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International Union of Soil Sciences (IUSS)

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International Decade of Soils 2015-2024

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It is freely distributed through the IUSS website.

Contents

IUSS Reports

World Congress of Soil Science 2022 (WCSS2022): Update

By Bruce Lascelles, IUSS Vice President Congress

Work continues apace in the build up to the World Congress in Glasgow in August 2022. The British Society of Soil Science (BSSS) Congress Working Group are holding regular virtual meetings to discuss and progress key actions, and are supported by their Professional Conference Organiser, Speakeasy.

Scientific Programme

The Scientific Committee, with support from the Division Vice Chairs (who are all BSSS members) are developing a programme in col-laboration with the Division Chairs, with the aim of having an outline programme to present at the Inter-Congress. This will detail more about the Congress theme and structure and also start to define the space we will require within the venue (the Scottish Event Campus, Glasgow).

The theme of the meeting, which was set out as part of the BSSS bid in South Korea in 2014, is ***Soil Science: crossing boundaries***, ***changing society***. This will form the over-arching theme and provides flexibility in the sub-themes that are being considered. The Divisions and associated Commissions and Working Groups will define much of the structure, but the team also want to find ways to raise the profile within the Scientific Programme of key issues in soil science that do not overtly appear in the existing IUSS Division structure; Interdivisional sessions are likely to be the best way to tackle contemporary issues and we will build further on the emerging ideas.

Planning for the plenary sessions is also being undertaken, comprising key speakers from outside soil science. The aim of these sessions is to raise the profile of soil science and the Congress to a wider public through the publicity associated with the key speakers and to challenge soil scientists to respond to issues articulated by those from outside our profession.

Tours

A number of pre-, post, and within Congress tours are being planned. These include:

- Britain South to North: A six-day pre-congress tour from the South of England ending in Glasgow at the start of the Congress;
- Mid-Congress one day tours within Glasgow, the Stirling area, to the immediate west of Edinburgh and the island of Arran;
- Post-Congress tours to NE Scotland (4 days), NW Scotland (4 days) and SW Scotland (3 days). We are also in touch with the Soil Science Societies of Belgium and the Netherlands in relation to possible tour programmes.

  These will involve significant logistical planning, drafting and completion of accompanying commentary and excavation and descriptions of soil profiles. The BSSS will be putting out a call shortly to their Early Careers Researcher community to support the profile description work. It provides a really valuable opportunity to learn about soil pit digging and profile description from some of our experts with travel and subsistence costs covered.

Cultural Activities

An artistic/cultural dimension to the Congress is proposed to take the Congress out of the main venue into the city of Glasgow and, if possible, beyond. To this end

we are working on a number of activities with various artists and groups from within Scotland and further afield. Activities under discussion include:

- A bid to Creative Scotland (CS) supported by seed corn funding from the BSSS. A key aspect is a symposium planned in Glasgow (hopefully on World Soil Day) primarily for artists (in all their guises) and writers involved in the natural world. This should provoke interest in other networks contributing to the programme at the World Congress in 2022
- A suggestion to 'have a short audio drama series telling the story of three people whose lives have been dominated by soil and exploring their journey and how their paths intertwine' using podcasts as the medium.
- A compilation of existing events and materials that might be curated for display at the World Congress. The BSSS will be ap-proaching the people behind these events/materials to gauge the possibility of and their willingness to have their material in-cluded.
- A suggestion to 'have a short audio drama series telling the story of three people whose lives have been dominated by soil and exploring their journey and how their paths intertwine' using podcasts as the medium.
- Collaboration with the Andrew Raven Trust which ran an event at Ardtonish Estate in the West Highlands. This was an excellent example of the integration of science, culture, community, land use and a number of other aspects. Discussions are ongoing.
- The compilation a digital archive of soil narratives which would serve as an educational resource and, if funding can be found, as a coffee table book. This would be a superb legacy of the World Congress.
- The inclusion of community-based food growing/soil awareness raising initiatives in Glasgow as part of a mid-Congress tour.

The Macaulay Development Trust are also interested in being involved in some aspect of the Congress; the Trust was set up in memory of T. B. Macaulay, the founder of the Macaulay Institute for Soil Research and it successor the Macaulay Land Use Research Institute.

Soil Film

The BSSS have assigned a budget to produce a short film on the importance of soils for use at the Inter-Congress and beyond (perhaps with further films on specific topics produced). This will form a great way to promote soils, the Society and the Congress.

Soil Judging

A feature of recent World Congresses has been the Soil Judging Competition, running for 4-6 days prior to the Congress. This is primari-ly aimed at early career scientists where they are given tuition on describing soil profiles and the World Reference Base (WRB) soil classification; this takes place in the lecture theatre and the field. The week culminates in each team (from different National Soil Science Societies) taking part in a competition to describe and classify a number of pre-excavated soil pits. The competition has been very well received in previous years and, whilst requiring a significant amount of effort, is planned to be held this again in 2022.

The BSSS, on behalf of the IUSS, look forward to welcoming as many of you as possible to Glasgow in 2022. The current global situation has required a re-focus around how we work and meet, and the BSSS are looking at how they can take learning from the current changes, in terms of virtual meetings, to build a more robust and more inclusive Congress in 2022.

Follow us on Twitter: *@Soil_Science and @WorldSoils2022*
Contact: *Bruce.lascelles@arcadis.com*
Read more: *https://www.soils.org.uk/wcss2022*

Report from the IUSS Secretariat

IUSS Presidential Elections 2020

The election of the next President of the IUSS is due this year. The appointment of the President represents a total of six years commitment to the Union by serving two years each as President-Elect (2021/22), President (2023/24) and Past-President (2025/26).

The Standing Committee on Presidential Elections has defined the respective procedure and the guidelines. Nominations should be made by two accomplished, highly-respected senior soil scientists.

Full nomination documentation should be submitted electronically to Prof. Dr. Rainer Horn (Email: *rhorn@soils.uni-kiel.de*) by June 1, 2020. A copy should also be sent to *iuss@umweltbundesamt.at*.

The first call for nominations was published in IUSS Alert 176 (February 2020). Reminders were sent with all the Alert issues that followed up to the nomination deadline.

The projected timetable for the Presidential Election process is as follows:
Nomination close 1st June, 2020. Shortlist of Candidates prepared by Presidential Election Committee by the end of June 2020 and presented to President. Shortlist voted on by Council (1 vote per National Member in good financial standing in IUSS) by end of September, 2020. Result of Election presented to President and Executive Committee following the conclusion of the vote and subsequently announced to members by email and on the IUSS website. Report on the process and any issues arising will be presented to Council and Executive Committee before the end of 2020. The schedule outlined above may be amended if unforeseen circumstances arise.
Read more: *http://www.iuss.org/media/president_election_full_info_2020.pdf*

Elections of Honorary Members 2020

According to the IUSS Statutes Honorary Members will be elected by Council, and shall be living at the time of election. They must be scientists of great distinction in Soil Science and have made substantial contributions to ISSS/IUSS. The number of Honorary Members that can be elected every four years at the Intercongress meeting will be determined by the merit of the candidates, but shall not exceed 10.
The IUSS Secretariat organized the call for nominations in January 2020 and collected nominations until February 29. In total 17 nominations were submitted, which were evaluated by the Executive Committee.
Elections take place by secret ballot among Council members present for the Inter-Congress meeting and the results announced in the Bulletin following the Inter-Congress meeting.
At the time this Bulletin was published the final decision as to when and how exactly the vote would take place remained to be decided – due to the fact that the Intercongress Meeting had to be postponed on account of the Corona pandemic.

IUSS Website

The main tasks of the webmaster during the last six months were adding new information to the website (e.g. new events, keeping track of cancellations and postponements due to the COVID19 pandemic; adding news), inputting Alert news into the content management system and sending the Alert out to our readers every month; further, creating new content, programming it backend, and finally, keeping contact information of IUSS members updated The Education and Teaching Commission of the Mexican Society. Patching up the content management system, implementing necessary updates and system back-ups rounded off the webmaster's tasks.

IUSS on TWITTER

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 900 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 conEtent.
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 can not be taken into consideration for funding.
As in the preceding years, in 2020 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.*
From the first round of submissions in 2020, the IUSS decided to support three activities: 1) Soil Judging competition and associated ANZSSS joint Conference, Cairns, December 2020: participation of four Pacifica students 2) 2nd Joint Workshop on Digital Soil Mapping and GlobalSoilMap, 14-18 December 2020, Goa, India: Sponsoring of Registration fee and travel (one way) for 4 students from low income countries; and 3) IUSS Conference on Sodic Soil Reclamation, 17 to 19 September 2020, Changchun, China: Travel support to five young participants.

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 2020.

News from national Soil Science Societies

News from the Latin American Soil Science Society (SLCS)

2nd Symposium on Chilean Law of Soil

During the visit of the IUSS Presidents to Chile in order to deliver the IUSS Distinguished Service Medal 2019 to Mrs. Carolina Schmidt Zaldivar, Minister of Environment of the Government of Chile and to Mr. Antonio Walker Prieto, Minister of Agriculture of the Government of Chile, the Chilean Soil Science Society planned to organize the "II Symposium on Chilean Law of Soil". This was planned to be done jointly with the IUSS, sponsored by the Chilean Senate, and in the framework of both "The International Decade of Soils" and the GSP-FAO Pillar 2. This symposium was scheduled to be held at the Honor auditorium of the Chilean Congress, in downtown Santiago, Morande Street 441, Santiago de Chile, on May 15th, 2020. It had to be cancelled due to the corona pandemic.

9th National Symposium on Control of Soil Degradation and Recovery

On behalf of the Spanish Soil Science Society, the Latin American Soil Science Society extended an invitation to participate in the IX Na-tional Symposium on Control of Soil Degradation and Recovery (IX Simposio Nacional sobre Control de la Degradación y Recuperación de Suelos), in Elche, Spain, which was planned to take place May 27-29, 2020. Due to the corona pandemic it had to be postponed to 30 Sept. 2020 to 2 Oct. 2020.
Read more: *https://condegres.es*

XXIII Latin-American Congress of Soil Sciences (XXIII CLACS)

The Latin-American Soil Science Society invites the whole soil science community to participate in its XXIII Latin-American Congress of Soil Sciences to be held from August 22 to 27, 2021, in Florianópolis, Brazil.

Read more: *www.slcs.org.mx;*
Facebook *https://www.facebook.com/clacs.cbcs2021* and Instagram *https://www.instagram.com/clacs.cbcs2021*

Report of the Education and Teaching Commission of the Mexican Society of Soil Science

The Education and Teaching Commission of the Mexican Society of Soil Science, founded in January 2020, pursues a strategy of rapprochement with students and teachers at all levels of basic education, trying to join efforts to achieve the objectives of the program "The IUSS goes to school". As one of the first activities carried out, the Commission visited the Centro de Bachillerato Tecnológico Ag-ropecuario no. 184 in the municipality of Actlán, Puebla, México, giving a workshop on "Assessment of the sustainability of agroecosystems". A total of 100 students attended and the tour of their facilities was very satisfactory. Students presented the different activities they take part in in high school, such as the installation and maintenance of a cacti nursery, endemic plants of Mexico; a house made of PET material, which was recovered in community campaigns to decontaminate the soil; water collection and soil conservation works; and an ethnobotanical garden where they preserve medicinal plants used by the communities of the region.

CBTA 184 Students and Members of the Education and Teaching Commission of the Mexican Society of Soil Science (© Dr. José Víctor Tamaríz Flores).

House made with PET by students of CBTA 184 in Acatlán de Osorio, Puebla, Mexico (© Dr. José Víctor Tamaríz Flores).

Picture 4: Inauguration of the workshop "Assessment of the sustainability of agroecosystems" (© Dr. José Víctor Tamaríz Flores).

Picture 5: Nursery of CBTA 184 in Acatlán de Osorio, Puebla, México (© Dr. José Víctor Tamaríz Flores).

News from the Soil Science Society of Poland

Soil Science Annual - news

Soil Science Annual journal is a continuation of the "Roczniki Gleboznawcze" – the journal of the Soil Science Society of Poland first published in 1950. Soil Science Annual is a quarterly publishing original papers, review papers and short communications devoted to a broad spectrum of issues relating to the soil environment. The journal is published in the open access system.

Read more: *http://www.soilsa.com/en*

News from the Romanian Society for Soil Science

Radu Lăcătușu (1943 – 2020)

Radu Lăcătușu belongs to the first Romanian generation of geochemists. He was a professor of soil chemistry and agro-chemistry at the prestigious University "Al. I. Cuza" from Iassy. He was born in Târnauca (now Ukraine) on June 1, 1943, from where he came as a refugee with his parents to Romania. He was a reputed scientist devoting his entire life to research in the soil sciences, as Head of Department or Laboratory at the National Research and Development for Soil Science, Agrochemistry and Environment – ICPA Bucharest. Author of over 300 scientific articles and 21 books and book chapters published in Romania and abroad. During 1996-2000 he was the President of the Romanian National Society for Soil Science. Appointed member of the "Gheorghe Ionescu-Şişeşti" Academy of Agricultural and Forestry Science and Corresponding member of the German Soil Science Society. He passed away on January 12, 2020 in Bucharest.

By Members of the Romanian National Society for Soil Science

Awards

Call for Awards of IUSS WG International Soil Modeling Consortium

Rien van Genuchten Award

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 rersearchers in the field of soil and vadose zone sciences. Granting merit to the scientific findings and breathroughs in the soil and hydrological sciences by Rien van Genuchten, the award honors a senior/mid-career scientist with a certificate and a cash award of $2,000.

ISMC Early Career Award

Along with the Rien van Genuchten Award, the ISMC Early Career Award is issued. The ISMC Early Career Award is dedicated to recognizing outstanding scientific achievements made by early career researchers in the field of soil and vadose zone sciences. Both awards will be conferred during the 3rd ISMC Conference.
Read more: *https://soil-modeling.org/ismc-conference/rien-van-genuchten-award/*
Deadline for nomination 15 May 2020.

Call for PRSSS Warkentin Prize

Annually, the Pacific Regional Society of Soil Science accepts nominations and applications for the Warkentin Prize. The Warkentin Prize of $500 will be awarded to a graduate student, or someone who has graduated from a graduate program within the last two years, that has published a graduate thesis or peer-reviewed article in the field of soil science. The recipient will be acknowledged in our newsletter and on our website. This prize is open to soil scientists worldwide.
The deadline to apply/nominate was May 31, 2020 at 11:59 pm PST
Read more: *https://drive.google.com/file/d/1zHjntwfVu5e5lmqALseOvOZOyHN6gvX-/view*

Other IUSS News

IUSS Commission 2.5 - signature access to scientific publications

Commission 2.5 would like to draw your attention to this petition, initiated by French scientists and open to all. Many scientific publications directly related to Covid-19 and pandemics have been made freely available, however other important work may not be available. This gesture highlights, indCall forependently of the Covid-19 risk, the dependence of scientists on the major scientific publishing houses and their profit margins in a context of decreasing finance throughout the world.
You are kindly invited to read this petition, and sign if you feel concerned by the message: Open the bibliographic databases now! The current COVID-19 crisis requires us to change our habits in order to maintain our activities in a difficult situation. Our petition (*https://freeaccesstoscience.wesign.it/en*) calls for free access to a tool crucial for understanding the current situation and thinking about the future: the large bibliographic databases, access to which is usually by subscription only. By signing this petition, you will allow us to ask publishers to open their databases transiently.

Claudio Zaccone re-elected as President of EGU Soil System Sciences (SSS) division

Prof. Claudio Zaccone, Vice Chair of Commission 4.1 "Soils and the Environments", International Union of Soil Sciences (IUSS), has been re-elected as President of the Soil System Sciences (SSS) division of the European Geosciences Union (2021-2023).
Read more: *https://www.egu.eu/elections/egu-election-autumn-2019/*

News from the International Science Council

IUSS is a member of ISC (International Science Council). If you would like to subscribe to the ISC newsletter where ISC advertises opportunities to engage in ISC's work and in international processes (including call for nominations from IPCC and IPBES), see here: *https://science.us5.list-manage.com/subscribe?u=2e9b648776114e2888e7ea8c5&id=6e20810dfd*

COVID-19 Global Science Portal

The ISC has launched an online hub for scientific commentary and analysis on responses to the COVID-19 coronavirus pandemic from its community of members and partners. The virus outbreak, and responses to it, have focused attention worldwide on the interaction between science, experts, society, policy making and politics, and have highlighted the vital importance of international scientific collaboration and open, accessible and reliable sources of information. The ISC's portal shares scientific commentary and analysis and provides access to information on various initiatives, highlighting the scale and scope of response, and encouraging ISC members and partners to collaborate and share best practices during this global emergency.
The ISC continues to collect inputs from community members and partners to populate the Global Science Portal with the latest scientific debates and institutional responses to the pandemic. Do continue to send your new initiatives and any updates on your current activities to be featured on the Portal.
Read more: *https://council.science/covid19/*
[From: The latest from the International Science Council, March & April 2020]

In addition, the following two items were posted on the COVID-19 Global Science Portal:The article Soil science beyond COVID-19 written by IUSS Past President Rattan Lal, published in the Journal of Soil Science and Water Conservation, appears on the portal under the tab "2030 Agenda for Sustainable Development".
Read more: *https://council.science/covid19/scientific-debates/*
Download the article: *https://www.jswconline.org/content/jswc/early/2020/04/22/jswc.2020.0408A.full.pdf*

The section Member Unions and Associations features under International Union of Soil Sciences Rattan Lal's quarterly viewpoint reminding the international community about the "One Health" concept: the health of soil, plants, animals, people and environment.
Read more: *https://council.science/covid19/institutional-responses/*

International Soil Modeling Consortium - Call for Working Groups

The International Soil Modeling Consortium has put out a call for proposals for working groups to contribute to the work and mission of the ISMC.
Read more: *https://soil-modeling.org/news/meetings-reports-publications/march-2020-1*

[From: GSBI Newsletter - March 2020]

Paleopedology Newsletter - December 2019 Issue available

The most recent newsletter of IUSS Commission 1.6 and INQUA is now online. It covers past and upcoming conferences and meetings, an overview of new publications and an article from Steven G. Driese et al. on the development of geochemical paleoclimate proxies and pedotransfer functions for paleosols and a number of other invited contributions.
Read more: *https://www.iuss.org/newsroom/newsletters/paleopedology-newsletters-commission-16/*

Report of Division 1: Soils in Space and 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 period under review, 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 newly formed IUSS Forum, which provides a platform for interactions between commissions and working groups.

IUSS Division 1. Commissions and 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 – Palaeopedology

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 varies, as reflected in the details of 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 palaeopedology and soil genesis. The Commission has two awards, the Kubiëna Medal and Young Micromorphologist Publication Awards.

Meetings organized:
Since 2018, Commission 1.1 – through its members - has been engaged in the following meetings:

- 2019 "Soils as records of Past and Present" was held on the 6th and 7th of November 2019, in Bruges (Belgium). Excursion (see below), with 50 participants, was organised in the region of Bruges
- San Diego, CA. Division: SSSA Division: Pedology. Session title: Recent Advances and Applications in Soil Micromorphology. Organizers: Craig Rasmussen and Danny Itkin, January 6-9, 2019
- International Workshop on Archaeological Soil Micromorphology, Basel, Switzerland, 2nd to 4th September 2019. Organising Committee (Philippe Rentzel, Kristin Ismail-Meyer, Christine Pümpin, Sarah Lo Russo, David Brönnimann)
- Archaeological Soil Micromorphology Meeting at the Faculty of Sciences - University of Lorraine (Nancy, France), 11-12 April 2019.

Pictures from the "Soils as Records of Past and Present" meeting (© Commission 1.1)

- Three meetings were strongly affected by COVID 19 lockdown, namely:

1. EGU 2020 Vienna | Austria | 3–8 May 2020 session on Multiscale Digital Soil Morphometrics – From Soil Profile to Soil Micromorphology: not held
2. International Workshop on Archaeological Soil Microscopy and phytoliths analysis - WASM – Paris 2020 July 8-10:
3. 16th international conference on soil micromorphology, Kraków, Poland – 30 August- 3 September 2020: postponed to 2021

Participants of the Training Course on Soil Micromorphology (© Rosa Poch)

Summer schools:
The following summer schools were organized through our members:

- Summerschool "Certificate In Archaeological Soil Micromorphology And Phytolith Analysis" 5 to 10 August 2019 at the Université Libre de Bruxelles
- 3rd Intensive Training Course on Soil Micromorphology (UdL). Coordination: Rosa Maria Poch Claret (rosa.poch@macs.udl.cat); Organization: Centre de Formació Contínua UdL C– Lleida, 30 September – 11 October 2019.

Future meeting:
Intensive Short Soil Micromorphology course connected to 16th International Conference on Soil Micromorphology August 2020, Kraków, Poland: postponed to 2021

New Activities:
New activities of the Commission (including web activities):

- Revise and support new Website, youtube channel, twitter, facebook.
- Produce and update commented list of scientific literature: archaeology.
- Produce and update commented list of scientific literature: x-ray tomography.
- Assemble a list of manufacturers of soil thin sections
- Videoclips (5 minutes) of selected speeches (to be placed on our website) including: (i) achievements in soil micromorphology (chosen on the basis of most cited paper) ; (ii) people who have received awards, (iii) emerging issues or opportunities
- Teleconference Round tables – once each semester - (e.g. by Skype, Webex, global.gotomeeting.com) about specific topics in soil micromorphology: soil genesis, archaeology, tomography, etc..
- Establish an archive for digital copies of micromorphology publications not readily available through standard digital sources (e.g. WoK, Scopus, etc.). For example, proceedings of micromorphology meetings, special project reports, etc.
- Create a list of places having large thin section collections, and interact with those places for identifying features to be recorded (e.g. soil type, features, location etc.)
- Reporting about the integrated use of microscopic techniques for various soil applications (carbon sequestration, structure preservation, human and climate impact).
- The "microphotograph of the month" should be published both on the micromorphology websites and in the newsletter.

Link to Newsletter (published every six months): *https://www.iuss.org/newsroom/newsletters/soil-morphology-and-micromorphology-newsletters-commission-11/*

Key publications

Book

Soils as records of Past and Present. From soil surveys to archaeological sites: research strategies for interpreting soil characteristics by Judit Deák, Carole Ampe, Jari Hinsch Mikkelsen, 2020. (*http://doi.org/10.5281/zenodo.3417724*)

Peer reviewed publications (selection of papers where soil micromorphology/morphology play an important role)

Ivanov, A.L., Shein, E. V., Skvortsova, E.B., 2019. Tomography of Soil Pores: from Morphological Characteristics to Structural–Functional Assessment of Pore Space. Eurasian Soil Sci. 52, 50–57. https://doi.org/10.1134/S106422931901006X

Juyal, A., Otten, W., Falconer, R., Hapca, S., Schmidt, H., Baveye, P.C., Eickhorst, T., 2019. Combination of techniques to quantify the distribution of bacteria in their soil microhabitats at different spatial scales. Geoderma 334, 165–174.

Khitrov, N.B., Ubugunov, V.L., Ubugunova, V.I., Rupyshev, Y.A., Ayushina, T.A., Zhambalova, A.D., Tsyrempilov, E.G., Paramonova, A.E., Nasatueva, T.N., 2019. Morphology of Soils in the Impact Zone of Kuchiger Hot Springs, the Barguzin Depression. Eurasian Soil Sci. 52, 1477–1498. https://doi.org/10.1134/S106422931912007X

Lucas, M., Pihlap, E., Steffens, M., Vetterlein, D., Kögel-Knabner, I., 2020. Combination of Imaging Infrared Spectroscopy and X-ray Computed Microtomography for the Investigation of Bio- and Physicochemical Processes in Structured Soils. Front. Environ. Sci. 8, 1–12. https://doi.org/10.3389/fenvs.2020.00042

Lucas, M., Vetterlein, D., Vogel, H.J., Schlüter, S., 2020. Revealing pore connectivity across scales and resolutions with X-ray CT. Eur. J. Soil Sci. 1–15. https://doi.org/10.1111/ejss.12961

Mariani, G.S., Compostella, C., Trombino, L., 2019. Complex climate-induced changes in soil development as markers for the Little Ice Age in the Northern Apennines (Italy). Catena 181, 104074. https://doi.org/10.1016/j.catena.2019.104074

Menon, M., Mawodza, T., Rabbani, A., Blaud, A., Lair, G.J., Babaei, M., Kercheva, M., Rousseva, S., Banwart, S., 2020. Pore system characteristics of soil aggregates and their relevance to aggregate stability. Geoderma 366, 114259. https://doi.org/10.1016/j.geoderma.2020.114259

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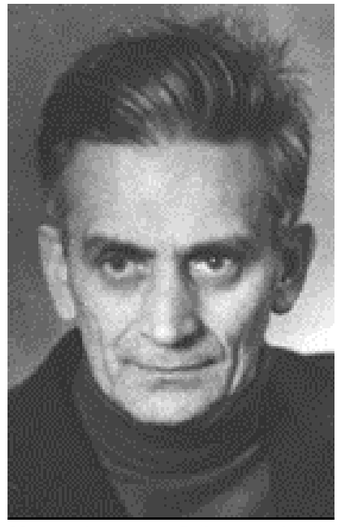

90th anniversary of Felix Ivanovich Kozlovsky (1928-2000, left picture) where the Vice-chair of the IUSS Commission 1.2 S.Goryachkin welcomes the participants of the anniversary session (right picture) (© for all pictures Commission 1.2)

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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 in and supported the organization of several events such as the European Geosciences Union General Assembly (EGU) 2019 and 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 2019 congress in Geneva, Switzerland and the 2021 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.

Major events organized by the Commission

On October 23, 2018, a scientific session was held dedicated to the 90th anniversary of the birth of an outstanding soil geographer Felix Ivanovich Kozlovsky (1928-2000).

The organizers of the scientific session were the Dokuchaev Soil Science Society (Commissions on the History of Soil Science, Land Reclamation and Soil Geography), IUSS (Commission 1.2 Soil Geography), and the Institute of Geography of the Russian Academy of Sciences (RAS), where F.I. Kozlovsky worked for the last 22 years of his life.

F.I.Kozlovsky's scientific ideas, career, creativity and journey through life were highlighted in the report of the Chairman of the Commission on the History and Philosophy of Soil Science I.V. Ivanov "Scientific Ideas of the Soil Scientist and Geographer Felix Ivanovich Kozlovsky". Furthermore, the staff of the Institute of Ecology and Evolution Problems, RAS, and the Institute of Geography, RAS, Yu.G. Puzachenko, M.Yu. Puzachenko, A. Avakov and A. Weiber presented the paper "The spatial structure of some properties of podzolic soils", in which they first showed that soil properties in space do not vary randomly, but are different-frequency patterns. This develops some of F.I.Kozlovsky's early work on the soil individual, but at a completely different technological and analytical level of big data processing. I.I. Vasenev from Timiryazev Moscow Agriculture Academy in the report "Growing relevance and prospects for the development of agroecological concepts of Kozlovsky for global challenges of the XXI century showed how many ideas of F.I.Kozlovsky are embodied in many scientific and educational organizations in Russia. Y. V. Kuzyakov (University of Göttingen, Germany) made a conceptual presentation "The Sixth Factor and the Concept of Agropedogenesis", where he showed with numerous examples that targeted soil change for agriculture fundamentally changes the paths of soil development - from natural divergence to convergence of agrogenic soils. Later it was published as Kuzyakov Y. & Zamanian K. 2019. Reviews and syntheses: Agropedogenesis – humankind as the sixth soil-forming factor and attractors of agricultural soil degradation. Biogeosciences, 16, 4783–4803, https://doi.org/10.5194/bg-16-4783-2019.

In fact, the soil-geographical discovery was presented by N. B. Khitrov (Dokuchaev Soil Science Institute) in his report "Gilgay soil combinations of the Lower Volga Region", where he showed the wide distribution of Vertisols and the associated gilgai microrelief in the south of Russia, previously not shown at all on soil maps. Young scientists of the Soil Institute D.N. Kozlov, N.I. Lozbenev, E.A. Levchenko, presented the report "Structural and functional organization of water-migration and denudation-accumulative patterns of the soil cover of the forest-steppe of the Russian Plain ", where they, based on the use of modern methods for studying the microrelief not seen by the naked eye, confirmed F.I.Kozlovsky's guesses about the priority of water-migration processes in the differentiation of the soil cover, including Chernozem zone.

On December 9-11, 2019, the Dokuchaev Soil Science Institute hosted the International Conference dedicated to the 100th anniversary of the birth of the distinguished soil geographer Vladimir M. Fridland (1919-

100th anniversary of Vladimir M. Fridland (1919-1983, left picture) where the Director of the Dokuchaev Soil Institute A.L.Ivanov and the President of the Dokuchaev SSS S.A. Shoba opens the conference (right picture) (© for all pictures Commission 1.2)

1983). The conference brought together more than a hundred leading soil scientists from Russia, Belarus, Kazakhstan and Uzbekistan with the aim of combining their efforts to study basic and applied aspects of soil resources including the interests of food and environmental security.

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 pattern. 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 most known to specialists in Earth sciences, is the theory of soil cover patterns (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), 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.

Many aspects of V.M.Fridland's scientific activity were elucidated in the plenary lecture of the Vice-chair of the IUSS Commission 1.2 (Soil geography) Sergey Goryachkin "Contribution of V.M.Fridland in creating of pedogeographical model of the world". The conference underlined the outstanding role of V.M. Fridland, whose scientific heritage and the scientific school he generated, predetermined the development of a number of modern basic and applied areas. In this regard, the participants of the conference considered it necessary to apply to the Dokuchaev Soil Science Society and the IUSS with the initiative to establish a 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.

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Commission 1.3 Soil Genesis

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

The Soil Genesis Commission decided to focus on supporting soil science and education targeting both the scientific and wider public community, by "reintegrating" traditional soil genesis knowledge into the scientific understanding of all the subfields of theoretical and applied soil science. We believe that traditional soil science knowledge related to soil genesis and soil landscape relationships has been eroded, or is increasingly ignored, as soil researchers are trained in very specific fields within soil science, such as subdisciplines of physics, chemistry, and biology. Many report work where interpretation of the results is not always done with consideration or understanding of the complexity of a soil body within the landscape. Thus the understanding of how widely such results might be applied is limited.
We suggest that soil genesis should be the basis of all soil related interpretations, but there are only a few "traditional" soil scientists, who can still teach the specialists and demonstrate the amazing complexity and fun to describe and understand the landscape based on a soil profile. Understanding the complexity is an important aspect of soil science and soil genesis in particular. The lack of awareness of soil and soil science worldwide is partly due to this scientific erosion, losing the focus from a complex living soil body and just interpreting soil properties individually, which can be done by any other related scientific field. Therefore we are undertaking four fields of actions described below.

1. Awareness raising

- by demonstrating the interesting nature of soil genesis and the cathartic feeling and fun of understanding what we see – demonstrating the fun of science

CSSI – Crime scene soil investigation

We have developed a soil science contest – on World Soil Day (2018 and 2019), a game for secondary school children, where the only evidence we have was some soil remaining on the tire of the four-wheel drive car that was used by the suspects. The children had to compare this sample with others from five potential crime field soils where the stolen box was buried to help police finding the stolen evidence.

The students had to make several soil tests and property interpretations to arrive at their conclusions. This way we direct their interest towards the variability of soil properties and raise questions in their minds as to why they are so different. Several promo media content were developed. Exciting documentation available:
https://www.youtube.com/watch?v=e4PnxWmwfWo

Participants of the extreme soil camp (© Aron Dobos)


A soil exhibition site at the University of Miskolc (© Endre Dobos)

Extreme soil camp

A three-day camp for soil mapping using remote sensing, geomorphology, digital terrain modelling complemented with soil pit digging, profile description and spatial interpretation was organized and met with a great success and interest. These good practices are planned to be collected and distributed, disseminated within the IUSS and within the soil science community to demonstrate the value of soil science (2019).
https://www.youtube.com/watch?v=awvKX4z3yZ8
https://www.youtube.com/watch?v=GQ6avE2APXw

2. Soil genesis media development

We have started to work on the development of teaching tools and media to support soil genesis education at different levels of understanding, school children, regular citizens, and professionals.

A virtual and a real thematic soil route development has been started. Two international cross border proposals were submitted to develop soil exhibition sites and supporting media development of two and three D downloadable materials for any visitor of the sites.
On each site there are voluntary local experts describing the profile and highlighting interesting features for visitors. Details available on youtube:
https://www.youtube.com/watch?v=45iMCcxI7cU&t=274s
https://www.youtube.com/watch?v=Yh4knKbSm1g
https://www.youtube.com/watch?v=4VVdW_9P9vg&t=1s

3. Development of a knowledge repository for soil media

- with an open access media linking possibility on a map background, where each site with any publicly accessible media will appear with links of videos in several languages. Any scientific or educational institution can use and link these sites for education.
https://www.uni-miskolc.hu/~soil/validatdsm.html

4. 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. Besides the major focus on soil description, we would like to use the opportunity to link the described features to the landscape and understand the soil-landscape formation and teach this complexity to the teams, potentially even organizing a soil genesiS-study tour using the existing profiles and describing soil genesis and genesis teaching and demonstration tools.
As part of the soil genesis commission activity we aim to strengthen the integration of knowledge of soil genesis into soil conservation/remediation activities. We want to support and collect good practices of altering or accelerating soil genesis with innovative approaches, tools, and materials to mitigate soil degradation, hasten remediation, and improve soil quality. We also want to give room to theoretical soil scientists engaged in soil genesis research, where basic soil science is undertaken with no need for immediate applicability to be discussed. Therefore the Commission we suggested several sessions for the next IUSS meeting.

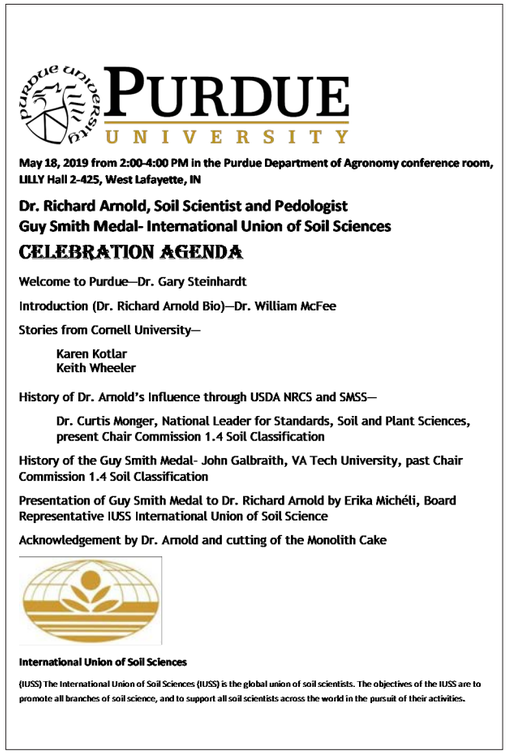
Commission 1.4: Soil Classification

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

Within Division 1 Soil classification, Commission 1.4 is responsible for categorizing the infinite number of morphogenetic attributes of the pedosphere so that the attributes used to classify soils permit the greatest number, most precise, and most significant statements about soil behaviour and genesis. Commission 1.4. has a home page: *https://sites.google.com/a/vt.edu/iuss1-4_soil_classification/*

Several activities are jointly organized by the WG WRB and the WG Universal Soil Classification and may overlap in the reports.

The Commission has an award, the Guy Smith Award (granted every 4 years). The 2018 awardee was Dick Arnold (USA), who could not attend the WCSS in Brazil.



PURDUE UNIVERSITY

May 18, 2019 from 2:00-4:00 PM in the Purdue Department of Agronomy conference room, LILLY Hall 2-425, West Lafayette, IN

Dr. Richard Arnold, Soil Scientist and Pedologist
Guy Smith Medal- International Union of Soil Sciences

CELEBRATION AGENDA

Welcome to Purdue—Dr. Gary Steinhardt

Introduction (Dr. Richard Arnold Bio)—Dr. William McFee

Stories from Cornell University—

Karen Kotlar
Keith Wheeler

History of Dr. Arnold's influence through USDA NRCS and SMSS—

Dr. Curtis Monger, National Leader for Standards, Soil and Plant Sciences, present Chair Commission 1.4 Soil Classification

History of the Guy Smith Medal- John Galbraith, VA Tech University, past Chair Commission 1.4 Soil Classification

Presentation of Guy Smith Medal to Dr. Richard Arnold by Erika Michéli, Board Representative IUSS International Union of Soil Science

Acknowledgement by Dr. Arnold and cutting of the Monolith Cake

International Union of Soil Sciences

(IUSS) The International Union of Soil Sciences (IUSS) is the global union of soil scientists. The objectives of the IUSS are to promote all branches of soil science, and to support all soil scientists across the world in the pursuit of their activities.

The agenda for that IUSS meeting and a picture of Dick Arnold with the medal and the past and current chairs of Commission 1.4 (John Galbraith and Curtis Mongen) (©Commission 1.4)

Division 1. and Commission 1.4. jointly organized a celebration symposium at Purdue University in May 2019.

Other meetings and activities:

1. International Soil Classification Congress 2020 that was scheduled for April 16-24, hosted by Mexico, had to be postponed because of the COVID-19 pandemic. Both the field trip and conference were in place with the abstracts having been submitted and reviewed. The organizing committee has postponed the Congress until October 2020. The same field trip and conference agenda is scheduled for the October meeting.
2. Commission 1.4 is working with the IUSS Research Forum to produce a "Global Map of the Potential for Soils to Sequester Atmospheric CO as Inorganic Carbon." This builds on a global inventory of soil inorganic carbon. However, the focus of this project is on global soils that have the potential for sequestering carbon under natural and amended conditions. It will involve Commission 1.6 (Maria Bronnikova and Elizabeth Solleiro) to take into account prehistoric soils that have sequestered CO_2 in the geologic past. The plan is presented below.

Sequestration of CO_2 from the atmosphere by the formation of soil inorganic carbon (SIC) is one of several soil management strategies for decreasing human-driven climate change. Certain soil taxa have the potential for sequestering more SIC than other soil taxa depending on pH, moisture regime, depth, respired soil CO_2, bicarbonate in water-saturated soils, and the supply and source of Ca^2+ (e.g., limestone versus igneous rock).

Maps of these factors can be generated and overlain using GIS technology to identify regions where soils have a high-to-low potential for SIC sequestration based on principles currently known about carbonate formation under both natural and managed conditions. Step 1 of this project will be to generate a SIC potential map of the United States using USDA databases and staff. This step will serve as a "proof of concept" project to provide experience for Step 2, which will be the generation of a SIC potential map of the world. Step 2 will be a IUSS Commission 1.4 project and involve international soil classification specialists and allied scientists, especially Commission 1.6. In total, these maps will assist the efforts of soil managers to reduce atmospheric CO_2 and will add to our understanding of carbon in the linked atmosphere-biosphere-pedosphere-lithosphere system.

Commission 1.5: Pedometrics

Chair: Vera Leatitia Mulder, the Netherlands
Vice Chair: Nicolas Saby, 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 WG) 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. 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*

Pedometrics Conference

The Commission organizes a biennial conference (Pedometrics Conference) which showcases innovative research on the mathematical spatial and temporal modelling of soil. The last 2019 meeting took place in Guelph, Canada. The conference was a great success. We had a total of 166 papers presented as oral (104) and posters (62) during the conference. We had a total of >110 international, >35 Canadian participants and about 25 participants from industry and sponsors. We had a great opening Sunday evening, Monday was a full day of presentations, a great field day in the Niagara Falls region including a visit to Niagara Falls and a winery dinner and tour on Tuesday, a full day of presentations on Wednesday and a half day of presentations on Thursday with a business meeting. We are having two special issues published in Geoderma and Geoderma Regional compiling the papers presented at the conference.

Participants of the Pedometrics Conference in Guelph, Canada (©Commission 1.5)

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).

There are several working Groups under or closely related to Commission 1.5, such as Digital Soil Mapping, Global Soil Map, Proximal Sensing, Soil Monitoring, Digital Soil Morphometrics and Soil Information Standards. The communication and activities of these working groups often overlap. Below you can find accounts of only those working groups that reported specific events. Other working groups mostly contributed to other larger events.

Key publications

Book:

Pedometrics, Editors: McBratney, Alex. B., Minasny, Budiman, Stockmann, Uta (Eds.), published 2018 by Springer. ISBN 978-3-319-63439-5

Participants of the final Jubilee X International Scientific School on Paleopedology for Young Researches in Siberia, Russia (©Commission 1.6)

Commission 1.6: Palaeopedology

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

The mission of the Palaeopedology Commission is to promote cooperative research by Soil and Environmental Scientists and Quaternary Geologists to increase our knowledge of past environments derived from paleosols. The issues covered by Paleopedology encompass the understanding of soil forming processes, deep weathering and regolith formation, soil mapping, soil conservation, Quaternary geology, geological mapping, neotectonics, and pedoarcheology. The motto of the Commission is rerum cognoscere causas (to know the cause of things).

The Commission introduced a new award: the Dan Yaalon Young Scientist Medal, which is awarded to outstanding scientists every four years at the World Congress.

Organized meetings

1. EGU General Assembly, April 2019, Vienna, Austria. Session "Pedogenic processes of soils and palaeosols across scales – influence of various factors, including imprints of human activities", convened by Daniela Sauer, Anna Schneider, Joscha Becker, Markus Egli and Klaus Kaiser, 13 oral presentations and 22 posters.

2. 20th Congress of the International Union for Quaternary Research (INQUA), Dublin, Ireland; 25-31 July 2019 Terrestrial Processes, Deposits and History: Soil formation - its rates and its use for reconstructing Quaternary landscape evolution (Poster only). Convened by Daniela Sauer, Sergey Sedov, Maria Bronnikova, 12 posters.

3. 10th annual International School on Paleopedology for Young Scholars in Siberia "Paleosols as a source of information about past environments", August 1-9, 2019, Altai region, Russia. Co-chaired by Maria Dergacheva, and Alexander Makeev. This was the Jubilee year for the School which gathered 40 scholars and 17 teachers who gave 19 lectures and five master classes on the methodology of techniques for sampling, preservation, and description of the studied objects.

Events within the frame of Commission 1.6 activities cancelled because of COVID-19 pandemic and postponed until 2021:

- XIVth International symposium and field workshop on paleopedology (ISFWP-XIV) - Paleosols, pedosediments and landscape morphology as archives of environmental changes. Russia, Altai, 13-23 August 2020. http://www.isfwp.igras.ru. The Commission has been working towards it since 2018, but very unfortunately we were forced to cancel it in spite of all non-economic damages and financial losses from both potential participants and organizers. But we hope very much that next year we will manage to hold it. To make this possible we intend to ask IUSS for financial support.
- Eurosoil 2020: Connecting People and Soil, 24-28 August 2020, Geneva, Switzerland. Cancelled, shifted to 2021. Session related to Commission 1.6, 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.

The new format of IUSS Commission 1.6 collaboration with INQUA

The IUSS Commission 1.6 Paleopedology promotes interdisciplinary research on paleosols by pedologists, geologists, paleoecologists, and geoarcheologists. The paleosol community (with a short break in 2007-2010) has been functioning within INQUA (first formally than informally) as a Working Group since 1969. But due to a general structural reform within INQUA during the last decades this Working Group has officially been affiliated only to IUSS. Recently, INQUA regulations have changed again, and non-funded Working Group is now one of the possible official types of activities within the commissions. Last year leaders of the IUSS Commission 1.6 Paleopedology, and paleosol representatives of the INQUA TERPRO advisory board Maria Bronnikova, Elizabeth Solleiro, and Tobias Sprafke with the contribution of regular members of Commission 1.6 applied for re-established of the official status of the Paleopedology Working Group in INQUA TERPRO commission. *On 5th of April the INQUA Executive Committee approved the proposal of Paleopedology Working Group contributed by IUSS Commission 1.6 Paleopedology.*

Paleopedology is a multidisciplinary area; hence, one of growing points in paleosol studies is the multiproxy approach. Establishment of the permanent Working Group on Paleopedology within INQUA TERPRO gives us the advantage of a broader audience, and wider opportunities for interdisciplinary collaboration.

Online activities or initiatives

Twitter profile *https://twitter.com/6Commission* was established in June 2019 and further run by Danny Itkin.

EGU General Assembly, May 2020
The Assembly was held -line because of the epidemiological situation. SSS3 – Soils as Records in Time and Space, SSS3.4 Pedogenic processes of soils and palaeosols across scales - influence of various factors, including imprints of human activities. Conveners: Florian Hirsch, Daniela Sauer, Tiina Törmänen, Patrick Drohan, Markus Egli, 19 contributions were presented and discussed in an online chatroom. Presentations are available in pdf format here: *https://meetingorganizer.copernicus.org/EGU2020/displays/35034*

Link to our website
Our website *https://sites.google.com/site/palaeopedology/* is currently under revision, under the responsibility of the commission's secretary Tobias Sprafke.

Link to our Newsletter
https://www.iuss.org/newsroom/newsletters/paleopedology-newsletters-commission-16/

Publishing an issue of Commission 1.6 Newsletter twice a year was resumed in December 2018. Three newsletters were issued since that time, and the next issue is in preparation (will be delivered in June 2020). Besides reports and announcements on paleosol-related events and other current news from commission members and officers, our newsletter also hosts contributors from outside Commission 1.6, including some senior researchers, who present their original research materials here.

Major Publications

Here, we only mention special issues of journals which were made with the direct participation of commission officers and members as invited editors and contributors.

1. Quaternary International, Volume 502, Part B, Pages 179-326 (30 January 2019). SI Landforms, sediments, soils and palaeosols as records of present and former environmental conditions and human-environment interactions. Edited by Bernhard Lucke, Daniela Sauer, Maria Bronnikova, Florian Hirsch, Eric McDonald. The SI contains 11 papers. These are papers from a variety of meetings on environmental changes documented by soils, paleosols, sediments, and landforms. It includes contributions from the following meetings: 1) Workshop of the INQUA Focus Group QUASAP (Quaternary Soils and Paleosols): "The Route of Humboldt - Rates of pedogenesis in the dynamic landscapes of Central Mexico", 6-13 December 2016 in Mexico City, 2) EGU session SSS3.4 "Geomorphological and (palaeo-)pedological records of natural environmental factors and human impact", 28 April 2017 in Vienna, 3) Meeting of the German working group Geoarchaeology, 12-14 May in Erlangen, Germany.
2. Quaternary International Special Issue Geochemical and physical expressions of soils in time and space: basic research and use of soils for paleoenvironmental reconstruction. Edited by Brad Sion, Florian Hirsch, Daniela Sauer. This SI includes 15 contributions from 21st World Congress of Soil Science, 12nd – 17th August 2018, Rio de Janeiro Brazil, and European Geoscience Union Assembly-2019, Vienna (several sessions guided by Commission 1.6)
3. Catena Special Issue Contemporary soils and paleosols: factors, processes and human-environment interactions Edited by Anna Shnider, Elizabeth Solleiro Rebolledo and Maria Bronnikova as guest editors. It includes 11 contributions from 1) Workshop of the INQUA Focus Group QUASAP (Quaternary Soils and Palaeosols): Yukon, Whitehorse – Kluane Lake – Dawson – Whitehorse, July 28 – August 4, 2018; 2) 21st World Congress of Soil Science, 12nd – 17th August

2018, Rio de Janeiro Brazil; Sessions C1.1.3 How to use micromorphology to understand palaeosols and polygenetic soils C1.6.1 Human-environment interactions recorded in soils and palaeosols, C1.6.2 Soil memory: Proxies for deciphering records of past environmental conditions in soils and palaeosols. The SI is supposed to be processed in June-August, 2020

Working Group Global Soil Map

Chair (GSM): Dominique Arrouays, France
Vice Chair: Pierre Roudier, New Zealand
Secretary: Zamir Libohova, USA.

The IUSS WG GlobalSoilMap is a WG of Commission 1.5 Pedometrics of the IUSS. It was endorsed by the IUSS during the inter-congress meeting in Rio (2016). The Chair is Dominique Arrouays (INRAE, France), the Vice Chair is Pierre Roudier (LandcareResearch, NZ) and the secretary is Zamir Libohova (UDSDA-NCRS, USA).
Since its foundation in 2016, the WG organized two meetings, one in Moscow (Russian Federation) in 2017 and a joint meeting with the WG Digital Soil Mapping in Santiago (Chile) in 2019. The next joint meeting is planned to be in Goa (India) in December 2020.

The proceedings of the first meeting were published as a book (Arrouays et al., 2017), while the main contributions of the second meeting are currently being published in a virtual issue of Geoderma Regional (ongoing), edited by D. Arrouays, L. Poggio, O. Salazar and Vera-Leatitia Mulder. This special issue will contain more than 20 peer-reviewed papers, a large number of which have already been published.

This conference gathered 65 participants from 19 countries. It included two keynote presentations, given by Laura Poggio and Axel Schmidt, 30 oral presentations and 12 poster presentations, and a final discussion about advances and remaining challenges concerning these two WGs. The first day (12 March 2019) was devoted to training sessions, and the last day (16 March 2019) to a field trip.

A business meeting of the WG was also organized during the WCSS in Rio (2018), which was attended by about 50 participants. During this meeting, it was decided to establish stronger links with the Global Soil Partnership (FAO).
Following a proposal from the IUSS GlobalSoilMap WG, during the 7th session of the Global Soil Partnership (GSP) Plenary Assembly it was decided that:

Opening Ceremony. From left to right : Osvaldo Salazar (University of Chile), Monica Antilén (President of Chilean Society of Soil Sciences), Carlos Muñoz (Vice-Dean Faculty of Agricultural Sciences, University of Chile), Dominique Arrouays (INRA-Chair of the GlobalSoilMap WG) and Laura Poggio (ISRIC-Chair of the Digital Soil Mapping WG) (© Global Soil Map WG)

Soil field trip to the "Rinconada de Maipú" Experimental Station at the Faculty of Agricultural Sciences, University of Chile. Tour guided by Prof. Manuel Casanova and Prof. Marco Pfeiffer from the University of Chile.
(© Global Soil Map WG)

'The International Union of Soil Sciences, GlobalSoilMap Working Group will join the GSP P4 Working Group to support the development of Fine Resolution Grids of soil properties'. It was proposed that the IUSS WG 'GlobalSoilMap' will contribute to GSP Pillar 4 WG activities by:

- Maintaining and updating the GlobalSoilMap specifications,
- Contribution to writing and reviewing the GSP-P4 specifications, and 'step by step' procedures for gridded soil information products developed under the GSP Pillar 4,
- Contributing to the development of new methods for harmonization and calculations of uncertainties,
- Supporting outreach and capacity building, depending on available resources,
- Promoting GSP Pillar 4 products and activities towards the scientific community through reporting to the IUSS and organizing scientific events.

Key publications

Book

Arrouays D, Savin I.Y. Leenaars J.G.B. McBratney A.B. (eds) 2018. GlobalSoilMap. Digital soil mapping from country to globe. Taylor&Francis CRC Press, London. 174 p.

Peer reviewed publications (selection)

Arrouays, D., Poggio, L., Salazar Guerrero, O., Mulder, V.L. 2020. Digital Soil Mapping and GlobalSoilMap. Main advances and ways forward. Geoderma Regional, 21, e000265. https://doi.org/10.1016/j.geodrs.2020.e00265

Arrouays, D.; McBratney, A.B.; Bouma, J.; Libohova, Z.; Richer-de-Forges A.C.; Morgan, C.; Roudier, P.; Poggio, L.; Mulder V.L.; 2020. Impressions of digital soil maps: the good, the not so good, and making them ever better. Geoderma Regional. 20, e00255. https://doi.org/10.1016/j.geodrs.2020.e00255

Caubet M, Roman Dobarco M, Arrouays D, Minasny B, Saby N. 2019. Merging country, continental and global predictions of soil texture: Lessons from ensemble modelling in France. Geoderma, 337, 99-110
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Chen S, Mulder VL, Heuvelink GBM, Poggio L, Caubet M, Román Dobarco M, Walter C, Arrouays D. 2020. Model averaging for mapping topsoil organic carbon in France. Geoderma, 366, 114237. https://doi.org/10.1016/j.geoderma.2020.114237

Chen, S, Arrouays D, Angers D, Chenu C, Barré P, Martin M, Saby NPA, Walter C. 2019. National estimation of soil organic carbon storage potential for arable soils: a data-driven approach coupled with carbon-landscape zones. Sci. Tot. Env. 666, 355-367.

Chen, S, Mulder VL, Martin MP, Walter C, Lacoste M, Richer-de-Forges AC, Saby NPA, Loiseau T, Hu B, Arrouays D. 2019. Probability mapping of soil thickness by random survival forest at a national scale. Geoderma, 344, 184-194.

Lagacherie P, Arrouays D, Bourennane H, Gomez C, Martin M, Saby N. 2019. How far can the uncertainty on a Digital Soil Map be known?: a numerical experiment using pseudo values of clay content obtained from

Vis-SWIR Hyperspectral imagery. Geoderma, 337, 1320-1328.

Roman Dobarco M, Bourennane H, Arrouays D, Saby NPA, Cousin I, Martin MP. 2019. Uncertainty assessment of GlobalSoilMap soil available water capacity products: a French case study. Geoderma. 344, 14-30.

Working Group Digital Soil Mapping

Chair: Laura Poggio, the Netherlands
Vice Chair: Alessandro Samuel-Rosa, Brazil

The working group working under Commission 1.5 Pedometrics is very closely collaborating with the Working Group Global Soil Map.

Organized meetings:

- *2019 Joint workshop for Digital Soil Mapping and GlobalSoilMap* (12-16 March 2019, Santiago, Chile). A detailed description can be found in this *Pedometron*.

- *Digital Soil mapping for Soil Sustainability and Security* Session at EGU 2019. The session was well attended on both the oral slots allocated. The presentations and poster display provided material for interesting discussions.

- *Digital soil mapping meets remote sensing for soil monitoring and assessment* session at EGU 2020

Other meetings

- Pedometrics 2019: many DSM presentations and good discussions with pedometricians and other Working groups.

Future meetings:

- *2nd Joint workshop for Digital Soil Mapping and GlobalSoilMap IUSS WGs* . Tentatively scheduled for December 2020.

Major Publications

- The Virtual Special Issue (VSI) in DSM and GlobalSoilMap on Geoderma Regional. This special issue includes papers dealing with different aspects of DSM at local, regional, national and continental scale.
- Many papers on DSM were published. Topics ranged from more technical to more applied, to link DSM with the assessment of soils.

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 by the Covid 19 pandemic and postponed.

Working Group WRB

Chair: Peter Schad, Germany
Vice Chair: Stephan Mantel, the Netherlands

The working group is working under Commission 1.4 Soil Classification and is continuously developing, testing and maintaining the World Reference Base for Soil Resources. Major activities include training courses and field excursions, such as the ones described below.

Meetings organized:

Participants of the WRB summer school in Poland (©Marcin Świtoniak)

1. WRB Summer school, Torun, Poland, June 30 - July 5, 2019. The goal of the summer school was to help beginners using WRB or to enhance skills in soil classification during a 1-day indoor training and 3 days of intensive field activities.

Field activity during the WRB field workshop in Romania (© Blaz Repe)

Field activity during the WRB field workshop in Romania (© Blaz Repe)

2. WRB Field Workshop, Romania: September 16-23, 2018
3. WRB Field Workshop, Mongolia: July 28 - August 10, 2019

A detailed report of the WRB Field Workshop in Mongolia (2019) can be found in the section Conference and Meeting reports.
Twitter of the Working Group: *https://twitter.com/2015wrb*

Websites
https://www.boku.wzw.tum.de/index.php?id=wrb&L=0
http://www.fao.org/soils-portal/soil-survey/soil-classification/world-reference-base/en/

Major publications

WRB translations into Slovene (published 11 February 2019) and Czech (published 8 May 2020); almost ready: Hungarian, Portuguese, German.

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.

Report of Division 2: Soil Properties and Processes

Division 2 integrates physics with chemistry, biology, mineralogy and pedo-genesis to understand fundamental soil properties and processes that determine soil behaviour. These phenomena are studied at multiple scales ranging from global to atomic.

Division 2 is organised into 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 interfacial reactions
- Working groups - Critical Zone System; Soil Modeling Consortium

Officers

Officers of Division 2 were elected in 2017, taking up their posts after the WCSS in Rio (12-18 August 2018).
Chair: Ryusuke Hatano / Japan1st Vice Chairperson: Paul Hallett / United Kingdom
2nd Vice Chairperson: Leo Condron / New Zealand

Divisional activities in 2019

The Chair of the Division contributed to national, regional and international conferences, symposia and workshops: such as the Annual Conference of the Japanese Society of Soil Science and Plant Nutrition (JSSSPN) at Shizuoka, Japan, on 3-5 September 2019; the 8th International Symposium on Interactions of Soil Minerals with Organic Components and Microorganisms (ISMOM organised by Commission 2.5) at Seville, Spain, on 23-28 June 2019; the 14th East and Southeast Asia Federation of Soil Science Societies (ESAFS) at Taipei, Taiwan on 3-7 November 2019. The Chair of the Division acted as guest editor of a Special Issue ("Greenhouse Gas Emissions in Agroecosystems") of "Agriculture", which published seven papers in the Special Issue. In 2019, Prof. Rattan Lal, the former president of IUSS, was awarded the 35th Japan Prize. The Chair of the Division also acted as president of JSSSPN, the Japanese Society of Soil Science and Plant Nutrition, which invited Prof. Lal to give a special lecture to the general public at the Annual Conference at Shizuoka city, on 4 September 2019. The title of Prof. Lal's lecture was "Managing Soils for a Negative Feedback to Climate Change and Positive Impact on Food and Nutritional Security". The content of the lecture has already been published in "Soil Science and Plant Nutrition" (*https://doi.org/10.1080/00380768.2020.1718*.

Left, Prof. Rattan Lal, past president of IUSS, and right, Prof. Takashi Kosaki, current president of IUSS (right) (©Japanese Society of Soil Science and Plant Nutrition).

Prof. Takashi Kosaki, president of IUSS (2019-2020) and a member of JSSSPN, gave a special lecture titled "Prof. R. Lal was awarded the 35th Japan Prize - What should domestic and international soil
science and plant nutrition communities do now?"

The 1st Vice Chair held a scientist-stakeholder workshop "How is reduced tillage really changing soils?" that included a keynote session at the British Society of Soil Science annual meeting and was attended by about 90 people, and a workshop to identify science gaps the following day.

The 2nd Vice Chair proposed, organised, and chaired a seminar series titled "Phosphorus at 350 – the brilliant, essential, and sinister 13th element" in March 2019 at Lincoln University, New Zealand, to mark the 350th anniversary of the discovery of phosphorus. This series comprised 12 seminars on various topics related to the nature and dynamics of phosphorus in soil-plant-animal systems in three sessions, and attracted over 200 attendees. A related one-day symposium on "Phosphorus Cycling and Management in Terrestrial Systems" was prepared in late 2019 and will be held at Lincoln University on 04 February 2020. This symposium will comprise 15 presentations with contributions from Canada, Australia, and New Zealand, and has attracted over 70 registrants

Travel fund in 2019

Division 2 provided travel funds to the following nine scientists for the 8th International Symposium on Interactions of Soil Minerals with Organic Components and Microorganisms (ISMOM) at Seville, Spain, on 23-28 June 2019 and to four scientists for the Wageningen Soil Conference 2019 at Wageningen, the Netherlands, on 27-30 August 2019.

At the ISMOM:

1. Tatiana Zubkova, from the Faculty of Soil Science, Lomonosov Moscow State University, Moscow, Russia, with the presentation: "Matrix approach to the molecular properties study of the Cuban soils on the rice agrocenosis

2. Magarita Osterrieth, from the Instituto de Geologia de Costas y del Cuaternario.IGCYC-UNMDP-CIC - Facultad de Ciencias Exactas y Naturales Universidad Nacional de Mar del Plata-IIMYC-CONICET, Buenos Aires, Argentina, with the presentation: "Importance of biogenic silicon in pedological sequences, as a determinant of the edaphic properties of agroecosystems of the ArgentinianPampean plains".

3. Mohammed Riaz, from the Department of Environmental Sciences & Engineering, Government College University Faisalabad, Faisalabad, Pakistan, with the presentation: "Improved C use efficiency and soil quality in a low-fertility status alkaline calcareous soil".

4. Marta Alvarez, from the Department of Forest Engineering, Technical School of Agronomic and Forestry Engineering. University of Cordoba, Cordoba, Spain, with the presentation: "Soil organic components and enzyme activities in a Podzol profile".

5. John J. Sandoval from the Facultad de Ciencias Agropecuarias, Universidad de Cundinamarca, Girardot, Colombia with the presentation: "International cooperation and transfer of knowledge: Application of different organic amendments for the restoration of endangered soils in tropical dry forest in Colombia".

6. Boris Durdevic from the Department for Agroecology and Environment Protection, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia, with the presentation: "Short-term responses of soil respiration induced with biochar and lime in acid soil".

7. Sergio Prads from the Department of Environment and Planning, University of Aveiro/CESAM, Aveiro Portugal with the presentation: "Use of coupled biochar and straw mulch as a technique to mitigate soil erosion and improve soil carbon stocks in burned soils of southern Iberian peninsula".

8. Ines Eugenia Garcia de Salomone from the Department of Applied Biology and Foods, University of Buenos Aires, Buenos Aires, Argentina, with the poster: "IMPACT OF THE AGRICULTURAL SYSTEM SOYBEAN-COVER CROPS AND PGPR INOCULATION ON RHIZOSPHERE MICROBIAL COMMUNITIES".

9. Belhadji Hamdi Aissa from the Department of Agricultural Sciences, Kasdi Merba University of Ouargla, Ouargla, Algeria, with the poster: "EVIDENCE OF BIOLOGICAL FEATURES IN ALGERIAN GYPSIC SOILS".

At the Wageningen Soil Conference 2019:

1. Nkosinomusa Buthelezi from the University of Kwa-Zulu-Natal in South Africa, who gave a presentation titled: "Farmer perceptions and laboratory measurements of soil fertility in four villages of eastern South Africa".

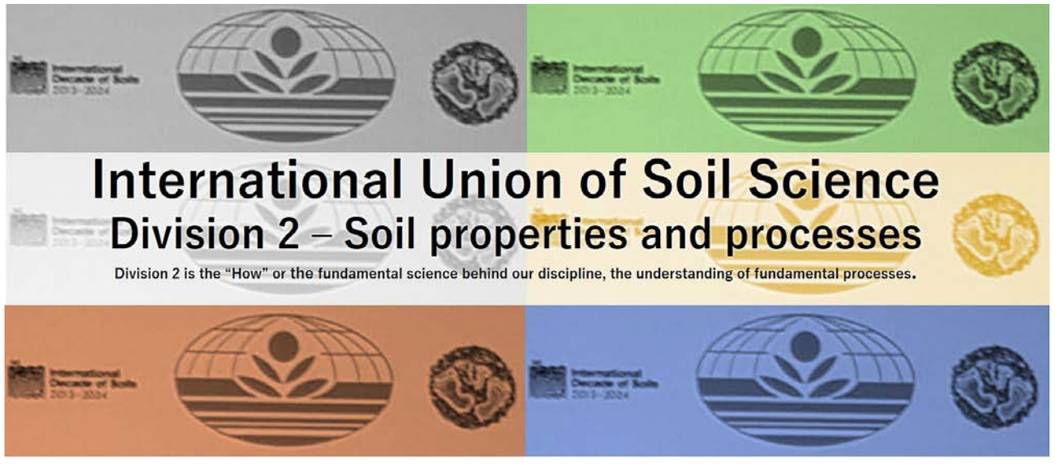
2. Fang Wang from the Chinese Academy of Sciences, CAS Centre for Excellence in Tibetan Plateau Earth Sciences, CAS in China, who gave a presentation titled: "Utilising archived soils to study long-term microbial community structural dynamics".

3. Deepika Pandey from the Amity University Haryana, Gurugram, Haryana in India, who gave a presentation titled: "Element mobilisation in weathering profiles as a process of soil formation".

4. Mojtaba Zeraatpisheh from the College of Environment and Planning, Henan University in China, who gave a presentation titled: "Spatial prediction of soil salinity using machine learning algorithms in semi-arid regions of Iran"

Facebook Group of IUSS Division 2

The Chair of the Division established the FB Group "IUSS Division 2" on 18 August 2018 to communicate the schedule and activities of the symposia, workshops and conferences, and to share information on books, papers and some other issues related to IUSS Division 2. So far, more than 2300 colleagues have joined the FB Group. The FB group also provides the photos of the events that opened in several countries on and around World Soil Day and of the parties celebrating awarded scientists. We welcome all who would like to join!
The FB Group can be contacted at *https://www.facebook.com/groups/213698576164024/.*



Cover of the Facebook Group of IUSS Division 2 (©IUSS Division 2). The five colours of the cover relate to plants and dominant soils in Japan. Green means plants. Bluish gley soils are dominant in the alluvial plain, and red soils are found in the warm area in the south. White sand dune soils and pumiceous volcanic regosols are found in western Japan, and black andosols are dominant in the cool area in the north.

Commission 2.1: Soil physics

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

Soil physics contributions to conferences and meetings

In 2019, a combined meeting of the German and Swiss Soil Science Societies was held in Bern with good participation of the soil physics community. Various topics on soil structure (stability and management, small-scale processes, soil-root interactions), water, gas and mass transport as well as other topics which were chosen freely were discussed intensively in eight lecture blocks. Overall, the lecture blocks were well attended. Soil-physical contributions were also to be found in the sessions on cross-cutting themes held by other Commissions (e.g. Rhizospheric Processes, Soil Protection and Soil Pollution and Soil Erosion), which shows that soil physics can also provide impulses there. A highlight was certainly the very exciting and entertaining keynote lecture by Prof. Paul Hallett (Univ. Aberdeen, UK) on the topic of "Rooting for soil physics", which dealt with mechanical and hydraulic processes in the root zone, among other things, but also provided an opportunity to learn something about the common features of soils and catch up.

The EGU 2019 session on "Building Inter- and Transdisciplinary Bridges in Soil Science: Honouring Lily Pereg 1964–2019" – organised with the participation of the Vice-Chairs of the 2.1 and 2.2 Commissions – brought together scientists from soil biology, chemistry and physic

The Wageningen Soil Conference 2019 focused on measuring, mapping and evaluating soil functions. There were several presentations related to soil hydrology and physics. There was a session dedicated to "Modelling & mapping: soil hydraulic processes and nutrient cycling". During the conference, Master Classes and "Meet the experts" events were organised as well, to enhance discussion between the participants of the conference. Master classes included field trips or laboratory tours or computer tutorials and/or classroom discussions. As a side event, a workshop on the Soil Programme on Hydro-Physics via International Engagement (SOPHIE) was organised.

Events

During the General assembly of the European Geoscience Union (EGU 2020) soil physics should have been represented in various core sessions covering topics ranging from soil water infiltration (SSS6.4), soil hydrol-

Left: "Meet the experts" event and group photo taken at the Wageningen Soil Conference 2019 (@Guy Ackermans). Right: Opening of the Swiss-German Soil Science meeting at the University of Bern (© DBG).

ogy and hydrophysics (HS8.3.5 and HS8.1.5) and preferential flow (SSS6.6.) to soil structure dynamics (SSS6.8) and new measurement techniques and modelling approaches (SSS.6.10). In cross-cutting sessions on soil plant interactions (HS8.3.4), the rhizosphere (SSS4.3) and soil microhabitats (SSS4.4.), the soil physics perspective was of particular interest.

The EUROSOIL 2020 meeting was to be held on 24-28 August in Geneva, Switzerland, with the objective of connecting people and soils. The meeting had to be postponed due to the Corona pandemic. The conference, which is amongst others sponsored by IUSS, will be dedicated to discussing the contribution of soil science to the sustainable development goals. Soil physics certainly is an important aspect in this matter and we are hoping for many soil physics talks at this conference in 2021. For details, please see section Upcoming Conferences and Meetings.

Awards

- Rainer Horn, Professor for Soil Science, received the honorary membership of the German Soil Science Society at the German-Swiss Soil Science meeting in Bern.
- Rattan Lal, Professor for Soil Science and Director of the Carbon Management and Sequestration Center at Ohio State University, Columbus, USA, has been appointed as corresponding member of the German Soil Science Society (DBG). This appointment is intended for renowned personalities to foster international cooperation with the DBG.

Commission: 2.2 Soil Chemistry

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

Actively promoting soil chemistry, in particular amongst young scientists, remained a core goal of Commission 2.2. in 2019. To this end, the following activities were organised.

The Chair and the Vice-Chair of the Soil Chemistry Commission once more organised a well attended session titled "Soil organic matter turnover: from molecules to ecosystems and back again" at the European Geosciences Union General Assembly in Vienna, Austria, on 7-12 April 2019. This session was explicitly endorsed by the Soil Chemistry Commission. More information can be found on this website: *https://www.egu2019.eu/*

However, the highlight of 2019 for the Soil Chemistry Commission was the Wageningen Soil Conference 2019 held in Wageningen, The Netherlands, on 27-30 August 2019. Soil chemistry played a key role at the conference throughout several sessions and, amongst others, a keynote lecture by Prof. Johanness Lehmann of Cornell University on the topic of soil organic matter dynamics.

Thanks to the kind financial contribution of IUSS Division 2 and the Dutch Soil Science Society (NBV), we were able to give six travel awards to young scientists from underprivileged countries and enable them to be present at the conference. Below we provide some photos of several awardees as well as a link to a video impression of the conference featuring one of the awardees, Deepika Pandey.
Link to video: *https://youtu.be/NOXvCpKli28*
Photos: below.

With a contribution to the "Summer of Soil" in Amsterdam, organised by the JRC's European Network on Raising Soil Awareness and the FAO European Soil Partnership, the Commission strongly emphasised the need to differentiate between different soil types and geochemical process domains when communicating about science to policy makers and the general public. In that sense, it was pointed out that a spatial and temporal appreciation of soil chemical properties and processes is essential for understanding, maintaining and enhancing soil functions.

A new, open-access Massive Open Online Course on Tropical soil science was launched in 2019, with the support of the IUSS stimulus fund. The MOOC was spearheaded by Dr. Vancampenhout, but contains important contributions from all over the world. Main partners include the Flemish Interuniversity Council for University Development Cooperation, ISRIC Wageningen, the EU - Joint Research Centre and FAO. The differences in the geochemical behaviour of different types of tropical soils constituted an essential part of the course. The MOOC has now begun its second run, and so far 1841 persons from more than 100 countries have taken part. Read more: *https://www.edx.org/course/as-above-so-below-an-introduction-to-soils-ecosyst*

Dr. Jansen and Dr. Vancampenhout have a strong ambition to promote soil sciences in general and chemistry in particular beyond Europe. The MOOC was a concrete realisation of that ambition in 2019. Moreover, Dr. Vancampenhout visited Dr. Didas Kimaro, president of the East African Soil Science Societies, to discuss potential future collaborations and to engage East African countries in the global soil science community.

Commission 2.3: Soil biology

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

The main focus of Commission 2.3 during the last year was on strengthening the interaction between IUSS and other international societies. Ellen Kandeler started to prepare a close collaboration with members organising the next Eurosoil conference which should have been held in Geneva from 24 to 28 August 2020. We suggested two different symposia. Our Commission 2.3 collaborates with the Food and Agriculture Organization of the United Nations (FAO), the Global Soil Partnership (GSP), the Intergovernmental Technical Panel on Soils (ITPS), the Convention on Biological Diversity (CBD), the Global Soil Biodiversity Initiative and the European Com-

People awarded travel funding from Division 2: a) Fang Wang from the Chinese Academy of Sciences, b) Deepika Pandey from the Amity University Haryana in India, c) Mojtaba Zeraatpisheh from Henan University in China (©Boris Jansen).

Poster about Benefits of Agricultural Biodiversity (© FAO).

mission. The main task was to launch a call for experts for the establishment of a Working Group to perform a global and regional assessment of the state of knowledge on soil biodiversity. The assessment covers the current status of soil biodiversity, as well as opportunities and challenges to support the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals. Ellen Kandeler as chair of Commission 2.3. of IUSS contributed to the report to the FAO which will be printed in the near future. Magdalena Frac as vice-president of ISEB (International Society for Environmental Biogeochemistry) participated in the 24th International Symposium on Environmental Biogeochemistry (ISEB24) in September (27-29) 2019 in Potsdam (Germany) and promoted the IUSS society. Moreover, during the 30th Congress of the Soil Science Society of Poland, she gave a plenary lecture concerning the importance of biodiversity in the soil environment

Commission 2.4: Soil mineralogy

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

Introduction

The meeting of the Commission leaders took place in the framework of the Euroclay 2019 Conference (Meeting of the European Clay Groups Association (ECGA) held at the Pierre & Marie Curie University (UPMC), Paris, 1-5 July 2019 (*https://euroclay2019.sciencesconf.org/*). The presentations concerning soil clay mineralogy were given mostly in the session "Clays and organic matter".

Events

A session "Linking soil mineralogy to soil properties and functions" (4.27) has been planned for the upcoming Eurosoil 2020 Conference (https://eurosoil2020.com/), taking place in Geneva, Switzerland, in 2021.
The leaders of the Soil Mineralogy Commission (S. Hillier and S. Lessovaia) are amongst the organisers of the session as well as Ben. Butler (James Hutton Institute, and Bruno Lanson (Grenoble).

The abstract of the session can be found below:
Minerals are major components of most soils. Through direct inheritance from the parent material and subsequent alteration by weathering, soil mineralogy can be spatially diverse - reflecting manifold many soil forming factors. Soil minerals are related to soil properties and functions, and, thus, inherently associated with all sustainable development goals (SDGs) related to soil. For example, soil mineralogy controls the sources, availability and behaviours of most major and micro plant nutrients, which in turn determine the potential for biomass production and its quality - key components of the "Zero Hunger" and "Good Health and Well Being" SDGs. Other examples include carbon sequestration, soil contaminants, and mineral-microbe interactions. Relating mineralogy to soil properties, functions and SDGs in this way is key to ensuring that soil mineralogy research helps advance the process-based understanding of the soil environment to better inform policy, land management and decision making. This session should be of interest to all who study soil mineralogy; it seeks to provide an opportunity to communicate recent advances in the understanding of mineral contributions to soil properties, soil functions, and SDGs. Presentations are sought from all branches of soil mineralogy, but particularly from those employing advanced or new approaches.

Thus far, the session has been advertised via the list server of the Association Internationale Pour L'Etude des Argiles (AIPEA).

Symposium

The Commission has also put forward two suggestions for symposia for the 2022 congress in Glasgow: Digital Soil Mineralogy and Minerals and Plants. The former focuses on modern, data-based and remote sensing approaches to determining soil mineralogy, the latter on the numerous interactions between minerals and plants e.g. nutrient cycles, nutrient mining, weathering, enhanced weathering, carbon sequestration.

Publications

A book that should be of interest to those interested in soil mineralogy was recently published:

G. Jock Churchman, Bruce Velde (2019) Soil Clays: Linking Geology, Biology, Agriculture and the Environment. Taylor & Francis Group, LLC. DOI: *https://doi.org/10.1201/9780429154768*

It is of interest to note that during the year a new mineral was named after one of the first soil scientists V.V. Dokuchaev:

O.I. Siidra, E.V. Nazarchuk, A.N. Zaitsev, Y.S. Polekhovsky, T. Wenzel & J. Spratt (2019): Dokuchaevite, Cu8O2(VO4)3Cl3, a new mineral with remarkably diverse Cu2+ mixed-ligand coordination environments. Mineralogical Magazine. 83 (5), p. 749-755, DOI: *https://doi.org/10.1180/mgm.2019.41*

Others

The description of the Soil Mineralogy Commission has been updated (*https://www.iuss.org/organisation-people/organisation/commissions/#Div2*):

Many functions of soils are related either directly or indirectly to soil mineralogy. The Commission on Soil Mineralogy seeks to encourage and support, through both research and teaching, the study of all aspects of the minerals found in soils, and their relationships to and interactions with other soil components, such as organic compounds. Soil minerals may be inherited from parent materials, and they may be transformed and neoformed by processes such as weathering. Knowledge of minerals in the soil environment may inform studies of the genesis and classification of soils as well as their management, behaviour, conservation, and fertility. Studies of soil mineralogy benefit from many advanced instrumental methods applied across nano to landscape scales. The vision of the Commission is to promote modern approaches to soil mineralogy, such as data driven approaches, and especially those approaches that seek to advance understanding of the roles of soil minerals in relation to sustaining and enhancing the functions of soils.

Commission 2.5: Soil interfacial relations

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

The highlight of 2019 for Commission 2.5 was the conference of the Commission, ISMOM (International Symposium on Interactions of Soil Minerals with Organic Components and Microorganisms) held once every four years, traditionally between WCSS. The 8th conference in the series was held in the beautiful Spanish city of Seville and was a great success, with 170 participants from 33 countries. A full report by the organisers, Heike Knicker and Francisco Gonzás-Vila, was published in Bulletin 135. 155 poster and oral presentations were made and there were lively scientific exchanges in the conference hall, at poster sessions and during the social events. The IUSS stimulus fund allowed the organisers to offer travel grants to students and researchers from low-income countries. As is traditional for ISMOM, there were no parallel sessions and ample time and space was accorded to the poster sessions and to breaks to allow for friendly and efficient exchanges. The welcome reception, the conference dinner, evening excursions to Real Alcazar and to the village of Alcala de Guadaira and the field trip to Donaña National Park all gave ample time to make new friendships, continue established acquaintances and spur new ideas. Papers submitted to the European Journal of Soil Science for a special issue are currently under review. Throughout 2019, papers submitted to the European Journal of Soil Science for another special issue following the symposia organised by the Commission for the WCSS (Rio de Janeiro, 2018) were reviewed and revised. Guest editors for this special issue are the convenors of the symposia, Jeferson Dieckow, Ladislau Martin-Neto and Siobhan Staunton. All the papers are now available online and will be published later this year. The Commission was delighted to lend support to a session planned for the forthcoming EGU General Assembly to take place in Vienna, 3-8 May 2020. The session titled "Organo-mineral interactions & dynamics in soil" will be organised by Isabelle Basile-Doelsch, Marco Keiluweit and Rota Wagai. Finally, plans are underway for the next WCSS to be held in Glasgow and the Commis-

Conference photo (©ISMOM)

Rota Wagai, winner of the P.M. Hang award, holding his certificate, with Ming's daughter, Crystal, and wife, Yun Yin Huang, Heike Knicker, Siobhan Staun-ton and Francisco Gonzás-Vila (© ISMOM)

Some of the participants examining the soil during a field trip to Donaňa National Park (©IS-MOM)

sion 2.5 is confident that it will attract excellent contributions to well-attended sessions in 2022.

Working Group: Critical Zone System

By Hans-Jörg Vogel, Chair

The year 2019 was overshadowed by the sudden and tragic death of Henry Lin, who initiated this working group under the title "Hydropedology" many years ago and had been driving it forward ever since with great dedication. Due to this great loss, the activities of last year were limited.

During the SSSA Meeting in San Diego (6-9 January 2019), a Special Session Symposium titled "Soil Systems Science" was organised by the WG (Henry Lin, Harry Vereecken, Don Sparks and Hans-Joerg Vogel). This was co-sponsored by six different SSSA divisions highlight-ing the systemic approach of our working group. Ten oral presentations on a broad variety of research questions, for which a systemic perspective is required, were followed by a panel discussion. The major conclusion was that advancing Soil Systems Science as a truly holistic understanding of the origin, evolution, properties, and processes of diverse soils and their functions, as well as applying systems theories to understand and manage soil resources as complex systems, will be rewarding avenues for the future.

The WG started the preparation of the 4th International Hydropedology Conference which was planned to be held at the University of Queensland in Brisbane from 6-10 July 2020. The conference chairs will be Keith Bristow (CSIRO Australia) and Brent Clothier (Plant & Food Research, New Zealand). We will take this opportunity to discuss the future activities of this working group

Working Group: International Soil Modelling Consortium (ISMC)

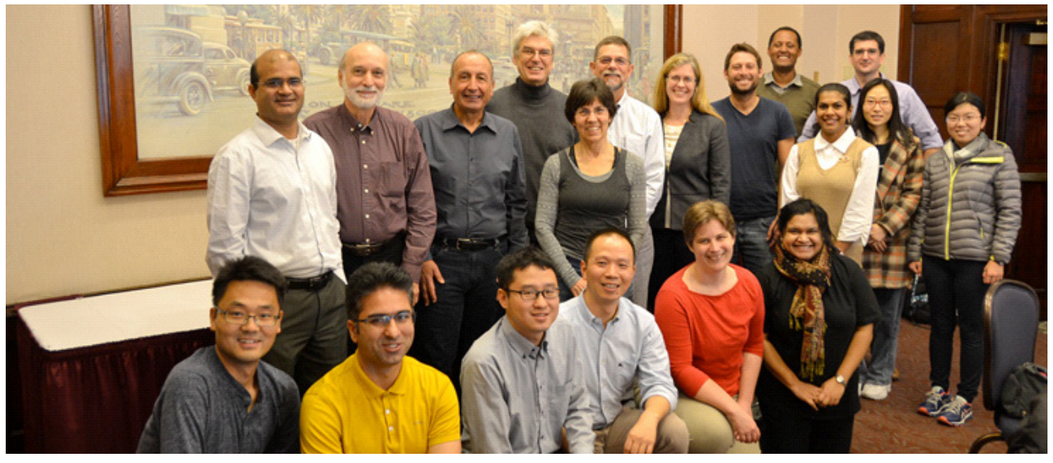
By Harry Vereecken, Chair, and Teamrat Ghezzehei, Vice-Chair, and Roland Baatz, Coordinator

The IUSS Working Group "International Soil Modelling Consortium" (WG ISMC) was established in 2016 with the aim to integrate and advance soil systems modelling, data collection, and observational capabilities. The underlying principles and scientific basis were out-lined in a recent white paper on "Modelling soil processes: review, challenges and new perspectives" published in the Vadose Zone Journal in 2016. Activities are organised into three science panels: data and observation model linking, soil modelling 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 for free under *https://soil-modeling.org*.

Here, we briefly state the recent activities organised or co-organised, if not stated otherwise, by WG ISMC during the year 2019. Land surface and vadose zone process modelling – local and global challenges was co-organised by the ISMC during the EGU 2019 in the hydrological science section HS8.3.3 and co-organised with AS4.8/CL5.21/SSS13.24. Anne Verhoef, Jan Vanderborght and Dani Or of the ISMC Executive Board co-organised the latest 2019 SoilWat meeting on Determining Evapotranspiration at the University of New South Wales, Australia. The Soil and Water (SoilWat) Initiative brings together two research communities to improve the representation of soil (ISMC) and subsurface processes in climate models. The soil and groundwater community and the climate modelling community (the latter represented by GEWEX) are working together to identify the most pressing challenges and topics related to this effort.

The ISMC Early Career Workshop with 15 early career researchers was conducted by Kathe Todd-Brown, Roland Baatz and Teamrat Ghezzehei on 8 Dec. 2019 in San Francisco, USA, with interactive discussions on big questions for soil models, the future of soil process modelling, and on ways to move these activities forward.

Further, the new science panel chairs and the early career board were established in 2019 and Teamrat Ghezzehei replaced Michael Young as ISMC Co-Chair. Michael Young was honoured for his leadership in soil modelling with the ISMC Honorary Award 2019. During 2019 ASA-CSSA-SSSA Interna-



Pre-AGU 2019 ISMC-IUSS Workshop participants in San Francisco (©ISMC)

Poster of 3rd ISMC Conference (@ISMC)

tional Annual Meeting, the ISMC Community Meeting led by Teamrath Ghezzehei took place at San Antonia, Texas. A multitude of contributions were provided to the AGU meeting e.g. in soil carbon research, critical zone science and land-atmosphere processes. Another call for contributions was targeted at a better incorporation of infiltration processes into land surface models *https://www.eurekalert.org/pub_releases/2019-08/asoa-scf082319.php*.

The existing Soil Meta Data Repository provides links to databases relevant for international soil modelling experts and the Soil Model Portal which has grown to include 35 numerical models focusing on one or more of the soil-vegetation-atmosphere compartments. Selected notable references are:

Vereecken et al. (2019), Or et al (2019) and Lehmann et al. (2018).

Vereecken, H., Weihermuller, L., Assouline, S., Šimůnek, J., Verhoef, A., Herbst, M., et al. (2019). Infiltration from the pedon to global grid scales: An overview and outlook for land surface modeling. Vadose Zone Journal, 18, 180191. *http://doi.org/10.2136/vzj2018.10.0191*.

Or, D., and Lehmann, P. (2019). Surface evaporative capacitance: How soil type and rainfall characteristics affect global-scale surface evaporation. Water Resources Research, 55. *https://doi.org/10.1029/2018WR024050*

Lehmann, P., Merlin, O., Gentine, P., & Or, D. (2018). Soil texture effects on surface resistance to bare-soil evaporation. Geophysical Research Letters, 45, 10,398–10,405. *https://doi.org/10.1029/2018GL078803*

Of key importance is the upcoming conference: "3rd ISMC Conference – Advances in Soil Systems Modeling" in Tianjin, China in 24-27 Sep. 2020 *https://soil-modeling.org/ismc-conference/ismcconference*

Report of Division 3: Soil Use and Management

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 in order to ensure that soils are used and managed in a sustainable manner. The Division is concerned with both soil use and manage-ment in terms of agricultural production, forestry, grazing lands, and the broader environmental context. Activities to remediate de-graded 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 consists of 6 commissions and 4 working groups (WG) in 2019. 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 – Soil use and management

Chair: Bal Ram Singh, Norway
1st Vice Chair: Bob Rees, United Kingdom
2nd Vice Chair: Tom Aspray, United Kingdom

Commission Chairs and Vice chairs

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 Tride, 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 Group Chairs and Vice Chairs

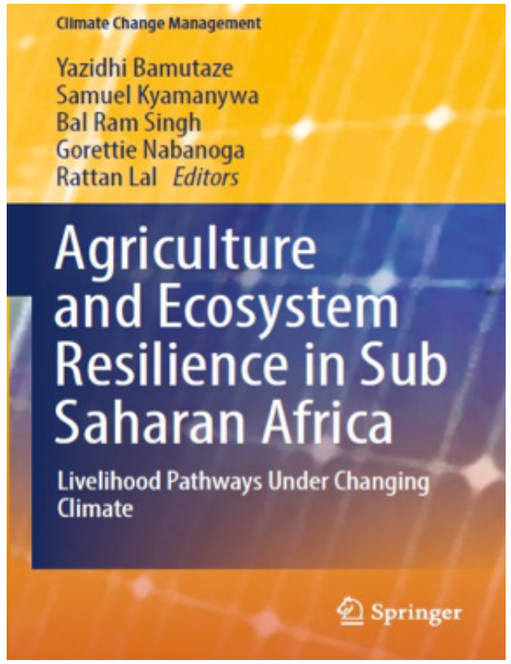
1. Acid Sulphate Soils
Chair: Anton Boman, Abo University, Finland
Vice Chair: Vanessa Wong, Southern Cross University, Australia

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

Cover page of the published book (below) and Photo (© Bal Ram Singh): (from left to right) Dr. E. Joner, President Norwegian Society of Soil Science (NSSS), Prof. Rattan Lal, OSU, USA, Speaker, Prof. Ø.Johnsen, Prorector, NMBU, Prof. Bal Ram Singh and Dr. S. Skøyen, Treasurer, NSSS (right).



Activities of the division and commissions

Report from Division 3

Division chair Prof. Bal Ram Singh co- edited the book entitled "Agriculture and Ecosystem Resilience in Sub Saharan Africa" based on the outcome of the International Conference on Ecosystem Resilience and Agricultural Productivity - Livelihood Pathways under Chang-ing Climate held in Kampala, Uganda, in November 2017 and published by Springer publishers in May 2019. The book with 33 chap-ters discusses emerging contexts of agricultural and ecosystem resilience in Sub Saharan Africa and contemporary technological ad-vances that have influenced African livelihoods.

In connection with the visits by Prof. Rattan Lal of the Ohio State University, USA, to the Norwegian University of Life Sciences (NMBU) and in association with the Soil Science Society of Norway, Prof. Bal Ram Singh organized a seminar on "Managing Soil Carbon for Food and Climate" on 1 August 2019, which was coordinated by

In cooperation with Prof. Lillian ØYGARDEN, chair of Commission 3.2, a seminar proposal on "Soil and water conservation under changing climate in Northern or high-altitude conditions" to be held at NMBU campus in October 2020 was prepared. The seminar is planned in cooperation with the following organizations:

However, the current situation with COVID-19 did not allow us to hold the seminar as planned and it has been postponed to a later date (2021).

IUSS-Forum: The Division chair along with some of the chairpersons of commissions regularly participated in the IUSS Forum meetings held in 2019 and contributed to a special topic on "Heavy metals and their bioavailability in soils and human health" among the 12 topics suggested for the IUSS forum. The division chair will be responsible for preparing a manuscript on the topic mentioned above in 2020.

Commission 3.1: Soil evaluation and land-use planning

Human society has developed through utilization of our planet's wealth in incredibly exclusive, inventive and prolific ways that have advanced human development. Of these resources, soils are the basis for the production system mainly of foods, natural fibers, wood etc. We reaped a reasonably good harvest in the past but in the quest for productivity push via intensification, man, however forgot the principles of rational allotment of lands for various competitive demands and holistic land management menu for soil health. Against this background, the future of mankind depends on whether and to what extent we can conserve and make proper use of the soil and thus there is a need to develop appropriate site- specific techniques/ technologies to slow down the degradation process to ensure sustainability.

Land evaluation and land use planning are to guide decisions on land use in such a way that resources are to be managed in a most efficient and optimal manner to fulfill the societal need without degrading the ecosystem. It assumes great significance in changing climate as land evaluation predicts the consequences of change in land use. Although researchers are developing site and situation specific land use models, on many occasions these models fall short of fulfilling the aspiration of the stakeholders due to various reasons. Further despite having dialogue in different forums on land use planning, operational blockades are evident at stakeholder level owing to complex societal issues, marketing, government policy etc. Before barking on such type of activities, soil and land resource inventories, societal need, demography, marketing, etc. agro-ecozone wise to be studied and aligned with government policy to fulfill the chartered sustainable development goals (SDGs) of the United Nations Organization.

Events

Soil and Water Resources Management for Climate Smart Agriculture, Global Food and Livelihood Security (A joint International Conference - 4th WASWAC World Conference, 20th ISCO International Conference, 4th SCSI International Conference) held at New Delhi during November 5 – 9, 2019.
Website: *http://scsi.org.in*

Publications

Jointly with ICAR we brought out a special issue of Indian Farming Volume 69, No. 11 with 11 popular articles.


Volume 69, No. 11 NOVEMBER 2019

Indian Farming

In This Issue

Awards

Dr. Suraj Bhanu, President, Soil Conservation Society of India has been elected as President International Soil Conservation Organization for the years 2020-2023.

The 84th Annual Convention of Indian Society of Soil Science and National Seminar on "Developments in Soil Science - 2019" held at Banaras Hindu University, Varanasi, during November 15-18, 2019

Publication: Brought out special publications on Soils Science Research in Uttar Pradesh, edited by Amitav Rakshit, S.K. Singh, P.C. Abhilash, P. Raha, A.P. Singh

International Conference on Climate Change & its Impact on Global food security & Sustainability of Agriculture, November 23-24, 2019. Organized by Mahima Research Foundation and Social Welfare, Banaras Hindu University, Varanasi (Website: *www.mrfsw.org*)

Planned activities for 2020

State Level Seminar on Frontier Technologies for Climate Resilient Agriculture, February 17-18, 2020 Organized by Akola Chapter of Indian Society of Soil Science, Department of Soil Science and Agricultural Chemistry Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola-444104 (Maharashtra), India.

Felicitation of Dr. Jagdish Prasad by Dr. P. Raha, Head, Department of Soil Science & Agricultural Chemistry after the session (©Jagdish Prasad)

Academy of Natural Resource Conservation and Management, Lucknow (U.P.) is organizing National Seminar on Natural Resource Conservation and Management on 20th March 2020 at ICAR-NBFGR Campus, Lucknow (UP). Indian Society of Soil Survey and Land Use Planning, Nagpur is going to organize a National Seminar on "Managing Soils in a Changing Climate" during 23-25 July 2020 at ICAR- NBSS&LUP, Amravati Road, Nagpur.

Dr. Jagdish Prasad (middle) chairing the Technical session (VIII): Soil Morphology, Soil Geography, Soil Genesis, Soil Classification, Soil Evaluation and Land Use Planning during the 84th Annual Convention of Indian Society of Soil Science (©Jagdish Prasad).

Commission 3.2: Soil and Water Conservation

Report for 2019

Events and presentations

Chair Lillian Øygarden presented a lecture at the 9th International Congress of the European Society of Soil Conservation (ESSC) in Tirana, Albania in September 2019. Adapting Sustainable Land Management to wetter climate. Examples of Best Management. (Lillian Øygarden and Johannes Deelstra).
The Commission started preparations for a seminar to be held in Norway in October 2020, together with the chair of Division 3, Professor Emeritus Bal Ram Singh as stated above under Division 3 activities.

Planning

In 2019 the Commission has started to prepare proposals for the Inter Congress meeting in Scotland, August-September 2020. Proposals include joint program, specific program for division and joint program with other divisions and commissions. The proposals will be presented at the Inter Congress meeting in Scotland 2020.
Joint program: Commission 3.2 has proposed a topic for a joint program with other divisions: BMPs for Global Soil Erosion Control under Extreme Events. Best Management Practice for increased carbon storage and improved soil quality.

Commission 3.2 will also be involved in the task: Best Soil Management Practices to restore Soil Health, led by Division 3. It is suggested that Commission 3.2 can contribute with the topic 'Soil erosion and degradation caused by extreme events related to climate change'. For the specific program for Commission 3.2 the following topics are suggested:

- Artificial drainage systems - new strategies for drainage design in changing climate.
- New strategies for best management practices for reduced environmental impact.

IUSS-Forum. The Chair of Commission 3.2 has participated in the Skype meetings in the IUSS Forum in 2019, mainly with proposals for preparation for the Inter Congress meeting. An outline and short summary for the

Photo from the 9th Congress of the European Society of Soil Conservation (ESSC) in Tirana, Albania, September 2019 (©Lillian Øygarden). Honorary President of the Organizing Committee Pandi Zdruli describes soil profiles during the excursion. In the background the President of ESSC, Professor Carmelo Dazzi and Immediate Past President of ESSC Jose, L. Rubio studies soil structure.

opic BMP for global soil erosion control under extreme events has been presented to the IUSS Forum.

Plans for 2020, Events

Participation at IUSS Inter Congress meeting in Glasgow in August- September for planning the Congress Program. Proposals from Commission 3.2 for a joint program with other divisions and commissions will be presented. After the Inter Congress meeting further planning of the topics selected for IUSS World Congress. Organising an IUSS seminar in Norway in October 2020, together with the chair of Division 3, Professor Emeritus Bal Ram Singh, as stated under Division 3 activities.

Participating in IUSS Forum for joint planning in IUSS. Status 23 April 2020:

Due to the Corona virus outbreak, the current plans for 2020 need to be revised. The Seminar in Norway will be postponed until later in the year or changed into a webinar at a later date.

Revised plans will be announced later. One of the suggestions is to produce more newsletters to be announced at IUSS webpage and encourage more contact with members without meetings.

Commission 3.3: Soil Fertility and Plant Nutrition

Activities 2019

Participation in new interdisciplinary research topic to link soil health and human health as one of our frontiers in soil science
This activity was initiated by chair (Lorna Dawson) and vice chair (Heide Spiegel) of Commission 4.2 (Soils, Food Security, and human health). As this topic is also related to soil fertility and plant nutrition, Commission 3.3 will participate in this interdisciplinary activity.

As further steps, we identified:
a) a need to provide links between soil scientists and human health experts
b) a high-ranked publication (ideally Science or Nature) as an output from our work
This issue was discussed during several IUSS Research Forums in 2019.

Participation in the IUSS Research Forum 17th June 2019 (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 in the IUSS Research Forum 30th September 2019 (Internet Meeting)
The procedure for the Glasgow conference was fixed:
31st March 2020 – Draft
30th April 2020 – Comments from Reviewers
31st May 2020 – Final Revised Version

Papers may be considered for publication of a Special of Soil & Tillage Research. Participation in the 1st International Biochar Conference Shenyang, China (20 – 23 September) The first International Conference on Biochar Research and Application in Shenyang, China, was attended by 650 scientists from all over the world. Among the world's most highly cited researchers, Prof. Dr. Bruno Glaser discussed "the state of the art of biochar research ".
Read more: *https://www.youtube.com/watch?v=zf5rbSJ3lHo&t=12s*

Activities proposed for presentations at the Glasgow meeting

Tentative sessions:

Commission Number	Technical Session	Indicative Title	No. Participant
3	1	Biochar use in soils and plant nutrition	50
3	2	The role of soil microorganisms as soil management tool	50
3	3	Towards sustainable use of natural resources (sewage sludge, compost, digestate, and other organic soil amendments)	50
3	4	Role of organic matter in soil N cycling	50

Commission 3.4: Soil Engineering and Technology

Report 2019

In the past year, the main work of our commission was preparing for the "International Soil Engineering and Technology Conference (ISETC)", which was planned to be held on 6-8 June 2020 in Nanjing, China. Considering the current tough situation of the corona virus outbreak, the planned activities have been postponed. Other progresses are reported as follows.

Events

Date: 20-23, Sep. 2019
City: Shenyang, Country: China
Title: The 1st International Conference on Biochar Research and Application
Invited talk: Improving inherent soil productivity in dryland of main grain-producing areas in China

Speaker at the 1st International Conference on Biochar Research and Application (©conference organizer)

Publications

Recommended publications from my group:

Guixiang Zhou, Xiuwen Qiu, Lin Chen, Congzhi Zhang, Donghao Ma, Jiabao Zhang, 2019. Succession of organics metabolic function of bacterial community in response to addition of earthworm casts and zeolite in maize straw composting. Bioresource Technology, 280: 229–238

Guixiang Zhou, Xiuwen Qiu, Jiabao Zhang, Chunyuan Tao, 2019. Effects of seaweed fertilizer on enzyme activities, metabolic characteristics, and bacterial communities during maize straw composting, Bioresource Technology, 286: 121375.

Guixiang Zhou, Xiaofeng Xu, Xiuwen Qiu, Jiabao Zhang, 2019. Biochar influences the succession of microbial communities and the metabolic functions during rice straw composting with pig manure. Bioresource Technology, 272: 10-18.

Others

Prof. Jiabao Zhang was selected as a member of the Chinese Academy of Engineering (CAE) Academician.

Outlook

The planned conference "International Soil Engineering and Technology Conference (ISETC)" is pending. We will find a suitable date later.

Commission 3.5: Soil Degradation Control, Remediation and Reclamation

Activities 2019

Many soils worldwide face severe stress due to contamination, nutrient depletion or over-fertilization, erosion and urbanization. There is no terrestrial life without soils. Soils 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 damaged/degraded soils may be remediated or reclaimed and returned to natural condition and productive use.

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
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

Cambier, P., Michaud, A., Paradelo, R., Germain, M., Mercier, V., Guérin-Lebourg, A., Revallier, A., Houot, S., 2019. Trace metal availability in soil horizons amended with various urban waste composts during 17 years - monitoring and modelling. Science of the Total Environment, 651, 2961-2974.

Campo, J.; Merino, A. 2019. Linking organic P dynamics in seasonally dry tropical forests to changes in duration and intensity of drought: evidence from a rainfall gradient in Yucatan. Forest Ecology and Management, 438, 75-85.

Chalise, D., L. Kumar, V. Spalevic and G. Skataric. Estimation of sediment yield and maximum outflow using the IntErO model in the Sarada river basin of Nepal. Water, 2019, 11(5). 2019. *https://doi.org/10.3390/w11050952*

Chalise, D., L. Kumar and P. Kristiansen. Land degradation by soil erosion in Nepal: A review. Soil Systems. 2019, 3(12). 2019. *https://doi.org/10.3390/soilsystems3010012*

Dominguez, M., Paradelo, R., Piñeiro, J., Barral, M.T., 2019. Physicochemical and biochemical properties of an acid soil under potato culture amended with municipal solid waste compost. International Journal of Recycling of Organic Waste in Agriculture, 8, 171-178.

Karczewska, A., Lewinska, K., Siepak, M., Galka, B.2019. Lanthanides in soils of historical mining sites in Poland. Polish Journal of Environmental Studies, 28 (3), pp. 1517-1522.

Lewińska, K., Karczewska, A. 2019. A release of toxic elements from military shooting range soils as affected by pH and treatment with compost, Geoderma, 346, pp. 1-10

Lewińska, K., Karczewska, A. 2019. Antimony in soils of SW Poland—an overview of potentially enriched sites. Environmental Monitoring and Assessment, 191 (2), art. no. 70,

Lewińska, K., Karczewska, A., Siepak, M., Szopka, K., Gałka, B., Iqbal, M. 2019. Effects of waterlogging on the solubility of antimony and arsenic in variously treated shooting range soils. Applied Geochemistry, 105, pp. 7-16.

Merino A.; Jiménez E.; Fernández, C.; Fontúrbel, M. T.; Campo, J.; Vega, J.A. 2019. Soil organic matter and phosphorus dynamics after low intensity prescribed burning in woodlands and shrublands. Journal of Environmental Management, 234, 214–225.

Ndzana G, Li H, Zhang Z, Zhu J, Liu F, Bhattacharyya R 2019: The transformation of clay minerals in the particle fractions of two soils from different Altitudes. Catena Journal 175: 317-328, *https://doi.org/10.1016/j.catena.2018.12.026*

Odigui Ahanda DH, Ndzana G, Bekoa E, Abossolo-Angue Abane M, Bitom LD 2019: Morphological, Geochimical and Mineralogical studies of two soil profiles developed on the itabirites of Ntem Complex, southern Cameroon. Journal of African Earth Sciences 153:11-129.

Panday, D., R.B. Ojha, D. Chalise, S. Das and B. Twanabasu 2019. Spatial variability of soil properties under different land use in the Dang district of Nepal. Cogent Food & Agriculture.

Paradelo, R., Lerch, T.Z., Houot, S., Dignac, M.-F., 2019. Composting modifies the patterns of incorporation of OC and N from plant residues into soil aggregates. Geoderma, 353, 415-422.

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Planned activities

Sessions at IUSS World Congress, Glasgow 2022:

- Remediation and reclamation of radio cesium contaminated soils
- Control, remediation and reclamation of brownfields
- Dynamics of soil erosion and land loss

Pollution of agricultural soils caused by use of contaminated irrigation water

Land loss at Camau Peninsula, South Vietnam, due to land subsidence, sea level rise and mangrove destruction. The German ViWaT project (Stefan Norra) is working together with Vietnamese on possible solutions (© Stefan Norra)

Commission 3.6: Salt-affected Soils

Report 2019

The focus of the officers is on organizing meetings. It was not successful last year in Uzbekistan. This year we organize a meeting in China:

First IUSS Conference on Sodic Soil Reclamation

Thursday, 17 September 2020 to Saturday, 19 September 2020

Due to the current epidemic the conference will be postponed to a date which will be decided later!

Location: Changchun, China

This conference will focus on the key scientific issues of sodic soil reclamation, face the theoretical innovation of soil sodification and improvement of sodic soil management. It will build a communication platform for scholars, enterprises and decision-makers, exchange the latest scientific frontiers through a variety of ways such as academic reports, posters and seminars. It provides useful references for the improvement and utilization of sodic land indifferent regions of the world.

The conference will be jointly organized by the International Union of Soil Sciences (IUSS), the Chinese Academy of Sciences (CAS) and the People's Government of Jilin Province, China. It will be hosted by the Northeast Institute of Geography and Agroecology, Chinese Academy of Sciences and the Salt-affected Commission of the Soil Science Society of China. It will be held in Changchun, Jilin Province, China, for a period of three days (one day fieldtrip).

Deadline for abstract submission: July 1, 2020
Deadline for full text of paper: Aug. 1, 2020
Contact: *wangzhichun@iga.ac.cn*
Website*: http://ssr.csp.escience.cn/dct/page/65578*
Read more: *https://www.iuss.org/meetings-events/*

Salty soils on the outskirts of oases (southern Tunisia) Amor Mtimet is working on (©Stefan Norra)

Working Group: Acid Sulfate Soils

Activities during 2019

The main activity of the working group took place at the EGU conference 7-12 April 2019 in Vienna, Austria where the Chair (Anton Boman) and Vice-Chair (Vanessa Wong) had arranged a session on acid sulfate soils; SSS9.3 Acid sulfate soils, sulfidic materials and wetland soils. The Vice-Chair was the convenor of the session and the Chair served as a co-convenor. The session had two oral blocks and one poster session and altogether 28 abstracts were presented (13 oral presentations and 15 posters) during the session.

After the session, the acid sulfate soils working group (ASSWG) had a general meeting, which was attended by 20 persons.

The main outcome of the WG-meeting was:

It was decided that the "Pons Medal Committee" is chaired by Vanessa Wong (Australia), and that Peter Österholm (Finland), Seija Virtanen (Finland) and Martin Rabenhorst (USA) serve as members.

It was determined that the next International ASS conference will be held in Adelaide, Australia, in November 2020.

It was also determined that the ASSWG will establish its own website. Krister Dalhem (Finland) was elected webmaster.

Work will be done in order to harmonise classification of ASS globally.

It was suggested that the location of the 10th International Acid Sulfate Soils Conference would be held 2024 in Indonesia. Wirastuti Widyatmanti (Universitas Gadjah Mada, Indonesia) will be a key person in taking this task forward.

It was decided that the ASSWG should aim at having a general meeting every year and that these meetings should be arranged in conjunction with the EGU conferences, the World Congress of Soil Sciences (WCSS) conferences and the International Acid Sulfate Soils Conferences, where the ASSWGG will be arranging acid sulfate soil sessions. Therefore, meetings will be scheduled:

2020: International Acid Sulfate Soil Conference (Adelaide, Australia)
2021: EGU General Assembly (Vienna, Austria)
2022: WCSS (Glasgow, Scotland)
2023: EGU General Assembly (Vienna, Austria), and so on.

The ASSWG will continue working towards becoming a permanent Commission in Division 3 of the IUSS.

Some of the participants at the acid sulfate soils poster session at EGU, Vienna (© Anton Boman)

Some of the participants at the acid sulfate soils oral session at EGU, Vienna. The Chair (Anton Boman, co-convenor) and Vice-Chair (Vanessa Wong, convenor) are sitting in the front row (© Anton Boman)

Upcoming and planned activities for 2020-2021

Arranging of the 9th International Acid Sulfate Soils Conference (IASSC) 21-26 November 2021 in Adelaide, Australia. One student received travel support (for covering the early bird registration) from the Division 3 Chair, Bal Ram Singh.

The Pons Medal Award will be handed out at the 9th IASSC in Adelaide. The nomination process has been initiated.Harmonization of Global ASS Classification will be a major point at the upcoming conference in Adelaide. A preliminary committee has been set up and currently consist of Anton Boman (Chair; Finland), Gustav Sohlenius (Sweden), Marina Becher (Sweden), and Leigh Sullivan (Australia). During the spring of 2020, other researchers will be asked to join the committee.

Establishment of a website will take place during the spring and summer of 2020. The ASSWG have received funding from the Divion 3 Chair (Bal Ram Singh) for this work and the next step is to form a committee that will register the content of the website. Krister Dalhem (Finland) is webmaster and the following persons have already expressed interest in being part of the committee: Delvin Fanning (USA), Anton Boman (Finland) and Peter Österholm (Finland).

Working Group Forest Soils

Activities 2019

The Forest Soils Working Group (FSWG) of IUSS has been active for more than 30 years since the late 1980s to coordinate and develop major International Symposia on Forest Soils (ISFS) and co-sponsor other related international conferences such as the IUSS (Forest Soils Working Group), Soil Science Society of America (SSSA) and Canadian Soil Science Society (CSSS) co-sponsored the 13th North American Forest Soils Conference / 9th International Symposium on Forest Soils: Joint Conference - Soils-Forests Interactions in Changing Environments, 10-16 June 2018, Quebec City, Quebec, Canada; and the IUSS co-sponsored 9th International Conference on Geochemistry in the Tropics & Sub-Tropics (GEOTROP 2019) - Biogeochemistry of Carbon and Nutrients as well as Pollutants in the Soil, Water and Environment, 28-31 Jul 2019, Crown Plaza, Surfers Paradise, Queensland, Australia. The FSWG has also hosted a series of Forest Soils Symposia during the World Congress of Soil Sciences since WCSS 2002 in Bangkok, Thailand, except for the WCSS 2018 in Brazil, but will do so at 2022 WCSS in Glasgow.

Events 2019

Symposium: 9th International Conference on Geochemistry in the Tropics & Sub-Tropics (GEOTROP 2019) - Biogeochemistry of Carbon and Nutrients as well as Pollutants in the Soil, Water and Environment, 28-31 Jul 2019, Crown Plaza, Surfers Paradise, Queensland, Australia, with about 120 participants attending the Conference.

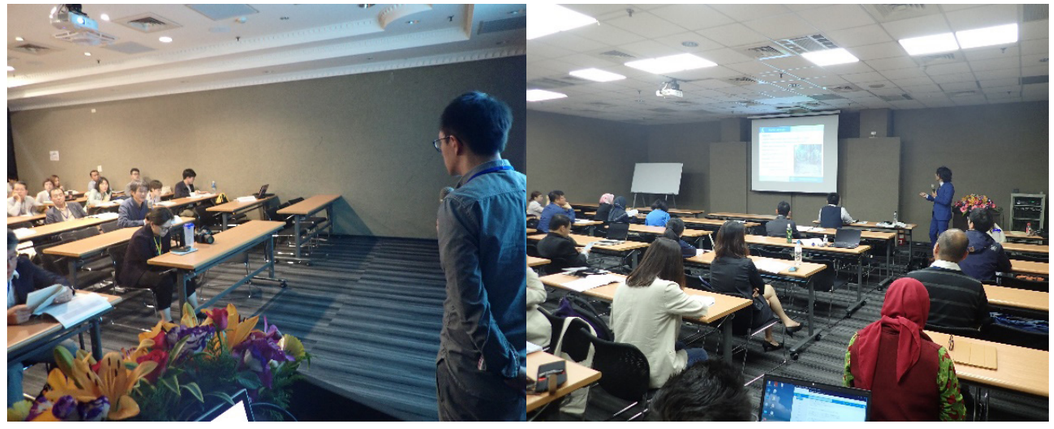
Events 2020/2021

Symposia: The10th International Conference on Geochemistry in the Sub-Tropics and Temperate Zone (GEOTROP 2020) - Biogeochemistry of Carbon and Pollutants in Soil, Nutrients for Soil Health, 15-18 October 2020, Shenyang, China, with more than 200 participants expected; and the IUSS FSWG sponsored 10th International Symposium on Forest Soils (ISFS 2020) - Forest Soils Under Global Change: Processes, Biodiversity and Ecological Services, 17-20 October 2021, Hangzhou, China, with about 150-200 participants expected.

Working Group Paddy Soils

Activities during 2019

The Paddy Soils Working Group (PSWG) organized a symposium "Recent advances in paddy soil science: toward establishments of sustainable rice production, environmentally-friendly managements and food safety" in the 14th International Conference of the East and Southeast Asia Federation of Soil Science Societies (ESAFS)



Symposium "Recent advances in paddy soil science: toward establishments of sustainable rice production, environmentally-friendly managements and food safety" in the 14th ESAFS (©Mizuhiko Nishida).

held in Taipei, China, 3-7 November, 2019. In the session, 15 oral presentations and 20 poster presentations were delivered. Latest studies were introduced, and significant discussions were held during the session.

Planned activities for 2020

PSWG is planning to support the 4th International Conference Organic Rice Farming and Production Systems held in Sendai, Japan, from 30 August to 2 September 2021. Chair of PSWG joins the scientific committee of this conference. Main activity of PSWG in 2020 will be setting up this conference.

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

Activities during 2019

Cooperation between WG Urban Soils of the German Soil Science Society and the Laboratoire Sols et Environnement UMR 1120 UL-INRA of the Université de Lorraine, Vandœuvre-lès-Nancy, France was the impulse to establish an international working group Urban Soils. This was straightaway welcomed and supported by Wilfried E. H. Blum, the Secretary General of the International Soil Science Society (ISSS, today International Union of Soil Science, IUSS). The 16th World Congress of Soil Science was a good opportunity and the International WG Urban Soils – Soils of Urban, Industrial, Traffic and Mining Areas (WG SU/SUITMA) of the ISSS was founded on August 20th, 1998 in Montpellier, France, during the IUSS Congress.

SUITMA started its activity at the 16 WCSS in Montpellier with a symposium (no 28) on 'Urban and suburban soils: nature, management and risks for human health' (Burghardt, 1999). The excursion 'A-I of the 16th WCSS: Lorraine, Alsace, Franche-Comté' offered the study, evaluation and management of urban and industrial soils. Professors Wolfgang Burghardt (Germany) and Jean Louis Morel (France) served as chairman and vice-chairman from SUITMA's birth to 2007, followed by professors Jean Louis Morel (France) and Gan-Lin Zhang (China) from 2007 to 2015. Professors Kye-Hoon John Kim (Korea) and Przemysław Charzyński (Poland) have been serving as chairman and vice-chairman since 2015.

WG SUITMA has organized conferences every two years since 2000. The 10th SUITMA conference was held in Seoul, Korea in 2019, following the successful 9th conference in Moscow, Russia, in 2017.

SUITMA 10 - Seoul, Republic of Korea

The 10th SUITMA biennial conference titled "SUITMA+20; visioning the future by reflecting on 20 years of SUITMA since its birth in 1998" was held at the University of Seoul, Republic of Korea, from June 16th to 21st, 2019. More than 160 scholars and students from 22 countries attended this great event. During the conference days, diverse and valuable speeches associated with soil classification, contamination, remediation, and sustainable ecosystem services of SUITMA were presented with 69 oral and 88 poster presentations in 10 sessions listed below:

Impressions from the conference (©Kye-Hoon John Kim)

1. Genesis and classification of SUITMA
2. Policy and education strategies for recognizing importance of SUITMA
3. Physical, geochemical and biological properties of SUITMA
4. Ecosystem service and biodiversity in SUITMA
5. Understanding SUITMA for urban agriculture
6. Understanding mine soils for sustainable ecosystem services
7. Remediation technologies for mining environmental impacts
8. Restoration of SUITMA for human health and ecosystem services
9. Sustainable soil & water management for ecosystem services
10. Contamination and remediation of SUITMA

All attendees had a great opportunity to share and exchange the newest information in the field of SUITMA as well as to make and strengthen friendships among the global colleagues. The authors of the top five posters were nominally rewarded. The potential journals for selected presentation to be published in special issues were Journal of Soils and Sediments and Soil Science.

On the last night of the conference, a gala dinner was offered, including a Pansori performance 'KOREA Shimcheong'. Also, excursion and post conference tour were organized during SUITMA 10. The excursion allowed all participants to visit 'Cheong Gye Cheon Museum' and two landfill sites near Seoul city including 'World Cup Park' and 'Sudokwon Landfill Site'. The post conference tour included visits in the Korean DMZ area, mine areas, a limestone cave, and a temple.

The SUITMA 10 conference was organized by the Korean Society of Soil Science and Fertilizer, Rural Development Administration, Pusan National University (Life and Industry Convergence Research Institute), and Chonbuk National University, along with support of national organizations such as the Korean Tourism Organization, Seoul Metropolitan Government, and the Korean Federation of Science and Technology Societies.
Berlin, Germany was elected as the next venue for SUITMA 11 in 2021. More information on the SUITMA 10 conference including the abstracts of all presentations and photos can be found at *http://www.suitma10.org/*.

Website of WG SUITMA

The official web-site of WG SUITMA is *https://sites.google.com/site/wgsuitma/home/board*. All the valuable information can be found here.

Impressions from the conference (©Kye-Hoon John Kim)

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

Report from the Division Chair, Damien J. FIELD

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The making of a book, Division 4's contribution to 'Soil science education'.

Members of Division 4 were invited to contribute to the writing of a book focused on Soil Science Education, as this is one of the major topics identified to promote the International Decade of Soils 2015-2024 (IDS) project of the International Union of Soil Sciences (IUSS). Edited by Takashi Kosaki, Rattan Lal, Laura Bertha Reyes Sánchez, the book is in the final stages of editing for publication and it is expected that it should be of interest to readers, who are interested in soils, geosciences, environment, ecosystems, art, etc. and may be used for teaching in schools at elementary through to university levels, working at museums, educational or extension organizations and serving for NPOs, NGOs, etc., providing on overview of a basic framework of soil and soil science education and a collection of good practices that are currently employed globally.

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 citizen. The second part includes practical methods for soil and soil science education from all over the world, i.e. one from Africa, three from Asia, three from Europe, two from North America, five from South America and two from Oceania, which have been found useful, efficient and promising in their own environments and situations. The final part is devoted to discussing the challenges and future of soil and soil science education. Contributions were led by me and the Commission Chairs Cristine Muggler, Eric Brevik and Vice Chair Hideaki Hirai and included chapters on

- Framing Soil Science Education
  Soil Science Education in Graduate Programs
- Representations of their Home Countries
- The Future of Soil science Education: informed by global experiences

Impact of Covid-19

COVID-19 has had a devastating impact globally and the impact of this pandemic will continue around the globe for some time to come. I wish to offer my thoughts and best wishes to my colleagues in the IUSS and Division 4 as we all navigate this time.

Since January 2020 COVID-19 has seen several activities planned by the Commission Chairs, Vice Chairs and members of Division 4 being cancelled or postponed to later in 2020 or rescheduled to 2021. Some of which are reported here.

EGU 2020

Several members of Division 4 had made submissions to chair Technical Sessions and Short Courses at EGU 2020. As with many conferences and meetings the travel bans and health impacts of Covid-19 changed how EGU was delivered this year. Sessions were run online with 18,036 abstracts forming the programme with 701 scientific sessions. Attendees joined on-line allocated sessions and time for comment has been left open until the 31st of May 2020. A poster session on Knowledge transfer to society: soil education and evidence syntheses in agro-environmental sciences (SSS12.3/EOS2.4) attracted a number of papers from IUSS members covering topics such as:

- Soil Education for General Public and School Students in China (Taipei)
- How much do Japanese university students know about soil? A survey of university students who received science education in Japanese schools
- Highlighting the importance of topsoil in human life through a soil education program
- Do we need to new set of soil principles to guide the

cross-sector engagement of soil education?
- 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
- "Soil Education Manual -Toolbox for DIY program at your classroom" by International Union of Soil Sciences (IUSS)

The chat for this session was scheduled for Monday (4 May) and was well attended. You can download some of the presentations: *https://meetingorganizer.copernicus.org/EGU2020/session/35018*.
A short course was to be co-convened by Hideaki Hirai, Keiko Mori and Damien Field focused on 'Raising soil awareness from elementary school pupils to high school students: practices and/or skills'. Due to Covid-19 this course was cancelled and deferred for inclusion in EGU2021. Details of other IUSS contributors can be found in the report for Commission 4.4.

Soil Security, Korea
I am on the scientific panel for the 4th International Symposium on Global Soil Security which was planned for June 2020 in Korea, see here. Following the conferences in USA, France and Australia Soil Security has developed as leading the integration of soil function with aspects of soil health, ecosystem services, and human Health. This conference will focus on soil security and its influence and impact on policies of soil management globally. The conference is now scheduled for late October due to the impact of COVID-19.

Eurosoil 2020
Several sessions and submissions were made to Eurosoil 2020, which has now been postponed to 2021. All session co-sponsors and presenters have been advised that their submissions will be carried over to 2021. I look forward to reporting on these in the Annual report for this Division in the future.

Representations by the Division Chair
Agroecology Meeting, Chile
I had planned to represent Division 4 (sponsored by the OECD) by presenting a paper at the Agroecology Workshop 2019 '***Challenges for Agroecology Development for the Building of Sustainable Agri-food Systems***' taking place in Santiago, Chile, on 11 to 13 November 2019. The paper was titled 'Sustaining Agri-Food Systems framed using soil security and education'. The unfortunate unrest that Chile suffered at that time meant the workshop was cancelled, but I have still prepared a paper that will be part of a collection of papers that were to be presented in the international journal of Agriculture and Natural Resources.

Sharing Curriculum Development – UGM Indonesia
I made representation for the IUSS and The University of Sydney, supported by Gajah Mada University in February to co-develop their curriculum focused on interdisciplinary work placement learning. This was a great opportunity to share our experiences and work collaboratively on curriculum design and delivery. I also had the opportunity to present a series of seminars on Soil Security both to the Soil Science and Geography Departments.

Conference
I presented papers as a keynote at the International Seminar and Congress of Indonesia Soil Science Meeting Bandung Indonesia, 5th – 7th August 2019, on the paper 'Can the concept of Soil Security frame the future of Soil Science Education?'

Relevant Publications

Field D J., Yang R., Kidd D., McBratney A B., Minasny B. 2019. Towards spatial quantification of soil security – progress and future challenges. European Geophysical Union, 8th – 12th April, Vienna EGU2019-7430 *https://www.egu2019.eu/*

Brevik E., Field D J., Hannam J., Krzic M., Muggler C. C., Odhiambo J., Uchida Y., Itkin D., Pozza L. 2019. Academic Soil Science Training in different countries. European Geophysical Union, 8th – 12th April, Vienna EGU2019-3433, Vienna. *https://www.egu2019.eu/*

Field D. J. 2019. Can the concept of Soil Security frame the future of Soil Science Education? 5th – 7th August, International Seminar and Congress of Indonesia Soil Science Meeting Bandung Indonesia,

Field D. J. 2020. Do we need to new set of soil principles to guide the cross-sector engagement of soil education? European Geophysical Union,4th – 8th May, Vienna, EGU2020-8810 (virtual paper) *https://www.egu2020.eu/*

Field D. J., 2020. Framing Soil Education. (In)Takashi, R. Lal. L. R. Reyes Sánchez (Eds) Soil Science Education. A global perspective (in press).

Field D. J., Abbott L., Barton L., Bennett J., Cattle S., Jenkins S., Pozza L. 2020. Soil Science Education in Australia. (In) Takashi, R. Lal. L. R. Reyes Sánchez (Eds) Soil Science Education. A global perspective (in press).

Field D J., Brevik E., Hirai H., Muggler C., 2020. Guiding the Future of Soil (Science) Education: informed by global experiences. (In) Takashi, R. Lal. L. R. Reyes Sánchez (Eds) Soil Science Education. A global perspective (in press).

Report Activities Commissions
The following activities are reported from each of the Commissions.

Commission 4.1: Soils and the Environment

Events
1. Field tour and discussion "Organic banana farming and cattle manure management in in agricultural areas in Vietnam" co-organized by Morihiro Maeda (Commission 4.1 Chair), Tran Quoc Thinh, and Fumio Matsuda (Ritsumeikan University, Japan) on 11-13 January 2020
2. Field tour and discussion "Better soil management in palm oil plantations in Sri Lanka" was co-organized by Morihiro Maeda (Commission 4.1 Chair) and D.A.L. Leelamanie (University of Ruhuna) on 14-15 February 2020.

Conferences
1. Invited speech by M. Maeda (Session 4.1 Chair) at the session on materials transport and nutrient cycles in watersheds; from headwaters to coastal seas, JpGU Meeting 2019, Makuhari Messe, Chiba, Japan, 29 May 2019
2. 14th International Conference of the East and Southeast Asia Federation of Soil Science Societies (ESAFS) and research discussions by M. Maeda (Session 4.1 Chair) at National Taiwan University, 4-6 November 2019
3. Invited speech by M. Maeda (Session 4.1 Chair) at 2019 Symposium on Biotechnology: Applied Biotech-


Organically grown banana


Composing from agricultural wastes


Invited speech and discussion at University of Ruhuna


Palm oil plantation field

organized and chaired by Claudio Zaccone (Commission 4.1 Vice-chair).

1. SSS5.2/BG3 - Mechanisms of soil organic matter stabilization and carbon sequestration. Conveners: César Plaza, Claire Chenu, Claudio Zaccone

2. SSS5.5 - Biomass and waste valorization within a circular economy: from urban mining to soil amendments. Convener: Claudio Zaccone, Gabriel Gascó Guerrero, Ana María Méndez, Maurizio Ventura, Claudia Kammann, Jorge Paz-Ferreiro, César Plaza

Joint Meetings

During the First Joint Meeting on Soil and Plant System Sciences (SPSS2019) "Natural and Human-induced Impacts on the Critical Zone and food production" (Bari, Italy, 23-26 September 2019; *https://spss2019.azuleon.org/welcome.php*), organized by the Italian Society of Agricultural Chemistry (SICA), the Italian Society of Pedology (SIPe) and the Italian Society of Soil Science (SISS), in collaboration with the Mediterranean Agronomic Institute (CIHEAM, Bari) and the International Humic Substances Society (IHSS), the former IUSS President, Takashi Kosaki, has been invited as key note speaker (presentation title: Harmonization of natural and agricultural soil systems for sustaining society). Claudio Zaccone (Commission 4.1 Vice-chair) was the Secretary of the Organizing Committee.Pictures: *https://spss2019.azuleon.org/gallery.php* (no copyright)

Other activities

On 30 November 2019, the Commission 4.1 Vice-chair Claudio Zaccone was re-elected as President of the Soil System Sciences (SSS) division of the European Geosciences Union (EGU) for the two-year period 2021-2023 (*https://www.egu.eu/elections/egu-election-autumn-2019/*).
Consequently, a closer collaboration between IUSS and EGU will support the future development of our discipline and will stimulate further inter- and intra-disciplinary exchanges.

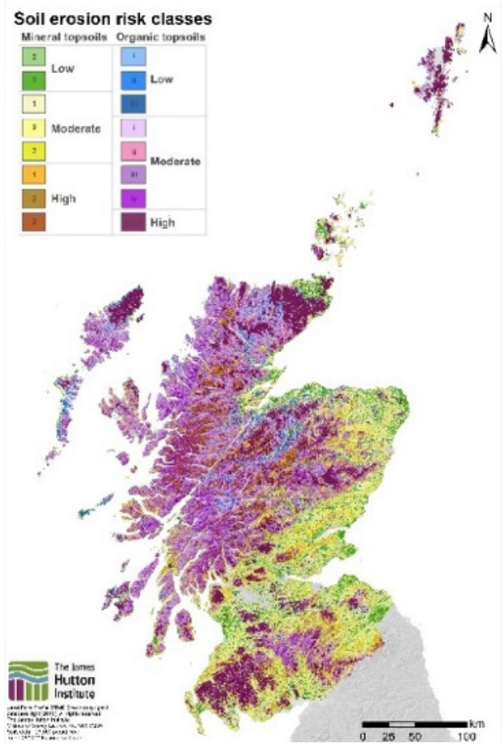
Soil Erosion

The topic of soil erosion was included as an article in the Scottish Government funded Strategic Research Programme 2016-2021 (SRP) on agriculture, environment, food and land, providing direct and tangible benefits across diverse issues. The latest highlights report covering the period September 2019 to February 2020 is available to view online: *https://sefari.scot/sites/default/files/page/Progress%20Report%20September%202019%20to%20February%202020.pdf*.
A map of erosion risk is available for Scottish soils which uses a mixture of the 1:25k soils data and the 1:250k soils data where this is not available. The map appears in the Royal Scottish Geographical Society geographer magazine with a description of the risk mapping that's been carried out: *https://www.rsgs.org/Handlers/Download.ashx?IDMF=b08cab0f-06fb-4ef0-b7df-b3e04ffcf308*. Further details of the modelling approach can be found on pages 6-8 of a CREW report: *https://www.crew.ac.uk/sites/www.crew.ac.uk/files/sites/default/files/publication/CREW_Risks%20to%20water%20quality.pdf*. Much of this work was led by Allan Lilly, James Hutton Institute.

Soils and water

The role of good soil stewardship has been shown to be essential to prevent runoff and preserve the water. This was said in a SEFARI blog backed up by ongoing strategic research on plant soil water interactions. Essential for root growth, for example periodic waterlogging or soil drying, or lack sufficient mineral elements, such as nitrogen (N).

Many of these topics were presented and discussed at the Scottish Alliance for Geoscience, Environment & Society (SAGES) 2019 conference on 27/28 November, 2019: *http://sages19.efconference.co.uk/*, SAGES'19 Symposium: Global Climate Challenges for a Blue Green Economy - Evidence, Relevance, Solution, which was hosted by Rebecca Wade of Abertay University.



Soils, soil structure and enhanced grassland yields

This study has investigated ways of mitigating soil structural damage and potential soil erosion in grassland soils through the use of controlled traffic farming compared to a field with normal traffic. This has been the third year of the study into the repeated use of the same wheelings for all vehicle activity for a three cut silage system on a grass:red clover sward. It included three levels of nitrogen fertiliser application to assess the effect of fertiliser on the stability of the red clover in the sward and on overall soil structure.

The grass field is treated more as an arable crop with set wheelings for the controlled traffic but reduced the area of the field that is potentially damaged by vehicle traffic and reduces soil compaction which ensures greater yield and better quality silage.

The results have indicated yearly increases in dry matter yield for the control traffic farming field compared to the normal traffic and indications of improved grass quality. *https://www.fginsight.com/grassland-toolkit-hub/grassland-toolkit---2020/limiting-compaction-at-silage-making*

Peatland

A blog was published on the SEFARI Gateway site by Rebekka Artz, James Hutton Institute, on the topic of peat called, 'Maximising the Benefits of Peatland Restoration: Right Place, Right Time and Best Practice', illustrating how peatlands are such internationally important habitats for wildlife and soil organisms, providing clean drinking water and iconic landscapes. View online: *https://sefari.scot/research/maximising-the-benefits-of-peatland-restoration-right-place-right-time-and-best-practice*.

Commission 4.2: Soils, Food Security and Human Health

Taru Sandén: EGU was organised online for the first time, and offered an interesting opportunity to discuss new research results online. The session ITS1.8/SSS1.1 "Bridging between scientific disciplines: Participatory Citizen Science and Open Science as a way to go" focused on citizen science and open science.

Citizen science (the involvement of the public in scientific processes) is gaining momentum across multiple disciplines, increasing multi-scale data production on biodiversity, earthquakes, weather, climate, health issues and food production, amongst others, that is extending the frontiers of knowledge. Successful participatory science enterprises and citizen observatories can potentially be scaled-up in order to contribute to larger policy strategies and actions (e.g. the European Earth Observation monitoring systems), for example to be integrated in GEOSS and Copernicus. Making credible contributions to science can empower citizens to actively participate as citizen stewards in decision making, helping to bridge scientific disciplines and promote vibrant, liveable and sustainable environments for inhabitants across rural and urban localities.

Often, citizen science is seen in the context of Open Science, which is a broad movement embracing Open Data, Open Technology, Open Access, Open Educational Resources, Open Source, Open Methodology, and Open Peer Review to transparently publish and share scientific research - thus leveraging Citizen Science and Reproducible Research. Both open science and citizen science pose great challenges for researchers to facilitate effective participatory science. To support the goals of the various Open Science initiatives, this session looks at what is possible and what is applied in geosciences. The session showcased how various stakeholders can benefit from co-developed participatory research using citizen science and open science, acknowledging the drawbacks and highlighting the opportunities available, particularly through applications within mapping, technology, policy, economy, practice and society at large. Learning from bottom-up initiatives, other disciplines, and understanding what to adopt and what to change can help synergize scientific disciplines and empower participants in their own undertakings and new initiatives. The session engaged 256 people in the online chat. The displays and open comments can be viewed here: *https://meetingorganizer.copernicus.org/EGU2020/session/35918*

Soil quality awareness and monitoring

SRUC has been working as part of a group including NIAB, ADAS and Fera IN the Soil Biology and Soil Health partnership funded by AHDB and BBRO. This project is to promote care and sustainability of soil to the agricultural industry and enhance the idea of soil health or quality. The promotion of soil quality has encompassed not just the usual idea of the soil chemistry i.e. the amount of nitrogen, potassium and phosphorous that needs to be applied for productive yields but the effects of soil physics (soil compaction - including the VESS system developed by SRUC) and soil biology (earthworms and nematodes) to enhance and sustain yields and production. The work has used data from the long-term plots at Craibstone, along with additional samplings done over the last two years to produce assessments of the soil quality and link this with the yields as well as provide a site for the testing of further monitoring. A management tool has been developed to advise farmers and consultants on the potential advantages and issues to be aware needs attention if changing management systems. *https://ahdb.org.uk/greatsoils and https://ahdb.org.uk/soil-health-scorecard*.

SRUC: Empowering Resource-Poor Rural Communities

SRUC was involved with a Scottish Catholic International Aid Foundation (SCIAF) led project for the Scottish Government in Zambia focused on the town of Kabwe; Empowering Resource-Poor Rural Communities in Central Province (Kabwe Kumena Project). This involved liaison with the local extension officers who collected soil samples for the farming communities and at different distances from a smelter (for lead and zinc) and old smelter waste that was responsible for high levels of lead in the area.

The soil samples were analysed for lead concentrations and nutrients, pH and organic matter, to provide advice on any contamination issues and nutrient deficiencies for productive growth. As the communities involved were at a distance from the main area of lead contamination their soils were not high in lead and the information was used to improve the pH of the soils through liming. The data will be used as a baseline to assess how the potential improvements being suggested through a more sustainable pattern of farming will improve the soil health. *https://www.sciaf.org.uk/stories/282-fighting-pollution-in-zambia-the-shadow-of-black-mountain*

Relevant Publications

Novelli, F., Spiegel, H., Sandén, T. & Vuolo, F. Assimilation of Sentinel-2 Leaf Area Index Data into a Physically-Based Crop Growth Model for Yield Estimation. doi:10.3390/agronomy9050255 (2019).

Sandén, T. et al. Development of an Agricultural Primary Productivity Decision Support Model: A Case Study in France. Frontiers in Environmental Science 7, doi:10.3389/fenvs.2019.00058 (2019).

Sandén, T. et al. Out of sight: Profiling soil characteristics, nutrients and bacterial communities affected by organic amendments down to one meter in a long-term maize experiment. Applied Soil Ecology 134, 54-63, doi:https://doi.org/10.1016/j.apsoil.2018.10.017 (2019).

Trajanov, A., Spiegel, H., Debeljak, M. & Sandén, T. Using data mining techniques to model primary productivity from international long-term ecological research (ILTER) agricultural experiments in Austria. Regional Environmental Change 19, 325-337, doi:10.1007/s10113-018-1361-3 (2019).

Van de Broek, M. et al. Assessing the Climate Regulation Potential of Agricultural Soils Using a Decision Support Tool Adapted to Stakeholders' Needs and Possibilities. Frontiers in Environmental Science 7, doi:10.3389/fenvs.2019.00131 (2019).Adapted to Stakeholders' Needs and Possibilities. Frontiers in Environmental Science 7, doi:10.3389/fenvs.2019.00131 (2019).

Pioli, S. et al. Linking plant litter microbial diversity to microhabitat conditions, environmental gradients and litter mass loss: Insights from a European study using standard litter bags. Soil Biology and Biochemistry 144, 107778, doi:https://doi.org/10.1016/j.soilbio.2020.107778 (2020).

Discussion and delegates for the 2nd National Symposium on the Beneficial Use of Recycled Organics, 20–21 June at the Brisbane Riverview Hotel, Australia

Commission 4.3: Soils and Land use Change

Conference

The 2nd National Symposium on the Beneficial Use of Recycled Organics was held 20 – 21 June at the Brisbane Riverview Hotel, Australia.
Read more: *http://www.nsro.com.au/events/past-events/*.

This symposium was co-chaired by the Chair of the Commission 4.3 Soil and Land Use Change, Prof Chengrong Chen (Griffith University, Australia). Over 150 delegates from universities and government agencies, as well as environmental consultants, land managers and farmers attended this symposium, which has exchanged the new understanding of the beneficial use of recycled organics under different land uses in our environment.

Event

1. 6th Annual Griffith University Field Trip: Land Degradation and Catchment Management on 1 Oct 2019, was jointly organised by Griffith University and Soil Science Australia-QLD Branch. The trip was led by Prof Chengrong Chen and Dr Maryam Esfandbod and sponsored by Rocky Point Ltd., Recycling Composting Industry. A group of 3rd year undergrad students from Griffith University with few attendees from Soil Science Australia, Queensland branch were taken on a field trip to various areas of the Lockyer Valley to provide them with some practical experience to ensure a thorough understanding of their course work. These sites included different land uses in the New Oakleigh Coal Mine Site, Gatton horticultural research station, UQ agricultural site, Darbalara salinity site, and Murphy's Creek Road erosion site.

2. 5 Dec 2019, World Soil Day celebration was held through a joint workshop with Soil Science Australia-QLD Branch and Soil CRC, Nathan Campus, Griffith University. *On World Soil Day - focus your attention on being part of the solution...* Small actions can have a significant impact on the health of our soils for Zero Hunger! Griffith Environmental Biogeochemistry Research Lab (EBRL) lead by Prof Chen, Soil Science Australia Queensland Branch and Applied Network for Recycled Organics and Waste Management, Australian Organics Recycling Association proud to join Soil CRC with other partners come across Australia to celebrate World Soil Day on 5th December at Nathan Campus Griffith University.

The students at 6th Annual Griffith University Field Trip - Land Degradation and Catchment Management

Soil scientists, land managers, agronomist and farmers and postgraduate students attended the 2019 World Soil Day celebration at Griffith University.

Scotland's Acid Soils – not all are equal

An investigation, led by Philip White at the James Hutton Institute, in collaboration with Rothamsted research demonstrates that liming soils to raise pH to an appropriate value can increase the yields of most arable crops grown in the UK. It provides valuable insights to the relationships between soil pH and crop yields. It reports that each arable crop might have a distinct yield response to soil pH, which presents management challenges. For example, for a given arable rotation it may be difficult to find the optimal soil pH for all crops grown. Some important arable crops in Scotland, such as potatoes, are not responsive to liming, but require low soil pH to prevent soil-borne diseases such as *common scab* (a bacterial disease).
This study highlights the interaction between soil type and fertiliser application (in particular phosphorus) on the relationship between soil pH and crop yield. When phosphorus fertiliser inputs are reduced, the critical soil pH for crop yield increases and consequently there is a greater need for liming. It is recommended that fertiliser inputs should be considered in combination with the management of lime application.
Read more: *https://sefari.scot/research/scotland's-harmful-acidic-soils-can-liming-improve-cropping-sustainability*

Legume Intercrops Help Improve Soil Quality

Recent policy changes have increased incentives to improve the environmental performance of farming. One option being investigated at SRUC is the greater cultivation of nitrogen fixing legumes, grown as either single species or in mixtures as an intercrop. One of the key benefits of including legumes in crop rotations is that they can improve soil quality for following cash crops. Key indicators of soil quality have been monitored in field experiments with the aim of optimising these benefits for Scottish farmers.

Single species of legumes tended to have a positive impact on key indicators of soil quality, although this effect depends on the species grown. Intercrops of legume species consistently showed greater benefits to soil quality than single species. This work will allow the development of specific, evidence-based agronomic and economic messages applicable to growers and advisors across Scotland on the benefits of legume-based intercrops to soil quality.

Commission 4.4: Soil Education and Public Awareness

Meetings

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 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, moderated by Hideaki Hirai, included:

1. Demonstration Functions, Specific Characteristics and High Impression of Soil Museums of the World (Zueng-Sang CHEN, China (Taipei)),
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 China (Taipei), (Wen-Shu HUANG, China (Taipei))

Poster presentations:

1. "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, China (Taipei)),
2. 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)

EGU Assembly 2020

Short Course cancelation and Poster session held on May 4th, 2020 (*Live-chat meeting*)

A 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 (10:45-12:30). 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 by the 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 China (Taipei) appeared on the list of SSS12.3/EOS2.4 entitled "Soil Education for General Public and School Students in China (Taipei) (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.

Symposium in Japan

A mini-symposium entitled "Towards an international standard for soil education – challenges for the International Decade of Soils (IDS)" was held in Shizuoka, Japan on 5th 2019. Oral presentations by nine researchers , namely Takashi Kosaki, Ryousuke Hatano, Hiroaki Sumida, Mitsuru Toma, Keiko Mori, Ikuko Akahane, Maki Asano, Haruo Tanaka, Hideaki Hirai (convener) were conducted. A highlight was the presentation of findings from a student questionnaire surveying soil in Japan, which we expect will be published in the near future in 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 preparing for a mini-symposium related to the contents of soil education by reconsideration of curriculum guidelines for the Course of Study in Japan.

Soil Resources for Schools

A range of resource materials for schools was created from across the RESAS research programme, helping teachers, parents and pupils with online learning under the COVID-19 restrictions: *https://safari.scot/document/sefari-educational-schools-engagement-report-2020*. These included materials and activities on the topic of soils, agriculture and land use. Lorna Dawson, SEFARI Gateway, produced a series of soil posters along with Geography teachers aimed for teaching. She also created a series of activities on the topics of crofting and soil science: *https://safari.scot/document/education-resource-how-to-make-an-edible-soil-profile; https://safari.scot/blog/2020/05/11/soils-and-crofting-resources-diversity-is-key-to-life; https://safari.scot/document/education-resource-collect-soil-bugs* and many more exciting activities mainly for primary school children and their parents.

The Galapagos – making of a film

Following the field trip to the Galápagos Islands, Martin Gerzabek, Sebastian Postl, Franz Zehetner and their students managed to produce a 52 minutes film "Galápagos beneath the earth". The film shows not only the beauties of the archipelago, but discusses the challenges of intensive agricultural production, invasive species and tourism in this unique environment. For this purpose, more than 20 interviews were conducted with farmers, conservation officials, scientists and tourism managers. The movie was shown first on 5th of December 2019 in Vienna to celebrate the international day of the soil. A

20 minutes version is in preparation for the Austrian Television company. Several publications about the soils of the Galápagos Islands were finalized, published or submitted. A publication about the impact of agricultural management on soils is cited below.

GERZABEK, M.H., BAJRAKTAREVIC, A., KEIBLINGER, K., MENTLER, A., RECHBERGER, M., TINTNER, J., WRIESSNIG, K., GARTNER, M., SALAZAR VALENZUELA, X., TROYA, A., COUENBERG, P.M., JÄGER, H., CARRIÓN, J.E., ZEHETNER, F. (2019). Agriculture changes soil properties on the Galápagos Islands – two case studies. J. Soil Research 57(3), 201-214.

Relevant publications

Hirai, H. (2019): Let's try to calculate the area of top soil necessary to produce the rice in a bowl of curry. The Journal of Science Education 62 (1): 2-7. (in Japanese)

Hirai, H., Narukawa, T., Fukuda, T., Mori, K., Murano, H., Akahane, I., Shirato, Y., Eguchi, S.2019: Time to reconsider how to teach soil - Renovation of soil education for the future curriculum guidelines. Japanese Journal of Soil Science and Plant Nutrition, 90 (2), 171176 (In Japanese) (This document was produced based on the presentation conducted in open symposium of yearly meeting of Japanese Society of Soil Science and Plant Nutrition held at Nihon University, Kanagawa, Japan on August 31st, 2018)

Hirai, H. and Kosaki, T. (2019): Setting the target of soil education based on questionnaire survey to elementary school children: A case study in Tokyo and Tochigi, Japan. Geophysical Research Abstracts Vol. 21, EGU2019-10305-2, EGU General Assembly 2019© Author(s) 2019. Creative Commons Attribution 4.0 license.

Mori, K., Hirai, H., Toma, M., Akahane, I., Asano, M., and Kosaki T. (2019): Suggestion to future soil education in Japan considering the current Guidelines for Primary School. Geophysical Research Abstracts Vol. 21, EGU2019-6413-2, EGU General Assembly 2019, © Author(s) 2019. CC Attribution 4.0 license.

Tanaka, H., Murakami, Y., Mitsuda, K., Fuchigami, K., and Hirai, H. (2019): Making shiny soil balls is popular with children, but what kind of soil balls should we make to link to soil education? 48, 14th International Conference of the East and Southeast Asia Federation of Soil Science Societies, *http://www.cssfs.org.tw/ESAFS2019/Files/2019-ESAFS-Conference-Abstracts_1025_compressed.pdf* (Access date: 8/Nov/2019)

Hirai, H. Deguchi, A., Shiraishi, S., and Kosaki, T. (2019): Soil education for pre- and elementary-school children towards setting an international standard. – How to convey the importance of top soil to support life from the viewpoint of daily rice consumption, 275, 14th International Conference of the East and Southeast Asia Federation of Soil Science Societies, *http://www.cssfs.org.tw/ESAFS2019/Files/2019-ESAFS-Conference-Abstracts_1025_compressed.pdf* (Access date: 8/Nov/2019)

Hirai, H. and Tsai, H. (Moderators of Oral session) (2019): Session 1, Soil education for pre- and elementary school children: current issues towards setting an international standard., 16, 14th International Conference of the East and Southeast Asia Federation of Soil Science Societies, *http://www.cssfs.org.tw/ESAFS2019/Files/2019-ESAFS-Conference-Abstracts_1025_compressed.pdf* (Access date: 8/Nov/2019)

Fujii, K., Matsuura, Y., Kanno, H., Yusuke, T., Hiradate, S., Tamura, K., Hirai, H., and Kosaki, T. (2019): Updating of soil education in high school textbook of geography, Pedologist 63 (2), 73-81 (In Japanese with English summary)

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 on September 2nd, 2019 in 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.

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 2019-2020

The Division Chair contributed to international and national meetings and symposia in 2019-2020, including the Canadian Society of Soil Science Annual meeting in Saskatoon, Saskatchewan, Canada 10-13 July, 2019, and the Soil Science Society of America annual meeting in San Antonio, Texas, USA 10-13 November, 2019. In each case the division chair helped organize sessions or presented materials relevant to the Division 4 mission. At the SSSA meeting he helped organize a symposium to honour the career of Larry Wilding, who passed away in January 2019. At both the SSSA and CSSA meetings he made Division 4 relevant presentations. More meetings had been planned for the 2019-2020 year, but all planned 2020 meetings have been cancelled due to COVID-19.

Upcoming Events

A symposium on ***History and Future of Pedology*** is being organized by Maxine Levine, Curtis Monger, Alfred Hartemink, Eric C. Brevik and Craig Rasmussen at the 2020 Soil Science Society of America Meeting. Jodi Johnson-Maynard, Eric C. Brevik, and Karen Vaughn are also organizing a session titled ***COVID-19 Impacts on Higher Education: Concerns and Strategies to Adapt*** at the 2020 Soil Science Society of America meeting.

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 is due to be released in 2020.

Relevant Publications

Brevik, Eric C., Lindsay Slaughter, Bal Ram Singh, Joshua J. Steffan, David Collier, Paul Barnhart, and Paulo Pereira. Soil and human health: current status and future needs. Air, Soil, and Water Research. in press. (This article is a direct result of the IUSS research group meetings).

Vaughan, Karen, Helga Van Miegroet, Amanda Pennino, Yamina Pressler, Chelsea Duball, Eric C. Brevik, Asmeret Asefaw Berhe, and Carolyn Olson. 2019. Women in soil science: Growing participation, emerging gaps, and the opportunities for advancement in the US. Soil Science Society of America Journal 83:1278–1289. doi:10.2136/sssaj2019.03.0085

Book Chapters

Pereg, Lily, Joshua J. Steffan, Csongor Gedeon, Phil Thomas, and Eric C. Brevik. Medical Geology of Soil Ecology. In: Malcolm Siegel, Olle Selinus, and Robert Finkelman (eds.). Practical Applications of Medical Geology (in press).

Field, Damien, Eric Brevik, Hideaki Hirai, and Cristine Muggler. Guiding the future of soil (science) education: informed by global experiences. IUSS soil education book (in press).

Brevik, Eric C., Maja Krzic, Danny Itkin, Yoshi Uchida, and Henry W. Chau. Guidelines for under- and post-graduate students. IUSS soil education book (in press).

Moorberg, Colby, Eric Brevik, and Kaizad Patel. 2020. Introduction. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Moorberg, Colby, Eric Brevik, and Kaizad Patel. 2020. Key concepts in soil science. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Moorberg, Colby, Allison Aubert, Eric Brevik, Isaiah Euler, Teddy Gillespie, Brook Hogan, Megan Owens, and Daniel Stich. 2020. Conservation practices for shorelines, streams, and wetlands. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Moorberg, Colby, Brooke Hogan, and Eric Brevik. 2020. Water quantity and quality conservation. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Moorberg, Colby, Tiffany Carter, and Eric Brevik. 2020. Conservation practices in broader context. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Moorberg, Colby, and Eric Brevik. 2020. Careers in soil and water conservation. In: Colby Moorberg (ed.). Soil and Water Conservation: an Annotated Bibliography. Prairie Press Open Book Publishing, Kansas State University, Manhattan, KS.

Presentation Abstracts

Brevik, Eric C. 2019. Bachelors Degrees Offered by Land Grant Colleges to Prepare Students for a Career in Soil Science. Soil Science Society of America Annual Meeting Abstracts.

Brevik, Eric C. 2019. Soil Science Education at Tribal Land Grant Colleges in the USA. Proceedings of the Canadian Society of Soil Science.

Working Group: Cultural Patterns of Soil Understanding

Annual Report: 2019-2020

Officers:
Chair: Nikola Patzel, *patzel@bodenkommunikation.info*
Vice-chair: Eric Brevik, *Eric.Brevik@dickinsonstate.edu*

Book on interconnectedness between soil and culture

Over the past year much of the Working Group's effort has gone into developing a book on the links between soils and cultures of the world as part of the IUSS Decade of Soil Science book edited by Nikola Patzel, Eric Brevik, Sabine Grunwald, and Christian Feller. We are in the process of making final modifications to the chapters and anticipate the book will be published by the end of 2020. We expect about 25 chapters to be part of the final book. Main cultural interests of most active WG members are bundled in here, stimulated to highest quality by intense editorial processes. Clearly we try to do service to the whole Div. mission to strengthen multi-layer links between ***various*** societies in the cultural areas, and soil

Symposia Organized

To date, the Working Group has organized the following symposia:
Symposia on "Society's perception of soils", "Soil and Spatial Planning", "History of Soil Science", and "Soil and Archaeology", organized by Nikola Patzel et al. in Berne, Switzerland, at the joint conference of German and Swiss Soil Science Societies, August 2019.

Presentations Given at Professional Meetings

Members of the Working Group have given the following presentations at meetings:
Brevik, Eric C., Sabine Grunwald, and Jeffrey Homburg. 2020. Native American origin myths including soil or Earth: Prehistory to present. Eurosoil 2020, Geneva.
Brevik, Eric C., Lindsey Slaughter, Bal Ram Singh, Joshua J. Steffan, David Collier, Paul Barnhart, and Paulo Pereira. 2020. Communicating the importance of soils to human health: New options and opportunities. Global Symposium on Soil Biodiversity.
Patzel, Nikola (2018, 2019, 2020): about 20 presentations given at various occasions in the fields of "cultural history of soil" and "dealing with inconsistent requirements from society concerning agricultural land use, and nature conservation".

Papers, Chapters, and similar Publications

Feller C., Aeschlimann P., Patzel N., 2020 (?) "The salt of the earth": Bernard Palissy (1510-1590) between soil science and religion. In: Cultural Understanding of Soils, IUSS. Accepted.

Feller C., Blum W., Lahmar R., Patzel N., Ribaut J.-P., 2020. Le sol des uns n'est pas celui des autres. Étude et Gestion des Sols, 26, 175-185.

The soil of some is not that of others. Special issue on "Communicate and make the general public aware of soil"

Feller C., Feller L., 2020 (?). Darwin and the earthworm. From God the Father to Mother Earth. In: Cultural Understanding of Soils, IUSS. Accepted.

Ibáñez, Juan-José, Eric C. Brevik, and Artemi Cerdà. 2019. Geodiversity and geoheritage: detecting scientific

and geographic biases and gaps through a bibliometric study. Science of the Total Environment 659:1032–1044. *https://doi.org/10.1016/j.scitotenv.2018.12.443*

Miller, Bradley A., Eric C. Brevik, Paulo Pereira, and Randall J. Schaetzl. 2019. Progress in Soil Geography I: Reinvigoration. Progress in Physical Geography: Earth and Environment 43(6): 827-854. *https://doi.org/10.1177/0309133319889048*

Vaughan, Karen, Helga Van Miegroet, Amanda Pennino, Yamina Pressler, Chelsea Duball, Eric C. Brevik, Asmeret Asefaw Berhe, and Carolyn Olson. 2019. Women in soil science: Growing participation, emerging gaps, and the opportunities for advancement in the US. Soil Science Society of America Journal 83:1278–1289. doi:10.2136/sssaj2019.03.0085

Books:

Patzel, Nikola, Eric C. Brevik, Sabine Grunwald, and Christian Feller (2020, upcoming): Cultural Understanding of Soils

Professional Advice Provided

Patzel, N, 2019, 2020: For German Environment Agency (UBA), communication on soil life that includes the human realm.

Meetings of the Working Group:

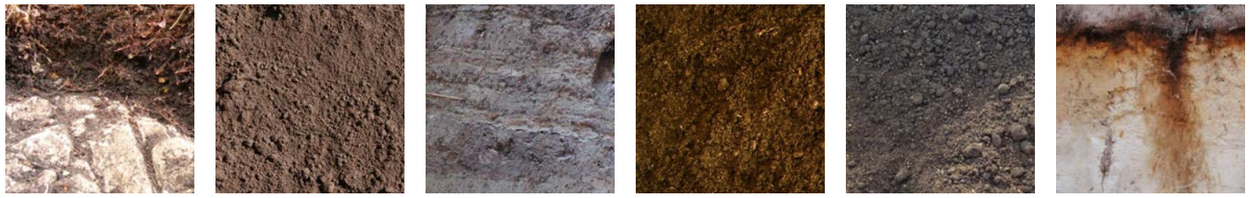
We have had video conference calls (at least 26 meetings): 2018: January 18, May 28; 2019: May 7, May 16, May 23, May 28, June 10, July 29, August 15, August 19, September 12, November 20, November 22, November 26, December 3, December 10, December 17; 2020: January 7, January 28, February 6, March 31, April 9, April 21, May 5, June 3.

Future Plans

Cultural understanding of soils. Results from an inter-cultural project – Eurosoil 2021. Organizers: Nikola Patzel, Eric C. Brevik, Christian Feller

Symposium "Perceptions and Evaluations of Soil in Society" of the German Soil Science Society, postponed from 2020 to 2021 (Stefan Norra, Nikola Patzel, Ludger Herrmann).

Symposium "Cultural understanding of soils, and how they can become part of the framework which IUSS and its members use in communication about soil and soil science", accepted for next inter-congress meeting in Glasgow (Patzel, Brevik, Feller).
Symposium "cultural Understanding of Soils. Results from an inter-cultural project". Accepted for Eurosoil conference in Geneva, postponed from August 2020 to August 2021 (Patzel, Brevik, Feller).



International Decade of Soils

(2015-2024)

Present and Future: Five Years into the International Decade of Soils 2015 - 2024

As we approach the halfway point in the International Decade of Soils in 2020 (ISC called it International Decade of Soil Health), we revisit the critical roles that soil plays in realizing the United Nations Sustainable Development Goals for 2030.

The International Science Council spoke to Rattan Lal, Distinguished University Professor of Soil Science and Director of the Carbon Management and Sequestration Center at Ohio State University. He is also Past President of International Union of Soil Sciences.

"Soil health and its sustainable management is critically important in advancing the Sustainable Development Goals of the United Nations, and specifically SDG #2 (Zero Hunger), SDG #13 (Climate Action) and SDG #15 (Life on Land)," said Lal. "Furthermore, the health of soil, plants, animals, people and the environment are one and indivisible. Restoration and judicious management of soil health is critical to addressing undernourishment of 821 million people (mostly in South Asia and Sub Saharan Africa) and 800 million malnourished people from around the world."

Read more: *https://council.science/current/news/present-and-future-five-years-into-the-international-decade-of-soil-health/*

World Soil Day 2019

"Solum Celebration": World Soil Day 2019

The World Soil Day-2019 was celebrated by the Department of Soil Science and Agricultural Chemistry, Bihar Agricultural University, Sabour (India) in association with the Sabour Chapter of the Indian Society of Soil Science as well as Soil Conservation Society of India on the 5th of December, 2019. A planned series of events were organized under the banner of "Solum Celebration" to witness the event. This included extramural lectures of Soil Scientists of the University, including Professor Bipin B. Mishra, Vice-Chair, Commission 1.4 (Soil Classification), International Union of Soil Sciences; 2018-22 & Former Chief Soil Survey Officer & Chairman, Department of Soil Science & Agricultural Chemistry, BAU, Sabour. Dr B B Mishra dwelled on Soil Environmental Nexus approaches in food, water, soil and energy for sustainable development following his emphasis on modern pedology as a mark of Solum celebration. Dr. Sunil Kumar Choudhary, Professor, PG Botany Department of the Tilkamanjhi Bhagalpur University spoke about the disastrous impacts of river bank erosion, soil and water pollution on the highly endangered Gangetic ecosystem and the urgent need of government intervention for conservation and management.

The lectures were followed by poster presentations highlighting the theme of the World Soil Day, 2019 "Stop Soil Erosion, Save our Future", which were attended by more than a thousand people, including local farmers, students, researchers, extension workers and soil scientists. Importantly, a farmer-student interaction event was subsequently organized. Awareness was raised among invited progressive farmers with farm-level practical tips of soil management. Also, to mark the day, a special issue of Wall Magazine in the Department of Soil Science and Agricultural Chemistry was unveiled by Mr Pranav Kumar, District Magistrate, Bhagalpur, Bihar in the presence of Professor Ajoy K Singh, Vice Chancellor of the Bihar Agricultural University, Sabour. A documentary made by the Post Graduate students of Soil Science under the able guidance of Dr. Anshuman Kohli, Chairman of the Department was displayed to highlight the emerging issues in soil degradation and heavy metal pollution based on research findings following their conservation and management. A field trip was also organized by the Department with undergraduate students on 6th December 2019 to raise the awareness of soil degradation under intensive agriculture.

World Soil Day 2019 in a nutshell

464 registered events on the *WSD map* **in over 100 countries;** *WSD logo* available in 94 languages; WSD posts seen by 400 000 000 social media users; Millions reached in *media articles published specifically for WSD*; Thousands of downloads of the *WSD campaign material.*

Read more: *http://www.fao.org/world-soil-day/en/*

Student participants, World Soil Day, 5th December 2019, BAU, Sabour, India

Professor Bipin B Mishra addressing the World Soil Day, 5th Dec 2019, BAU, Sabour, India

Inauguration function, World Soil Day, 5th December 2019, BAU, Sabour, India

Guest being welcomed by the Chairman of the Department

Mr. Pranav Kumar, District Magistrate, Bhagalpur sharing his experience on vital role of soils

Vice Chancellor Dr AK Singh interacting with Soil Science students

Professor Bipin B Mishra delivering on soil as a nexus tool in secured and sustainable livelihood

Stop Soil Degradation and the IUSS educative project to achieve it

Within the framework of its activities during the International Decade of Soils (2015-2024) "The IUSS GOES TO THE SCHOOL" is another educative project – you may remember "Thus are the soils of my Nation". The project is expected to be fully launched in 2021.

Exhibition of instruments and methods of erosion measurement

Organized by the Section of Soil Teaching and Public Safety of the Spanish Society of Soil Science, and the support of the IUSS GOES TO THE SCHOOL educative project, the "Exhibition of instruments and methods of erosion measurement" was held on February 13, 2020, at the Higher Technical School Agronomic Engineering of the Valencia University, Spain.

For more photos, please have a look at: *https://drive.google.com/drive/folders/1wE3XiX6cKF2W1Dn3rLtXnLoF3mxUlNSj* Intellectual property rights of all photos: Dr. Cristina Lull Noguera

Poster presented at the Exhibition of instruments and methods of erosion measurement (©Dr Cristina Lull Noguera).

Some students of the Higher Technical School of Agronomic Engineering of the University of Valencia, Spain, who attended the Exhibition of instruments and methods of erosion measurement (©Dr. Cristina Lull Noguera).

Erosion Kids WSD 2019_SECS

The Section of Soil Teaching and Public Safety of the Spanish Society of Soil Science, as part of the IUSS GOES TO THE SCHOOL educative project, invites you to get to know the book "Stop soil erosion, save our future!" written by Cristina Lull Noguera and Ma. Desamparados Soriano Soto.

English: *http://edafoeduca.es/wp-content/uploads/2019/11/Erosi%C3%B3n-Escolares-WSD-2019_SECS.pdf*

Spanish: *http://edafoeduca.es/wp-content/uploads/2019/11/Erosi%C3%B3n-Escolares-WSD-2019_SECS.pdf*

Soil Book Series

Due to the Covid-19 pandemic the publication of the next edition in this series has been postponed to the second half of 2020:

Soil Sciences Education: Global Concepts and Teaching.

Edited by Takashi Kosaki, Laura Bertha Reyes Sánchez und Rattan Lal, this tome will consist of three sections, and present the framework of soil science education, good practice in soil science education and provide an outlook with Guiding the Future of Soil Science Education: informed by global experiences.

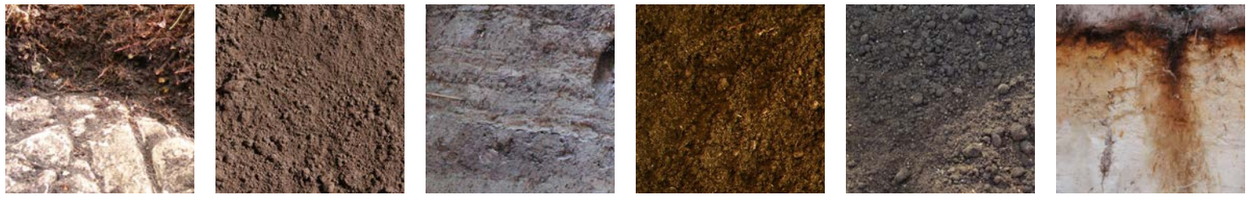
Review of the book "Soil Proverbs"

by Edoardo A.C. Costantini

It was with real pleasure that I have read the book "Soil Proverbs". The book, published by Edizioni Dell'Orso Publishing House (ordini@ediorso.it) on the initiative of the Italian Soil Science Society, was edited by colleagues Paola Adamo, Gian Franco Capra, Andrea Vacca and Gilmo Vianello and is divided into regional chapters to which many members of SISS have contributed.
There are about 300 proverbs that directly or indirectly call into question the relationship of man, not just the farmer, with life around him: land, nature, climate, work, society, sex, religion ...
The book is part of the activities and objectives of the International Soil Decade (2015-2024), proclaimed by the International Union of Soil Sciences (IUSS) to raise awareness and promote the correct communication of the importance of the soil for human life on our planet.
There are many keys and ways of reading that can be found in this book. First of all the proverbs tell the life of the farmer in his working relationship with the land, marked by ways of doing things, by times, and seasons. A relationship of love and hate modulated by fatigue and hunger, by successes and failures, by the struggle to obtain food from a nature that is often more difficult to face than hostile, where intelligence, experience and wisdom are more important than strength and wealth.
A series of experiences that become school of life and philosophy. The meaning of the proverbs then changes in level and the lesson learned from the physical reality transcends to social and human relationships.
Of course, an agronomic reading is also possible, where the importance of the fight against weeds is highlighted since they steal water and nutrients from crops often without irrigated resources and poor in fertilizers. From this the continuous emphasis on the tillage in its various forms: hoeing, digging, plowing. The recommendations relating to avoid cultivating soil when it is wet and to manage rainwater to avoid soil erosion, seen as a real disaster caused by serious negligence, are very relevant and frequent.
From a more strictly pedological point of view, the proverbs highlight the perception of the great variability of the nature of the soils and of their cultivation and agronomic vocation. Even observations on soil biology are recognized, through the notation of its state of health or disease.
I also appreciated the introductory chapters of each region, for the historical, geographical and linguistic examination of the various dialectal forms and languages in which the proverbs are expressed, and the conclusions, where the regional redundancies are described and a peasant culture, in many aspects common despite local diversity, is highlighted.
The proverbs are reported in the original language, in Italian and English, each one with a comprehensive explanation. It is often possible to give multiple interpretations to the same text, and the reader will then be able to have fun in giving his own.

Enjoy the reading!

https://www.ediorso.it/proverbi-del-suolo-soil-proverbs.html/



Conference and Meeting Reports

International WRB Excursion to Mongolia 2019

By Peter Schad (Chair) and Stephan Mantel (Vice-Chair), IUSS Working Group WRB

Every year the IUSS Working Group World Reference Base for Soil Resources (WRB) undertakes a field workshop. The aim is to test the current version of the WRB, which is now the Third Edition, Update 2015 (*http://www.fao.org/3/i3794en/I3794en.pdf*), and to identify definitions that have to be changed in the next edition. This requires a sound knowledge of soils of all ecoregions of the world.

In 2019, we were invited to Mongolia: *https://sites.google.com/view/wrbexcursioninmongolia/*. The tour started from Ulaanbaatar to the steppe regions of the west, then went south to the semi-desert and desert areas of the Gobi and turned back to Ulaanbaatar. We were 32 international participants coming from 15 countries. Nine of the participants were PhD students, which tells us that soil classification is an interesting topic for young scientists.

The soils of the dry steppes west of Ulaanbaatar are, not surprisingly, very typical Kastanozems. From there, we proceeded to Khorgo volcano, where we found an Andosol, but also Leptosols and Regosols (on the way to be Andosols) and a Phaeozem that may have developed from an Andosol. At higher elevation, the cold continental climate allows permafrost. We saw soils, in which the cryic horizon starts between 1 and 2 m. They only are Cryosols if they show cryoturbation features in the first meter. This is not always easy to decide. Then, we went south and found the typical soils of semi-arid and arid regions: Calcisol, Gypsisol, Solonchak and Solo-

Figure 2: Amphiluvic Calcisol (Hypocalcic, Amphiclayic, Amphiraptic, Endoprotosalic, Endosodic, Protovertic, Yermic) (© Peter Schad)

Figure 1: The excursion group with the drivers (in front) and the cars (behind), close to the salty Orog Lake (© Marcin Switoniak)

Figure 3: Participants listening to Karl Stahr explaining a Solonchak (© Marcin Switoniak)

netz. Arenosols on sand dunes and Leptosols (especially Hyperskeletic Leptosols) also belong to this landscape. Many of these soils show yermic properties: desert pavement, desert varnish, platy structure, vesicular pores. While these soils cover large areas, the small playas have different soils, and we saw a Vertisol with takyric properties. Even in the semi-desert, we found a Luvisol with beautiful clay coatings, where clay migration is caused by occasional heavy rainfalls, despite the high Ca^{2+} saturation. On the way back to Ulaanbaatar, again we passed the zone with Kastanozems.

What were our major discussion points? It seems that too many mollic horizons key out. They are expected for the steppe areas but we find them more widespread. The definition of the yermic properties needs some refinements. A better quantification of the secondary carbonates in the protocalcic properties and the calcic horizon is needed. But in general, WRB allows a precise and meaningful naming of soils.

Of course, we visited some cultural highlights, e.g., Karakorum, the old Mongolian capital. We saw beautiful landscapes. Small thufurs and other cryoturbation features were as impressive as the wide desert areas. Despite the experience of some rainfall in the Gobi desert, the nights in the desert with the absolutely clear sky were marvellous. We saw the animal herds with yaks, camels, horses, sheep and goats. We enjoyed Mongolian hospitality, passed some nights in hotels and some nights in ger camps, and tasted Mongolian food. And we are greatly indebted to the organizers, to Undrakh-od Baatar and her team.

Figure 4: Excursion leader Undrakh-od Baatar explaining a Calcisol (© Peter Schad)

Newsletter of ESAFS 2019

Dec. 19, 2019

Rationale

During the business meeting of the 13th International Conference of East and Southeast Asia Federation of Soil Science Societies (ESAFS) in Pattaya, Thailand on 12-15 Dec., 2017, the chairman informed that three member societies had proposed to host the 14th ESAFS conference in 2019, namely, Malaysia, the Philippines and China (Taipei). Members accepted all nominations and requested the three societies to present their preparations to be the next host. After the three presentations, a secret ballot was conducted and China (Taipei) won by favor of 8 of 11 member countries. In this matter Prof. Dr. Zeng Yei Hseu, president of the Chinese Society of Soil and Fertilizer Sciences (China, Taipei), expressed his thankfulness to all member countries and said he would try to be the best host possible, and invited the members of societies to attend and present their research work during the next ESAFS conference.

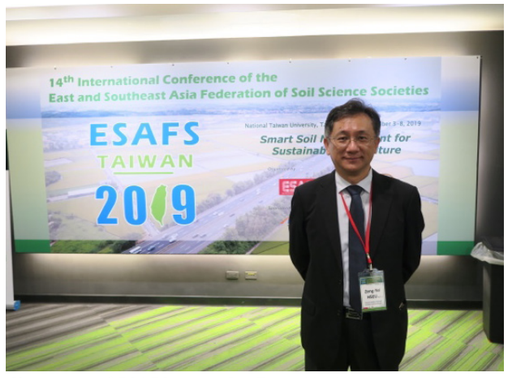
According to the rule of ESAFS, Dr. Zeng-Yei Hseu was automatically appointed as the President of ESAFS from Jan. 2018 to Dec. 2019, because he was elected as the President of the Chinese Society of Soil and Fertilizer Sciences (CSSFS) from Jan. 2018 to Dec. 2019. His contact information is: *zyhseu@ntu.edu.tw*.

Organizers and sponsors of ESAFS 2019

The organizing Committee of 14th International Conference of ESAFS (ESAFS 2019) was established in Aug. 2018. The first announcement of the 14th ESAFS conference was released on Sept. 27, 2018, and focused on the

Dr. Hseu (2nd on the right) received the host of ESAFS 2019 from the president of ESAFS 2017 (©Zeng-Yei H

The logo of ESAFS 2019 (© Zeng-Yei Hseu)



Chairman of ESAFS 2019, Dr. Zeng-Yei Hseu (©Zeng-Yei Hseu)

theme of the conference on "Smart Soil Management for Sustainable Agriculture". The conference homepage was established on Sept. 25, 2018. The second, third, and final announcement and detailed program were sent to all the intended participants on Feb. 2, Jun. 25, and Sept. 26, and Oct. 21, 2019, respectively; in addition, all announcements were also posted on the homepage.
In addition to the chairman of ESAFS 2019, Dr. Zeng-Yei Hseu, the organizers included vice-chairman Dr. Dar-Yuan Lee from the National Taiwan University (NTU) and Secretary General Dr. Shih-Hao Jien from the National Pingtung University of Science and Technology (NPUST). The members of International Advisory Committee were Takashi Kosaki (President, International Union of Soil Science/Professor, Aichi University), Jae E Yang (Former President, International Union of Soil Science/Professor, Kangwon National University), Nanthi Bolan (Professor, University of Newcastle), Huu-Sheng Lur (Dean, College of Bioresources and Agriculture, National Taiwan University), and Zueng-Sang Chen (Professor Emeritus, National Taiwan University).

Members of International Scientific Committee: S. M. Imamul Huq (President, Soil Science Society of Bangladesh), Renfang Shen (President, Soil Science Society of China), Budi Mulyanto (President, Indonesian Soil Science Society), Ryusuke Hatano (President, Japanese Society of Soil Science and Plant Nutrition), Yong Seon Zhang (President, Korean Society of Soil Science and Fertilizer), Rosazlin Abdullah (President, Malaysian Society of Soil Science), Keshav R Adhikari (President, Nepalese Society of Soil Science), Edna D. Samar (President, Philippine Society of Soil Science and Technology), M.G.T.S. Amarasekara (President, Soil Science Society of Sri Lanka), Pitayakon Limtong (President, Soil and Fertilizer Society of Thailand), Minh Tien Tran (Secretary general, Vietnam Society of Soil Science), Zeng-Yei Hseu (President, Chinese Society of Soil and Fertilizer Sciences (China, Taipei)), and Budiman Minasny (Professor, The University of Sydney).

The 14th ESAFS conference was organized by CSSFS and National Taiwan University (NTU). This conference was funded by NTU, the Ministry of Science and Technology (MOST), China (Taipei), and Apollo Technology CO., LTD., China (Taipei).

The organizing committee of the 14th ESAFS Conference has published the Program Book and Abstract Proceedings (two pages for each paper) of all oral (167 presentations) and poster (212 presentations) papers, and field education guides.

Address of Chairman (Zeng-Yei Hseu) at ESAFS 2019

Soil is not only important for sustainable agriculture, but also crucial to environmental quality. The negative impacts of civilization development on our environment are rapidly growing due to the steadily increasing global population, yet humans are getting dependent on the high quality of soil resources for surviving on the earth. The ESAFS is dedicated to the exchange of recent advances in soil science in the East and Southeast Asian regions, providing a better understanding of the attributes of soil quality and ways of improving soil and associated environmental quality to ensure sustainable food security and a healthy life of East and Southeast Asia as well as world population.

ESAFS 2019, an international conference, is an integrated platform for interaction among scientists, consultants, and policy makers, who are responsible for the research and technology transfer of soil science, fertilizer management, and plant nutrition in order to cope with the rapid industrial development globally. ESAFS 2019 is held at GIS Convention Center of NTU in Taipei, China. It emphasizes multidisciplinary collaboration for the development of smart soil management for sustainable agriculture. The presentations of ESAFS 2019 focus on soil education and public awareness, emerging contaminant elements in soil-plant systems, pedogenesis and soil information, soil fertility and plant nutrition, soil ecology, paddy soil remediation and food safety, soil management and climate change, soil and water management, and forest soils.

Participation and presentation

The 14th ESAFS Conference was held at the GIS Convention Center of National Taiwan University (NTU) on 3-8 November, 2019. Current member societies of ESAFS, include Taipei (China), Bangladesh, China, Indonesia, India, Japan, South Korea, Malaysia, Sri Lanka, the Philippines, Thailand, Nepal, North Korea, and Mongolia. 410 participants from 17 countries registered for ESAFS 2019, including 200 participants from Taipei (China) and approximately 200 participants from all ESAFS member societies, except for India, North Korea, and Mongolia. The scientific programs on 4-5 November, 2019, included 297 oral and poster presentations. Regarding the number of participants and papers, ESAFS 2019 has broken the record of the past ESAFS conferences.

Seventy participants attended the post conference education trip on 6-7 November 2019. They visited two nature education areas, Xitou and Fenghuang, the Experimental Forest of NTU, understanding the promotion of ecological conservation and organic farming by NTU.

Conclusions of Business Meeting ESAFS 2019

1. Next host of ESAFS conference

Chairman informed that the Malaysian Society of Soil Science has proposed to host the 15th ESAFS in 2021. Members accepted the nomination and requested President Rosazlin Abdullah to present the society's preparations to be the next host. After the presentation, the proposal of the Malaysian Society of Soil Science to host the 15th International Conference of ESAFS in 2021 was approved in the business meeting.
After the approval of the 15th ESAFS in 2021, the chairman explained the potential willingness of the Vietnam Society of Soil Science from Minh Tien Tran to become a future host of ESAFS. Members accepted the possibility of future hosting by the Vietnam Society of Soil Science,


The ESAFS chairman and the president of IUSS Dr. Takashi Kosaki (right) at ESAFS 2019 (© Zeng-Yei Hseu)

Participants at the opening ceremony of ESAFS 2019 (©Zeng-Yei Hseu)

Group photo taken during the education trip (© Zeng-Yei Hseu)

but Dr. Tran could not guarantee the hosting in 2023. Hence, the ESAFS committee concluded that the Vietnam Society of Soil Science will be one of the potential hosts of ESAFS 2023 given priority.

2. Election of ESAFS Award

Chairman called for nominations from member societies for the ESAFS Award 2019 in September, 2019, by e-mail message. According to the rules of ESAFS Award, chairman informed that there were three nominees from the Japan Society of Soil Science and Plant Nutrition, Soil Science Society of Bangladesh, and Soil Science Society of Sri Lanka, namely, Dr. Kazuyuki Inubushi, Dr. S. M. Imamul Huq, and Dr. Ranjith B. Mapa, respectively. Members accepted all nominations and requested the three societies to present the candidates' backgrounds. A secret ballot was conducted and Dr. Kazuyuki Inubushi was voted to receive the 7th ESAFS Award 2019. This award was presented to Dr. Kazuyuki Inubushi at the banquet on 4 November 2019.

3. Other business

Dr. Masanori Saito, representative of the ESAFS Support Office, briefly introduced the homepage on the website of ESAFS: *https://www.esafs-support.com/*, and called upon members to provide information from all member societies.

ESAFS Award 2019 to Dr. Kazuyuki Inubushi (left) (© Zeng-Yei Hseu)

The business meeting of ESAFS 2019 (© Zeng-Yei Hseu)

IUSS Alerts

December 2019 – May 2020

Information for and from the global soil science community

IUSS Alerts were e-mailed to more than 2,100 people in over 100 countries. 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 2019 and May 2020.

Glinka World Soil Prize

Dr. Xu Minggang received the *Glinka World Soil Prize 2019* during the *WSD celebration at FAO headquarters* in Rome (Italy).

In China, his achievements are illustrated by 260 scientific articles and had a positive impact on food security for over 1.4 billion people.
Read more: *http://www.fao.org/world-soil-day/glinka-world-soil-prize/en/*

Countries leading the implementation of the VGSSM

The Voluntary Guidelines for Sustainable Soil Management provides technical and policy recommendations on how sustainable soil management can be achieved. Their successful implementation will pave the way to boosting soil health. Recent translations now include Italian | Turkish | Portuguese, and Ukrainian.
Read more: *http://www.fao.org/publications/card/en/c/5544358d-f11f-4e9f-90ef-a37c3bf52db7*

Launch of the 'Soils for nutrition' project

The GSP is supporting FAO member countries to apply sustainable soil management practices in an effort to improve the nutritional quality of locally-produced foods to address micronutrient deficiencies in people. The nutrition-sensitive agriculture project is a 3-year initiative funded by the government of Germany and is being piloted in Bangladesh, Burkina Faso and Malawi.
Read more: *http://www.fao.org/global-soil-partnership/pillars-action/1-soil-management/nutrition-sensitive-agriculture/en/*

Restyling of the next GSP Plenary Assembly

All GSP partners and member countries are welcome to attend the eighth GSP Plenary Assembly on 3 - 5 June 2020 at FAO headquarters in Rome. This year the Plenary will be significantly different from previous editions both in its structure and execution to make it more interactive and efficient. A call for side events will be announced soon, so start getting ready to submit your proposal!

Read more: *http://www.fao.org/global-soil-partnership/resources/events/detail/en/c/1197439/*

Training on Soil Salinity Mapping

In the framework of the Global Soil Salinity Map (GSSmap) that will be launched in June 2020, the GSP organized a one-week training on soil salinity mapping from 28 November to 3 December 2019 in Tunis, Tunisia for countries from Near East and North Africa. The objectives were to understand the soil salinity drivers, indicators and classification methods and to prepare country-level data for national mapping of soil salinity.
Read more: *http://www.fao.org/global-soil-partnership/resources/events/detail/en/c/1250686/*

Launch of INSAS | International Network of Salt-Affected Soils

The International Network of Salt-Affected Soils (INSAS) was launched on 21 November in Dubai, UAE on the occasion of the ICBA 20th anniversary celebrations. The network will facilitate the sustainable and productive use of salt-affected soils for current and future generations and provide a platform to foster collaboration for countries with salt-affected soils.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1252161/*

William's Soil Agronomic Museum starts its modernization

The William's Soil Agronomic Museum represents one of the best and most varied collections of soil monoliths in the world. The Russian Federation is supporting its internationalization and modernization through the technical support from the GSP.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1252940/*
[All articles above are from the GSP Newsletter #26, 18 December 2019]

Combatting Soil Erosion to Help Achieve Zero Hunger and Clean Water: IAEA Commemorates World Soil Day

Over 45 billion tons of soil are lost to erosion every year. Farmers and agricultural authorities in several countries have succeeded in slowing down erosion with the help of nuclear techniques. Here are their stories from Zimbabwe, Argentina and Sri Lanka.
Read more: *https://www.iaea.org/newscenter/news/combatting-soil-erosion-to-help-achieve-zero-hunger-and-clean-water-iaea-commemorates-world-soil-day*

Contribute to #GlobalCollembola

The #GlobalCollembola project has collected over 26,000 Collembola samples and counting! If you have data on Collembola distribution, consider contributing it to this growing database by January 31, 2020.
Read more: *https://files.constantcontact.com/a3128908401/f78f10e2-3436-4008-9ac5-081b1100438a.pdf*
[From: GSBI Newsletter - December 2019]

Collaborate in a Global Effort to Study Soil Microbes

You have the opportunity to participate in a new, international effort to create a database for global soil microbial biomass and function! To see how you can be a collaborator, read the new call for collaborators in Soil Organisms by Gabriel Smith, Thomas Crowther, Nico Eisenhauer, and Johan van den Hoogen below. Contributions are due February 29, 2020.
Read more: *http://www.soil-organisms.org/index.php/SO/article/view/112*
[From: GSBI Newsletter - December 2019]

New LIFEPLAN Project to Standardize Global Soil Biodiversity Sampling Efforts

Otso Ovaskainen, Tomas Roslin, and David Dunson just received an ERC Synergy grant to standardize global soil biodiversity sampling until 2025. They will select 100 teams from across the globe to participate in this unprecedented effort. All sampling will be done using semi-automated methods, meaning that taxonomic expertise isn't necessary.
Read more: *https://www.helsinki.fi/en/projects/lifeplan*
[From: GSBI Newsletter - December 2019]

Not all soil carbon is created equal: The key thing soil carbon initiatives are missing

Soil carbon is receiving a huge amount of interest from many sides – everyone from farmers to policy makers to industry leaders – because it presents an opportunity to mitigate climate change and provide food security for our rapidly growing population. But not all soil carbon is equal. There are two distinct types of soil carbon, and we can't manage soil carbon effectively without understanding and considering both of them.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2019/12/4/not-all-soil-carbon-is-created-equal-the-key-thing-soil-carbon-initiatives-are-missing*
[From: GSBI Newsletter - December 2019]

New findings reveal a need to optimise the use of phosphorus in agriculture

The first continent-wide assessment of the chemical properties of EU soils reveals high levels of phosphorus in agricultural soils. Fertiliser use has an impact on agriculture and on the environment.
Under most conditions, the use of fertilisers increases the production of biomass, and therefore increases the potential yield and facilitates the capture of carbon dioxide from the atmosphere.
However, overuse of fertilisers creates negative environmental issues.
Read more: *https://ec.europa.eu/jrc/en/news/new-findings-reveal-need-optimise-use-phosphorus-agriculture*

European Commission Survey - Mission Soil health and food

The European Commission proposes to implement a mission in the area of "Soil health and food" as part of the next research programme Horizon Europe. Missions are a new instrument for research and innovation to increase the impact of research, connect with citizens and show that science matters in day-to-day lives. A mission in the area of soil health and food will raise awareness on the importance of soils for food production and other important services/functions. It will deliver knowledge and solutions to manage soils in more sustainable ways so that they are preserved for future generations.
The EC would like to hear what you know about soils and their functions and how you perceive the mission area "soil health and food". Your answers will help the EC to develop the scope of the mission and communicate to you on its design and implementation.
The survey will take around 10 min.
Read more: *https://ec.europa.eu/eusurvey/runner/mission-soil-health-and-food*

Sneak Preview SoilGrids250m

ISRIC has been updating their soil property maps for the world (SoilGrids250m). Numerous improvements were implemented since publication of the `2017 version', making this a completely new product. A sneak preview is available at *https://www.isric.org/news/sneak-preview-new-edition-soil-property-estimates-world-and-request-feedback-soilgrids250m;* the full version with supporting web viewer will be released around March 2020.

So far, the layers have been submitted to a first draft expert evaluation at ISRIC. We are aware that some layers are prone to change prior to their final release in early 2020. While we continue to address some of the identified issues, you are most welcome to help us improve SoilGrids by providing your expertise for the geographical areas you are most familiar with. For this, you are kindly invited to answer a few questions on the following form *https://forms.gle/5xrWZrgzqfG5hP5Y9* to help us to qualitatively evaluate the general patterns of the different layers. You may also help us by *sharing* soil profile data and soil expertise for your country.

News from the IUGS Commission on Global Geochemical Baselines

The main activity of IUGS-CGGB during November 2019 was the compilation of two IUGS Standard Geochemical Methods manuals:

1. Manual of Standard Methods for Establishing the Global Geochemical Reference Network, and
2. Global Black Soil Project Manual of Standard Geochemical Methods.

The work on the first manual is continuing, whereas the second manual was completed, and submitted to external reviewers for comments. Further, a member of the IUGS-CGGB Steering Committee participated in two events. The first was the 3rd Workshop of the Global Black Soil Critical Zone Geo-ecological Survey (BASGES), which was held in Chengdu, P.R. China, on the 20th and 21st of November 2019. Alecos Demetriades (Chair of Sampling Committee) presented the final version of the IUGS Global Black Soil Project Manual of Standard Geochemical Methods. The requirements for starting the global field sampling campaign were also presented, and subsequently discussed. The most important requirement is the preparation of two Black Soil project reference samples, and a solid blank reference sample for the mandatory external quality control. Shenyang Geological Survey (project coordinator) finally agreed to prepare the two Black Soil project reference samples, and the preparation of the solid blank reference sample is still being discussed.

The second event was a two-day workshop on the 22nd and 23rd of November 2019 in Chang'an University, School of Earth Science and Resources, Xi'an, P.R. China, where Alecos Demetriades (Chair of CGGB Sampling Committee) given eight lectures, starting from basic Applied geochemistry, Sampling, Sample preparation, Laboratory analysis, Quality control, Statistical-geostatistical data processing, Global- to local-scale geochemical surveys, Phased mineral exploration, and Preparing manuscripts in English for publication in International Journals. The workshop was attended by 22 students from China (17), Egypt (1), Namibia (1), Pakistan (2) and Rwanda (1). At the end of the workshop a USB-memory card with the lectures and other workshop material was given to the attendees.
Follow the IUGS Commission on Global Geochemical Baselines at:
http://www.globalgeochemicalbaselines.eu/
https://www.facebook.com/CGGBIUGS/
https://twitter.com/cggb_iugs
[From: IUGS E-Bulletin No. 161 – December 2019]

A newly found Atacama Desert soil community survives on sips of fog

Lichens and other fungi and algae unite to form this 'grit-crust' on parched soil. Scientists have discovered a hardy form of biological soil crust that survives on coastal fog in northern Chile. This "grit-crust" creates black and white splotches across the land in Pan de Azúcar National Park
Read more: *https://www.sciencenews.org/article/new-atacama-desert-soil-fungi-lichen-community-survives-fog-sips?fbclid=IwAR3-Pat1R7M4XvjDeI-b1uSu8eITzjEDpj_Feaui-tP36jPqGZXq4nLffZA*

Soil newsletter of FAO/IAEA

The Soils Newsletter Vol.42 No.2, January 2020 of FAO/IAEA is now available and contains a number of interesting articles including one on Antimicrobial movement

from agricultural areas to the environment: A role for nuclear techniques.
Read more: *https://www.iaea.org/publications/14670/soils-newsletter-vol42-no2-january-2020*

Innovation Awards Roullier 2020

The Innovation Awards Roullier 2020 is an international contest in Plant & Animal Nutrition rewarding the two best projects with a €75,000 grant each. This year the soil is at the center of the plant nutrition competition.
Registration until February 29, 2020
Read more: *https://www.innovation-awards-roullier.com/*

Can soil microbes slow climate change?

With global carbon emissions hitting an all-time high in 2018, the world is on a trajectory that climate experts believe will lead to catastrophic warming by 2100 or before. Some of those experts say that to combat the threat, it is now imperative for society to use carbon farming techniques that extract carbon dioxide from the air and store it in soils. Because so much exposed soil across the planet is used for farming, the critical question is whether scientists can find ways to store more carbon while also increasing agricultural yields.
Read more: *https://www.scientificamerican.com/article/can-soil-microbes-slow-climate-change/*
[From: ASA-CSSA-SSSA Science Policy Report: 8 January 2020]

Ancient soil from secret Greenland base suggests Earth could lose a lot of ice

In one of the Cold War's oddest experiments, the United States dug a 300-meter-long military base called Camp Century into the ice of northwest Greenland in the early 1960s, powered it with a nuclear reactor, and set out to test the feasibility of shuttling nuclear missiles beneath the ice. A constant struggle against intruding snow doomed the base, which was abandoned in 1966. But Camp Century has left a lasting, entirely nonmilitary legacy: a 1.3-kilometer-long ice core drilled at the site.
Read more: *https://www.sciencemag.org/news/2019/10/ancient-soil-secret-greenland-base-suggests-earth-could-lose-lot-ice?fbclid=IwAR0uuz2O7W22qxdIEuAIJp1B9aOrTQn3hgGuGN9F2nnXRyI84mp2A2IQmxI*

Soil study shows Australia at its most stripped back

New research from The Australian National University (ANU) and Geoscience Australia could provide a much clearer picture of the Australian landscape, and how to better manage it under a changing climate.
Read more: *https://phys.org/news/2019-12-soil-australia.html?fbclid=IwAR1LrB-1UASgumG5sxiIncpT4aqS7Y5-cmD-Fg7ZgWVrXBM61KLG72zRgUuw*

Invitation to questionnaire on research priorities of soil scientists

A NERC-BBSRC funded research project is being carried out by researchers at Cranfield, Lancaster, and Nottingham Universities to identify the extent to which soil science currently contributes towards several industries, including water management, waste management, agriculture, ecosystem services and natural resources. The researchers are particularly interested in exploring whether the research priorities of soil scientists correspond with the priorities identified by those within the industries we are investigating, and how soil scientists could better meet these research needs in the future. The short questionnaire should take no longer than 5-10 minutes to complete. The researchers would be happy if you could circulate this to your colleagues within soil science. They hope that this research will help to identify knowledge gaps, and avenues for future research within soil science.
Link to questionnaire: *https://cranfielduniversity.eu.qualtrics.com/jfe/form/SV_2iu911f34OdiAw5*

Cover crops increase microbial biomass and soil carbon

Agricultural soils are largely degraded or under threat of degradation. Agricultural practices are now seeking to improve soils while also maintaining productivity. Cover crops are one such practice gaining popularity. However, relatively little is known regarding how cover cropping will affect soil microbial community composition and function. In an article recently published in Agrosystems, Geosciences & Environment, researchers report on the effect cover cropping has on soil microbes. This research spanned multiple actively managed farms across Virginia. The team found that cover cropping increased active microbial biomass by 64% and bioavailable soil carbon by 37% in one season.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/10.1002/csan.20019*
[From: ASA-CSSA-SSSA Science Policy Report: 19 February 2020]

Soil carbon is a valuable resource, but all soil carbon is not created equal

Human society is literally built on soil. It feeds the world and produces vital fuel and fiber. But most people rarely give soil a second thought. Recently, though, soil has been getting some well-deserved attention from environmental organizations, policymakers and industry leaders. It has been covered in news articles, argued over in policy debates and has even received an international day of recognition. However, current efforts to promote carbon storage in soil miss a key point: Not all soil carbon is the same. As scientists focusing on soil ecology and sustainability, we believe that managing soil carbon effectively requires taking its differences into account.
Read more: *https://theconversation.com/soil-carbon-is-a-valuable-resource-but-all-soil-carbon-is-not-created-equal-129175*
[From: ASA-CSSA-SSSA Science Policy Report: 19 February 2020]

FBI Forensic Geology Training Video, Kentucky, USA

IUGS-IFG endorsed and supported the production of a professionally produced training video on the forensic collection of soil samples, initiated by the FBI (Jodi Webb). This is aimed at raising skills levels and the standardization of soil collection at crime scenes. The video was filmed at the University of Kentucky College of Agriculture Food and Environment, in association with Dr Brad Lee, Suzette Walling (Extension Associate) and Brian Volland (Videographer).
Watch the video: *https://youtu.be/o9dWZOj1U5A*
[From: IUGS E-Bulletin#162, January 2020]

UN Secretary-General's 2020 resolution for nature and people

"As we embark on a crucial Decade of Action to deliver the Sustainable Development Goals, biodiversity offers solutions for many global challenges."
The United Nations is committed to making 2020 a super year for #nature and people!
Watch #UN Secretary-General António Guterres' special message on why biodiversity is critical to achieving the #SustainableDevelopmentGoals.
Read more: *https://www.facebook.com/watch/?v=121578709231903*

Consider taking this survey for global biodiversity experts

Dr. Forest Isbell, the Associate Director of the Cedar Creek Ecosystem Science Reserve at the University of Minnesota, is surveying global biodiversity researchers in an attempt to estimate global biodiversity loss and its consequences for ecosystem function and nature's contributions to people. This survey extends previous related research by including more experts and by being more quantitative, in terms of estimates and their uncertainty. More than 2,700 biodiversity experts working in over 188 countries worldwide have already completed the survey. If you have already received an invitation to complete the survey, please do not repeat the survey. Survey completion is estimated to take 20 minutes, and all responses will be anonymous.
Survey link: *https://umn.qualtrics.com/jfe/form/SV_d3TDbJP12k9rdLn*
For questions about the survey, please contact Dr. Isbell: *isbell@umn.edu*
[From: GSBI Newsletter - February 2020]

IAEA Marie Skłodowska-Curie Fellowship Programme

The overall objective of the programme is to encourage young women to pursue a career in nuclear sciences and technologies. It will create additional opportunities for female scientists to get further training in isotope and nuclear techniques, including in the field of food and agriculture.

The IAEA Marie Skłodowska-Curie Fellowship Programme provides opportunities to highly motivated and talented female students by providing scholarships and internships. Fellows will receive a scholarship for graduate degree programmes focussed on nuclear sciences and technologies and non-proliferation studies at an accredited university for up to a maximum of two years. Selected recipients will also receive an opportunity to pursue an internship at the IAEA related to their field of study for between 6 and 12 months.
Up to 100 female students per year will be selected.
The scholarship will cover university tuition fees up to a maximum of 10,000 euros per year and a lump sum payment for living expenses based on the cost of living for the university's location, up to a maximum of 10,000 euros

per year. The first round of fellowships will be awarded for the academic year starting in 2021.
Read more: *https://www.iaea.org/sites/default/files/20/03/marie-curie-fellowship-programme.pdf*

New report available on Soils and Gender

The online discussion 'Mainstreaming gender for sustainable soil management', held on the FAO Global Forum on Food Security and Nutrition (FSN Forum) from 23 September to 25 October 2019 aimed to collect views from a wide range of stakeholders about the relations between gender equality and sustainable soil management (SSM).
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1266151/?fbclid=IwAR3yO11oZ1v-wFeyOXjDvL48hbqVjZfv-Ia-VU9QiKfw5syeGrbr599k6rsI*

Huge knowledge gap over health of soil

A vital knowledge gap about England's environment has been uncovered by soil campaigners. They have discovered that just 0.41% of the cash invested in environmental monitoring goes on examining the soil. That's despite the fact that soils round the world – including in the UK – are said to be facing a crisis.
The figures are startling: £60.5m goes to monitoring water quality, £7.65m to checking on air – but just £284,000 to auditing soil. The mismatch was revealed in a Freedom of Information (FoI) request by the Sustainable Soils Alliance (SSA).
Read more*: https://www.bbc.com/news/science-environment-51861539*

Mapping soil-available Phosphorus with scanning electron microscopy

Phosphorus (P) is an essential element for plants. Due to complex chemical reactions in soils, most P is rapidly fixed in a form that is unavailable for plants to utilize. To study the dynamic between P mobility and fixation, it is essential to assess the available P fraction. Traditional soil P tests are based on aggressive extractions that are destructive and applied at coarse resolution while most P reactions occurs in subcentimeter scale. Phosphorus-fixing resin was proven to be an excellent indicator for soil P availability. The common practice is to shake a soil suspension with the resin and then extract the absorbed P. Authors of an article published in the Soil Science Society of America Journal used the P resin approach (FeO paper) with a modified quantification procedure.
Read more: *https://acsess.onlinelibrary.wiley.com/doi/10.1002/csan.20027*
[From: ASA-CSSA-SSSA Science Policy Report: 4 March 2020]

Healthy soils lead to healthy food and added value for all

It's been said that America has the most plentiful, safe and nutritious food supply in the world. And yet, there is a slow rumbling in some circles that today's food is less "nutrient-dense" than the food our grandmothers and great-grandmothers once put on their tables. It's a case of quantity over quality, explained Dan Kittredge, farmer and founder of the Bionutrient Food Association. Kittredge is executive director of BFA, a non-profit that is working to show how soil health practices not only benefit soils, but that, in turn, those healthier soils produce food crops that are more flavourful, aromatic, nutritious, pest- and disease-resistant, and in some cases more shelf-stable.
[From: ASA-CSSA-SSSA Science Policy Report: 4 March 2020]

Nominate candidates for the Philippe Duchaufour Medal

The Philippe Duchaufour medal is awarded every year for distinguished contributions to soil science. Detailed information on the selection process and how to propose a candidate is available on the Awards & Medals section of the EGU website. Nominations for all the medals and awards must be submitted via an online nomination form (https://www.egu.eu/awards-medals/nominations/).
The deadline for submissions is 15 June 2020.
Read more: *https://www.egu.eu/awards-medals/proposal-and-selection-of-candidates/*

Global soil library will help us better know the living skin of planet Earth

A global initiative led by the UN's Food and Agriculture Organization has launched the Soil Spectral Calibration Library. The University of Sydney is a founding member of the project.
Soils are the basis of life and while humanity is building extensive genomic libraries there is no comprehensive library of the soils upon which much of life on Earth relies. That gap in human knowledge is being filled with the launch of a global system of universal standards to measure and classify soils across the planet.
Read more: *https://www.sydney.edu.au/news-opinion/news/2020/04/23/global-soil-library-understand-living-skin-planet-earth-UN-FAO.html*

Internationalization of science / Covid-19

IUBS have published a message from their President, Pr. LS Shashidhara, expensing their concerns and mobilization during the Covid-19 pandemic.
It is important to disseminate scientifically correct information and prevent fake news. Therefore on IUBS website there is a link pointing to WHO. However, if you undertake local actions which can be consolidated and shared with all for everyone's benefits, please send the information to IUBS.
IUBS would like to set up a working group on Pandemics, which can facilitate sharing of information and data for analysis and predictions and increase the world's preparedness to such pandemic in future. We would come back to you with specific details and seek your suggestions on the same. Meanwhile, do let us know if you have any suggestions on action points that IUBS can take up immediately.
Read more: *https://www.iubs.org/about-iubs/statements.html*

Rootin', poopin' African elephants help keep soil fertile

The iconic wildlife of the African savanna—zebras, gazelles, and other grazers—has for decades been under pressure from some unnatural rivals. Ranchers' cattle compete with local wildlife for food and water, and they starve much of the soil of nutrients. But a new study suggests wildlife and cattle can coexist—if elephants remain to help distribute nutrients into the soil, via their poop and their habit of knocking over trees. Cattle ranching, which has been intensifying across the savanna, can lead to overgrazing, eroding and impoverishing the soil and helping shrubs invade the grasslands. To investigate the ecological effects of ranching—and the role of elephants in the ecosystem—scientists launched a long-term experiment in 1995 at the Mpala Research Centre in central Kenya.
Read more: *https://www.sciencemag.org/news/2020/04/rootin-poopin-african-elephants-help-keep-soil-fertile#*
[From: ASA-CSSA-SSSA Science Policy Report: 15 April 2020]

Study shows universally positive effect of cover crops on soil microbiome

Only a fraction of conventional row crop farmers grow cover crops after harvest, but a new global analysis from the University of Illinois shows the practice can boost soil microbial abundance by 27%. The result adds to cover crops' reputation for nitrogen loss reduction, weed suppression, erosion control, and more. Although soil microbial abundance is less easily observed, it is a hugely important metric in estimating soil health. A new paper looks for universal patterns among dozens of individual studies.
Read more: *https://aces.illinois.edu/news/illinois-study-shows-universally-positive-effect-cover-crops-soil-microbiome*
[From: ASA-CSSA-SSSA Science Policy Report: 1 April 2020]

Scientists seek to establish community-driven metadata standards for microbiomes research

In agricultural systems, the proliferation of research on plant and soil microbiomes has been coupled with excitement for the potential that microbiome data may have for the development of novel, sustainable, and effective crop management strategies. While this is an exciting development, as the collective body of microbiome data for diverse crops grows, the lack of consistency in recording data makes it harder for the data to be utilized across research projects. In a recent article published in Phytobiomes Journal, researchers discuss the need for agriculture-specific metadata standards for microbiome research.
Read more: *https://phys.org/news/2020-03-scientists-community-driven-metadata-standards-microbiomes.html*
[From: ASA-CSSA-SSSA Science Policy Report: 1 April 2020]

The novelist who loved soil

A biography digs into Pulitzer prizewinner and farming pioneer Louis Bromfield's life. By David R. Montgomery.
Read more: *https://www.nature.com/articles/d41586-020-01024-1?utm_source=twt_nnc&utm_medium=social&utm_campaign=naturenews&sf232899412=1&fbclid=IwAR1_C25YFRW6tdumibrpav_hTfH_VpuE9eDTs5RpFTMGXEXPQydk_W_yrYU*

Photo and video contest on soil biodiversity

In the framework of GSOBI20, FAO and the GSP Secretariat is launching a photo and video contest on soil biodiversity. The main objective of this contest is to promote the importance on soil organisms and raise awareness on the urgency of protecting soil biodiversity. The deadline to send your submission/s is 30 June 2020.
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1271715/*

Love the smell of wet earth after rain? So do these strange creatures

Humans aren't the only ones to appreciate the earthy aroma after an April rain shower. That smell—known as petrichor—stems from microscopic streptomycete bacteria in the soil that produce a compound called geosmin, The Times reports. Although geosmin can be toxic to some species, others, such as the insect-like springtail, associate it with a meal. A recent study published this week in Nature Microbiology used tiny electrodes to monitor the response of springtails' sensitive antennae to the scent of geosmin.
Read more: *https://www.sciencemag.org/news/2020/04/love-smell-wet-earth-after-rain-so-do-these-strange-creatures?utm_campaign=ScienceNow&utm_source=JHubbard&utm_medium=Facebook*

New edition of soil property estimates for the world with associated web platform released (SoilGrids250m)

Since the sneak preview on World Soil Day 2019, ISRIC - World Soil Information has been finalizing a new set of soil property maps for the world (SoilGrids250m), incorporating comments from many experts and organizations. Numerous improvements were implemented since publication of the `2017 version', making this a completely new product. The GIS layers can be accessed using various services.
Read more: *https://www.isric.org/explore/soilgrids/faq-soilgrids#How_can_I_access_SoilGrids*
The newly released webtool *(http://soilgrids.isric.org/)* offers visualization, querying and download facilities for enhanced user experience.
Read more: *https://www.isric.org/news/new-edition-soil-property-estimates-world-associated-web-platform-released-soilgrids250m*

Participate in the photo & video contest on soil biodiversity

Competitors can submit either HD pictures or short videos/time-lapse on soil biodiversity and win a cash prize of USD$ 500.
Submission closes: 30 June 2020
Read more: *http://www.fao.org/about/meetings/soil-biodiversity-symposium/contest/en/*
[From: GSP Special Announcement No. 24 | 29 April 2020]

Share your insights on Soil Biodiversity

You are welcome to *share your insights* with soil biodiversity top experts and contribute to the discussion on current knowledge gaps, challenges and opportunities to protect soil biodiversity across the world.
Read more: *https://docs.google.com/forms/d/e/1FAIpQLSfUBQbYoY9uQL0acJ_AYM6-yXdEqR_pI26pObX-WcXPelBILBw/viewform*
[From: GSP Special Announcement No. 24 | 29 April 2020]

Soil biodiversity and a sustainable future

Humanity is transforming our world in unprecedented ways, including ways that are likely to impact humanity's ability to thrive in the future. Recognition of the need to sustain life on Earth, both human and non-human, has led to global agreements to guide actions now for a better future. These agreements include the Sustainable Development Goals, adopted by member nations of the United Nations (UN) in 2015, and an emerging Biodiversity Strategic Plan for 2030 to carry forward the UN Convention on Biodiversity's strategic plan for 2020.
Read more: *https://www.globalsoilbiodiversity.org/blog-beneath-our-feet/2020/4/14/soil-biodiversity-and-a-sustainable-future*
[From: GSBI Newsletter - May 2020]

Floods, Droughts & The Soil

Turning soils into sponges: Opportunities to reduce flood and drought risks. You may think that the common factor between drought and flood in many places in Kenya is water, especially lately. Other than the lack or abundance of rain, the major reason for droughts and floods is the soil's health status and its inability to absorb, store and release water.
Read more: *https://cropnuts.com/floods-drought-soil-relationship/*

Farmers measuring more to boost efficiencies

Farmers are taking an increasingly measured approach to their grassland and manure management, helping to cut costs and improve efficiencies.
A new survey carried out by the organisers of the Grassland & Muck Event – the third such survey since 2011 – has revealed that more farmers are analysing inputs and outputs, enabling them to better target management decisions.
Read more: *https://www.agri-hub.co.uk/2020/05/farmers-measuring-more-to-boost-efficiencies/*

Soils Store Huge Amounts of Carbon, Warming May Unleash It

Higher temperatures and wetter weather may spur soil microbes to release more carbon into the atmosphere.
Read more: *https://www.scientificamerican.com/article/soils-store-huge-amounts-of-carbon-warming-may-unleash-it/*

Upcoming Conferences and Meetings

2020

4th annual international summer school "Monitoring, modeling and management of urban green infrastructure and soils" (3MUGIS)

Topic 2020 is "Anthropogenic landscapes and soils of European Russia: from Sea to Sea"
6-26 July 2020. Moscow and field tour from the Barents Sea to the Black Sea, Russia
The 3MUGIS summer school is an annual event, which addresses relevant contemporary environmental consequences and opportunities of urbanization with special emphasis on soil functions. The event is organized under the umbrella of the International Union of Soil Science (IUSS), RUDN University (Russia) and the Urban Soil Institute (USA) with strong cooperation from universities, institutions and research teams from around the world. The 3MUGIS summer school provides students with first hand field experience examining anthropogenic impact sequences across conventional soil forming factors from Subartic to Subtropical climates. At the end of the program, students will better understand the social, climactic, and geographic factors that contribute to human soil modification in this region; the long-term implications of such changes; practical skills to perform in-field soil monitoring, soil mapping and remote sensing; and applied skills in identifying, implementing, and managing opportunities for urban green infrastructure development.
Deadline for registration: May 1, 2020
Read more: *www.3MUGIS.org*

International Workshop on Archaeological Soil Microscopy and Phytoliths Analysis (WASM)

8 - 10 July 2020, Paris, France
Registration is now open until the 30th of April
Please send back the completed registration form to *quentinborderie@yahoo.fr*
Contact: *quentinborderie@yahoo.fr*
2nd Circular: *media/wasm-paris2020_-_2nd_circular-1.0.pdf*
Registration form: *media/wasm-paris2020_-_registrform-1.1.doc*

2nd international conference "Smart and Sustainable Cities" (SSC-2020)

"Advanced technologies for sustainable development of urban green infrastructure"
8-10 July 2020, Moscow, Russia
Urbanization is a global tendency. Up to 70% of the world population is projected to live in cities by 2050. How will this rapid urbanization alter the face of the world? What are the environmental consequences of megacities' expansion? What are smart solutions to make life in cities safe, comfortable and environmentally friendly? These and other important questions are addressed by the conference SSC-2020
Deadline for abstract submission for oral presentations: March 1, 2020
Abstract approval and decision on the presentation type (oral/poster): March 31, 2020
Deadline for abstract submission for posters: June 1, 2020
Deadline for registration and subscribing for post-congress tours: June 1, 2020
Read more: *www.SSC-conf.org*

XIVth International symposium and field workshop on paleopedology (ISFWP-XIV)

Paleosols, pedosediments and landscape morphology as archives of environmental changes
13-23 August 2020, Russia, Altai
Payment should be made until March 1, 2020
Scientific coverage of academic sessions and field workshop (18-23 August) will include soil, geomorphic, sedimentary archives/records/memory of environmental changes; specificity of different types of paleoenvironmental archives and their correlation.
Preliminary list of sections (main topics) for the scientific symposium:

- Loess-, alluvilal-, colluvial-, tephra-paleosol sequences: case studies, specific features for different types of paleoenvironmental records, correlation between different types of soilsedimentary records, and with other paleoenvironmental archives.
- Paleosols and pedosediments of human habitats.
- Surface paleosols and relic features in contemporary surface soils.
- Pre-Quarternary paleosols: paleoenvironment and

diagenesis.
Download the second circular: *https://www.iuss.org/media/2_circular_xiv-isfwp-2020.pdf*
Read more: http://isfwp.100igras.ru/

2020 Soil Biology Lab Skills Course

31 August 2020 to 4 Sept. 2020, Wageningen University, Netherlands
!Postponed from June 2020!
Deadline for registration: 27 February 2020
Website*: www.wur.eu/lab-skills-course*

2020 SSSA Kirkham Conference

14-17 September 2020, Kruger National Park, South Africa
The Theme: Since soil-water-atmosphere interactions in southern Africa are critically dependent on soil hydraulics, the development of soil physics in South Africa has a long history. With agriculture, ecology and now mining heavily dependent on advances in soil physics, these topics will be included in a broad theme, suited to the region.
Questions? Please contact Kirkham Conference Chair Brent Clothier at *brent.clothier@plantandfood.co.nz.*
Website: *www.soils.org/membership/divisions/soil-physics-and-hydrology/kirkham-conferences*

7th International Scientific Conference «Reflection of bio-, geo-, antropospheric interactions in soils and soil cover»

September 14-19, 2020, Tomsk, Russia

Conference topics: Modern methods and approaches to the study of soil genesis and their classification; Spatial and functional relationships of soils with geospheres; Soils and paleoecological reconstructions of the Holocene and Pleistocene. The role of man in the formation of the modern appearance of the pedosphere; Land resources: problems of assessment, use and protection.

Deadline of registration and abstract submission: April 30, 2020
Contact: *soiltsu90@mail.ru*
Download first circular: *https://www.iuss.org/media/first_circular_tomsk_russia_2020.pdf*
Read more: *http://www.bio.tsu.ru/*

8th World Sustainability Forum (WSF2020)

15 – 17 September 2020, International Conference Center, Geneva, Switzerland
September 2020 marks the 5th birthday of the 2030 Agenda for Sustainable Development and the UN Sustainable Development Goals. With The 8th World Sustainability Forum, we are taking stock of where we are in relation to a more sustainable world, what has worked, what has not yet worked, and where we need to go next.
Abstract submission deadline: March 31, 2020
IUSS members get 20% discount on all registration fees, but do not proceed to payment until notification.
Due to the developing health and economic situation across the globe, it is recommend that you do not book flights or hotels.
Read more: *https://wsf-8.sciforum.net/*

3rd ISMC Conference – Advances in Soil Systems Modeling

24-27 September 2020, Tianjin, China
!Postponed to May 2021 due to the unpredictable safety conditions and travel restrictions under Covid-19!
Conference website: *https://soil-modeling.org/ismc-conference/ismc-conference*

WRB Workshop Summer 2020

20-25 Sept. 2020, Toruń, Poland
!Postponed from June 2020!
Regular fee payment deadline: 15 May 2020
Website: *https://sites.google.com/site/summerwrb/home*

IX National Symposium on Control of Soil Degradation and Recovery

30 Sept. 2020 to 2 Oct. 2020, Elche, Spain
!Postponed from May 2020!
Deadline for abstract submission: 29 February 2020
Website: *https://condegres.es*

VI International Soil Classification Congress in 2020 in Mexico – new dates

8-16 October 2020, Mexico
Field Workshop - Cuatro Ciénegas-Querétaro: October 8-13, 2020
Congress - Campus UNAM-Juriquilla, Querétaro: October 14-16, 2020
XII International Workshop of Soil Classification Campus UNAM-Juriquilla, Querétaro: October 19-24, 2020
V International Course-Workshop of Soil Quality Indicators Campus UNAM-Juriquilla, Querétaro: October 19-24, 2020
Congress website: *http://iscc2020.org/*

GSS 2020 – 4th Global Soil Security 2020 Conference - "Global Soil Security: Beyond the Soil to Human Health."

12- 15 Oct 2020, Seoul, Korea
!Postponed from June 2020!
Abstract submission deadline: July 13, 2020
Website: *http://www.globalsoilsecurity2020.org/*

Global Symposium on Salt-Affected Soils

12 - 16 October 2020, Tashkent (Uzbekistan)
Given the current threat of salt-affected soils and their impact on food security, FAO, the Global Soil Partnership and its Intergovernmental Technical Panel on Soils (ITPS) together with the Republic of Uzbekistan, will be organizing the Global Symposium on Salt-Affected Soils.
Read more: *http://www.fao.org/global-soil-partnership/resources/events/detail/en/c/1264612/*
[From: Global Soil Partnership Newsletter No. 27, 6 March 2020]

International Conference Contaminated Sites 2020

October 26-28, 2020, Trnava, Slovak Republic
!Postponed from June 2020!
Abstract submission before March 20, 2020
Conference website: *http://contaminated-sites2020.sazp.sk/*

SUSTREM2020 Conference - Empowering Sustainable Land Management for the Future

29-30 October 2020, Cape Town, South Africa
!Postponed to Oct 2021!
Read more: *https://nicola-org.com/save-the-date/*

ISCRAES 2020

3-6 November 2020, Dublin, Ireland.
Abstract (flash and poster) submission deadline: July 31, 2020
Standard registration deadline: August 31, 2020
Symposium website*: http://www.iscraes2020.org/*
Download flyer: *https://www.iuss.org/media/iscraes_flyer_updated.jpg*

2020 ASA, CSSA & SSSA Annual Meeting

November 8-11, 2020, Phoenix, Arizona, USA
Annual Meeting Theme: "2020: Translating Visionary Science to Practice". In these confusing times where "fake news" is competing with facts, it has never been more important, nor more urgent, to develop the skills and tools needed to translate scientific knowledge for the public good and to do so with absolute transparency, clarity and 2020 Vision.
Abstract submission deadline: May 27 to receive the discounted rate, final deadline June 9, 2020
Website: *https://www.acsmeetings.org/*

Soils Conference 2020 – Soils, investing in our future

Soil Science Australia and New Zealand Society of Soil Science's joint conference
29 Nov to 4 Dec 2020, Cairns, Queensland, Australia
Short & extended abstract submission deadline: May 31, 2020
Read more: *https://www.soilscienceaustralia.org.au/soils-conference-2020/*
Download the presentation: *https://www.iuss.org/meetings-events/*

International workshop Soil conservation and Environmental Protection

3-5 December 2020, Imola, Italy
Deadline abstract submission: September 30, 2020
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. Moreover the workshop wishes to highlights that a soil kept in "good health", through good management practices, brings multiple benefits for the whole ecosystem, not only for agriculture and forest lands but also, to assure water quality and regulation, to preserve the hydrogeological stability of the territory and for landscape protection and enhancement.

The last day of the workshop will be dedicated to the WSD celebration.
Registration form to be sent to geolab@geolab-aps-it
Read more: *media/soil_conservation_and_environmental_protection_december_2020_first_circular.pdf*

Global Soil Conference 2020

Caring Soils Beyond Food Security
9-13 December 2020, New Delhi, India
Receipt of Abstracts Deadline: 30 June 2020
Read more: *http://www.isss-india.org/img/GlobalSoilConference2020.pdf*

2nd joint workshop on digital soil mapping and GlobalSoilMap WGs

14-18 December 2020, Goa, India
Key topics regarding GlobalSoilMap, Advances in Digital Soil Mapping as well as DSM and digital soil assessment are in the focus of this workshop.
Abstract submission is open until June 1, 2020
Read more: *https://sites.google.com/view/soilmapping2020*

2021

Global Symposium on Soil Biodiversity (GSOBI20)

2-4 February 2021, FAO Headquarters in Rome, Italy
!Postponed from June 2020!
Read more: *http://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1263718/*

International Colloquium on Soil Zoology

28 March - 2 April 2021
Bolzano, South Tyrol, Italy
Early bird registration until December 31, 2020
Website: *https://icsz2020.eurac.edu/*

100 years of agricultural experimentation at the Faculty of Agriculture and Biology at the Warsaw University of Life Sciences in Warsaw

27-28 May 2021, Warsaw and Skierniewice, Poland
!Postponed from May 2020!
Conference website: *http://sggw2020.pl*

Global Conference on Sandy Soils

30 May – 3 June 2021 (postponed from 2020); University of Wisconsin-Madison, USA
Deadline for Abstract submission is March 31, 2021
Download: *https://www.iuss.org/media/global_conference_on_sandy_soils.pdf*
Read more: *https://sandysoils.org/*

5th International Conference on Contaminated Land, Ecological Assessment and Remediation CLEAR2020

9-11 June 2021, Middlesex University, London, United Kingdom
A new call for abstracts and participation will be announced shortly.
Conference website: *http://clear2020.mdx.ac.uk/*
Download: *media/flyer_a4_call_for_abstracts_v3.pdf*

17th International Clay Conference 2021 (17th-ICC) - New interfaces: bridging continents and cultures with clays

11-16 July 2021, Istanbul, Turkey
Call for thematic sessions: open until July 2020
Conference website: *www.icc.aipea.org*
Invitation letter: *https://www.iuss.org/media/invitation_letter_of_17th_icc_2021.pdf*
2nd call for thematic sessions: *https://www.iuss.org/media/icc2021_2._call_for_thematic_sessions.pdf*

XXIII Latin-American Congress of Soil Sciences (XXIII CLACS)

22-27 August 2021, Florianópolis, Brasil
Website: *www.slcs.org.mx*
Facebook *https://www.facebook.com/clacs.cbcs2021*
Instagram *https://www.instagram.com/clacs.cbcs2021*

Eurosoil 2020, Connecting people and soil

23-27 August 2021, Geneva, Switzerland
!Postponed from Aug. 2020!
Pre-Program: *https://www.iuss.org/media/eurosoil_2020_pre-programm.pdf*
Early Bird Registrations deadline: 27 May 2021
Website: *http://eurosoil2020.com/*

International Conference on Soil Micromorphology

The Conference

August 29 - September 2, 2021:
August 29 (Sunday) – registration (in the afternoon) and ice-breaking party, Faculty of Forestry, University of Agriculture in Kraków; visit of the Museum of Soils
August 30 (Monday) – registration, opening session, plenary sessions, poster session 1, afternoon: visit of the Kraków city center with a guide (undergrounds beneath the Main Market Square, a walk around the city center, dinner in a restaurant)
August 31 (Tuesday) – Plenary sessions, poster session 2, IUSS Business Meeting, Banquet
September 1 (Wednesday) – Mid-conference trip (Kraków and its close vicinity)
September 2 (Thursday) – Plenary sessions, summary and closing ceremony

Post-Conference Trip

September 3–5 (from Friday to Sunday):
Polish Upland tour with emphasis to: contemporary soils (e.g. Chernozems, soils developed on gypsum and carbonate rocks), sequences of paleosols in loess, fossil Lower Jurassic podzols, influence of metal mining on soil environment.

Micromorphological Course

September 6–11 (from Monday to Saturday)
Registration for the conference will start in autumn 2020. Previous registrations will be cancelled, thus please register again once the registration starts in a proper time.
Web page: *http://www.icosm2020.sggw.pl/*

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

Thursday, September 9, 2021 to Monday, September 13, 2021, Santo Stefano di Camastra, Sicily, ITALY
!Rescheduled from Oct 2020!
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.
Further information on the Congress (registration, logistics, accommodation), will be distributed soon.
Contact: Prof. Carmelo Dazzi, *carmelo.dazzi@unipa.it*
Website: *https://www.ecocycles.net/essc2020*
Download the 2nd circular: *media/2nd_circular_essc-eurecys_2020.pdf*

International Symposium on Forest Soils (ISFS2020) - Forest Soils under Global Change: Processes, Biodiversity and Ecological Services

17-20 October 2021, Hangzhou, China
!Postponed from October 2020!
Deadline for abstract and poster submission: May 30, 2021
Conference website: *http://isfs2020.csp.escience.cn/dct/page/1*

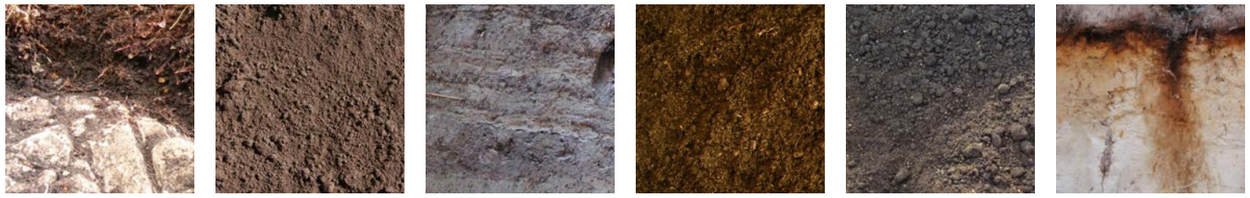
The 3rd Global Soil Biodiversity Conference

1-3 November 2021, Dublin, Ireland
The 3rd Global Soil Biodiversity Conference will expand on previous GSBI conferences and convene the world's leading experts in this interdisciplinary field of soil biodiversity science to present and discuss recent advances addressing the urgency of meeting global challenges which link to human, animal and plant health and a more sustainable world.
Session and workshop proposal submissions for GSB 2021 are closing on Monday 2nd March 2020.
Read more: *https://gsb2021.ie/call-for-sessions/*

9th International Acid Sulfate Soils Conference - Acid Sulfate Soils: Progress, Policy and Prospects

November 21 to 26, 2021, Adelaide, Australia
!Postponed from Nov. 2020!
Abstract Submission and Conference Registration opens: 1st November, 2019
Abstract Submission and Early Registration closes 1st February, 2020
Read more: *https://biological.adelaide.edu.au/acid-sulfate-soil/iassc*

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



New Publications

Reading the Soil Archives, Volume 18 Unraveling the Geoecological Code of Palaeosols and Sediment Cores

Edited by Jan Van Mourik, Jaap van der Meer; 1st Edition, published in the series ***Developments in Quaternary Science*** on 25 November 2019, by Elsevier, 320 pages, Paperback ISBN: 9780444641083, eBook ISBN: 9780444641090, price paperback € 124.39, price eBook € 138.34.

This tome provides details of new techniques for understanding geological history in the form of quantitative pollen analyses, soil micromorphology, OSL (Optically Stimulated Luminescence) dating, phytolith analysis and biomarker analysis. The book presents the genesis of a cultural landscape, based on multi-proxy analysis of paleosoils and integration of geomorphological, pedological and archaeological research results, which can be a model for geoecological landscape studies. Beginning with analytical methods for interpreting soil archives, the book examines methods for reconstructing the landscape genesis.

The book presents strengths and weaknesses of applications, especially in relation to the data from case studies in the Netherlands. The final chapter of the book addresses landscape evolution in different cultural periods. This book offers an integrated approach to geoecological knowledge that is valuable to students and professionals in quaternary science, physical geography, soil science, archaeology, historical geography, and land planning and restructuring.

Read more: *https://www.elsevier.com/books/reading-the-soil-archives/van-mourik/978-0-444-64108-3*

Soil Resources and Its Mapping Through Geostatistics Using R and QGIS

Edited by Priyabrata Santra, Mahesh Kumar, N.R. Panwar, C.B. Pandey; 1st Edition published by CRC Press on 28 November 2019, 342 pages, Hardback ISBN: 9780367340520, price £92.00.

This book provides an exposure to recent developments in the field of geostatistical modeling, spatial variability of soil resources, and preparation of digital soil maps using R and GIS and potential application of it in agricultural resource management.

Please note: This title is co-published with New India Publishing Agency, Delhi. Taylor & Francis does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka

Read more: *https://www.routledge.com/Soil-Resources-and-Its-Mapping-Through-Geostatistics-Using-R-and-QGIS/Santra-Kumar-Panwar-Pandey/p/book/9780367340520*

The Soils of India

By Mishra, Bipin B. (Ed.), Springer, World Soils Book Series, 2020. 281 pages, Hardback ISBN: ISBN 978-3-030-31082-0, price € 171.17.

This book provides an overview of the diversified soil regimes in India. In addition to the historical advances in soil research and its limitations, it describes the monitoring of various soil conditions and soil uses to improve productivity. Discussing topics such as climate, geology and geomorphology, major soil types and their classification, soil mineralogy and clays, soil micromorphology, soil biogeochemistry, benchmark soils, land evaluation and land use planning, soil health and fertility and soil resilience, the book highlights the multiple uses of soils in industry, human health care, mitigation of challenges due to climate change and construction. It also presents measures for a brighter future of soil science in India, such as imposing organic farming principles toward sustainable agriculture in the context of the second green revolution besides alleviating the poverty and providing the employment opportunities among the farming communities in India.

Read more: *https://www.springer.com/de/book/9783030310806*

China's Soil Pollution and Degradation Problems

By Claudio O. Delang, Routledge, December 12, 2019, 146 pages, ISBN 9780367878290, price hardback £45.00, paperback £17.00.

This book provides an overview of the problems related to soil degradation and pollution throughout China, examining how and why current policy has fallen short of expectation. It also examines the challenges faced by policy makers as they attempt to adopt sustainable practices alongside a booming and ever-expanding economy. China's Soil Pollution and Degradation Problems utilizes grey literature such as newspaper articles, NGO reports and Chinese government information alongside academic studies in order to provide an extensive review of the challenges faced by grassroots organizations as they tackle environmental policy failings throughout China.

Read more: *https://www.crcpress.com/Chinas-Soil-Pollution-and-Degradation-Problems/Delang/p/book/9780367878290*

Soil Microenvironment for Bioremediation and Polymer Production

By Nazia Jamil, Prasun Kumar, Rida Batool (Eds.), Wiley, December 2019, 420 pages, eBook: ISBN 978-1-119-59217-4, Price *£153.99, hardcover: ISBN: 978-1-119-59205-1, Price £171.00*

The book consists of 21 chapters by subject matter experts and is divided into four parts: Soil Microenvironment and Biotransformation Mechanisms; Synergistic effects between substrates and Microbes; Polyhydroxyalakanoates: Resources, Demands and Sustainability; and Cellulose based biomaterials: Benefits and challenges. Included in the chapters are classical bioremediation approaches and advances in the use of nanoparticles for removal of radioactive waste. The book also discusses the production of applied emerging biopolymers using diverse microorganisms.

Edafología: uso y protección de suelos (Soil Science: soil use and protection)

By Dr. Jaume Porta, Dr. Rosa M. Poch and Dr. Marta López-Acevedo, 4th edition published by Mundiprensa on 29 November 2019, 624 pages, ISBN: 9788484767503. Price Paper 56.05 EUR, eBook: 14.99 EUR.

The book's objective is the training of professionals to be more prepared and motivated to face the challenges of sustainably producing sufficient and healthy food despite multiple and growing environmental problems, soil being a fundamental factor. It can be used for education of students at basic and advanced level. The 4th edition benefits from the multilingual dictionary of soil science and revisions from several soil specialists.

Read more: *https://www.paraninfo.es/catalogo/9788484767503/edafologia--uso-y-proteccion-de-suelos*

The Soil Loss Atlas of Malawi

By Christian Thine Omuto, Ronald Vargas; edited by Fiona Bottigliero, Isabelle Verbeke, Zineb Bazza. Published in 2019 by the Food and Agriculture Organization of the United Nations and the UNDP-UNEP Poverty-Environment Initiative and the Ministry of Agriculture, Irrigation and Water Development, Malawi. 440 pages, Rome, FAO; ISBN 978-92-5-131323-7 (FAO), © FAO, UNEP and UNDP, 2019.

With over three-quarters of the country's soils at risk, soil loss in Malawi represents a major threat to food security and nutrition, agricultural growth, the provision of ecosystem services and the achievement of the Sustainable Development Goals (SDGs). Since the Malawian economy is highly dependent on agriculture, soil loss is a significant hindrance to the overall economic development of the country. The Soil Loss Atlas of Malawi is part of an effort of the Government of Malawi (GoM) and its development partners to determine the major contributing factors to soil loss in Malawi and the most effective approaches to control it.

Read more: *http://www.fao.org/3/ca3624en/CA3624EN.pdf*

Field Measurement Methods in Soil Science (2020)

Edited by Wessel-Bothe/Weihermüller. Published by E. Schweizerbart Science Publishers in 2020, 210 pages, 76 figures, 18 tables, 17x24cm, 650 g, ISBN 978-3-443-01109-3, price hardcopy: 59.90 €.

Rising interest in soils causes mounting demand for soil information. These data must frequently be generated by field measurements and are necessary to describe and model water and solute transport processes, detect soil degeneration or to optimize crop production.

The nine chapters of this book cover available methods for measuring soil redox potential, soil pH, soil water content, matric potential, taking in-situ soil water samples, measuring infiltration rate/conductivity, soil erosion, and the penetration resistance of soils.

The book is not only useful for soil-science "beginners" looking for an introductory review of available techniques, but also for more experienced colleagues by providing "best practice" guidelines for consistent, reproducible installation and operation of field instruments to collect reliable and meaningful data which can be gainfully interpreted.

Read more: *http://www.borntraeger-cramer.de/9783443011093*

Climate Change Impacts on Coastal Soil and Water Management

By Zied Haj-Amor, Salem Bouri, 1st Edition, CRC Press, published February 12, 2020,184 pages, 75 b/w illustrations, ISBN 9780367405533, price hardback 92 GBP.

Climate Change Impacts on Coastal Soil and Water Management discusses the latest approaches for monitoring soil and water degradation in coastal regions under current climate conditions as well as potential further changes in the future. It presents an overview of climate change impacts on soil and water resources and summarizes the adaptation of practical options and strategies to minimize the potential risks, such as land degradation, seawater intrusion, droughts, ocean acidification, etc. The book aims to promote the adoption of best practices, which can be selected and implemented according to the respective local conditions. In addition, the recommendations for specific soil and water use planning strategies to address climate change can also be incorporated into national and international development plans.

Read more: *https://www.crcpress.com/Climate-Change-Impacts-on-Coastal-Soil-and-Water-Management/Haj-Amor-Bouri/p/book/9780367405533*

Experimental and Theoretical Study of Strength and Stability of Soil

By A.Z. Khasanov, Z.A. Khasanov, 1st Edition, CRC Press, Published February 12, 2020, 142 pages, ISBN 9780367368883, price hardback 50 GBP.

This work presents the experimental results of the strength of sands and clay soils in the following conditions: plane shear, triaxial stress state, with passive and active loading. The obtained experimental results are compared with existing theories of strength and the reasons for their non-conformity are identified. Experimental data on the determination of the position of shear surfaces with active and passive resistance of soils is analysed. A new concept of the theory of soil strength is considered, which allows to take into account the fundamental parameters of the strength of soils: the angle of internal friction, specific adhesion, and lateral pressure ratio. Given analytical expressions allow one to determine the stress state at the sites rejected with respect to the main stresses. The definition of the physical essence of the concept of lateral pressure coefficient for soils is given. The book is intended for professionals working in the fields of soil mechanics and geotechnics, as well as for students and academics in engineering, earth and soil sciences and construction.

Read more: *https://www.crcpress.com/Experimental-and-Theoretical-Study-of-Strength-and-Stability-of-Soil/Khasanov-Khasanov/p/book/9780367368883*

Soil Physics with Python - Transport in the Soil-Plant-Atmosphere System

By Marco Bittelli, Gaylon S. Campbell, and Fausto Tomei, published 14 February 2020, 464 pages, 57 figures and/or tables, ISBN: 9780198854791, price paperback 35 GBP.

This innovative study presents concepts and problems in soil physics, and provides solutions using original computer programs. It provides a close examination of physical environments of soil, including an analysis of the movement of heat, water and gases. The authors employ the programming language Python, which is now widely used for numerical problem solving in the sciences. In contrast to the majority of the literature on soil physics, this text focuses on solving, not deriving, differential equations for transport. Using numerical procedures to solve differential equations allows the solution of quite difficult problems with fairly simple mathematical tools. Numerical methods convert differential into algebraic equations, which can be solved using conventional methods of linear algebra. Each chapter introduces a soil physics concept, and proceeds to develop computer programs to solve the equations and illustrate the points made in the discussion.

Read more: *https://global.oup.com/academic/product/soil-physics-with-python-9780198854791?q=Soil&lang=en&cc=at*

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Read more: *https://www.schweizerbart.de/publications/detail/isbn/9783443011093*

Advances in Conservation Agriculture, Volumes 1 & 2

Both volumes edited by Amir Kassam, published by Burleigh Dodds Science Publishing in January 2020.

Advances in Conservation Agriculture - Volume 1: Systems and Science

602 pages, ISBN-13: 9781786762641, price £150/$195/€180/C$255.

- Key features:Reviews the development of CA systems globally and elaborates on science underlying the key CA system components.
- Assesses the latest evidence on improving soil and crop health and CA system resilience through the application of the core CA system principles.
- Includes case studies reviewing current science on optimising CA cropping systems involving cereal, legume, horticultural and tree crops as well as integrating livestock in CA systems.

Read more: *https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-82923*

Advances in Conservation Agriculture - Volume 2: Practice and Benefits

498 pages, ISBN-13: 9781786762689, price £150/$195/€180/C$255

Key features:

- Summarises current research on optimising CA system practices and their ecological, economic and social benefits.
- Elaborates on how CA systems make efficient use of production inputs such as water, nutrients, energy and addresses challenges in such areas as weed, insect pest and disease management.
- Reviews the central issues of improvement in yield, profitability and ecosystem services as well as climate change adaptability and mitigation in CA systems.

Read more: *https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-82937*

Innovations in Sustainable Agriculture

Editors: Farooq, Muhammad, Pisante, Michele. Published in 2019 by Springer International Publishing, 627 pages, 23 b/w illustrations, 47 illustrations in colour, Hardcover ISBN978-3-030-23168-2, eBook ISBN978-3-030-23169-9, price hardcover EUR 199.99, price eBook EUR 160.49.

This volume is a ready reference on sustainable agriculture and reinforce the understanding for its utilization to develop environmentally sustainable and profitable food production systems. It describes ecological sustainability of farming systems, present innovations for improving efficiency in the use of resources for sustainable agriculture and propose technological options and new areas of research in this very important area of agriculture.

Read more: *https://www.springer.com/gp/book/9783030231682*

Climate Change Impacts on Coastal Soil and Water Management

By Zied Haj-Amor, Salem Bouri, 1st Edition published February 3, 2020 by CRC Press, 184 Pages, 75 B/W illustrations, ISBN 9780367405533, price hardback GBP 73.60, eBook VitalSource GBP 61.75, eBook VitalSource rental GBP 47.50.

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By A.Z. Khasanov, Z.A. Khasanov, 1st Edition published on February 12, 2020 by CRC Press, 142 pages, ISBN 9780367368883, price hardback GBP 40, eBook GBP 11.05, eBook rental from GBP 8.50.

This work presents the experimental results of the strength of sands and clay soils in the following conditions: plane shear, triaxial stress state, with passive and active loading. The obtained experimental results are compared with existing theories of strength and the reasons for their non-conformity are identified. Experimental data on the determination of the position of shear surfaces with active and passive resistance of soils is analysed. A new concept of the theory of soil strength is considered, which allows to take into account the fundamental parameters of the strength of soils: the angle of internal friction, specific adhesion, and lateral pressure ratio. Given analytical expressions allow one to determine the stress state at the sites rejected with respect to the main stresses. The definition of the physical essence of the concept of lateral pressure coefficient for soils is given.

The book is intended for professionals working in the fields of soil mechanics and geotechnics, as well as for students and academics in engineering, earth and soil sciences and construction.

Read more: *https://www.crcpress.com/Experimental-and-Theoretical-Study-of-Strength-and-Stability-of-Soil/Khasanov-Khasanov/p/book/9780367368883*

Soil Physics with Python - Transport in the Soil-Plant-Atmosphere System

By Marco Bittelli, Gaylon S. Campbell, and Fausto Tomei. Published on 14 February 2020 by Oxford University Press, 464 Pages, 57 figures and/or tables, 246x171mm, ISBN: 9780198854791. Price paperback GBP 35.00. Also available as eBook.

This innovative study presents concepts and problems in soil physics, and provides solutions using original computer programs. It provides a close examination of physical environments of soil, including an analysis of the movement of heat, water and gases. The authors employ the programming language Python, which is now widely used for numerical problem solving in the sciences. In contrast to the majority of the literature on soil physics, this text focuses on solving, not deriving, differential equations for transport. Using numerical procedures to solve differential equations allows the solution of quite difficult problems with fairly simple mathematical tools. Numerical methods convert differential into algebraic equations, which can be solved using conventional methods of linear algebra. Each chapter introduces a soil physics concept, and proceeds to develop computer programs to solve the equations and illustrate the points made in the discussion. Problems at the end of each chapter help the reader practise using the concepts introduced. The text is suitable for advanced undergraduates, graduates and researchers of soil physics. It employs an open source philosophy where computer code is presented, explained and discussed, and provides the reader with a full understanding of the solutions. Once mastered, the code can be adapted and expanded for the user's own models, fostering further developments. The Python tools provide a simple syntax, Object Oriented Programming techniques, powerful mathematical and numerical tools, and a user friendly environment.

Read more: *https://global.oup.com/academic/product/soil-physics-with-python-9780198854791?q=Soil&lang=en&cc=at*

Frontiers in Soil and Environmental Microbiology

By Suraja Kumar Nayak, Bibhuti Bhusan Mishra. 1st Edition published by CRC Press on March 12, 2020, 349 pages, 50 colour & 25 b/w illustrations, ISBN 9781138599352, price hardback GBP 148.00, eBook GBP 120.25, eBook Rental from GBP 92.50.

Soil harbours a wide range of microorganisms with biotic potentials which can be explored for social benefits. The book ***Frontiers in Soil and Environmental Microbiology*** comprises an overview of the complex interrelationship between beneficial soil microbes and crop plants, and highlights the potential for utilisation to enhance crop productivity, bioremediation and soil health. The book focusses on important areas of research such as biocide production, pesticide degradation and detoxification, microbial decay processes, remediation of soils contaminated with toxic metals, industrial wastes, and hydrocarbon pollutants.

Read more: *https://www.crcpress.com/Frontiers-in-Soil-and-Environmental-Microbiology/Mishra-Nayak/p/book/9781138599352*

Soil and Groundwater Remediation Technologies

A Practical Guide

By Yong Sik Ok, Jörg Rinklebe, Deyi Hou, Daniel C.W. Tsang, Filip M.G. Tack. 1st Edition published April 10 2020 by CRC Press, 338 Pages - 30 Colour & 70 B/W Illustrations, ISBN 9780367337407, price hardback GBP 124.00, eBook VitalSource GBP 27.29, eBook VitalSource rental GBP 21.00.

This book offers various soil and water treatment technologies due to increasing global soil and water pollution. In many countries, the management of contaminated land has matured, and it is developing in many others. Topics covered include chemical and ecological risk assessment of contaminated sites; phytomanagement of contaminants; arsenic removal; selection and technology diffusion; technologies and socio-environmental management; post-remediation long-term man-

agement; soil and groundwater laws and regulations; and trace element regulation limits in soil. Future prospects of soil and groundwater remediation are critically discussed in this book. Hence, readers will learn to understand the future prospects of soil and groundwater contaminants and remediation measures.
Read more: *https://www.routledge.com/Soil-and-Groundwater-Remediation-Technologies-A-Practical-Guide/Ok-Rinklebe-Hou-Tsang-Tack/p/book/9780367337407*

Beneficial Microbes for Sustainable Agriculture and Environmental Management

By Jeyabalan Sangeetha, Devarajan Thangadurai, Saher Islam. Published March 27, 2020 by Apple Academic Press, 396 pages, ISBN 9780429284137, price hardcover GBP 104.80, eBook GBP 85.15.
Microbes are the most abundant organisms in the biosphere and regulate many critical elemental and biogeochemical phenomena. Because microbes are the key players in the carbon cycle and in related biological reactions, microbial ecology is a vital research area for understanding the contribution of the biosphere in global warming and the response of the natural environment to climate variations. The beneficial uses of microbes have enabled constructive and cost-effective responses that have not been possible through physical or chemical methods. This new volume reviews the multifaceted interactions among microbes, ecosystems, and their pivotal role in maintaining a more balanced environment, in order to help facilitate living organisms coexisting with the natural environment. With extensive references, tables, and illustrations, this book provides valuable information on microbial utilization for environmental sustainability and provides fascinating insights into microbial diversity.
Read more: https://www.routledge.com/Beneficial-Microbes-for-Sustainable-Agriculture-and-Environmental-Management/Sangeetha-Thangadurai-Islam/p/book/9780429284137

Soil Supplements: Implications on Plant Productivity

By Bhupinder Dhir. Published in the series *Agriculture Issues and Policies* in March 2020 by Nova Science Publishing, 210 pages, ISBN: 978-1-53617-423-6, price hardcover $160.00.
The need for more food to sustain the growing human population has led to the conversion of forests to croplands. Excessive input of chemical fertilizers has exerted pressure on soil resulting in the deterioration of its quality and productive potential. The changing environmental conditions and climatic transformations have also adversely affected the properties of soil. Realizing the negative effects of chemical fertilizers on soil quality, various organic substances, waste materials and other substances were explored for their potential to be used as soil supplements. This book provides detailed information about various inorganic, organic, biological and other non-conventional soil supplements with emphasis to the role they play in maintaining soil fertility and increasing agricultural productivity. The soil supplements contribute a lot in restoring the productive potential of soil to a great extent. Each soil supplement possesses certain advantages and limitations in restoring the fertility of soil. Integrated fertilizer treatment proves beneficial in restoring soil fertility for various types of soils. The book provides latest information on the topic and describes advances in soil science.
Read more: https://novapublishers.com/shop/soil-supplements-implications-on-plant-productivity/

Bridging Among Disciplines by Synthesizing Soil and Plant Processes

By Ole Wendroth (Editor), Robert J. Lascano (Editor), Liwang Ma (Editor), Published in Series Advances in Agricultural Systems Modeling in March 2020 by Wiley. 304 Pages, ISBN: 978-0-891-18364-8, price hardcover GBP 56.95.
In the 8th book of Dr. Ahuja's innovative "Advances in Agricultural Systems Modeling" series, authors give a look into the future of climate-smart agricultural systems, emphasizing the integration of soil, weather, vegetation and management information to predict relevant agro-ecosystem processes. Expansion of data availability, improvement of sensors, and computational power have opened opportunities in modeling and exploration of management impact. Authors give a background on model development and explain soil, plant, and climate processes and their interactions that encompass the wide range of applications of simulation models to address challenges in managing our resources and complex agricultural systems.
Read more: *https://www.wiley.com/en-gb/Bridging+Among+Disciplines+by+Synthesizing+Soil+and+Plant+Processes-p-9780891183648*

Soil Analysis: Recent Trends and Applications

Edited by Rakshit, A., Ghosh, S., Chakraborty, S., Philip, V., Datta, A. 1st ed. published by Springer 2020, 338 p. 104 illus., 80 illus. in color, ISBN 978-981-15-2039-6, price hardcover 159.99 € | £139.99 | $199.99; eBook: 128.39 € | £111.50 | $149.00.
Soil analysis is critically important in the management of soil-based production systems. In the absence of efficient methods of soil analysis our understanding of soil is pure guesswork. Ideally the pro-active use of laboratory analysis leads to more sustainable soil productivity. Unfortunately, most of the world's agriculture is still reactionary, waiting for obvious yield declines to occur before taking action to identify the reasons.
This book provides a synopsis of the analytical procedures used for soil analysis, discussing the common physical, chemical and biological analytical methods used in agriculture and horticulture. Written by experienced experts from institutions and laboratories around the globe, it provides insights for a range of users, including those with limited laboratory facilities, and helps students, teachers, soil scientists and laboratory technicians increase their knowledge and skills and select appropriate methods for soil analysis.
Read more: *https://www.springer.com/gp/book/9789811520389*

Climate Change and Agriculture

Edited by Dr. Delphine Deryng. Published 28 April 2020 by Burleigh Dodds Science Publishing. 404 pages, ISBN-13: 9781786763204, price hardback £150.00. Also available as eBook (VitalSource).
It has been suggested that agriculture may account for up to 24% of the greenhouse gas emissions (GHGs) contributing to climate change. At the same time climate change is threatening to disrupt agricultural production. This collection reviews key research addressing this challenge.

Climate change is the biggest challenge agriculture faces. Part 1 of this collection reviews current research on the impacts of climate change on agriculture, such as the effects of increased temperatures, as well as the ways these impacts can be modelled. Part 2 assesses what we know about the contribution of agriculture to climate change, including the impacts of both crop and livestock production as well as land use. Part 3 surveys mitigation strategies to achieve a more 'climate-smart' agriculture such as the role of integrated crop-livestock and agroforestry systems.
Read more: *https://shop.bdspublishing.com/store/bds/detail/workgroup/3-190-84056*

The Role of Agriculture in Climate Change Mitigation

By Lucjan Pawlowski, Zygmunt Litwińczuk, Guomo Zhou. 1st Edition published by CRC Press on 28 May 2020, 136 Pages, 20 B/W Illustrations, ISBN 9780367433727, price hardback GBP 74.39, eBook VitalSource 6 Month Rental GBP 46.50.
According to IPCC reports, one of the greatest threats to the Earth ecosystems is climate change caused by the anthropogenic emissions of greenhouse gases, mostly carbon dioxide, mainly from the combustion of fossil fuels, cement production and land-use change which leads to an excessive temperature rise. Agriculture and forestry are responsible for quiet big emissions of greenhouse gases: CO2, CH4 and N2O, and have significant potential to reduce these emissions mainly through enhancement of CO2 absorption by terrestrial ecosystems. To evaluate the impact of agriculture on climate change, ruminant farming should be also taken into account. The methods for reducing greenhouse gas emissions through appropriate management of terrestrial ecosystems and animal husbandry are widely discussed in this book, which will be of interest to academics, professionals and policy makers in environmental sciences.
Read more: *https://www.routledge.com/The-Role-of-Agriculture-in-Climate-Change-Mitigation/Pawlowski-Litwinczuk-Zhou/p/book/9780367433727*

Soil and Fertilizers - Managing the Environmental Footprint

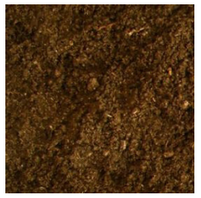
By Rattan Lal. 1st Edition published by CRC Press on 27 May 2020, 358 Pages , 10 Color & 96 B/W Illustrations, ISBN 9781138600072, price hardback GBP 124.00, , eBook VitalSource 6 Month Rental GBP 21.00.
This tome presents strategies to improve soil health by reducing the rate of fertilizer input while maintaining high agronomic yields.
It is estimated that fertilizer use supported nearly half of global births in 2008. In a context of potential food insecurity exacerbated by population growth and climate change, the importance of fertilizers in sustaining the agronomic production is clear. However, excessive use of chemical fertilizers poses serious risks both to the environment and to human health.

Highlighting a tenfold increase in global fertilizer consumption between 2002 and 2016, the book explains the effects on the quality of soil, water, air and biota from overuse of chemical fertilizers. Written by an interdisciplinary author team, this book presents methods for enhancing the efficiency of fertilizer use and outlines agricultural practices that can reduce the environmental footprint.
Read more: *https://www.routledge.com/Soil-and-Fertilizers-Managing-the-Environmental-Footprint/Lal/p/book/9781138600072?utm_source=crcpress.com&utm_medium=referral*

KEYSOM Handbook on Methods "Soil Fauna: Key to soil organic matter dynamics and modelling"

Edited by Juan J. Jiménez and Juliane Filser, Feb. 2020. The KEYSOM handbook of methods as a deliverable of COST Action ES1406 is finally published. This manual will help to interested readers the different techniques that were used in the Action to address the role of soil organic matter and soil fauna.
Read more: *http://www.keysom.eu/files/resource/document/30/Handbook_%20COST%20Action%20ES1406%20Soil%20fauna%202020.pdf*



Miscellaneous

Vladimir Fridland: contribution to the theory of pedogenesis, soil geography, cartography, and classification (100th birthday anniversary)

By Prof. Maria Gerasimova, Dokuchaev Soil Science Society, Russia

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 pattern.

Vladimir Fridland (©Prof.Dr. Victor P. Belobrov, private collection)

Vladimir Markovich Fridland was born 24.12.1919 in the town of Novomoskovsk, Central Russia. In 1937-1941, he was a student of the soil-geological faculty, Moscow University, and in the beginning of the Second World War he was sent to the Higher Military Hydrometeorological Institute. During a year, until December 1945, he worked as a specialist-synoptic forecasting weather for the Chernomorskiy Navy in the city of Sevastopol. Probably, this was a good background for his attitude to the climatic aspects of soil formation and soil geography. Immediately after the War, V.M.Fridland returned to his profession as a post-graduate student of Academician I.P. Gerasimov, who was working then in Dokuchaev Soil Science Institute, and this was the time of active and rather extensive soil research for creating the State Soil Map of the USSR, scale 1:1 000 000. I.P. Gerasimov was the Editor-in-Chief of this map from the post-War years until his death in 1985.

Vladimir Fridland proved to be a talented student; he defended his PhD thesis (Experience of studying vertical zonality in the Bol'shoy Kavkaz Mountains) in 1949, and was sent to the Caucasus by the group of soil scientists working on the State Soil Map. They decided that he was a healthy and strong young man capable of working in high mountains, well educated, familiar with local landscapes and full of enthusiasm for soils. Hence, the Caucasian sheets of the map were compiled with his active participation. Moreover, he created a logical and comprehensive grouping of soils most widely spread in the Caucasus – brown forest and mountain meadow soils that are discussed in this issue. At the age of 32, he published a paper on regionalizing the Caucasus in terms of its soil cover: seven provinces were specified by the differences in their systems of altitudinal soil belts modified by the longitudinal climatic trends related to global atmosphere circulation.

The continuation of activities on the State Soil Map proceeded at the Dokuchaev Institute, where V.M.Fridland first worked in the department of large-scale mapping and aerial methods (soil survey), and in 1970, he became the Head of the leading department in the Institute "Soil genesis, geography and classification" responsible for the compilation of the State Soil Map. In the same time, he worked several years in the Institute of Geography, Russian Academy of Sciences, and lectured at Moscow University, Faculty of Geography.

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 most known to specialists in Earth sciences, is ***the theory of soil cover patterns***, the second is the original three-component ***basic soil classification***, and the last one is the ***soil map of Russian Federation***, scale 1:2.500 000; now it is the only real detailed map of the whole country, published posthumously, in 1988. We shall consider the major features of each of these three spheres.

1. Worldwide, V.M. Fridland is known as author of the ***theory of the soil cover patterns.*** His book "Patterns of soil cover" was published in Russian in 1972; in 1976 its English translation appeared; some aspects were discussed in a few papers in English (1965, 1974). Most soil scientists know the book, not many of them apply its ideas and methodology in their field work because the assessment of the soil cover in spatial and genetic aspects according to the prescribed rules requires time and labor.

The novelty of the approach to soil spatial pattern forwarded by V.M.Fridland is the quantitative and geometric characteristics of soil units for an objective and reliable description of the soil cover. The results – patterns of primary (individual) soil mapping units with their size, shape and position on topographic elements, were interpreted by V.M.Fridland in terms of soil genesis, genetic relationships among soils, and amplitudes of taxonomic distances between them. It is worth mentioning that the latter parameter of the soil cover became popular in this millennium: the concept of pedodiversity, originated of that of biodiversity, is actively expanding in the world (Pedodiversity, 2013). Its founders – J.J.Ibañez, B.Minasny, A.McBratney commonly begin their publications by citing Fridland's book. Measuring taxonomic distances is one of important procedure while assessing pedodiversity. One more recent aspect of soil geography, namely, digital soil mapping frequently addresses to the theory of soil cover patterns.

The application of the soil cover patterns concept and its implementation by soil geographers and soil surveyors produced some new trends in conceptual pedology. One trend is looking for regularities governing the hierarchy of soil spatial units, another one – discussion on pedon, or soil individual. The former construction was delineated by V.M.Fridland in his paper of 1977 and outlines the hierarchical system of spatial soil units starting with continents and ending with the smallest units (up to first square meters), which were named "elementary soil areas." These smallest units serve as "bricks" in multiple "soil houses" composing the pedosphere, these are complexes, spottinesses, associations, variations, mosaics and tashets. The whole construction involves traditional units of soil-geographic zoning (1964, 2011) and may be regarded as a synthesis of diverse spatial schemes in soil geography. As a by-product, although very important and ambiguous, of Fridland's ideas in the field of soil cartography, is his perception of boundaries between individual soil units in view of scale of research, nature of its objects and importance for soil resources evaluation (first published in 1986).

The image of minimal homogeneous soil body was not invented by him, it appeared earlier or simultaneously under the names of pedon (Soil Taxonomy, 1975) or soil individual (Kozlovskiy, 1970). This issue was inevitable, because it concerned the perception and limits of the spatial unit – elementary soil area, and its correlation with similar units in other natural sciences. In landscape science, it might be analogous to its minimal unit – facies (Solntsev, 1949), in forest science – biogeocenosis (Sukachev, 1960), in landscape geochemistry – elementary landscape (Perelman, Kasimov, 1999). The soil cover patterns theory was also implemented by its author on the world soil map, scale 1:15M, compiled together with M.A.Glazovskaya (1982).

Finally, one more remark concerning this issue should be added: the theory was created by one person from the very beginning – object, methods, results, to its im-

plementation – data for diverse geographical regions, regularities, and applications. There is one more similar case in soil science, namely, micromorphology as branch of pedology – studying soils under the microscope, it was also created solely by W.L.Kubiena (Micropedology, 1938).

2. The second field of scientific interests and achievements of V.M.Fridland is soil classification. He created an ***original three-component basic soil classification system (***Fridland, 1982), which is the source and background of the recent new classification of soils of Russia (Classification…,2004; Field Guide.., 2008; Gerasimova et al., 2019). Both systems strongly differ in principles, criteria for categorizing soils, partly by objects of the traditional Soviet classification of 1977 (Classification and diagnostics…, 1977) that remains popular among soil scientists in the post-Soviet territory. Soil classification proposed by V.M.Fridland is designed for the soils of the world, and, like the new Russian system, it is much closer to the International one, known as WRB (Gerasimova, 2015).

The classification system of Fridland has three components: profile-genetic (and this is what all soil scientists mean as soil classification), granulometric-mineralogical component, and hydrothermal-regime component. The soil should be classified separately by components in accordance with the rules for each component, so that the full name of the soil comprises three blocks. Here is an example: profile-genetic component: brown forest soil; granulometric-mineralogical component: skeletic-loamy soil with metamorphic profile and illite minerals in the clay fraction; regime component: non-freezing soil with percolative water regime.

In reality, profile-genetic component corresponds to soil classification ***sensu stricto***, and the further discussion concerns this component.

Unlike former Soviet systems, the system of Fridland starts with a definition of soil as "***the surficial layer of the earth's crust resulting from the interaction of the atmosphere and biosphere with the lithosphere; this interaction produces different genetically interrelated horizons, which are basically parallel the earth's surface; the layer has the property of fertility" (***Fridland***,*** 1982; page 8). This definition enabled V.M.Fridland to include in objects to be classified the subaquatic soils, or bottom sediments of shallow-water bodies and the "parasoils" – artificial substrates or human-made soil-like bodies functioning as soils, in particular, capable to support green plants and to become "normal" soils in a certain time period. As for subaquatic soils, V.M. Fridland mentions the same approach of B.B.Polynov (1933), W.L.Kubiena (1953) and Soil Taxonomy (1975); whereas addressing to "parasoils" was a new experience. It's worth reminding that in the new Russian system the "Technogenic Surface Formations" bodies are introduced, but they are ranked separately from soils (2004, 2008).

Soil classification is based on soil properties implemented in diagnostic horizons and subhorizons; choice of properties inherent to a genetic (diagnostic) horizon is controlled by soil forming processes. Prior to construct the system, there was a broad discussion on genetic horizons – the criteria to specify them, their number and definitions; final decisions were taken together with M.A.Glazovskaya, I.A.Sokolov, and V.O.Targulian. The system has 7 levels with the central one – genetic soil type, which is traditional in Russian soil science in zonal perception; however, in Fridland's system, it is identified by combinations of horizons. The definition of soil type given by Fridland is the following: "Soil types have similar characteristics of the soil profiles that are composed of the sets of genetic horizons having certain properties that were formed by main processes, which depend on soil forming agents" (Fridland, 1982; page 15). There are 3 levels above the type level, and 3 lower levels, which were practically the same as in the system of 1977. At the above-type levels, soils are grouped in accordance with their genesis and genetic horizons composing their profiles. For two upper categories a key was made, which is the first soil key in Russian pedology. As for human-affected soils, only strongly modified ones were included, for example, the old-irrigated soils.
Thus, the profile-genetic component of the basic classification system or soil classification properly, is a hierarchical, open system, based on soil properties and taking into account soil genesis, and it should be updated every 10-15 years.

3. ***Soil Map of Russian Federation, scale 1:2 500 000*** is thought to be the most prominent result of Fridland's scientific activities (Belobrov, 2012; Ivanov, Zamotaev, 2019; Fridland, 2019), he was its Editor-in-Chief. The map was published in 1988 on 16 sheets (Soil map…, 1988), its program – in 1972 (Program.., 1972) and explanatory notes to this map represent a description of the soil cover of the country in the ideology and nomenclature of the map (Soil cover..., 2001). There are 205 soil units in the map legend, and more than 25 000 mapping units, or polygons in the database of the digitized version of the map. Until now, the map serves a main source of information for developing databases of Russian soils, since it is the most detailed map of the whole country. It was used for many official documents, for research projects, for correlating soils and soil cover of several regions, assessments of land quality and pools of carbon and other chemical elements, compiling special maps and for many other purposes.

V.M.Fridland made much more for this map than Editor-in-Chief usually does. He had arranged collecting and processing original data of many scientists and institutions (88 specialists), he discussed them not once practically with each in order to adjust the heterogeneous regional data to the concept of the map, and form a unified system of soil units in the legend along with introducing information in the mapping units. In the program, main features of each soil unit were briefly described. This enormous work lasted at least 16 years (1972-1988), and during these long years, new approaches to soil diagnostics, description and grouping evolved. They served as foundation for creating the basic soil classification (1982), and in the same time for its verification. Probably, three classification components derived of the process of small-scale map compilation, in which much attention was paid to the soil forming agents. In other words, the Program of the map was a serious contribution to the development of the basic soil classification.

Conclusions

Only three areas of soil science, where the contribution of V.M. Fridland was especially prominent, are analyzed in this paper.
V.M. Fridland created the theory of soil cover patterns, which brings together traditional pedogenetic and current formal approaches, and this theory remains in demand until now. Moreover, in our dynamic world with its new ideas and technologies, the theory acquired new users.
Soil classification of V.M. Fridland is original and was quite new in those years, rather "opposing" the traditional ones and giving birth to the new Russian system; this is written as a dedication in its first edition of 1997. The new Russian system inherited principles and structure, objects to classify, principle of identifying and using diagnostic elements and their preliminary list. Presumably, the international experience exerted a certain influence on the system of Fridland; however it has some particular features.

- **(i)** It comprises three components in order to reconcile "factor-properties" conflict;
- **(ii)** it includes non-traditional objects – "parasoils" and subaquatic soils;
- **(iii)** being based on soil properties it puts emphasis on pedogenic processes;
- **(iv)** it is the first national classification with strict definitions of horizons and features and with keys.

The soil map of Russian Federation summarized a huge amount of information on soils of the whole country, part of which was taken from the published sheets of the State Soil Map, and arranged this information in a logical system. During this long-lasting cartographic work, blocks of soil classification were improved, checked, modified, and vice-versa, the elements of classification were introduced into the soil units of the map's legend.

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Viewpoint: COVID-19: The World is One Family

By Rattan Lal, Past President, IUSS

The Sanskrit phrase Vasudhaiva Kutumbakam (The World is One Family) is more relevant now than ever before. The virus pandemic has spread rapidly throughout the world in developed and developing countries, rich and poor nations, advanced and emerging economies, and among friends and foes alike. It is the formidable enemy of all of humanity, regardless of differences in race, language, culture, religion, ethnicity, gender and political ideology. Therefore, its effective and swift mitigation demands a united approach of helping one another, maintaining a strict code of social distancing, adopting high standards of hygiene and cleanliness, and taking care of others in need of help. We must salute and appreciate the services of health-giver professionals who are on the frontline of the World War against an invisible and a microscopic enemy of the human race.

The global tragedy of COVID-19 necessitates a paradigm shift in the thinking of the scientific community towards addressing future research and education priorities. Obviously, international cooperation on issues of global significance is a high priority. The daunting challenge of the sustainable management of finite and fragile natural resources must be based on strong international cooperation. The global soil resource, and its management for food and nutritional security through adoption of nutrition-sensitive agriculture, is an example of the need for protecting and managing a precious resource, which must never be taken for granted. Not only should food be produced by using conservation-effective strategies of "producing more from less," the waste must also be minimized.

The food waste, equivalent to one-third produced globally, may be exacerbated by COVID-19 because of unnecessary hoarding and panic buying. Wastage of prime soil, through degradation of its quality by indiscriminate and inappropriate use of inputs and by conversion to other land uses (rapid and ad-hoc urbanization), must be addressed by adopting the concept of the "Rights-of-Soil" and global soil protection policy.

The focus of the world community on COVID-19 will adversely affect the progress of the Sustainable Development Goals (SDGs) for the Agenda 2030. Yet, sustainable management of soil is essential to achieving SDG #2 (Zero Hunger), #3 (Good Health and Wellbeing), #4 (Clean Water and Sanitation), #13 (Climate Action) and #15 (Life on Land). The tragedy of COVID-19 has refocused the attention on restoration and management of soil health as stated in SDG #3 (Global Health and Wellbeing) and SDG #15 (Life on Land).

The general education curricula, at all levels (from primary school to the college and graduate level), must be revisited to enhance focus on the "One Health" concept: the health of soil, plants, animal, people and environment is one and indivisible. The need for soil protection also necessitates implementation of the "Revised World Soil Charter" (FAO 2015) across the globe.

Download the viewpoint from the IUSS website: *https://www.iuss.org/media/2020_april_quarterly_viewpoint_iuss.pdf*

In Memoriam

Professor Jan Marian Gliński

(1933-2020)

Professor Jan Marian Gliński (©Institute of Agrophysics in Lublin)

Professor Jan Gliński was born on 4 April 1933 in Plińsk. He graduated from the Lublin Higher School of Agriculture (Wyższa Szkoła Rolnicza w Lublinie), where he obtained his Master of Engineering Degree (magister inżynier) in Agriculture. In 1964, ten years after beginning his work at the School at the Soil Science Department, he was awarded a doctoral degree for his Copper forms in soils of the Łęczyńsko-Włodawskie Lakeland (Formy miedzi w glebach Pojezierza Łęczyńsko-Włodawskiego) dissertation, and in 1968 he obtained a postdoctoral degree (doctor habilitowany) in the field of agricultural sciences on the basis of his thesis Impact of some soil-forming factors on the content and distribution of micronutrients in soil profiles (Wpływ niektórych czynników glebotwórczych na zawartość i rozmieszczenie mikroskładników w profilach glebowych). In 1971 Jan Gliński began his work at the Department of Agrophysics of the Polish Academy of Sciences (PAS) in Lublin. Three years later he was granted the title of associate professor, and in 1980 he was promoted to full professor. Soon he became the head of the Department, and in 1987 the director of the Institute of Agrophysics, Polish Academy of Sciences (in 1986 the Department of Agrophysics, PAS became the Institute of Agrophysics, PAS), a post he held until 2003. The Polish Academy of Sciences elected him as a corresponding member in 1991, and in 2002 he became a full member of the Academy.
The Professor's scientific achievements consist of over 350 works (i.a. 26 monographs, 220 studies and dissertations, 5 books, 18 patents). His scientific work was

focused mainly on the physicochemical soil properties, with particular regard to soil oxidoreductive processes. Jan Gliński tutored 6 postdoctoral dissertations, 10 doctoral dissertations, including 6 under his direct supervision, 30 MSc theses and 120 scientific dissertations in the field of soil physicochemical properties.

His soil oxygenation research resulted in two co-authored books: ***Soil Aeration and its Role for Plants*** (1985) and ***Soil Physical Conditions and Plant Roots*** (1990), published in the US by CRC Press.

Professor Gliński was the editor-in-chief of the Institute of Agrophysics PAS' ***International Agrophysics*** journal (ISSN: 0236-8722) and the Lublin Branch of PAS' several ***TEKA*** Commissions. He was an honorary member of the International Union of Soil Sciences (before 1998 functioning under the name: International Society of Soil Science) and a member of the Soil Science Society of Poland (SSSP), where for six years he held the position of the secretary, and the chairman of the SSSP's branch in Lublin. Moreover, he was the secretary of the Scientific Society of Lublin, long-time scientific secretary of the Committee of Soil Science and Agricultural Chemistry PAS (1978-1983), member of the Committee of Agrophysics PAS (1987-1989) and member of the Committee of Terminology PAS, a member of the Committee of Soil Chemistry SSSP, and since 1987 the vice-chairman of the Commission of Soil Physics, SSSP. In addition, in 1998 the Professor was nominated vice-president, and in 2001 president of the Lublin Branch of PAS. He was a foreign member of Slovak Academy of Science, and a member of Academia Europaea.

For his scientific activity, Professor Gliński was awarded two first degree team awards from the Polish Minister of Science, Higher Education and Technics (now the Ministry of Science and Higher Education), a team award of the PAS' Division V (1973) and five team awards from the PAS' Scientific Secretary (in 1981, 1985, 1987, 1988, 1990). He also received a medal For Merits for the Lublin Region, the Golden Badge of SSSP. Professor Gliński was honoured with the Bronze Cross of Merit (1972), the Gold Cross of Merit (1979), the Knight's (1988), the Officer's (1995) and the Commander's (2003) Cross of the Order of Polonia Restituta. He was also awarded the Michał Oczapowski Medal of the Polish Academy of Sciences (2007) and the Honorary Diploma of the Cabinet of Ministers of Ukraine (2006).

Professor Gliński was awarded the title of Doctor Honoris Causa from the University of Life Sciences in Lublin (2010) and from the Lviv National Agrarian University in Dublany and the Volodymyr Dahl East-Ukrainian National University (2011).

Professor Jan Gliński was a remarkable scientist and scholar, a kind, warm and friendly man, who always stayed willing to serve us with professional advice and support. His colleagues will remember him as their moral and academic authority.

Professor Jan Gliński died at the age of 86. The funeral service was held on 10 January 2020 at the Lipowa Cemetery in Lublin. Along with the family, numerous representatives of the Polish Academy of Sciences, academic community, local authorities and the Professor's colleagues and friends attended the ceremony.

By Cezary Sławiński, based on Professor Jan Gliński's summary of professional accomplishments

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
1982	Ph. Duchaufour †	France

Year	Member	Country
	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
2004	Winfried E.H. Blum	Austria
	Hans-Peter Blume	Germany
	Johan Bouma	Netherlands

Year	Member	Country
	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

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