in Russia, and was perhaps the first person to make wide geographical investigations of different soil types. His great contribution to science was, figuratively, to "put soils on the map".

The following slides give an overview of Dokuchaev's life and work. The author of these slides, Rusakova Elena Anatolyevna, has kindly granted IUSS the license to publish them in the IUSS Bulletin.

Vasily Vasilyevich Dokuchaev
(01.03.1846 – 08.11.1903)

Great Russian scholar, natural scientist,
Professor of Mineralogy and Geology of St. Petersburg University.

- created the science of soil - Soil Science
- he was the first to establish that the soil is an independent natural body, qualitatively different from all other bodies of nature
- proved that living organisms form an integral part of the soil
- discovered the basic laws of the origin and geographical distribution of soils
- developed the doctrine of natural and soil zones, discovered the law of horizontal zoning and high-altitude zoning of soils
- formulated the law about factors of soil formation
- established the principles of the structure of the soil profile
- developed new methods of soil research and the basics of soil classification and cartography
- laid the foundations of ecology
- laid the foundations of the doctrine of the biosphere
- he pioneered and put into practice a sustainable system of farming
- the author of 281 printed works, 4 maps; editor of 57 books and 7 maps from 1869 to 1900
- founded the scientific school. His outstanding students made major contributions to various branches of natural science.

The Dokuchaev natural science paradigm evolutionarily changed the methodologies of almost all sciences of the XX century. Many of Dokuchaev's ideas are most relevant and they have not lost their significance in the modern world.

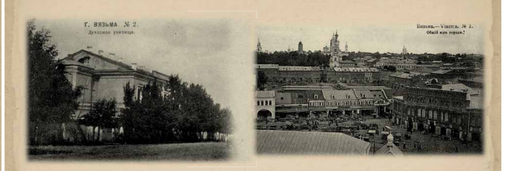
On the site of this house in the village of Milyukovo, Novoduginsky district, Smolensk region, stood the house where Vasily Dokuchaev was born.
Archive CSM F.2. I. 39. D. 4. P.28

Church of St. Nicholas the Wonderworker in the village of Milyukovo, Smolensk region, where V. Dokuchaev was baptised in 1846. It was destroyed during the Great Patriotic War.
Archive CSM F.2. I. 39. D. 4. L.14

Vasily Dokuchaev was born on 1 March (February 17 by the Julian calendar) 1846 in the village of Milyukovo, Smolensk region into the family of the priest Vasily Sergeyevich and Pelageya Trofimovna Dokuchaev. Vasily was the youngest of seven children.
The house where the family lived and the church where the father served and the children were baptised have not survived to the present.

The Dokuchaev family

Archive CSM F.2. I. 39. D. 15. P.1.
Archive CSM F.2. I. 39. D. 12. P.12.
Family archive of N. Vorona



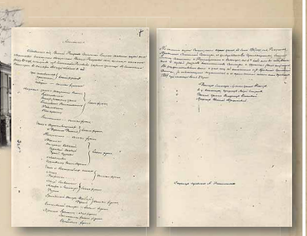
Vyazemsky Religious School at the Smolensk Seminary.

The view of the city of Vyazma

Source: https://human.livejournal.com/2145076.html?view=comments

After attending a parochial school in Milyukovo, at the age of 11 Dokuchaev enrolled at the Vyazemsky Religious School at the Smolensk Seminary.

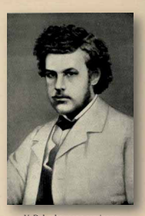
The Smolensk Theological Seminary
Source: https://drevo-info.ru/pictures/1908.html



The Smolensk Seminary Diploma of Dokuchaev's. Issued July 27, 1867.
Archive CSM copy from CGIA St. Petersburg. F.14. I.5. D.3550.

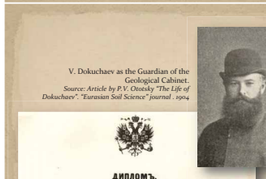
In 1867 Dokuchaev graduated with honours from the Smolensk Theological Seminary and was sent to the St. Petersburg Theological Academy.

Imperial Saint Petersburg University
Source: https://museums.kgfu.ru/blog/news/lingvist-professor-buntovshhik-chast-i/?template=popup



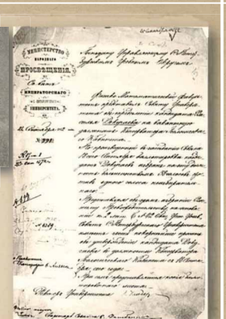
V. Dokuchaev as a seminary student.
Archive CSM F.2. I. 39. D.1. P.5

After enrolling in the St Petersburg Theological Academy, he left it and almost immediately joined the Faculty of Physics and Mathematics of the Imperial St Petersburg University.

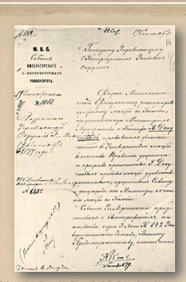


V. Dokuchaev as the Guardian of the Geological Cabinet.
Source: Article by P.V. Ototsky "The Life of Dokuchaev". "Eurasian Soil Science" journal . 1904

Diploma of the Imperial St. Petersburg University with the defense of a thesis and the awarding of the Candidate's degree. October 16, 1871.
Archive CSM copy from CGIA St. Petersburg. F.14. I.5. D.3550. P.30



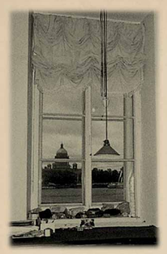
Approval of candidate V. Dokuchaev for the vacancy of Guardian of the Geological Cabinet from September 18, 1872.
Archive CSM copy from CGIA St. Petersburg. F.14. I.1. D.7732. P.3.



Submission from the Council of St. Petersburg University for the appointment of Master of Mineralogy and Geology Vasily Dokuchaev as privat-docent to give lectures in Geology. September 19, 1879.
Archive CSM copy from CGIA St. Petersburg. F.14. I.1. D.7792. P.16.

The Geological Cabinet of St. Petersburg University
Source: http://nlr.ru/petersburg/spbpcards/vo/3.htm

From 1870 Vasily Dokuchaev was lecturing in dynamic geology and petrography at the Imperial University in St. Petersburg.



View from the window of the office of Vasily Dokuchaev on the Neva river and St. Isaac's Cathedral.
Archive CSM

St. Petersburg University. Mineralogical Museum.
Archive CSM

St. Petersburg University. Mineralogical classroom
Source: http://old.ru/petersburg/sights/words/103.htm

In 1879 Vasily Dokuchaev was appointed privat-docent of mineralogy and became head of the department of mineralogy and crystallography at St. Petersburg University.

Explanatory text written by Vasily Dokuchaev for the soil map of the European Russia
Archive CSM

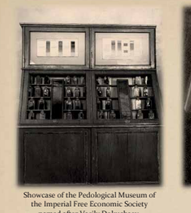
The first soil map of European Russia by Vasily Chaslavsky. 1879
From the National Atlas of Soils of the Russian Federation

From 1875, Dokuchaev takes part in creating the first soil map of European Russia. Due to the death of Vasily Chaslavsky in 1878, Dokuchaev had to complete the work himself and write an explanatory note for the Cartography of Russian Soils map, which was published in 1879.

Schematic map of the chernozem zone of European Russia, compiled by Vasily Dokuchaev.
Archive CSM

Soil sample selected by Vasily Dokuchaev. Saratov region, Volsky district, 5 miles West of the town of Volsk. A pasture field.
CSM GIK №1-132

In 1876, at the suggestion of Aleksey Khodnev and Aexander Sovetov, a special commission was organized at the First Department the Imperial Free Economic Society to develop new research programs for Russian chernozem. Vasily Dokuchaev was entrusted with drafting the working program of research and later its execution.
During the summer months from 1877 to 1881, Vasily Dokuchaev was travelling over the chernozem zone of European Russia (the total length of the route was over 10 thousand kilometers).



Showcase of the Pedological Museum of the Imperial Free Economic Society named after Vasily Dokuchaev.
Archive CSM F.5. I.1. D.4. P.3.

Halls of the Pedological Museum of the Imperial Free Economic Society named after Vasily Dokuchaev.
Archive CSM F.5. I.1. D.4. P.4.

Since 1879, Vasily Dokuchaev regularly raised the issue of the need for a soil science museum in Russia. This dream came true only after his death through the efforts of his close student Pavel Ototsky.
The official opening of the Pedagogical Museum was held on 6 of November 1904 at the Imperial Free Economic Society. Already at the time of its foundation the Museum was named after Vasily Dokuchaev.
The exhibition was based on a collection of soil samples and monoliths collected by Vasily Dokuchaev and his students during expeditions, which had been displayed at various exhibitions since the 70s of the 19th century.

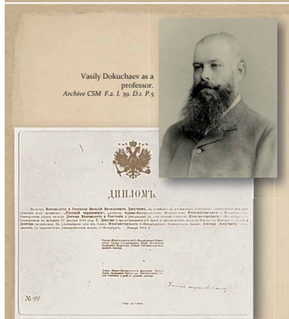
Anna Sinkler.
Archive CSM F.2. I. 39. D.1. P.4

Vasily Dokuchaev
Archive CSM F.2. I. 39. D.2. P.8

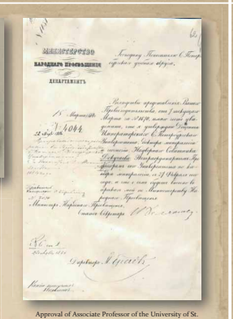
Vasily Dokuchaev married Anna Sinkler in 1880.
By the time she met Vasily Dokuchaev, Anna Egorovna had experience of teaching and was head of her own first-class boarding school for girls.

Assembly Hall of the Imperial St. Petersburg University. Vasily Dokuchaev defended his doctoral thesis "Russian Chernozem" on December 19, 1883.
Source: http://nlr.ru/petersburg/spbpcards/vo/3.htm

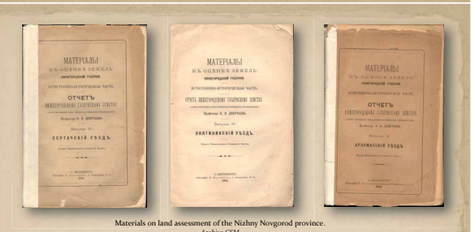
The work on the study of the chernozem zone of European Russia evolved into Dokyuchaev's doctoral thesis entitled "The Russian Chernozem", which he defended at the Imperial Saint Petersburg University on 19 December, 1883.
One of the official opponents for the thesis was Dmitry Mendeleev, who highly appreciated this work.



Diploma awarding the degree of Doctor of Mineralogy and Geognosy to Vasily Dokuchaev on the basis of his thesis "The Russian Chernozem", which he defended on the 19th of December.
Archive CSM copy from CGIA St. Petersburg. F.14. I.1.



Approval of Associate Professor of the University of St. Petersburg, Doctor of Mineralogy and Geology, Privy Councilor Dokuchaev as Extraordinary Professor of this University. March 15, 1884.
Archive CSM copy from CGIA St. Petersburg. F.14. I.1. D.7792. P.62.



Materials on land assessment of the Nizhny Novgorod province.
Archive CSM

In 1882, the Nizhny Novgorod provincial zemstvo approached Vasily Dokuchaev with a proposal to determine the qualities of the provincial soils with a precise marking of their boundaries. Under the leadership of Dokuchaev, specialists trained by him completed the work in six years. The results were 14 issues of "Materials on land assessment of the Nizhny Novgorod Province" (one for each county of the province), with a soil and geological map.
In this expedition, the methodology of soil mapping was created and developed, together with the genetic classification of soils with four major classes of land-vegetation, land-swamp, swamp and floodplain soils. The method of land appraisal was improved and the Dokuchaev concept of genetic soil science was tested and extended to the northern soils.

The FAO Protocol for the Assessment of Sustainable Soil Management

By Edoardo A.C. Costantini, IUSS President Elect 2021-2022

Many authoritative international scientific institutions and societies aim at sustainable intensification as a possible response to the greater agri-food needs of a growing world population and the need to reduce the environmental impact of agricultural and forest products. Sustainable intensification aims to increase production while reducing the environmental impacts of the processes involved. A win-win strategy to raise the general level of sustainability of agriculture, helping the economic sustainability of agricultural enterprises and protecting the environment.

The innovations that are proposed in the various production sectors are many and they all need to deal with simple and meaningful sustainability indicators. As for soil indicators, FAO has recently published a reference protocol for monitoring a set of soil properties sensitive to management changes (*http://www.fao.org/fileadmin/user_upload//GSP/SSM/SSM_Protocol_EN_006.pdf*).

The document, produced with the contribution of many IUSS experts, continues the commitment of the Global Soil Partnership to promote soil conservation and is in continuity with the "Voluntary guidelines for sustainable soil management", also published by FAO (*http://www.fao.org/3/bl813e/bl813e.pdf*).

The protocol is a practical, applicative tool to evaluate the effects on soil of the interventions realized in the agricultural field to implement sustainable intensification techniques, such as the improvement of production systems, innovation and implementation of new technologies, the restoration of ecosystems, and carbon sequestration. In concrete terms, the protocol provides key indicators and a set of suggestions to assess soil functions based on its physical, chemical and biological properties. The changes in the values of the indicators should allow an initial judgment on the effectiveness of the practices introduced.

The protocol lists 4 main indicators, relating to productivity, organic carbon, physical properties and biological activity.

The first indicator, **soil productivity**, or ability to produce biomass, although it is an indirect indicator of the state of the soils, is a parameter that indicates the overall impact of the introduced management practices. For its correct evaluation, agricultural productivity must be measured on the same crop and phenological and agronomic stage, through the weight of the total biomass or an estimate of the dry biomass per unit area.

Soil organic carbon (SOC) is a commonly recognized indicator that reflects the chemical, physical and biological state of soils. The organic carbon rate has a direct relationship with the availability of soil nutrients, its structure, porosity, water retention capacity and the presence of macro, meso and microfauna within it. SOC can be measured in surface soil and expressed as a percentage of carbon or organic matter.

For the **soil physical properties**, the indicator chosen is its bulk density (BD), which measures the mass of dry soil per unit of volume. The changes in BD offer an indication of changes in soil structure, porosity, and compaction. They also inform how easily water, air and plant roots can move inside it.

Finally, **biological activity** is an indicator of life in the soil. It is affected by salinity and pollution and can reveal the presence of degraded soil. To measure it, the choice fell on soil respiration. However, soil biological characteristics are not commonly measured and some complementary analyses can be very useful, such as those reported among the additional indicators.

In **addition** to the 4 main **indicators**, the FAO protocol lists a series of possible additional indicators, such as:

- the amount of soil nutrients, in particular available phosphorus,
- the presence of erosion phenomena, assessed directly in the field, or remotely, or estimated using models

- soil salinity, through the evaluation of electrical conductivity
- the biological activity of the soil in terms of soil microbial biomass, specific enzymatic activities, or through methods with field measurements.
- biological diversity (diversity and richness), through the counting of macro and meso-organisms with methods also in this case to be implemented either in the field or in the laboratory
- the pH, to evaluate variations in soil acidity or alkalinity
- resistance to penetration, particularly important for estimating consistency variations along the soil profile
- the rate of water infiltration into the soil
- the water holding capacity available for plants
- the presence of polluting elements, such as heavy minerals, various types of pesticides, excess nutrients, hydrocarbons and plastics.

In general, the protocol is not exclusive, leaving room for the use of other indicators, if the need arises, or if experiments and its application will highlight the usefulness of new indicators, but the implementation of at least all four indicators principal is considered essential to arrive at a correct judgment.
A soil management practice will be considered sustainable if the four indicators maintain their values or show positive change. For the first indicator, relating to soil productivity, the value must increase or remain the same to consider a positive impact of the practice on the soil studied. For soil organic carbon, the values should increase, for bulk density they should decrease. For the soil respiration rate, an increase is considered a positive impact on the soil, but the nature of the soil must be carefully considered.

The **choice of the monitoring sites** is of fundamental importance. This is perhaps the most delicate and professional part of the protocol. The areas selected must be representative of the soil and management practice to be assessed. For example, in an agricultural area, an area representative of the main crop (not including secondary or ancillary crops) and homogeneous by soil type should be selected. The monitoring must include the assessment of baseline values, measured before the implementation of the practices being assessed and/or at least a control area, always on the same type of soil.
For survey planning, it may be useful to include remote sensing tools to delineate study areas based on remote vegetation cover assessment (NDVI or Bare Soil Index – BSI) or soil moisture estimation. A more accurate delimitation can take place on the basis of proximal sensing sensors, such as geoelectric, spectrophotometric and radiometric ones.

Then it is crucial to make comparisons within the **same type of soil**. The protocol underlines how the great variety of soil properties, even within a limited territory, means that the measures of soil indicators cannot be compared with those of a different site. A correct application of the indicators of the protocol passes from a comparison with the measures carried out on the same land before starting the sustainable management practices, or on similar and nearby areas that have not received such actions.

Equally important is the **measurement timeframe**. The time can be from 1 to 2 years if the practice focuses on soil fertility (for example a new fertilization plan or the application of micronutrients). In this case, soil productivity may increase but the other indicators may not change significantly. In other cases of sustainable use practices, where the goal is to achieve long-term results on the soil properties, the positive impact can be observed within a longer period of time, ranging from 4 to 8 years after their introduction.
The protocol is intended to be tested in numerous projects in different parts of the world and may be subject to improvements, but already in its current form represents an important reference tool for verifying the environmental sustainability of innovations and intensification of agricultural and forestry techniques, as well as the possible success of organic, conservative or regenerative farming practices.

If its adoption is therefore undoubtedly recommended in many field trials, the importance of the **specific competence** of those who will apply the protocol, who will choose the indicators, the crops, and soils under test, and who will carry out the analysis, should be emphasized. A risk that could be run is that of arriving at wrong or approximate judgments, as a consequence of an inaccurate sampling and an incomplete or inaccurate analysis.

The resolution on soil protection of the European Parliament

By Edoardo A.C. Costantini, IUSS President Elect 2021-2022

The European Parliament, in the plenary session of last April 29, definitively approved the motion with which it asks the European Commission to prepare a specific directive for the protection of the soil and its biodiversity (660 voters: 605 yes, 55 no, 41 abstentions). This is a fundamental step towards achieving the goal of having single legislation of reference for the soil. The European Commission had already proposed a legal framework for soil protection in 2006, but it was withdrawn in 2014 after eight years of blocking by a minority of Member States in the Council. This time things could be better. In fact, the European Commission led by Ursula von der Leyen has made the protection of the environment one of its distinctive features, and the guiding principle of economic policy choices.
The document, published on *https://www.europarl.europa.eu/doceo/document/TA-9-2021-0143_EN.html*, underlines that soil is an essential, complex, multifunctional and vital ecosystem, of crucial importance under the environmental and socio-economic profile, which performs many key functions and provides vital services for human existence and the survival of ecosystems, including the conservation of biodiversity. Soils also affect the beauty of our European landscapes, as do forests, coasts and mountain areas.
The document states that a European legal framework for soil protection is necessary, as the soil protection measures currently in place are fragmented among many uncoordinated and often non-binding strategic instruments. Existing national measures have proved in themselves insufficient, so much so that we are witnessing a progressive spread of various forms of soil degradation. Existing sectoral policies, such as the common agricultural policy (CAP), do not contribute effectively to soil protection; in fact, although most of the cultivated lands are included in the CAP regime, on average less than a quarter of them apply effective measures to protect soil from erosion. Given the public interest in encouraging land users to manage soil in a sustainable way for future generations, it is advisable to provide additional financial incentives and support measures in favour of landowners to protect their soil.
Because of these considerations, the European Parliament asks the Commission and the Member States for a series of interventions, the most important of which can be grouped into the following objectives:

1. **knowledge of the state of the soil resource:**
   - common definitions regarding soil, its functions, its good condition and sustainable use;
   - objectives, harmonized indicators and a methodology to constantly monitor the state of the soil;
   - intermediate and final objectives measurable with harmonized datasets;
   - measures to counter all identified threats, with adequate timing.

2. **policies and intervention tools:**
   - clarifications on the responsibilities of the various interested parties;
   - a mechanism for sharing best practices and training, as well as adequate control measures;
   - adequate financial resources;
   - national strategic plans of the CAP which guarantee a high level of soil protection and promote actions for the regeneration of degraded agricultural soils;
   - innovative agricultural practices that can prevent and reduce the threat of soil salinization, or control its negative effects;
   - collection of compaction data and promotion of agricultural measures to reduce the use of heavy machinery;
   - ensure coherence between the new strategy for soil protection and the future EU forestry strategy, including in the latter the requirements of sustainable soil management, such as agroforestry practices.

3. **fight against soil consumption and its sealing:**
   - effective measures regarding the prevention and/or minimization of soil sealing, giving priority to the reuse of abandoned land and the reuse of abandoned sites over the use of unsealed land;
   - estimate the sealed soils and the corresponding loss of ecosystem services and ecological connectivity; these aspects will have to be taken into account and adequately compensated for in the context of environmental and strategic impact assessments of projects and programs;
   - development of new green, forest and agroforestry areas, especially in urban regions, to offset the negative impacts of the current high level of soil sealing in European cities.

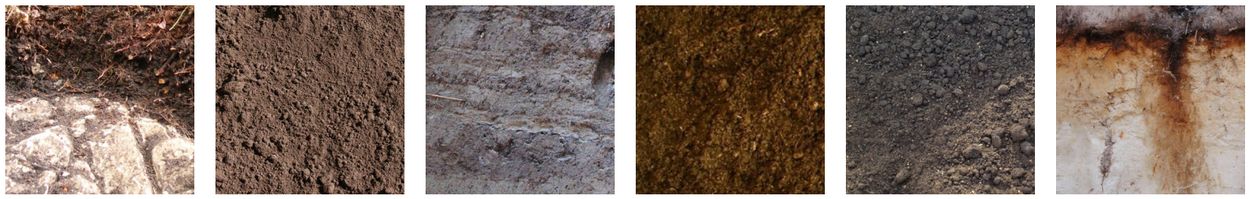
4. **contrasting soil pollution:**
   - provisions relating to the mapping of risk areas and contaminated sites, as well as regarding the decontamination of contaminated sites; Parliament calls on the Commission and the Member States to apply the "polluter pays" principle;
   - effectively contribute to the reduction of the excessive use of synthetic fertilizers, in particular nitrogen, by decreasing the thresholds set by the Nitrates Directive;
   - review the directive on the sustainable use of pesticides;
   - prevent and mitigate soil pollution caused by chemicals, especially persistent and bioaccumulative (including plastics and microplastics);
   - develop European limits for pollution by per and polyfluoro alkyl substances (PFAS), based on the precautionary principle.

5. **incentives for the circular economy:**
   - include a target for the recovery of excavated soil materials in the revision of the Waste Framework Directive;
   - revise the Council Directive 86/78/EEC on sewage sludge, so that this revision contributes to the protection of the soil by increasing its organic matter, reusing nutrients and reducing erosion;
   - obtain the full reuse of nutrients and precious components present in wastewater, to improve circularity in agriculture and avoid the excessive discharge of nutrients into the environment.

6. **reduction of the global ecological footprint of the European economy:**
   - include the protection and sustainable use of soil in all aspects relevant to its external policy and, in particular, take it fully into account when concluding relevant international agreements and reviewing existing ones;
   - include soil protection in trade agreements by taking measures to address land degradation imported from third countries, including degradation caused by biofuels;
   - ensure that products imported from third countries to the EU comply with the same environmental and sustainable land use standards.

The resolution of the European Parliament is certainly a good result, the fruit of the work of the many who have spent these years in various capacities. It must be recalled the initiative conceived in 2016 by European citizens and called "People4Soil", which is mentioned in the European Parliament resolution itself. The initiative was supported by 500 European institutions and organizations and asked the EU to do more to protect the soil. The numerous responses to the soil questionnaire proposed by the EU in recent months have also demonstrated the vast interest in soil protection present among European citizens.

Now it is a question of moving from the parliamentary resolution to the implementation of the policies of the European Commission and the Member States. It will not be easy. There will certainly be strong conflicting interests. It will be the task of associations, academies, but above all of the European citizens, to maintain a high level of attention in the public opinion and to constantly monitor what is actually implemented for the protection of European soils.



In Memoriam

H. Magdi Selim

(1944-2020)

H. Magdi Selim (© Richard Selim)

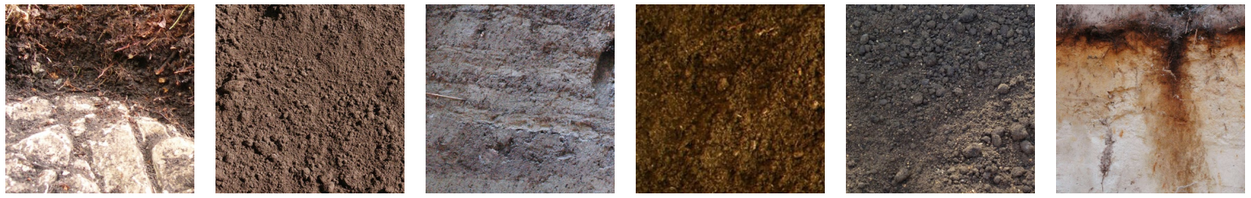
H. Magdi Selim, age 76, died in Baton Rouge on November 26, 2020. He was a professor of soil physics at Louisiana State University for over forty years before retiring in 2019. Magdi served as the Graduate student coordinator for the Agronomy Department and was a beloved mentor for members of the LSU AgCenter faculty.

He earned his BS degree from Alexandria University in Egypt and his MS and PhD from Iowa State University. Magdi authored or coauthored over ten books and numerous scientific publications in several journals. In 2014 he received the IUSS Von Liebig Award at the World Congress of Soil Science in Jeju, South Korea, for his outstanding contributions in applied soil science research.

Read more: *https://www.iuss.org/about-the-iuss/awards-prizes/awards/von-liebig-award/von-liebig-award-2014/*.

He is survived by his wife Liz, their son Richard and his wife Emily, and his grandson Elliott. Magdi enjoyed LSU basketball, eating at Sammy's Grill, and his many pet cats over the years. A reception celebrating his life will be scheduled in 2021.

By Richard Selim



IUSS Honorary Members and Award Winners

IUSS Honorary Members

Year	Member	Country
1924	L. Cayeux †	France
	K. Glinka †	USSR
	Jos. Kopecky †	Czechoslovakia
	G. Murgoci †	Romania
	E. Ramann †	Germany
	Sir John Russell †	UK
	S. Winogradski †	USSR
1927	P. Treitz †	Hungary
1935	E.A. Mitscherlich †	Germany
	A. d'Sigmond †	Hungary
	J. Stoklasa †	Czechoslovakia
	G. Wiegner †	Switzerland
1950	A. Demolon †	France
	D.J. Hissink †	Netherlands
	W.P. Kelley †	USA
1954	S. Mattson †	Sweden
	E. Truog †	USA
1956	G. Bertrand †	France
	E.C.J. Mohr †	Netherlands
1960	F.A. Bear †	USA
1964	J.A. Prescott †	Australia
1968	F. Hardy †	UK
	W.L. Kubiena †	Germany
	L.A. Richards †	USA
	A.A. Rode †	USSR
1974	R. Bradfield †	USA
	G.V. Jacks †	UK
	Ch.E. Kellogg †	USA
	M.K. Kononova †	USSR
	A. Oudin †	France
	F. Scheffer †	Germany
1978	G. Barbier †	France
	V. Ignatieff †	Canada
	Y. Ishizuka †	Japan
	L. Krolikowski †	Poland
	L. Vettori †	Brazil

Year	Member	Country
1982	Ph. Duchaufour †	France
	W. Flaig †	Germany
	V. Kovda †	USSR
	E. Mueckenhausen †	Germany
	E.W. Russell †	UK
1986	H. Jenny †	USA
	D. Kirkham †	USA
	S.K. Mukherjee †	India
	R. Tavernier †	Belgium
1990	G. Aubert †	France
	E.G. Hallsworth †	Australia
	J.S. Kanwar	India
	P. Schachtschabel †	Germany
	R.W. Simonson †	USA
	I. Szabolcs †	Hungary
1998	G.H. Bolt †	Netherlands
	R. Dudal †	Belgium
	K.H. Hartge †	Germany
	M. Kutilek †	Czech Rep.
	J. Quirk	Australia
	W.G. Sombroek †	Netherlands
	K. Wada	Japan
	D.H. Yaalon †	Israel
	S.V. Zonn †	Russia
2002	Richard W. Arnold	USA
	Gleb V. Dobrovolsky †	Russia
	Wilford Gardner †	USA
	Hassan M. Hamdi †	Egypt
	Luis A.L. Sarmiento	Colombia
	Fiorenzo Mancini †	Italy
	Boris S. Nosko	Ukraine
	Ramon Rosell †	Argentina
	Alain Ruellan †	France
	Akira Tanaka †	Japan
	Bernard H. Tinker	UK

Year	Member	Country
2004	Winfried E.H. Blum	Austria
	Hans-Peter Blume	Germany
	Johan Bouma	Netherlands
	Seong-Jin Cho †	S Korea
	Jan Glinski †	Poland
	Marcel G.H. Jamagne †	France
	Donald R. Nielsen †	USA
	Hans V. van Baren †	Netherlands
	Larry P. Wilding †	USA
2008	Christian Feller	France
	Kikuo Kumazawa	Japan
	Kazutake Kyuma	Japan
	John Ryan	Ireland
	Bob A. Stewart	USA
	Victor Targulian	Russia
	György Varallyay †	Hungary
	Jai Singh Pal Yadav †	India
2012	Jai-Joung Kim	Korea
	John M. Kimble	USA
	Ahmet Ruhi Mermut	Canada
	Nicola Senesi	Italy
	Donald L. Sparks	USA
	Robert E. White	Australia
2016	I. P. Abrol	India
	Jaume Bech	Spain
	Maria Gerasimova	Russia
	Martin H. Gerzabek	Austria
	Mary Beth Kirkham	USA
	Josef Kozak	Czech Republic
	Stephen Nortcliff	United Kingdom
	Marcello Pagliai	Italy
	Piotr Sklodowski	Poland
	Karl Stahr	Germany
	Roger Swift	Australia
	Tengiz F. Urushadze	Georgia
	Jae Yang	Korea

Year	Member	Country
2020	Jozef A. (Seppe) Deckers	Belgium
	Flavio Anastacio de Oliveira Camargo	Brazil
	Rainer Horn	Germany
	Carmelo Dazzi	Italy
	Kazuyuki Inubushi	Japan
	Kye-Hoon 'John' Kim	Korea
	Bal Ram Singh	Norway
	Pavel Krasilnikov	Russia
	Rosa M. Poch Claret	Spain
	Alfred Hartemink	USA

IUSS Award Winners

Dokuchaev Award		
Year	Member	Country
2006	Victor Targulian	Russia
2010	Dan Yaalon †	Israel
2014	Alex McBratney	Australia
2018	Johan Bouma	Netherlands

Von Liebig Award		
Year	Member	Country
2006	Rattan Lal	USA
2010	Don Sparks	USA
2014	Magdi Selim †	USA
2018	John Ryan	Ireland

Jeju Award		
Year	Member	Country
2018	John Bennett	Australia