

IUSS Bulletin

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115



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The IUSS Bulletin is the official Newsletter of the International Union of Soil Sciences. It is freely distributed through the IUSS website. All contributions are welcome and should be sent to the editor.

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19th World Congress of Soil Science



1. We have reached a milestone in the planning for the Congress – the initial closing date for the papers has now been reached. There has been an excellent response to the Call for Papers, with around 2000 submissions received by the official close date.
2. There have been many requests, from international institutions as well as individual authors, for more time to submit papers. The Congress committee is also keen to ensure that the scientific program is inclusive of the global soil science community and that as extensive a program as possible is provided for delegates. With these in mind, we have decided to extend the submission dates as follows:
 - a. Oral Papers: The final close date for papers to be considered for oral presentation at the Congress is now **30 November 2009**.
 - b. Poster Papers: Papers to be considered for poster presentation will now be accepted until **31st January 2010**.
3. We are preparing the papers already received for distribution to session Chairs to allocate the oral presentation slots.
4. Sponsorship of the Congress reflects the importance with which the event is seen within and outside Australia. We have Patron and Major sponsors in place and a stream of smaller or more specific sponsorships now being received.
5. Early registration is now open. Apart from the considerable incentive of a smaller registration fee – there will be a holiday prize for a lucky early registrant! Go to: <http://www.19wcss.org.au/delegate-registration.html>
6. A comprehensive list of tours can now be seen on the website. These include substantial and exciting Pre- and Post-Congress Tours, in addition to an interesting selection of shorter Congress Excursions available just before or after the week of the Congress. See:
<http://www.19wcss.org.au/congress-tours.html>
http://www.19wcss.org.au/congress_excursions.html
7. The main Congress program is developing. A visit to <http://www.19wcss.org.au/congress-program.html> will show you the program outline. It is important to note that hidden behind the brief headline ‘Plenary Sessions’, will be a time each morning when the entire Congress assembles to hear perspectives on major integrated challenges where soil science plays key roles. We will update you on these as the program develops.
8. Congress updates are sent to an email database of approximately 11 000 addresses. If you wish to add your name to the list please email <http://www.19wcss.org.au/contact-us.html>
9. All is building for a vibrant and interesting Congress. It is now time to register!

IUSS Alerts May – November 2009

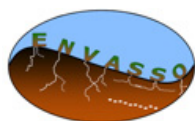
International Union of Soil Sciences



Information for and from the global soil science community

IUSS Alerts are e-mailed to more than 12,000 people in over 100 countries. If you have information to share, please send it to alfred.hartemink@wur.nl Below are the still relevant contributions that appeared in the IUSS Alerts between May and November 2009.

Bravo ENVASSO



The ENVironmental ASsessment of Soil for mOnitoring (ENVASSO) Project was funded as Scientific Support to Policy (SSP) under the European Commission 6th Framework Programme. The project's main objective was to define and document a soil monitoring system for implementation in support of a Soil Framework Directive, aimed at protecting soil in the EU. The ENVASSO Consortium, comprising 37 partners drawn from 25 EU Member States, succeeded in reviewing existing soil inventories, monitoring programmes, soil indicators and criteria that could serve as a base for a soil monitoring system for Europe. Procedures and protocols appropriate for inclusion in a European soil monitoring system were defined and fully documented and 22 of these procedures were evaluated in 28 Pilot Areas. In conclusion, an outline European Soil Monitoring System, comprising a network of geo-referenced sites at which a qualified sampling process is or could be conducted, is presented. The six final reports from the ENVASSO project can be downloaded from <http://eusoils.jrc.ec.europa.eu/projects/envasso/>

covered natural resources and sustainability, specifically looking at agriculture, soil, hydrology, geology and geographical information systems. It also offered plenty of field trips. After finishing her honours in soil salinity, Melissa was headhunted by a consultancy group where she worked for three years. Great Bits: "I find there's a good balance in my job. It doesn't involve me just sitting in front of a computer. I get to travel and go out into the field to do soil and groundwater testing. It's an awesome job and I'd love to keep doing this for a very long time."

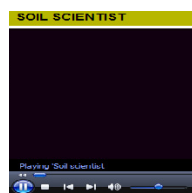
Africasoils.net



AfricaSoils.net

Knowledge about the condition and trend of African soils is highly fragmented and dated. There is an urgent need for accurate, up-to-date and spatially referenced soil information to support agriculture in Africa. This coincides with developments in technologies that allow for accurate collection and prediction of soil properties. The Africa Soil Information Service (AfsIS) will develop a practical, timely, cost-effective, soil health surveillance service to map soil conditions, set a baseline for monitoring changes, and provide options for improved soil and land management. The system will facilitate the identification of areas at risk of soil degradation and corresponding preventive and rehabilitative soil management interventions based on analysis of what works and what doesn't. This project will build on recent advances in digital soil mapping, infrared spectroscopy, remote sensing, statistics, and integrated soil fertility management. Dissemination and training will make the project's outcomes highly accessible to farm communities, public and private extension services, national agricultural research and soil survey organizations, the fertilizer sector, proj-

Soil science enthusiasm on video



Declining number of soil science students is a concern in many universities. We can sit down and grumble, or we can do something about it. One of the remedies is to show the great variety of soil science jobs. Melissa Peart from Australia tells her story in this video. Melissa enjoyed science at school and originally wanted to study history and be an archaeologist. But when she heard about a degree in land and water science at Sydney University, she turned her attention to the environment. The course

ect and local planners, national and regional policy-makers, and scientists. The efforts in Africa are part of a wider, global effort to digitally map the world's soil resources – www.globalsoilmap.net

Frozen soil



Permafrost and seasonally frozen ground regions occupy approximately 24% and 60%, respectively, of the exposed land surface in the Northern Hemisphere. The actual area underlain by permafrost is approximately 12% to 18% of the exposed land area. Frozen ground data and information collected over past decades, and to be collected in the future, are critical for fundamental process understanding, environmental change detection, impact assessment, model validation, and engineering applications. However, much of this information remains widely dispersed and unavailable to the science and engineering communities, and some data are in danger of being lost permanently. The International Permafrost Association (IPA) has developed a strategy for data and information management to meet the requirements of cold regions science, engineering, and modeling communities. A central component of this strategy is the Global Geocryological Data (GGD) system, an internationally distributed system linking investigators and data centers around the world. The Frozen Ground Data Center has now published on this web site and continues to expand and improve access to frozen ground data. The maps are at: <http://nsidc.org/fgdc/maps/>

Soils for kids



There are many initiatives to popularise soils for school kids. Henry Ferguson, a soil scientist at the National Geospatial Development Center in the USA, has a website with ideas, interesting suggestions and a couple of simple experiments illustrating some soil processes. There is also lesson plan suitable for elementary or secondary educators which includes materials and preparation, background information, student procedure and a student worksheet. Visit his website :

<http://www2.ngdc.wvu.edu/~hferguson/educationngdc>

Advertisement – product focus

Eijkelkamp e+ SOIL MCT sensor/logger



This intelligent e+ sensor measures Moisture content, electrical Conductivity and Temperature in soils or comparable substrates. Measured data are stored internally and can be transferred optically to the user via the e-SENSE telemetry system or directly to an e+ CONTROL or laptop. The measuring principle of the sensor is based on the Frequency Domain Method (FD), described by Wageningen University & Research Centre, at a frequency of 20 MHz, from which the system derives:

- permittivity
- conductivity
- temperature

The internal software can automatically compensate the conductivity for the measured temperature. See www.eijkelkamp.com for more information.

African Science Network



The African Science Network is a growing online network of scientists and science enthusiasts of African descent and other nationalities who have an interest in the development and application of science in Africa. If you have not registered yet, we encourage scientists to go to the website and register for free, and also encourage your friends or colleagues to register. Every service that we provide is free. There are great incentives to being a registered member, all registered members will be able to post and publish articles, get automatic email notification when new articles are submitted by members, we also have discussion forum where members discuss and share ideas on related field of work. The website allows users to post jobs, search for jobs, post conferences, grants, study programs and collaboration opportunities in. The site will soon have added features for members to invite friends and make new friends.

Soil-climate change podcast



A podcast has been recorded as part of the *International Year of Planet Earth* on soils and climate change. The soil under our feet has a complex relationship with our warming world. Soil microbiologist Charles Rice explains that soil helps take carbon dioxide out of the air – it absorbs millions of tons each year. But Earth is still warming, and, as it does so, microorganisms in the soil release carbon. Charles Rice: With warmer temperatures, just like our warm bodies, the microorganisms grow faster and so they need more food, so they would feed on that organic carbon. So as they're feeding on that, then they're releasing that carbon back to the atmosphere as carbon dioxide. He said that keeping carbon locked in soil also keeps soil healthy and results in better crops, and there's a multiple win situation. Hear the whole podcast at:

<http://www.earthsky.org/radioshows/53195/warming-earth-warming-soil>

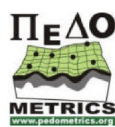
Advertisement – product focus

Eijkelkamp calcimeter



The calcimeter by Eijkelkamp is suitable for the simultaneous determination of the carbonate content in 5 samples. Where possible the vulnerable glass has been replaced by synthetic materials. As hydrochloric acid is used a stable and ergonomic design was chosen. The calcimeter is delivered complete with reaction vessels and test tubes (without reagents). Approximately one hour is required per recation. Carbonates that are hard to dissolve, such as sea shells, may take more reaction time. The benefits are: Accurate measurements the easiest way; 5 flasks allow batch-wise working; Rapid results; Modern tool to suit the professional lab. See www.eijkelkamp.com for more information

New Pedometron



The latest version of Pedometron has now been published on the IUSS and Pedometrics website. There is ample information on the last pedometrics meeting in Beijing, a report from the EGU in Vienna, the nine chapters of mathematical art, the Gods of soil, a pedometrics family tree, the agua salud project, soil bibliometrics pedomathemagica, profiles from Zhou Shi and John Crawford and a book review. Plenty to read and fun too!

1 km soil moisture for Southern African and Australia



The regularly updated soil moisture dataset with 1 km spatial resolution is available for free for Southern African Development Community (SADC) SADC and Australia. The dataset has been generated within the framework of the European Space Agency's (ESA) DUE Tiger project SHARE and is a result of the cooperation between Vienna Technical University and University of Kwazulu Natal. The soil moisture products are based on the newest radar satellite technology (ENVISAT's Advanced Synthetic Aperture Radar (ASAR) and Metop's Advanced Scatterometer (ASCAT) sensors). The synergistic use of both systems allows frequent, medium resolution monitoring of regional soil moisture dynamics. The regular bulletin on soil moisture datasets can be downloaded at :

www.ipf.tuwien.ac.at/radar/share/index.php?go=bulletin



Soil Science Gains Voice in the US Government

By: Karl Glasener

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The Soil Science Society of America's (SSSA) Science Policy Office, started in 1986 and based in Washington, DC, educates United States (US) federal government policymakers about and advocates for soil and the soil sciences. As a result, US agricultural, natural resources and environmental legislation and corresponding federal rules and regulations are more scientifically sound and appropriately incorporate and address soil science priorities. Moreover, funding for soil science supported by US federal agencies including the National Science Foundation, Department of Agriculture, National Aeronautics and Space Administration, Department of Energy, Environmental Protection Agency and others, increases annually, e.g., funding at the National Science Foundation for soil and soil-related sciences is estimated to total 400 million dollars!

Today's US Congress, composed of 435 Representatives and 100 Senators, includes just five scientists—three physicists, one chemist and a psychologist. The average Congressional staff member (staff really do all of the heavy lifting for members of Congress) with whom the SSSA Science Policy Office interacts daily, is a 23-year-old with an undergraduate degree in political science. While these young people are generally very intelligent, enthusiastic and quick studies, many of them just don't get the importance of soil and soil science. I remember vividly a meeting I had a couple of years ago with a young staff member of a California Representative. When I told him that we wanted the Congressman to join the Congressional Soils Caucus, he responded, "My boss is only interested in clean water issues."

Concerned with the lack of soil science expertise in the US Congress, the Soil Science Society of America selected its first Congressional Science Fellow (Fellows spend one year in the House of Representatives or Senate as a science advisor) in 1986; we selected our 33rd Fellow last month who works in the office of Senator Dick Durbin, a Democrat from the state of Illinois. Many of our Congressional Science Fellow alumni, the author

being one of them, have elected to stay on in the Congress or White House and Federal Agencies or with a scientific society, to serve as a scientific resource and educate policymakers about the importance of and need to support soil and the soil sciences.

In 1994, the Soil Science Society of America established a half-time Science Policy Director's (SPD) position also in Washington, DC which became a full-time one in 2000. The SPD interacts with federal policymakers, teaching them about and urging their support for soil and soil science. The SPD also communicates with SSSA members about important laws or rules and regulations addressing our sciences. Finally, the SPD taps into the more than 6,000 SSSA members informing them about and providing them opportunities to speak up for policies and funding supportive of soil and soil science. More details about SSSA's "grassroots advocacy" program follow below.

Nine years later in 2003, the Soil Science Society of America selected its first Science Policy Intern (SPI) to assist the Science Policy Director. Serving from three to 12 months, SPIs handle much of the day-to-day tasks such as setting up meetings with Congressional offices, organizing workgroups to review and comment on draft legislation, or leading SSSA grassroots advocacy efforts.

Finally, two years ago (2007), the Soil Science Society of America created the Policy Programs Coordinator (PPC) position to provide additional project-management capacity for the SSSA Science Policy Office. The PPC has allowed the Science Policy Office to expand its reach significantly, broaden interactions with other scientific societies and disciplines, and take on major projects, e.g., climate change legislation.

In recent years, as the Soil Science Society of America's Science Policy Office has matured, many invaluable policy tools have been developed to assist our science policy efforts including:

Congressional Soils Caucus which, composed of 49 US Representatives who support soil and soil science, serves as a voice for our sciences in the US Congress. SSSA has been instrumental in forming and supporting



SSSA leadership discusses soil carbon sequestration with Rep. Ben Chandler


the CSC since 2006, when it was created, often providing the CSC with educational briefings on topics selected by CSC members. For example, July 2008, with parts of the nation suffering from severe forest fires, CSC members asked SSSA to provide an educational briefing on Post Wildfire Management of Soil. SSSA has also provided CSC members educational briefings on carbon sequestration, nutrient management and ecosystem services. Finally, SSSA has periodically provided CSC members with a scientific analysis of draft legislation, e.g. recent climate change legislation being debated in the House of Representatives and Senate. (learn more about the CSC at: <https://www.soils.org/science-policy/activities/congressional-soils-caucus>).

SSSA Rapid Response Team was created to provide the Science Policy Director access to the incredible scientific expertise embodied in our 6,000 SSSA members. Often, Congressional offices contact us seeking expertise in a specific area, e.g., capacity for cropping systems employing conservation tillage practices to sequester carbon. The fast, sometimes crazy, pace of Congress requires us to provide an answer sometimes in as little as 30 minutes! The SSSA RRT often provides the Science Policy Office names of scientific experts in minutes.

SSSA Core Constituent Scientists Teams were recently developed to train SSSA members to interact

with policymakers to influence legislation and funding supportive of our sciences. After all as the old saying goes, "All politics is local." CCST leaders are SSSA members who've participated in Congressional Visits organized annually by the Science Policy Office during which SSSA scientists travel to Washington, DC to learn how to advocate for a specific policy goal and are then led on visits with their Representative and two Senators. Each CCST leader recruits two or more CCST members initially who also learn how to communicate effectively with Congress. Overtime, the number of and size of CCSTs will increase until one day (a dream really) there will be 435 CCSTs, corresponding to the 435 Congressional districts making up this great nation.

How does it all work? A recent successful effort to promote soil science in the 2008 Farm Bill (Farm Bill) provides a great example of how SSSA Science Policy resources and tools can be harnessed and employed together to achieve a specific policy goal. During the Farm Bill rewrite, while Congress reviewed, changed and added provisions addressing areas (titles) such as research, energy, horticulture, nutrition and others, SSSA identified in the Energy Title a biomass advisory committee (view committee at: <http://www.brdisolutions.com/default.aspx>) charged with counseling the US Secretaries of Agriculture and Energy on how



best to produce the volume of biomass from the nation's lands needed to meet a Renewable Fuel Standard (RFS) set by Congress in 2007. Note: the RFS mandated that the volume of renewable fuel required to blend into gasoline increase from nine billion gallons in 2008 to 36 billion gallons by 2022. In our review of the Farm Bill legislation, we noticed that this biomass advisory committee was made of up engineers, economists, conservationists, industry representatives and other experts, but did not contain an agronomist, crop or soil scientist! While we were not surprised with this oversight given how the agronomic, crop and soil sciences are often not taken into consideration due to a lack of understanding by policymakers for their importance, we were still dismayed at this glaring omission of our expertise from the committee makeup. After all, biomass crops are plants and they grown in the soil! Who then is better qualified to counsel the Secretaries of Agriculture and Energy on how to reach the biomass goals than an agronomist, crop or soil scientist? Shorting this tale, below I've listed the steps taken and Science Policy tools employed successfully, so that today an agronomist, crop or soil scientist slot exists on this important biomass advisory committee:

- April 2007—SSSA Science Policy Office, while reviewing Farm Bill text, discovers missing agronomic, crop and soil science expertise on biomass advisory committee.
- May 2007—SSSA Science Policy Office asks SSSA Rapid Response Team (RRT) to identify scientists with expertise in biomass production for biofuels. SSSA RRT responds with list of experts and indicated scientists are contacted and asked to develop a quick one-page biomass primer for members of the House and Senate Agriculture Committees, explaining the role of the agronomic, crop and soil sciences in achieving Renewable Fuel Standard biomass production goals. Sciences. Note: from contacting SSSA RRT to completion of biomass primer took two weeks).
- May 2007—SSSA contacts SSSA South Dakota Core Constituent Scientist Team (CCST) members to seek their support persuading Congressional Soils Caucus member Representative Stephanie Herseth Sandlin to introduce an amendment during the Farm Bill debate to add an agronomist, crop or soil scientist to membership of the biomass advisory committee. SSSA Science Policy Director meets with Herseth Sandlin's office to educate them about the issue and provide the

biomass primer. Strong response from South Dakota CCST members and support from fellow Congressional Soils Caucus members results in Representative Herseth Sandlin introducing amendment which passes.

- November 2007—SSSA Science Policy Director meets with staff from office of Senator Tom Harkin (Democrat, Iowa), Chairman of the Senate Agriculture Committee, to explain the biomass advisory committee issue, provide the biomass primer and seek his support for similar biomass advisory committee amendment. SSSA Iowa CCST urges Senator Harkin to include provision in Farm Bill. Senator Harkin includes provision to include an agronomist, crop or soil scientist to the biomass advisory committee in the Senate version of the Farm Bill.
- December 2007—Senate passes Farm Bill containing our provision.
- May 2008—Farm Bill is signed into law by President.

The Soil Science Society of America (SSSA) Science Policy Office staff, SSSA Rapid Response Team, SSSA Scientists, SSSA Core Constituent Scientist Teams and the Congressional Soils Caucus, working in concert towards a common goal, were successful; one of our scientists is a member of the biomass advisory board today! Additional opportunities for the SSSA Science Policy Office program exist now that President Obama has released his top priorities: Renewable energy, Climate change, Environmental issues (air and water quality), Food production and security, Science funding, Science education and workforce. All of these priorities must include consideration of and roles for soil science and involve the soil resource. The Soil Science Society of America Science Policy Office is poised to achieve even greater policy successes during the coming years.



Chemical Contaminants as a Factor of Soil-Subsurface Metagenesis*

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The soil and the subsurface region below it are two interrelated natural bodies that comprise the earth's upper layer from land surface to aquifers. The ratio between these phases fluctuates as a function of environmental conditions, while the subsurface water content ranges from air-dried to completely water-saturated. Because the soil-subsurface water content is controlled by rainfall-irrigation, evaporation, and depth to the groundwater, a vertical water gradient always exists. The soil-subsurface zone, known also as the "critical zone" (CZ), also involves a large microbiological population, which develops under both aerobic or anaerobic conditions, and may affect the composition of the earth environment.

In general, it is considered that the structure and properties of the soil-subsurface zone are the result of natural processes occurring over geological time scales. Despite the fact that the soil-subsurface has in many cases been affected by human impact, anthropogenic factors in defining the actual matrix and properties of the soil-subsurface have been largely neglected.

Human impacts on soil-subsurface properties have become a subject of interest only in the second part of the last century. In 1966, Yaalon and Yaron proposed that anthropogenically-induced changes in the soil formation process should be considered an integral, independent factor in addition to the five recognized natural-forming factors. In contrast to these natural factors, the rate of change of anthropogenically-induced processes is relatively rapid, with fundamental soil properties being changed within a short time. Yaalon and Yaron (1966) argue that in these changes occur within a new reference system in which the natural soil serves as a parent material at an initial state relative to the new anthropogenically-formed soil. The differences

between the rates of impact on soil characteristics of anthropogenic and natural-environmental factors support the view that anthropogenically-induced changes to soil matrix and properties represent an additional, independent soil-forming factor.

Over the last decades the anthropogenic role in soil formation has received further recognition, human factor being added to the classical natural factors

In a recent, comprehensive position paper on anthropogenic transformation of the earth's soil, Richter (2007) reviewed the existing approaches on human impacts on soil formation. He distinguished between contemporary and historic influences and suggested a possible rapid change of the ecosystem on a time scale of decades as a frame for defining meta-genesis of new contemporary soils. Throughout this period, human recognized influences on soil-subsurface modification have been reduced mainly to physically- and mechanically-induced changes, with chemical impacts being essentially neglected. However, toxic chemical compounds – which are produced and used by modern society in enormous quantities – reach the land surface directly or indirectly and may contaminate the soil-vadose-aquifer zones.

While reviewing a large number of research papers on contaminant interactions in the soil-subsurface geosystem, during preparation of our book "Contaminant Geochemistry" (Berkowitz et al., 2008), we observed that most research has focused on effect of the soil-subsurface environment on the fate of contaminants; while the impact of chemical contaminants on the soil-subsurface region has been neglected. Some studies have noted contaminant-induced changes in the soil-subsurface matrix and properties, but these changes are generally considered as deviations from the "normal" situation which will disappear by natural attenuation or by restoration procedures.

However chemical contaminants often induce significant alteration of the soil-subsurface matrix and properties which may lead over a "lifetime" scale to

*This article is based on the paper "Contaminant geochemistry: a new perspective" by Yaron, Dror and Berkowitz (2009), published recently online in *Naturwissenschaften*. (DOI 10.1007/s00114-009-0592-z)

Matrix Configuration		Properties	
<i>Aqueous phase</i>	<i>Solid phase</i>	<i>Aqueous phase</i>	<i>Solid phase</i>
<ul style="list-style-type: none"> • Salinity/alkalinity • Ionic composition • Presence of organic ligands • Heavy metals • Toxic organic substances • Radionuclides • Colloids 	<ul style="list-style-type: none"> • Charge of clay surface • Cation exchange capacity • Organic matter configuration • Hydration status • Clay redistribution with depth 	<ul style="list-style-type: none"> • Acidity • Redox potential • Solubility • Salinity • Turbidity • Surface tension 	<ul style="list-style-type: none"> • Infiltration rate • Hydraulic conductivity • Retention capacity • Porosity • Rheological properties • Water repellency

Table 1: Selected Potential Contaminant Induced Irreversible Changes in the Soil and Subsurface: Matrix Configuration and Properties

irreversible changes. As the soil-subsurface region is an open thermodynamic system, it will never return to its initial state following exposure to chemical contamination, and new soils with different matrices and properties will be formed by changing the existing system. As a general perspective we present possible irreversible changes in the matrix and properties of soil and subsurface natural systems as a result of anthropogenic chemical contamination (Table 1).

As noted above, huge amounts of toxic chemicals are directly or indirectly released onto the land surface, which by precipitation and/or irrigation are transported through the soil layer and vadose zone into groundwater systems. Because we are interested in the irreversible impact of chemical contaminants on the soil-subsurface matrix and properties, it is important to consider their behavior in the “critical zone” (CZ). Organic contaminants, for example, may have a negative (toxic) or a beneficial (energy source) effect on biota and consequently on their persistence or natural attenuation in the CZ environment. Natural biodegradation of organic contaminants will decrease when the released contaminants have a direct toxic effect on biota, causing a decrease in biological activity. Under these conditions contaminant persistence in the soil-subsurface system will increase. When an organic contaminant represents a source of energy for the natural biota, contaminant degradation will occur together with metabolite formation. This biologically-induced persistence-transformation process will affect the impact of contaminants and their metabolites on potentially irreversible changes in soil-subsurface matrix and properties. Natural organic compounds may serve as ligands for inorganic contaminants such

as heavy metals reaching the CZ, by forming organo-metallic complexes. Some forms of these compounds may be retained or transported within the CZ in a manner different than that of the original heavy metal contaminant. However within the CZ, organo-metallic compounds can be biodegraded by natural microbial populations. In this case, too, the impact of heavy metals on the soil and subsurface matrix will be different than that of the pure heavy metal compounds. As a consequence, to consider and predict the extent of irreversible changes in soil-subsurface matrix and properties, as induced by land disposal of anthropogenic contaminants, we must examine the fate of chemicals within the CZ environment.

In conclusion we consider that under specific conditions chemical contaminants may irreversibly change the matrix and the properties of the soil-subsurface region. In many cases, a contaminated soil-subsurface system that formed under natural environmental conditions over geological time may be transformed over a short “human lifetime” into a new body with different matrix and properties. **Once released on the land surface, chemical contaminants may become a forming factor of a new soil-subsurface regime.**

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Five questions to a soil scientist

Five questions to Alex McBratney



Name: Alex McBratney
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When did you decide to study soil science?

A long time ago, I was born very close to the Ordovician-Silurian boundary. In fact when I was 16. I was at high school sitting around deciding which course to do at University. We had a handbook from the Universities Central Council on Admissions listing all the courses for the 92 universities in the United Kingdom at that time. Flicking through the book I found something called 'soil science' that somehow intrigued me. I had never heard of it before. I was interested in physics chemistry and geography, and as part of my rural background, my family had always taken part in ploughing competitions - they still do this soil art- so it seemed like a perfect fit to me. So I went off to Aberdeen University to study soil science.

2. Who has been your most influential teacher?

Perhaps the most difficult of the five questions. I've had a number of heroes who've influenced me greatly. My high school geography teacher James McLay who first taught me a little about soil and a lot about geomorphology, and with whom I still keep in touch. We're currently doing a little study on the soil of my home area in Scotland. Of the soil scientists the most influential teachers have been E.A. FitzPatrick from the University of Aberdeen who taught me to think outside the pedological box;

Richard Webster from Rothamsted who taught me the techniques for handling the natural variation of soil and to think quantitatively; and the late Alan Moore of the CSIRO Division of Soils who taught me to think deeply and philosophically. There are many others from Aberdeen, Rothamsted, CSIRO, here at the University of Sydney, and elsewhere whom I could mention. I can see the process of being deeply influenced by, and learning from, one's own students being more and more important in my thinking and development.

3. What do you find most exciting about soil science?

The future. Soil science is integral to the sustainable solution of many of the global issues of today;- food security, water security, energy security, the effect of climate change and biodiversity. Without soil science there will be no planet for humanity. We should recognise that we are at the beginning of a golden era and celebrate it by our growing aspirations and achievements.

4. How would you stimulate teenagers and young graduates to study soil science?

As a teacher I'm always trying to get students to study soil science with variable degrees of success. They do respond positively to the global issues I mentioned above. I think however we need to emphasise the vitality and diversity of soil and its crucial role in the ecosystem and the development of human civilization. We need more people talking about soil out there in the real world. We're beginning to see that with the soil carbon story.

5. How do you see the future of soil science?

I think I've answered this question before somewhere (in the Future of Soil Science) in addition to that statement I would simply like to add that we urgently need to understand soil carbon coming carbon carbon...

Five questions to Stephen Nortcliff



Name: Stephen Nortcliff
Position: Professor of Soil Science (since 2003)
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1. When did you decide to study soil science?

When I was an undergraduate at Bristol I became fascinated with soils, initially in how they were distributed in the landscape, but then on how water and energy flowed through soils. Within my degree I chose, whenever possible, courses which involved soil science or elements of soil science, and endeavoured to undertake all my project work on soils and soil related subjects. My undergraduate project was on soil patterns in an area of Derbyshire, when I was first introduced into the often complex nature of soil variability.

2. Who has been your most influential teacher?

My most influential teacher was probably Len Curtis, who as well as being a teacher was also at some time in his life a soil surveyor. It was Len Curtis who first introduced me to soils in the field as an undergraduate and who encouraged me to seek to explore and understand soil patterns. In my undergraduate year I was probably the only individual who found this soil and landscape relationship so fascinating and enjoyed the support and enthusiasm provided by Len Curtis.

3. What do you find most exciting about soil science?

Throughout my professional life I have not ceased to be fascinated by the diversity of soils and the diversity which occurs within an individual soil. I have been fortunate to observe soils in many environments where the nature of the patterns and diversity are often different. It is seeking to understand this diversity and where appropriate manage the soils taking account of this diversity, which is a major challenge which I still enjoy.

4. How would you stimulate teenagers and young graduates to study soil science?

I approach this in two broad areas. The first relates to my own fascination with the diversity of soils in the landscape and the differences and similarities which occur in different environmental settings. The second, and this has become more focused with my involvement in seeking to develop soil protection strategies, is the often critical position in the environmental context, the role of soils at the interface of the atmosphere, hydrosphere, biosphere and lithosphere. In the development of sustainable land management we must be aware of this role.

5. How do you see the future of soil science?

In my opinion Soil Science has 'turned the corner' in recent years. In the final quarter of the 20th century there appeared to be a decline in interest in the soil, particularly in the context of agricultural production. In the last few years there has been increased awareness of the need to understand and manage soil if sustainable agricultural production is to be achieved. Coupled to this re-awakening of the role of soil in the context of food production, there is also an increasing recognition that soils are often critical in the broader environmental context and it is therefore imperative that the nature and behaviour of soils are understood. This increased awareness of the key roles played by soils has been recognized in the development of soil protection strategies.


Five questions to J.J. Ibáñez



Age: J.J. Ibáñez
Age: 54
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1. When did you decide to study soil science?

When I was seventeen years old I started my University studies. When studying the subject of geology, I



found a photo and a short commentary on soil profiles. For no reason, I decided that I would investigate that issue, but pedology was not taught at my school (Biological Sciences). When I was 23 years old I became as PhD student at the CSIC and started investigations in biology, biochemistry and soil ecology. My dissertation (1986) was on landscape ecology. By a series of extremely unlikely circumstances, the same year I obtained a senior position in pedology. It seems that my vocation was predestined!

2. Who has been your most influential teacher?

Professor Antonio Bello (CCMA, CSIC, and EPA Award), a soil ecologist and pathologist, began to teach me everything related to scientific activity. He encouraged me to be determined, brave and aggressive in my research. Professor Francisco Monturiol years later began my training in pedology. In many aspects I have been self-taught (spatial patterns analyses, complexity sciences, etc.).

3. What do you find most exciting about soil science?

The cryptic nature of the soil system. My academic background was that of an ecologist. Soon I realized that ecological theory lacked a lot of information concerning the great importance of soil. Thus, I tried to explore relationships between ecological communities and soils from different viewpoints. I have often been misunderstood by both soil scientists and ecologists, as I continued in this disciplinary boundary. As a soil scientist I understand that we are partly responsible for the lack of credibility that we are not in the mainstream of science.

4. How would you stimulate teenagers and young graduates to study soil science?

I am not a teacher in soil science. In my opinion the importance of soil in agronomy studies can be understood without difficulty by young people. I have never had problems of young people understanding the vital importance of soil resources. Possibly, talking as an ecologist it is easier to show the importance of soil resources because young people like ecology more than soil science topics, as does current mass media. As a pedologist I believe that we must teach others making use of their desires and interests, yet be rigorous. I do not usually like the style of soils manuals and handbooks; they tend to be boring.

5. How do you see the future of soil science?

I always thought that to solve external problems first internal ones must be solved. I worry about the lack

of constructive self-criticism in our discipline and any lack of credibility must be resolved by ourselves. Currently, there are several alternatives influencing a paradigm shift in pedology: pedometrics thought, soil quality approaches, critical zone earth approaches. Sometimes, we do not listen to each other, thus we are not united. To achieve success requires not only talent, but also willingness to develop and maintain open, friendly cooperative dialogs. As of now I do not see enough of this attitude in our community of interests.

I think that pedometrics will be essential to achieve a paradigm shift, however classical pedologists and pedometricians do not listen well to each other. We need a constructive interchange of ideas and obtain consensus to move ahead in pedology. I am optimistic for the future.



Favourite Soil Science Books

The favourite books of Christian Walter (France)

I always liked books and despite all the digital resources, I still pay special attention to update the textbooks of our library in order to integrate the most recent publications in French or English. Choosing favourite books may be done using several criteria, e.g. personal profit, teaching interest, quality of the illustrations, etc. In my selection, I paid special attention to books which may introduce young people to soil.

My first choice is «Regards sur le sol » from A. Ruelan and M. Dosso, published first in 1993 (Foucher-Aupelf). This book is devoted to soil morphology and includes a large collection of beautiful pictures from soil and landscapes from all over the world. This book explains to beginners how to observe, describe and interpret morphological features. What I particularly appreciated was the clear methodological approach which is especially useful for students. Electronic versions of this book have been later published and are still available.

“Le sol vivant” by Gobat et al. (Presses Polytechniques et universitaires Romandes) is a textbook first published in 1998, translated as “the living soil” in 2004 (Sciences Publishers). I find it a seminal introduction to soil biology and related processes. This book is remarkably illustrated and integrates step by step new knowledge and methods on soil biology in a more general framework of soil knowledge. Together with the book of Lavelle and Spain “Soil Ecology” published in 2001 (Kluwer), they constitute an in-depth contribution suitable for disseminating knowledge well beyond the community of soil biologists and ecologists.

My third choice is “Geostatistics for environmental Scientists” published by Webster and Oliver in 2001 (Wiley), which is an upgraded version of a previous textbook published in 1990. This book is a good introduction to statistical methods applied to soil studies, with a particular emphasis on spatial issues. I learned personally a lot studying this book and I still strongly recommend as a reference to my students.

The favourite books of Anthony Young (UK)


For clear, concise writing, without jargon, G. V. Jacks *Soil* (Nelson, Edinburgh, UK, 1954) comes first. Even the title could not be more concise! Then as a former soil surveyor, allow me to class as a ‘book’ one of the classic maps and accompanying reports. Geoffrey Milne’s *A provisional soil map of East Africa* (Amani Memoirs, Tanganyika, 1936) is a mind-blowing achievement from the days before air photography, a huge addition to soil science and geographical knowledge.

Harder to pick number three. Nye and Greenland, *The soil under shifting cultivation* (CAB, Harpenden, UK, 1960), still being cited as a basic source on organic matter? One of the first *Soil map of Africa* compiled by Julius d’Hoore (CCTA, Lagos, 1964)? The clarity of Rudy Dudal’s *Dark clay soils of tropical and subtropical regions* (FAO, Rome, 1965)? Peter Ahn’s *West African soils* (Oxford UP, 1970), obviously written by someone with a close field knowledge of soils and their agricultural management? Or Philippe Duchaufour’s *Precis de pédologie* (Masson, Paris, 1977), comprehensive but always clear?

No, let me settle for another classic of good writing, Robin Clarke’s *The study of the soil in the field* (Clarendon, Oxford, UK), first published in 1936 and so readable that it ran to five editions over a period of 35 years.

The favourite books of Alain Ruellan (France)

I am a pedologist, mainly interested by the study and understanding of soil morphology. I have been formed and influenced by teachers and researchers that have worked, all around the world, about soil mantle constituents and structures at the diverse scales of their organization and functioning. As examples I can underline three books that I consider significant of the main steps of soil morphology studies and use, since forty years.



The first one is the French book of G. Bocquier (Orstom, 1973): "Origin and evolution of two Chadian tropical soil toposequences – Biogeodynamic interpretation". This book is a masterly demonstration about the existence of space and time relationships and dynamics inside soils covers: soil cover organizations and functioning are vertical and lateral; the history of a soil cover is a succession of soil minerals and structures, that we can discover looking at the space scale. Reading this book we learn very much about how to use together morphological and biogeochemical methodologies.

The second example is the book of D. Nahon (John Wiley & Sons, 1991): "Introduction to the petrology of soils and chemical weathering". This book was written on the base of many scientific studies made, mainly, in Africa, but also in Brazil, Australia, France.... From rocks to soil, vertically and laterally, the aim of this book is to explain how to study and interpret, macro and micro alterites and soils morphologies: transformation of the mineral constituents, disappearance and appearance of old and new structures, dynamical interpretations. This book is a large demonstration about the soil systems existence: how to discover and how to understand the soil systems, base for the good use of the soil covers.

The third book is quite different, but also very important for the future of soil use: it is the "World Reference Base for Soil Resources – Introduction" written by J.A. Deckers, F.O. Nachtergale, O.C. Spaargaren (Eds.)" (Acco, 1998). This book is a nice demonstration that it is possible to construct a real international soil reference base where we can find all the soils of the world, presented first by their morphology. WRB represent an important step for soil science and soil use. My "dream", for the next future, is that the WRB construction will be continued with a more important introduction of the soils covers existence : that is, how to use the knowledge presented in the two first books, for the future construction of a "WRB for Soils Covers"?

Professor Victor Targulian is 75!



10/08/2009 is the 75th anniversary of Prof. Dr. Victor O. Targulian – the first winner of the Dokuchaev Award of the IUSS, the Honorary Member of the IUSS, and the Vice-President of the Dokuchaev Soil Science Society, Russia.

Victor O. Targulian was born in Moscow. He graduated from Timiryazev Agricultural Academy. He got his first experience in soil science in the Dokuchaev Soil Institute, where the well-known pedologists of the 1950-1970s – Professors Ivanova, Rode, Rozov, Fridland, Gerasimov were actively discussing problems of zonality, soil genesis and pedogenetic processes along with compiling the main national soil map – the State Soil Map of the USSR, scale 1:1M. This was a wonderful school for a young specialist; moreover, he did extensive field work in very remote areas of the Arctic, East Siberia and Far East for the survey on unexplored soils there for this map. He loved this kind of activities with overcoming many difficulties, wandering in uninhabited taiga or tundra lands, hunting for food, rafting on dangerous mountainous rivers.


In 1967 he has got the degree of a full doctor (Doctor of Sciences, Geography), without the first Candidate (Ph.D.) stage, for his comprehensive monograph “Pedogenesis and weathering in cold

humid areas” (published in Russian in 1971). This study made a revolution in understanding the soil genesis in cold climates of the world.

The worldwide recognition came to Prof. V.Targulian in 1974 during the X International Congress of Soil Science in Moscow for the unique experience of implementing the hierarchical morphological study of a profile. He organized a team of specialists to perform a comprehensive analytical and morphological study of a soddy-podzolic soil (Albeluvisol) near Moscow. The results were published in two volumes; the discussion on the pit lasted for a whole day, and many famous pedologists – Ph.Duchaufour, J.Aubert, E.Schlichting, M.Glazovskaya, A.Rode, R.Dudal and many others participated in it.

Since 1980s after his trip to the tropical islands of Pacific, V.Targulian attended many international conferences and congresses, where his non-traditional ideas about well-known issues and their emotional presentation attracted many advanced soil scientists, and in 1989-90 he managed to prepare together with R.Arnold, I.Szabolc, R.Dudal, D.Yaalon and many other prominent specialists the book “Global Soil Change” (1990). As an internationally known person, he was frequently invited to give lecture courses in many countries (France, Italy, Austria, USA, Bulgaria, Poland) on the problems of pedology and soil functioning, its interaction with the environment and society.

From the detailed studies of pedogenesis in humid cold and hot areas Victor Targulian moved to conceptual and paleopedological issues in his own and collective research. Most interesting in the former were his famous paradigms “soil-moment and soil-memory” (together with his friend I.Sokolov); characteristic time in soils; the approaches to the pedosphere as a reactor, regulator and memory of biosphere interactions; perception of the soil as a system and its self-regulation. In 1983 he published the paper “Exogenesis and Pedogenesis: Expansion of the Theoretical Basis of Soil Science” where he elucidated the ability of Dokuchaev soil science to be used as an approach for study of other planets’ surface bodies – it was 25 years before the term “astropedology” appeared. Later on, his permanent



interest to soil evolution and time as a factor of soil formation brought him to the investigation of very old soils – Permian, Carboniferous, not unanimously accepted as soils by other specialists.

Another astonishing feature of scientific activities of Victor Targulian is his ability to involve many colleagues and disciples into joint projects to solve a problem. The best results of such activity in recent years are the monographs: “Elementary Soil-Forming Processes” and “Soil Memory”. This feature also explains his success in the field of teaching at the Faculty of Soil science in Lomonosov Moscow State University, where his lectures on basic problems of our science always attract people irrespective of their age. His former students are high professionals now. Victor Targulian is thought to be an informal leader among pedologists in Russia and also a person who “constructs a bridge” between the national soil science and up-to-date world experience.

The world community of soil scientists wishes many years of healthy and creative life to Victor Targulian.

Obituaries

Professor Dr Stanisław Moskal (1921-2008)

President of the Polish Soil Science Society
(1987 - 1995)



Prof. Dr Stanisław Moskal, a retired research worker and academic lecturer at the Agricultural Chemistry Department of the Warsaw University of Life Sciences (SGGW), died on September 21st, 2008 at the age of 87. He was well – respected in scientific activities and as well as being a well-liked teacher and tutor of many generations of students, research workers and other academic teacher.

Prof. S. Moskal was born on November 10st in Krosno. Immediately after the end of the Higher Education School, he studied at the Faculty of Agricultural at SGGW (1945-1950). He started work at the Agricultural Chemistry Department at SGGW (1948), in 1959 he obtained a doctorate in agricultural, in 1965 he completed his postdoctoral dissertation. He

was appointed to the position of associate professor in 1974.

His scientific output considered of more than 100 articles, published mainly in scientific journals. Apart from his, he was the author of more than ten chapters in academic books, more than ten academic course books as well as other materials. The subject matter of his research was innovative both in Poland and abroad, this being a result of his numerous visits to scientific centers in many countries.

Prof. S. Moskal conducted research using radioactive isotopes and he participated in the creation of the first Polish Agricultural Isotope Laboratory of the Polish Academy of Sciences (1956) which was located at the Agricultural Chemistry Department of SGGW. To extend his knowledge of the application of radioactive isotopes he took several internships with foreign scientific centres in Belgium, Netherlands, Soviet Union, England and USA. In the 70s and 80s he was a coordinator or participant of international research projects.

Prof. S. Moskal's scientific activity centred around the following issues: assessment of the methods for determining available phosphorus, natural radioactivity of soil and taking up the radioactive isotopes by plants, content of mobile aluminium in the soil and influence of this element on the availability of various nutrients. The research with phosphorus was used as the subject matter of six doctoral dissertations under his supervision.

Prof. S. Moskal for many years worked on a voluntary basis at the Polish Teacher Union and the Association of SGGW Graduates. He was the Head of the Association in 1977-2001 and then in 2002 he was appointed an Honorary President of this Association. He also performed more voluntary work in various organizations outside of the SGGW. For example: in the years 1975-1988 he was the Head of the Agricultural Commission for Isotopes in the Polish Academy of Sciences, in the years 1984-1996 he was a member of the General Committee of the International Fertilizer Centre and from 1972 he was repeatedly selected to the Committee on Soil Science and Agricultural Chemistry of the Polish Academy of Sciences. He participated for the longest period and in

the most active way for the Polish Society of Soil Science. In 1987-1995 he was the President of the Society and in 1995 he became the Honorary President of the Polish Society of Soil Science.

These extensive actions show that he was a well-known and highly regarded organizer of Polish scientific activities, and he was many times decorated and awarded for his achievements. The distinctions he was awarded included: Order of Polonia Restituta knight's Cross, Medal of the Commission of National Education, M. Oczapowski Medal and others.

He will remain in our memories forever as an example to be followed. Academic society has lost an excellent scientist, a voluntary worker and a man of considerable intellectual stature.

Stanisław Mercik, Warsaw, Poland

Emeritus Professor Carolus (Karel) Sys (1923 – 2009)



Dr. ir. Carolus, emeritus professor of Soil Science in the Faculty of Sciences, Ghent University, passed away on October 1, 2009 at the age of 85. He was born in Zande (West-Flanders, Belgium) on Christmas-day, December 25, 1923. Being son of a farmer, his parents certainly not directed him towards uni-

versity studies. Instead they depicted for him a career as a cattle tradesman. However, when during World War II, young men were summoned to work for the war industries, he decided not to go that way but to enroll at the Agricultural University in Ghent, where he obtained the degree of agricultural engineer, tropical soil science, in 1949.

In the same year ir. C. Sys was selected by the Belgian administration for a job in the former Belgian Congo. He began working as a field soil surveyor at INEAC (*Institut National pour l'Etude Agronomique au Congo Belge*), pioneering the soils of the central part of Africa. He participated in regional soil surveys in different parts of the former Belgian Congo and in Burundi. In 1956, he was appointed as *Chef du Groupe Cartographie et Prospection de la Division d'Agrologie* of this institute, in charge of the supervision and co-ordination of the soil survey. In this function, he together with his collaborators, elaborated the INEAC system of soil classification for Central Africa. Under the leadership of Sys, much emphasis was laid by the Belgian soil scientists on characteristics easily recognizable in the field, such as the presence of pseudosands in the poor Ferral-sols and the presence of shiny clay skins in the much richer Ferrisols. Many of these criteria were later taken over in the international classification systems, such as Soil Taxonomy or the FAO legend. At that time, Sys was also a member of the committee in charge of the establishment of a Soil Map of Africa, and he compiled the first soil map of Congo and Ruanda-Urundi at scale 1:5M.

In 1960, Sys returned back to Belgium and worked for three years, until 1963, as chief cartographer at the Belgian Centre for Soil Survey and as researcher in the Laboratory of Physical Geography and Regional Pedology under the direction of Professor René Tavernier. At the same time, he supervised soil survey work and was in charge of the study of the soil suitability for crop growing in Belgium. Ir. Sys was awarded a Ph.D. in Agronomy in 1961 at the Agricultural University of Ghent on the thesis "Soil Genesis in the High-Katanga".

In 1963, Dr. ir. C. Sys, was appointed associate professor, and in 1981 full professor at the State University Ghent, teaching regional pedology (mainly of tropical and subtropical regions) and land evaluation at the Faculty of Sciences (International Training Centre for Post-Graduate Soil Scientists, ITC-Ghent) and at the Faculty of Agricultural Sciences. In this function he was responsible for the scientific educa-

tion of numerous pedologists from developing countries as well as from developed countries all over the world. Initially his research was oriented to the study of soil-forming processes of tropical and arid soils, but since the 1970s his interest shifted mainly to land evaluation. His green books on "Land Evaluation" published by the former General Administration for Development Cooperation in Brussels are well-known and are still used and cited by scientists. Around that time, Professor Sys's career took an international course and his reputation as a leading and influential soil scientist grew through this period. Since 1963, he was consultant or scientific supervisor of many overseas projects for the Belgian Administration for Development Co-operation, the Flemish Interuniversity Council, the FAO and for many other Belgian and international organizations and consultant bureaus. In Africa, he realized soil survey and land evaluation projects in Morocco, Egypt, Senegal, Burkina Faso, Ethiopia, Chad, Ivory Coast, Togo, Benin, Cameroon, Democratic Republic of Congo, Rwanda, Burundi, Tanzania and Zambia. In Nicaragua, he planned and supervised the soil survey of the *Costa Atlántica* between the *Rio Grande de Matagalpa* and the *Rio Escondido*. In Asia he participated in soil research and soil survey work in Lebanon, Saudi Arabia, Iraq, Iran, Thailand, Malaysia, Indonesia and China.

From 1968 until 1981 Professor Sys was Secretary General of the Belgian Soil Science Society and editor-in-chief of "Pedologie", the journal of the Belgian Soil Science Society. His wide-spread expertise in the field of land evaluation was acknowledged in 1978 during the World Congress in Edmonton, Canada by his election as chairman of the Commission "Soil Technology" of the International Society of Soil Science (ISSS). He chaired this commission until 1982. In 1984, he succeeded Professor Tavernier as director of the ITC-Ghent and in 1987 he was elected president of the Belgian Royal Academy of Overseas Sciences.

Throughout his career his main solicitude has always been to carry out scientific research leading to practical applications. Hereby he was particularly concerned about the possibilities to apply his findings in the sometimes precarious working conditions of the third world. Therefore his advices on soil management were always very much appreciated by all the people working in the agricultural sector in developing countries.

His working capacity is illustrated by numerous scientific articles and technical reports, the many M.Sc.

and Ph.D. theses prepared under his supervision or with his collaboration, his activities in the Belgian and International Soil Science Societies and his position as director of the ITC-Ghent. Despite retirement in 1989, Sys remained interested in the International Training Centre and in the work of the Laboratory of Soil Science, especially in their activities in Central Africa.

Eric Van Ranst

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Luis A. León Sarmiento (1927-2009)



Luis A. León, who died on June 27/2009 at the age of 82, was one of the most outstanding Latin American soil scientists over a period of four decades. He was born in Bogotá, Colombia, on September 12, 1927. He obtained a B.Sc. degree in Chemical Engineering from the National University of Colombia and on leaving the university he joined the laboratory of the Soils Program of the Colombian Agricultural Institute (ICA), based at the Palmira Experimental Station. In 1963 he obtained a Ph.D. in Soil Chemistry from the University of California Riverside and back to Colombia was designated National Director of the ICA's Soils Research Program.

In 1978 he joined the staff of the International Fertilizer Development Center to develop research on phosphorus and phosphate rocks of Latin America in the International Center of Tropical Agriculture in Palmira, Colombia. He spent several years with this

international organization and play a pivotal role in the phosphate rocks scientific development. He also worked as a consultant for the Texas Gulf, Raleigh N.C. in natural phosphates use; for CYMMIT, in CIAT-Palmira, working in the different scientific soil projects for South America of this international center for 2 years; also for Cenipalma, the Colombian research center for the oil palm and finally He was to spend the rest of his professional career working with the newest University of the Pacific on the Colombian Pacific Coast where he developed scientific love for soil sustainability in the students of this marginated and poor region of Colombia.

He carried on research on soil chemistry and soil fertility and also teaching at the National University of Colombia. Through his long and intense engagement in both research and teaching Dr. León has had an enormous impact on development in the science of soils chemistry and fertility. He is author of more than 200 research papers, numerous chapters in handbooks and meeting/congresses memories.

As a counselor of graduate students many of them were guided towards an advanced degree in Soil Chemistry and Soil Fertility and many others became well known researchers and university professors themselves.

He was cofounder and a long-standing member of the Colombian Soil Science Society. He was its president from 1971 to 1975 and from 1979 to 1981. Also was president of the Latin American Soil Science Society from 1973 to 1975.

Dr. León has received numerous honors and awards. Among other things, was an Honorary Member of the Colombian, Peruvian and of the International Soil Science Societies. He will be remembered by colleagues and friends for his important contributions to the development of soil science.

Prof. Dr. rer. hort. Dr. hc. Karl Heinrich Hartge (1926-2009)

On the 11th of June 2009, Professor Dr. rer. hort., Dr. hc. Karl Heinrich Hartge died in his house in Garbsen, Germany, shortly after his 83rd birthday after a more than fulfilled scientific life. He has left not only his family but also the international soil science community and uncounted colleagues and friends all over the world sad and deeply depressed.

Born in Dorpat (Estonia) on the 18th of March 1926, Karl Heinrich Hartge finished highschool in 1946 in Diepholz/Lower Saxony and graduated at the Tech-



nical University of Hannover in Horticulture in 1955. His extraordinary scientific career started at the Institute of Soil Science, Hannover, where he earned his PhD (Dr. rerum hortorum) in 1958 in the institute of the famous Prof. Dr. Dr. hc. Paul Schachtschabel.

In 1963, Karl Heinrich Hartge finished his Habilitation Thesis about the effect of soil structure on pore size distribution, a subject which in those days was mostly unknown. In 1965 he was appointed Professor of Soil Physics at the Technical University of Hannover, where he worked until his retirement in 1991. He concentrated as a highly gifted researcher, teacher, and extraordinary “doctor father” with great enthusiasm on the analyses and documentation of soil physical properties and processes in structured saturated and unsaturated soils under various climatic and land use conditions. He published more than 150 reviewed papers and uncounted book chapters. He developed and wrote 2 books on soil physics in German, which are still the standard textbooks for students in the various soil related education systems. The 4th edition of the book, Soil Physical Experiments and Measurements (Bodenphysikalisches Praktikum), was just recently published, and he was one of the active authors. He also prepared the rewriting and further conceptual improvement of the 4th edition of Introduction to Soil Physics (in German), in order to update the scientific content and its documentation.

His internationally accepted and honoured out-

standing knowledge, which was not only in soil physics but also reached far beyond this discipline, is documented in numerous chapters in various books, as well as in the famous textbook, Scheffer Schachtschabel: Lehrbuch der Bodenkunde (Soil Science textbook), which was co-authored (chapter: soil physics) by him for 32 years.

He had restless interests in soil scientific questions. His excellent analysis of problems or possibilities to define for soil physics a capacity/intensity parameter, which would gain an identical acceptance in soil science like the pH value in soil chemistry, dominated his data analyses up to the very last days. It was always impressive for all of us, when he underlined his new findings with hand drawings and corresponding hand written information and discussed in great detail the new insights.

Fourteen PhD students were privileged to be guided and educated by Karl Heinrich Hartge and to gain their scientific background from him. He was a real promoter and doctor father in the best sense for all of them. His presence and his wisdom, his encouraging information, helpful discussions, corrections, and recommendations occurred in an outstanding scientific and social atmosphere and guaranteed new scientific insights, as well as formed the basis for their own careers as professors in Kiel, Hannover, and Valdivia/Chile or on the advisory boards within various research and administrative organisations and research institutes.

Professor Hartge can be without any doubt called the father of soil physics in Germany, which is also documented by his enormous activity and guidance of additional research groups initiated by him. Their success is based on his fundamental knowledge of soils and their physical processes.

Besides his intense research and ambitious teaching, Professor Hartge also found time to serve the German Soil Science Society as the Chairman for Soil Physics and Soil Technology and as their President for 4 years. Elected 1982 in New Delhi/India as the President of the International Soil Science Society for 4 years, he organised the International Congress in Hamburg in 1986. In the same year he was awarded the prestigious Dokuchaev Medal through the Russian Soil Science Society. He earned thereafter also numerous honorary memberships from Germany, the International Union of Soil Science, and the Institute of Agrophysics, Poland, for his outstanding contributions to soil science and untiring activity for these soil communities.

After his retirement in 1991, he became the foun-

dation director of the Center for Agricultural and Landscape Research (ZALF) in Müncheberg, Germany, which he reorganized after the reunification of Germany. He also served as a guest Professor for Soil Physics in Rostock, Germany, and Vienna, Austria.

On the 18th of November 2005, Prof. Dr. Karl Heinrich Hartge received the Honorary Certificate (Dr honoris causa) of the Christian Albrechts University zu Kiel in recognition of his outstanding scientific career as a soil scientist, researcher, and teacher.

For his most prestigious award, the President of the Federal Republic of Germany, Dr. Horst Köhler, honoured him on the 3rd of April 2009 with the Grand Cross 1st Class of the Order of Merit of the Federal Republic of Germany (Bundesverdienstkreuz Erster Klasse der Bundesrepublik Deutschland) in recognition of his outstanding scientific achievements as well as for his social activities for the Baltic community in the widest sense.

Karl Heinrich Hartge was for more than 50 years married to his wife Uta, who survives him. It is doubtless that his outstanding success in science, social activities, and education of generations of students, PhD students, and co-workers is based on her untiring support. Moreover, many soil scientists in the world are thankful for her help and understanding. Three children and 3 grandchildren were supported and promoted by him as their best father and grandfather.

The German Soil Science Society, the international soil science community, his colleagues, PhD students, and friends bow in thankfulness to Prof. Hartge and will keep him in honoured memory.

Prof. Dr. Rainer Horn

President German Soil Science Society

Peter Nye (1921–2009)

Peter Hague Nye FRS, Reader in Soil Science and Emeritus Fellow of St Cross College, University of Oxford, died on 13 February 2009, aged 87.

Peter Nye was one of the foremost figures in plant and soil sciences internationally for 40 years. He read chemistry at Oxford (Balliol College, Domus Exhibitioner) and took a postgraduate course organised by the Colonial Agricultural Service at Cambridge (Christ's College) and elsewhere. He then spent 13 years in West Africa, initially as the Agri-



Picture caption: Peter Nye with members of the Oxford Soil Science Laboratory circa 1983. Nye is sixth from the left. To his left are Bob White, Philip Beckett, Ros Haigh, Guy Kirk, Rachhpal Singh, James McDuff, X, Frank Greene, Pete Darrah, Robin Kneale, Gwyneth Jenkins, Andrew Ameloko, X, X, Raul Ponce-Hernandez, Mike Hedley. Far left is Hilary Moorby and in front of Nye is Jeni Tree. Missing is Siobhan Staunton.

cultural Chemist for the Gold Coast, then as Lecturer in Soil Science at University College of Ibadan, Nigeria, and Senior Lecturer in Soil Science at the University of Ghana. The work he did there led to, amongst other publications, his seminal book with DJ Greenland 'The Soil Under Shifting Cultivation' (CABI, 1961), an outstanding example of what can be achieved with minimal research resources cleverly deployed. It is still widely cited.

He returned to Oxford in 1961, via a year at the International Atomic Energy Agency in Vienna, succeeding RK Schofield as Reader in Soil Science. He continued studies begun by Schofield on solute diffusion in soil, and established a theory of diffusion in soils which became the foundation for his work on the mechanisms of solute uptake by plant roots. This culminated in his book with PB Tinker 'Solute Movement in the Soil-Root System' (Blackwell, 1977, with second edition, OUP, 2000). This is still one of the most influential books across the whole of plant and soil sciences.

Nye's approach to research was no-nonsense. His lab contained no fancy instruments. He aimed to base everything as far as possible on first principles, and he had a strong conviction that it should always be possible to understand a problem or process well enough to develop predictive, mathematical models of it. These were then tested to destruction with simple experiments with all model input parameters derived independently. He was a follower of Karl Popper and a firm believer in Occam's razor.

Nye was Visiting Professor at the University of North Carolina at Raleigh (1958), Visiting Professor at Cornell University (1974, 1981, Messenger Lectures 1989), Commonwealth Visiting Professor at the University of Western Australia (1979), Visiting Professor at the Royal Veterinary and Agricultural University Copenhagen (1990) and Honorary Research Professor at the Scottish Crops Research Institute (1995–2000). He was President of the British Society of Soil Science (1968–69), a Member of the Council of the International Society of Soil Science

(1968–74) and a Governor of the National Vegetable Research Station (1972–87). He became a Fellow of the Royal Society in 1987.

Nye was a keen sportsman. He gained half blues for squash and tennis at Oxford, and played cricket for the national teams of Nigeria and Ghana. He also did a lot of sailing, cycling and walking.

He was a gentleman of the old school. He was tirelessly kind and polite with students and junior colleagues. He never put himself forward, and everything he said was worth hearing. His writing is a marvel of clarity and elegance. He leaves a huge legacy for the plant and soil sciences. He was a giant. He suffered from poor health in his later years but bore this with great courage and no complaint. He was married to Phyllis Mary Nye (née Quenault) for 55 years and had three children and six grandchildren.

Guy Kirk

Pieter Buringh (1918 – 2009)

After a long and active life Dr ir Piet Buringh passed away on 27th April 2009 at the age of 91 years. His career centred around the study of soils in the field, their geography, morphology and classification, as well as their agricultural use potential. He studied at Wageningen Agricultural University, where Prof. C.H.Edelman was one of his teachers. Buringh's career included a chair at the same university. He was an efficient manager, a devoted scientist and a gifted teacher.

Buringh's career started in 1947 at the Netherlands Soil Survey Institute (StiBoKa) where he was appointed as secretary and worked closely with the director, Prof. Edeleman. His doctoral thesis¹ was written during this period in which he was actively engaged in soil surveys in the Netherlands. In 1955, he was appointed by the Government of Iraq as a consultant for soil survey and land evaluation. He participated in various soil survey projects in Iraq, the main emphasis being on the study of saline and alkali soils, their origin, distribution and use potential. The results of three years work in Iraq were published² in a book on Iraqi soils, with an exploratory soil map.

After his return to the Netherlands in 1958 Dr Buringh was appointed Head of the Soils Department of the International Training Centre for Aerial Survey at

Delft (now at Enschede). He was a keen promoter of the interpretation of aerial photographs as a tool in soil surveys. In 1960, Buringh joined the Board of Directors of a Dutch consulting firm, 'De Nederlandse Heidemaatschappij'. He worked in several projects, both in the Netherlands and overseas. From 1956 to 1974 he was Deputy Secretary General of the International Society of Soil Science (ISSS, now IUSS).

In 1964, Dr Buringh was offered a chair in tropical soil science at Wageningen Agricultural University. Next to teaching he initiated the Training Project in Pedology which was meant to give students with a major in soil science an opportunity to get practical experience. The Training Project was to be based in a tropical or subtropical country, in cooperation with local university and government departments. The project has two main aims: offering a study area to students from Wageningen and the host country, and making the results of the investigations available to host country authorities. The first training project was based in the Konya Basin of Central Turkey. Some 25 Dutch students and a number of Turkish students participated in the project together with several members of the teaching staff of Wageningen University. Three staff members received a PhD on work in Konya. To the students in this project Prof. Buringh was an inspiring and highly appreciated mentor.



In the 1960s and 1970s an increasing number of foreign students came to Wageningen University. Tropical soil science was often an important part of their study programme. Buringh's concise review of tropical and subtropical soils³, first published in 1968 and serving as a textbook for his lectures, became increasingly popular in the tropical world. The third and last edition was published in 1979 and the book was translated in several languages, including Arabic. The Training Project in Turkey continued after Buringh's retirement and became increasingly multidisciplinary. Subsequent study areas were in Kenya and Costa Rica.

Buringh's work as a professor was interrupted from 1971 to 1975. He was appointed Chairman of the Board of Directors of Wageningen University. In a period of major change in organization and study programmes, the university was in need of an experienced manager who also was a member of the teaching staff.

From 1975 until his retirement in 1981 Buringh focused his attention increasingly on worldwide problems of food production in relation to land potential and (changing) climatic conditions.

Retirement meant fewer obligations, but Piet Buringh remained interested in world food problems, and he busied himself with agricultural history, religion and society in the Middle East, which region was close to his heart.

Wouter Blokhuis

Titus de Meester

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- ¹ P.Buringh, 1951. Over de bodemgesteldheid rondom Wageningen (Soil conditions in the environments of Wageningen). Versl. Landbouwk. Onderz. 57.4. Staatsdrukkerij, 's-Gravenhage.
 - ² P.Buringh. 1960. Soils and soil conditions in Iraq (with soil map). Ministry of Agriculture, Bagdad, Iraq.
 - ³ P.Buringh, 1979. Introduction to the study of soils in tropical and subtropical regions. 3rd edition, Pudoc, Wageningen (ISBN 90-220-0691-3)

Prof. Pan Ming Huang (1934-2009)

Prof. P.M. Huang, Professor Emeritus of Soil Science at the University of Saskatchewan, Saskatoon, Canada passed away on September 13, 2009.


He was born in Taiwan on September 2, 1934, and after growing up there and graduating in Agricultural Chemistry from the National Chung Hsing University, moved to the University of Manitoba, Winnipeg in 1961. It was there that he met Lin, the lovely young woman who was to become his wife. He moved on to the University of Wisconsin at Madison upon completing his Masters in 1962, studying for his PhD with Prof. M. L. Jackson, one of the world's most highly regarded soil scientists. Prof. Huang and Prof. Jackson worked well together, developing a warm friendship that continued for decades. Prof. Huang received his Ph.D. degree in Soil Science in 1965 and in the same year traveled to Saskatoon having accepted a position in the Department of Soil Science



at the University of Saskatchewan. In 1966 he and Lin were married. Lin has been a wonderful companion and support for him. They have two children: Daniel and Crystal.

Prof. Huang was a leading international authority on environmental soil chemistry, with emphasis on mineral colloids and organo-mineral complexes, their reactions with nutrients and pollutants in soils and waters and the impact on ecosystem health. He has pioneered extensive chemical, spectroscopic, and ultramicroscopic research on the formation mechanisms of short-range ordered (poorly crystalline) mineral colloids which are extremely reactive in governing the accumulation, transport, and bioavailability of nutrients and pollutants in the environment. He has done groundbreaking work in establishing mineral catalysis mechanisms of transformations of biomolecules such as sugars, phenolic compounds and amino acids, and the resulting formation of humic substances which are essential for maintaining and for enhancing the productivity of the land and are also vital in influencing the dynamics and fate of environmental pollutants. Further, his cutting-edge research has advanced the world's knowledge on the chemistry and behavior of vital and toxic inorganic ions and organic compounds in soils and freshwaters and their impact on agricultural sustainability and ecosystem protection.

In Professor Huang's research on the impact of toxic materials in the environment, he emphasized the harmful effects of ions such as cadmium, arsenic, and mercury in terrestrial and aquatic ecosystems. Because these ions can be taken up by freshwater biota and crop plants, the significance of his work



has extended to human and animal health. For example, his laboratory was the first in the world to show the ability of manganese oxides to convert toxic arsenite to much less toxic arsenate through abiotic catalysis. Further, because of substantial uptake of cadmium by cereal crops, his research has contributed to the development of land resource management strategies to enhance the quality of Canadian grains and their competitiveness in international markets.

His research accomplishments, embodied in over 300 refereed publications, of which nine were published in *Nature* (London). Furthermore, he has written 2 books, edited 17 books, and successfully trained and inspired Ph.D. and M.Sc. students (more than 60) and postdoctoral fellows (45), and hosted numerous international visiting scientists. Besides his significant contributions to the training of highly qualified personnel and outstanding research accomplishments in fundamental soil and environmental sciences, as founding Chair of both the Working Group “*Interactions of Soil Minerals with Organic Components and Microorganisms*” and Commission 2.5 *Soil Physical/Chemical/Biological Interfacial Reactions* of the International Union of Soil Sciences, prof. Huang was instrumental in promoting worldwide research leading to integration of knowledge on mineral colloids, organic matter, and microorganisms, and its impact on agricultural production, environmental sustainability, and ecosystem health.

In 2000 prof. Huang served as Editor of Soil Chemistry section of the *Handbook of Soil Science*, but since 2008 he was serving as Editor-in-Chief of the second edition of the this handbook, which assembles the core of knowledge from all fields encompassed within the discipline of Soil Science and is, thus, a comprehensive reference work on the discipline of Soil Science as practiced today. Further, Prof. Huang has served as Titular Member of the International Union of Pure and Applied Chemistry (IUPAC) and has been Series Editor of the IUPAC Book Series “*Biophysico-Chemical Processes in Environmental Systems*” to promote research and education on physical, chemical, and biological interfacial interactions in the environment on a global scale.

He has developed and taught courses in soil physical chemistry and mineralogy, soil analytical chemistry, and ecological toxicology. He has served on numerous national and international scientific and academic committees. He also has served as a member of many editorial boards such as the Soil Science

Society of America Journal, *Geoderma*, *Chemosphere*, *Water, Air and Soil Pollution*, *Soil Science and Plant Nutrition*, and *Pedosphere*. He received the *Distinguished Researcher Award from the University of Saskatchewan* (1997) and the *Soil Science Research Award from the Soil Science Society of America* (2000). He was a Fellow of the *Canadian Society of Soil Science* (1985), the *Soil Science Society of America* (1985), the *American Society of Agronomy* (1985), the *American Association for the Advancement of Science* (1998), and the *World Innovation Foundation* (2001). He was Honorary Professor of six Chinese Universities.

Prof. Huang was an eminent scholar, a great educator, a man of vision and extraordinary leadership. He was a teacher appreciated for his organization and thoroughness, his passion for science, and for his high expectations. Most of his students and colleagues mention the decisive influence he had on their careers.

Antonio Violante
Università di Napoli Federico II, Italy

Reports of meetings

10th International Meeting on Soils with Mediterranean Type of Climate Beirut

Lebanon 23-26 June 2009


The 10th International Meeting on Soils with Mediterranean Type of Climate was held in Beirut, Lebanon 23-26 June 2009. It was jointly organized by the International Union of Soil Science and national Council for Scientific Research-Center of Remote Sensing (CNRS-CRS). The meeting was attended by 45 experts from Kuwait, Iran, Jordan, Syria, Lebanon, Alger, Tunisia, Morocco, Spain, Germany, France, Italy, China, Canada and experts from regional and international organization ACSAD and ICARDA. The book of extended abstract contained 54 original works. The program was spread over four days. During the opening ceremony Dr Mouin Hamzé, the Secretary General CNRS, Dr Ahmet Mermut the Chairman of the International Working Group on Soils with Mediterranean Type of Climate (IUSS), Dr Khaled Be Ramdan, Deputy DG ACSAD, Dr Ali Moumen the FAO Representative in Lebanon, and Dr Mohmoud El Solh the DG of ICARDA all presented

fact and figures about current regional and international issues in soil science.

The first session was devoted to the use of remote sensing and GIS in land resources studies, land degradation, mass movement and soil erosion. Three keynote lectures were presented: 1) W. Erian on soil survey mapping at different scales in Sudan and Egypt, 2) W. Wu on landuse and biomass production in Sudan and China, and: 3) S. Khresat on landuse/cover changes detection in Jordan. Keynote lectures were followed by three oral presentations on the assessment of land degradation in coastal Syria by M. Al-Abed, mass movement hazards in Lebanon by Ch. Abdallah and land degradation in Lebanon by Mr Antonio Youssef.

The topic of the second session was on the impact of climate change on soil behavior and productivity and soil resilience to erosion, drought and desertification. One keynote lecture was given by Hong Ma on benchmark and indicators for desertification monitoring and assessment in Asia region followed by a presentation on soil erosion in Alger by Gh. Abderahim and another presentation on the role of ACSAD in the soil research in the Arab countries by W. Erian.





The third session held on Wednesday 24/6/2009 was on Land management and organic amendment to enhance carbon sequestration. A keynote was presented by R. Sommer on using the crocyst model for assessing soil organic carbon sequestration, followed by a presentation on soil organic carbon stocks at Tunisia scale by T. Gallali and in the Lebanese territory by T. Darwish. The last two oral presentations of this session were given by R. Bachour on field experiments on CA in Lebanon and on influence of no-tillage on hydrodynamic properties of a Mediterranean Vertisol by R. Moussadek. The third session was followed by examining 16 posters dealing with soil genesis and classification, soil mapping, soil pollution, and nutrient management.

The fourth session dealt with Indigenous Mediterranean ecosystems- the Mediterranean anthrosapes. Indicators of the reshaping processes of the Mediterranean landscape. Two keynotes were given: 1) R. Harfouche on combining archaeology and pedology in the study of Mediterranean anthrosapes and 2) E. De Pauw on land suitability for deroking. One oral presentation was given by A. Ramadan on the use of chemical stabilizers for sand stabilization.

On Wendsady 25 June 2009 a field trip was organized to present the Lebanese soils with a visit to the Cedar mountain forest at Falougha and Baalback Roman Temples.

Session five and six dealing with effective irrigation and fertilization of Mediterranean soils within the context of integrated production, secondary soil salinity and soil management and contamination were held on Friday 26 June 2009, the last day of the meeting. Three key-notes and five oral presentations have been made on these sessions. The first keynote by A. Hennings on the development of pedotransfer functions to estimate annual percolation rates in countries of the Arab regions. The second keynote was presented by F. Trolard on Astuce and Tic program: a collaborative tool to integrate soil and water resources for spreading cities. The third keynote was presented by S. Loddo on GIS based model to assess risk of soil salinization in Sardinia (Italy). The five presentations were made by 1) Th. Atallah on the origin and distribution of soil salinity in greenhouses along coastal Lebanon, 2) M. Benkhelifa on the effects of salinity and sodicity on physical properties of sandy soils under semi-arid Mediterranean climate, 3) G. Bourrié on copper mobility in contaminated soils in Chile, 4) R. Wakim on selenium levels in Lebanese environment and 5) A. Hasanzadeh on the assessment of input and output energy in chick-

pea production under rainfed farming systems.

Each session was followed by discussion and the meeting was closed by general discussion where a positive evaluation was given to the organization and smooth flow of sessions in a thematic way. Participants emphasized the importance of variability in the topics which enriched the management of natural resources keeping soil as a central focus in the land degradation assessment, land contamination, indigenous ecosystems, irrigation and fertilization, land management, climate change and soil resilience to drought and use of modern techniques in the studies of land resources. They confirmed that involvement of participants in the sessions were serious and active participation in the poster session reflecting the interest of participants about land contamination, climate change, new techniques related to using nematodes found in the soil to fight forest insects, beside some basic studies on soil genesis and classification. The fact that the final session was attended by more than 75% of participants indicates the seriousness and success of the meeting. A proposal to hold the next, 11th International Meeting on Soils with Mediterranean Type of Climate, in Algeria in 2011 was discussed.

32nd Congress of the Brazilian Society of Soil Science

August 2 - 7, 2009, Fortaleza, Ceará, Brazil

The Brazilian Soil Science Society is one of the larger Soil Science Societies within the IUSS family of Soil Science Societies which was shown at its recent Congress, held in Fortaleza in north eastern Brazil. The Congress, the 32nd in the series was held from 2nd to 7th August 2009 with the very topical theme 'The soil and the production of bioenergy: Possibilities and Challenges. There were well over 2000 participants from across Brazil and fellow Soil Science Societies in Latin America together with a number of invited guests from further afield. At the invitation of the President of the Brazilian Soil Science Society Flavio Camargo, IUSS were represented by the President Roger Swift and the Secretary General Stephen Nortcliff (the Photograph shows Flavio Camargo together with Roger Swift and Stephen Nortcliff). As well as presenting the opportunity to discuss IUSS with colleagues it also provided an opportunity to promote the forthcoming World Congress in Brisbane one

year from the date of this Brazilian Conference. Fortaleza is a wonderful city, on the Atlantic Coast with a port and strong industrial base as well as serving as an outlet for agricultural production from its hinterland in the State of Ceará. Fortaleza is a tourist destination for both Brazilians and those from abroad and is well provided with a wide range of hotel accommodation. Many of the participants stayed in hotels close to the extensive beach and the Atlantic Ocean and took advantage of the range of foods available including excellent sea food and the traditional 'Churrasco' with its excellent range of meats served at your table.

The conference began on the Sunday evening with a welcome at the open air theatre of the Rectory of the Federal University of Ceará, which has a number of buildings from the early days of Fortaleza before the very rapid growth in recent years. The entertainment included folk dancing, singing, a poem to welcome Brazilians from the four corners of the country and a virtuoso performance on the accordion. This was followed by speeches of welcome and thanks from local and national representatives of Brazilian Soil Science and scientists from related fields, together with a recognition of the companies and bodies which had provided sponsorship for the Congress.

The Congress itself was held at the Conference Centre of Fortaleza with delegates transported by buses or making their own way there. In addition to the full programme of oral papers there was an extensive poster display with over 1000 posters. I was given the honour of opening the Congress with a Plenary presentation entitled 'IUSS activities and its role in world soil science'. In addition to my presentation Roger Swift gave a short presentation outlining the plans for the World Congress of Soil Science in Brisbane August 2010.

After Coffee there were four parallel sessions which ran for the rest of the day. The first of these on 'Fertility and Plant Nutrition' was opened by a special presentation from Malcolm Sumner from Athens, Georgia entitled 'Plant Analysis: Benefits and Pitfalls in Making Diagnoses in the Field. In the second of the parallel sessions Ahmet Mermut (Chair of Division One) gave a presentation entitled 'Structures and reactivity of mineral particles of tropical soil'. The other two sessions were on the Biology of Soil and Soil Physics.

The Second day of the Congress began with a Plenary presentation from F.O.M. Durães from EMBRAPA Agro-Energia group on 'Brazilian biomass and the pro-

duction of Bioenergy'. This was a wide-ranging presentation which gave a very positive outlook on the potential of Brazil to sustainably produce bioenergy. After coffee there were again four parallel sessions. Roger Swift opened the session on Management and Conservation of Soils with a talk entitled 'Carbon sequestration by soils, including biofuels and biochar.' The session on Genesis, Morphology and Classification of Soils was opened by Peter Buurman from Wageningen University with a talk entitled 'Soil organic matter and its role in pedogenesis'. The other parallel sessions addressed fertilizers and corrective actions in soils and soil pollution. Steve McGrath from Rothamsted gave a talk entitled 'Terrestrial ecological risk assessment of heavy metals'. The 8 themes identified provided the structure for the paper presentations, the panel discussions and the poster presentations throughout the Congress. In addition to the oral and poster presentations the Brazilian Society of Soil Science also took the opportunity to recognise text produced under the auspices of the Society to ensure that modern Soil Science information is available in Portuguese at reasonable prices for the students. These included a very well illustrated and referenced two volume text edited by Vander de Freitas Melo and Luis Reynaldo F. Alleoni on the Chemistry and Mineralogy of Soils and Volume Vi (2009) of *Tópicos em Ciência do Solo*.

In addition to oral presentations, poster presentations and panel discussions there were of course field excursions. One and two day excursions to study the Genesis, Morphology and Classification of soils in Ceará and a one day excursion to an area of irrigated agriculture in Ceará.

This was a very well organised Congress with a wide range of topics and speakers. The discussion in the formal presentations was good and well structured, but was probably outstripped by the lively discussions which took place informally at coffee breaks



and around the posters. It was good to see very active participation of young soil scientists. It was also good to hear Professor Emidio Cantido de Oliveira Filho, Director of the Programs of CAPES, that Brazil is increasing Federal funding for University courses in Soil Science, particularly at Masters level as well as supporting an active programme of in service training and courses to ensure the professional development of its scientists.

In addition to scientific discussions the Brazilian Soil Science Society also held a General Meeting at which discussions about future plans and the structure of the Society were discussed. In the future the scientific structure of the Brazilian Soil Science Society will mirror that of IUSS, with four Divisions and Commissions within Divisions.

On behalf of those invited to join in the Congress, I would like to express by many thanks. The Congress was very well organised covered a wide range of subjects and provided the opportunity to discuss some very pertinent questions on the subject of bioenergy and the role of soils, whilst not forgetting the other areas of soil science which are also important. Fortaleza is a wonderful place to hold a Congress, just south of the Equator, but with the cooling breeze from the sea making it a pleasant environment in which to walk around, even for someone from so far north as me!

Stephen Nortcliff
Secretary General IUSS

Annual Meeting of the AOAC INTERNATIONAL PNW

Tacoma, USA

The 29th Annual Meeting of the Pacific Northwest Section of the AOAC INTERNATIONAL was held at the University of Puget Sound in Tacoma, Washington, USA on June 17-18, 2009. The theme of the meeting was *"Validation Science to Ensure our Safety in a Changing World"*. The meeting began with an international group of keynote speakers and progressed into the following specialized seminars: Soil and Environmental Chemistry, Microbiology, Dietary Supplements, Pesticides and Industrial Residues, and Seafood Contaminants. The program also included Membership Reception, Poster Session, Chemistry Training (Statistics and Spreadsheets), Microbiology Training (Single Laboratory Validations), Instrument Expo (an exhibition of scientific equipment, supplies and services), and a banquet presentation *"In the Land of Camas and Cedar: American Indian Plant Medicines of the Pacific Northwest"*.

The diverse program was of interest to analytical communities, researchers, regulators, and industry members. The meeting provided an excellent opportunity to learn from the experts recognized in their fields and peers and other attendees who share similar interests and challenges in analytical fields.

The 2008–2009 Executive included James M. Hungerford (Chair), Yash P. Kalra (Past Chair), Mike



Planning Committee of the Annual Meeting of the AOAC INTERNATIONAL PNW.

Grant and Fred Krick (Treasurers), and Nancy Hill (Secretary). For further information on the Section, please visit us at www.aoacpacnw.com.

*Yash P. Kalra
Edmonton, Alberta, Canada*

V International Conference on Cryopedology

September 14-20, 2009

The Cryosol Working Group of the IUSS and International Permafrost Association (IPA) held the V International Conference on Cryopedology on September 14-20 in Ulan-Ude, Buryatia, Russia. The focus of the meeting was DIVERSITY OF FROST-AFFECTED SOILS AND THEIR ROLE IN ECOSYSTEMS. The meeting was hosted by the Institute of General and Experimental Biology, Siberian Branch of Russian Academy of Sciences, Ulan-Ude. The co-organizers of the conference were Institute of Geography, Russian Academy of Sciences, Moscow and Dokuchaev Soil Science Institute, Russian Academy of Agricultural Sciences, Moscow. There were several groups active in the organization and sponsoring of the conference - Cryosol Working group of IUSS and IPA; Commission of Genesis of IUSS; Commission of Paleopedology of

IUSS and INQUA; Dokuchaev Soil Science Society; Institute of Physico-Chemical and Biological Problems of Soil Science, Pushchino, Russia; Russian Foundation for Basic Research; Presidium of Russian Academy of Sciences. All of these groups are thanked for their efforts.

Over 110 participants attended the meeting from six different countries representing many different areas of soil science but all with an active interest in Cryopedology. The first 4 days in Ulan-Ude were formal sessions where 74 papers were presented as well as 25 posters dealing with all aspects of Cryosols. There was a very active discussion of the different papers and recommendations were made for mitigation of consequences of global climate change for permafrost-affected soils.

Three days were then spent on very interesting field trips to the Vitim Plateau in Central Buryatia and Lake Baikal Region. The field trip focused on Soils and Temperature regimes of these regions. Several soil profiles were visited and their genesis and classification were discussed by the group. How the soils were classified in different classification and mapping systems were discussed and compared. It was stressed that the criteria of soil classification systems, especially the WRB system, are developed for regions with a climate lacking strong continental features, where a cold and usually humid summer cor-



responds to a cold winter. Cryosols, i.e., soils with shallow permafrost, frequently cryoturbated, occur under those conditions. The rare case of non-cryoturbated soils with permafrost corresponds to the qualifier Gelic, which denotes the soils with permafrost at a depth between 1 and 2 m. However, the soils observed in the field trip showed that permafrost has a significant effect when thaws deeper than 2 m. This fact should be taken into consideration. For this purpose, new qualifiers in WRB can be developed and the prefix qualifier Turbic should be included in the WRB list of definitions not only for Cryosols, but also for other soils.

All of us who attended were very impressed by the organizational work done by our Russian colleagues from Ulan-Ude. All of the logistical arrangements were excellent and the meeting ran very smoothly at all times. The field trip was super with many soil profiles to discuss with a very informative and detailed tour guide. Meeting was very scientific and everyone had a good time and all left with a very good impression.

Marek Drewnik
Sergey Goryachkin
(Cryosol Working Group)

Eleventh International Symposium on Soil and Plant Analysis

Santa Rosa, California, USA

The 11th International Symposium on Soil and Plant Analysis (ISSPA) was held at the Hyatt Vineyard Creek Hotel, Santa Rosa, California, USA on July 20-24, 2009. There were approximately 100 delegates from 19 countries. The Symposium was sponsored by the Soil and Plant Analysis Council, Inc. (SPAC), an international society of scientists and organizations interested in advancing nutrient analysis of soil, plant, and water. The objective of this biennial Symposium was "to convene agricultural and natural resource scientists from around the world to disseminate information on methodology, interpretation, and application of soil, plant, and water analyses for the purpose of efficient resource management, sustainable production, and the environment".

There were 29 oral presentations in the following 11 Plenary Sessions: (1) Welcome and California

Agriculture (2) Turf and Landscape (3) Precision Agriculture and Cropping Systems (4 to 7) Viticulture Program (8) Energy and Biofuels (9) Instrumentation (10) Water Analysis and Lab Proficiency Testing, and (11) Interpretation of Soil and Plant Analysis. These sessions were moderated by Stu Pettygrove (USA), Roger Hill (New Zealand), Tamás Németh (Hungary), Daniel Roberts (USA), Nat Dellavalle (USA), Joan Davenport (USA), Rob Mikkelsen (USA), Jorgé Etchevers (Mexico), George Rayment (Australia), Yash Kalra (Canada), and Rigas Karamanos (Canada), respectively. There were 109 presentations in three poster sessions. Joe Crumbaugh (Canada), Katalin Sárdi (Hungary), and Stu Pettygrove (USA) gave, to whet the appetite, an overall picture of the posters being presented in these sessions. The oral and poster papers will be published, after scientific reviews, in the *Proceedings* as a special issue of the *Communications in Soil Science and Plant Analysis*".

At the Symposium Dinner on July 23, David Kissel, SPAC President, presented the J. Benton Jones, Jr. Award to Tamás Németh, a world renowned soil scientist from Hungary, for his significant contributions to the development and advancement of soil and plant analysis. The recipients of this prestigious award at the previous ten symposia were J. Benton Jones, Jr., USA (1989), Victor J.G. Houbba, the Netherlands (1991), Yash P. Kalra, Canada (1993), Nat Dellavalle, USA (1995), Wayne Sabbe, USA (1997), Umesh C. Gupta, Canada (1999), Theodore R. Peck, USA (2001), George E. Rayment, Australia (2003), Malcolm Sumner, USA (2005), and John Ryan, Syria (2007).

The Symposium Organizing Committee included members from the USA (Nat Dellavalle, Mark Flock, Donald Horneck, David E. Kissel (Chair), Steve McGeehan, Rob Mikkelsen, Robert Miller, Rao Mylavarapu, Stu Pettygrove, Daniel Roberts, Quentin Rund, and Cliff Snyder), Australia (George E. Rayment), Canada (Yash P. Kalra), New Zealand (Roger Hill), and South Africa (Arri van Vuuren). The Scientific Program Committee included Steve McGeehan, Rao Mylavarapu, Stuart Pettygrove (Chair), George E. Rayment. In addition to the sponsors (Agriculture Laboratory Proficiency Program, Bunge Fertilizantes S.A., International Plant Nutrition Institute, Mosaic, and Brookside Laboratories, Inc.), the Exhibit Hall featured exhibits and robotics demonstrations from several vendors.

Twenty participants from Australia (2), Canada (2), Croatia (3), Hungary (7), and USA (6) took the Pre-



Participants view a vineyard soil profile.

Symposium Tour on July 17-19. The Salinas Valley (“Salad Bowl of the World”) Agricultural Education Tour featured fresh vegetable production and focused on the advanced farming techniques that make Monterey County the number one vegetable growing region in the world. Observed were leaf lettuce (romaine, red leaf, green leaf, butter, and escarole), head lettuce (iceberg), broccoli, cauliflower, artichoke, celery, greenhouse nurseries, strawberries, and other field activities. The Tour stopped at the Pezzini Farms Produce Stand in Castroville (“The Artichoke Capital of the World”).

At the Sea Mist Farms, lettuce field harvest and packing techniques were seen. The Tour also included the Dole Value-Added Products Plant. In Salinas, participants visited the National Steinbeck Center Museum, a museum and memorial dedicated to author, Nobel Prize winner, John Ernst Steinbeck, Jr. The second day included a tour of the scenic Monterey peninsula and the world famous Monterey Bay Aquarium. Then Pacific Grove and Pebble Beach (17 Mile Drive) with several stops including the Lone Cypress Tree (the tree is over 200 years old; it is perched on a rock).

Also observed was marine wildlife. The Tour stopped and visited serene seaside town of Carmel-by-the-Sea (which has no streetlights or house numbers). The last day included a drive north along the scenic Hwy 1 coast (Watsonville, Santa Cruz, Davenport, Half Moon Bay, etc.), then east along Hwy 92, Hwy 101 north. Next was a brief photo-op at the Golden

Gate Bridge, then lunch in the picturesque waterfront community of Sausalito (elevation 4 m). In the afternoon the tour group visited Muir Woods National Monument (named for noted conservationist John Muir). It was interesting to learn that Muir Woods’ Cathedral Grove hosted the first United Nations conference on May 19, 1945; delegates from 48 nations discussed the establishment of a lasting peace following the Second World War. The Coast Redwoods, *Sequoia sempervirens* (also known as California Redwoods) are the tallest trees on Earth. Nat Dellavalle did an excellent job of coordinating this memorable tour.

The mid-Symposium Viticulture Tour on July 22 included stops at Dana States Winery and Quintessa vineyards in Napa County and Platt and King Vineyards in Sonoma County. These counties produce some of the finest wines in the world. At each stop, a soil scientist, viticulturist and a winemaker discussed the vineyard in terms of soil, climate, grape production and wine. Soil pits allowed participants to view soil profiles and discuss how soils interacted with climate and grape management to affect production of wine quality.

The first three symposia were held in USA. Since then they have been held alternately in North America and overseas. The previous ten symposia were held in Fresno, California, USA (1989), Orlando, Florida, USA (1991), Olympia, Washington, USA (1993), Wageningen, the Netherlands (1995), Bloomington, Minnesota, USA (1997), Brisbane,



Participants of the symposium on molecular modeling in Dornburg.

Queensland, Australia (1999), Edmonton, Alberta, Canada (2001), Somerset West, Western Cape, South Africa (2003), Cancun, Mexico (2005), and Budapest, Hungary (2007). The 12th ISSPA will be held in Greece in 2011. Further information will be available on the Council's website (www.spcouncil.com).

Yash P. Kalra

Canadian Forest Service, Edmonton, AB, Canada

Joe A. Crumbaugh

Canadian Forest Service, Edmonton, AB, Canada, and

David E. Kissel

University of Georgia, Athens, GA, USA

Specifically the understanding of humic substances and their properties in an aqueous environment, the molecular interactions of organic compounds and inorganic ions with soil interfaces were in the center of the presentations.

A publication of the outcome of the symposium is planned.

Martin H. Gerzabek, Vienna

Advances of Molecular Modelling of Biogeochemical Interfaces

Perspectives for Soil Research - 2009

In Dornburg near Jena/Germany the 2nd DFG-IUSS (Commission 2.2) Symposium on molecular modeling was held from 6th to 7th of October 2009 (http://www.spp1315.uni-jena.de/Symposium_2009.html). Close to 50 participants from all over the world contributed to the symposium, consisting of 19 lectures and numerous posters. The distinguished invited speakers as e.g. Don Sparks, Jim Kubicki, Gabi Schaumann, Neal Skipper, Hans Lischka, Sylvio Canuto, M.A.C. Nascimento and A.G. Kalinichev reviewed the present status of molecular analytical and modeling methods. In comparison to the first symposium, which was held 4 years ago in Vienna, it became clear that molecular methods have developed significantly and numerous examples of contributions of molecular modeling to elucidate principle processes in soils could be shown.

New Publications

Référentiel pédologique 2008 (in French), Association française pour l'étude du sol – Denis Baize & Michel-Claude Girard (Eds). Quae. 2008. 436 p. ISBN-13 978-2-7592-0185-3. Price: 45 euros.



The Référentiel pédologique is a detailed typology of soils of France, Europe, Africa and other continents. This third edition, which has been entirely reworked, contains three new chapters covering soils in intertropical zones and their specific reference horizons, and two new tools: a rapid access

key to the different chapters and an annexe of the possible correspondences between the references in the Référentiel pédologique and the categories in the World Reference Base for Soil Resources. The Référentiel pédologique has been tried and tested in the field for some fifteen years now, and has become indispensable. It was designed to be accessible to non-specialists with some knowledge of the basic vocabulary of soil science, and is indispensable to anyone wanting to take account of the diversity of soil types.

www.quae.com/livre/?GCOI=27380100883830&fa=description

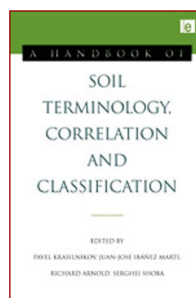
Response of Crops to Limited Water: Understanding and Modeling Water Stress Effects on Plant Growth Processes, edited by L.R. Ahuja, V.R. Reddy, S.A. Saseendran, and Qiang Yu. ASA, CSSA, SSSA, 2008. ISBN: 978-0-89118-167-5.



Agriculture research today requires a whole-system quantitative approach, and farmers need simple management tools derived from robust models. Agricultural system modelers see a snarl of competing water demands, depleted aquifers, drought, and changing plant water requirements due to global warming and know where the answers lie: in achieving conservation of rain and irrigation water, preservation of

groundwater quality, and increased water use efficiency in crop production. The first in the groundbreaking Advances in Agricultural Systems Modeling series from ASA-CSSA-SSSA, *Response of Crops to Limited Water: Understanding and Modeling Water Stress Effects on Plant Growth Processes* compiles the work of world experts, systematically presenting recent knowledge of water stress effects and emphasizing the knowledge synthesis that will move agriculture forward.

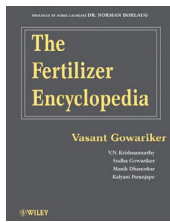
A Handbook of Soil Terminology, Correlation and Classification, edited By Pavel Krasilnikov, Juan-Jose Ibanez Marti, Richard Arnold, Serghei Shoba. Hardback September 2009. 352 pages. ISBN 9781844076833.



Soil classification and terminology are fundamental issues for the clear understanding and communication of the subject. However, while there are many national soil classification systems, these do not directly correlate with each other. This leads to confusion and great difficulty in undertaking

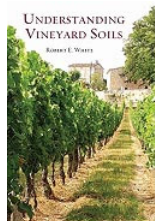
comparative scientific research that draws on more than one system and in making sense of international scientific papers using a system that is unfamiliar to the reader. This book aims to clarify this position by describing and comparing different systems and evaluating them in the context of the World Reference Base (WRB) for Soil Resources. The latter was set up to resolve these problems by creating an international “umbrella” system for soil correlation. All soil scientists should then classify soils using the WRB as well as their national systems. The book is a definitive and essential reference work for all students studying soils as part of life, earth or environmental sciences, as well as professional soil scientists.

The Fertilizer Encyclopedia, by Vasant Gowariker, V. N. Krishnamurthy, Sudha Gowariker, Manik Dhanorkar, Kalyani Paranjape, Norman Borlaug (Prologue by). ISBN: 978-0-470-41034-9 Hardcover, 880 pages. February 2009.



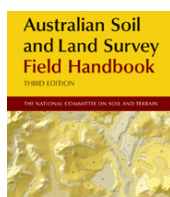
Fertilizers are key for meeting the world's demands for food, fiber, and fuel. Featuring nearly 4,500 terms of interest to all scientists and researchers dealing with fertilizers, *The Fertilizer Encyclopedia* compiles a wealth of information on the chemical composition of fertilizers, and includes information on everything from manufacturing and applications to economical and environmental considerations. It covers behavior in soil, chemical and physical characteristics, physiological role in plant growth and soil fertility, and more. This is the definitive, up-to-date reference on fertilizers.

Understanding Vineyard Soils, by Robert White. Oxford University Press. Hardback, 240 pages, ISBN 13: 9780195311259.



Understanding Vineyard Soils explains to a wide audience how soils form and why they are so variable. Robert White describes essential chemical and physical processes involving nutrients, water, oxygen and carbon dioxide, moderated by the activities of soil organisms, and proposes remedies to alleviate adverse conditions such as soil acidity, compaction, poor drainage and salinity. The pros and cons of organic viticulture are discussed, as are the possible impacts of climate change. The author explains how sustainable wine production requires grape growers and winemakers to take care of the soil and minimize the impact of their activities on the environment. This book is a practical guide for viticulturists and for the lay reader who is seeking general information about soils, but who may also wish to pursue in more depth the influence of different soil types on vine performance and wine character. *Understanding Vineyard Soils* will discuss new developments, especially in precision viticulture and organic viticulture. The introduction will address new technologies (near and remote sensing, digital soil mapping) as well as traditional soil classification.

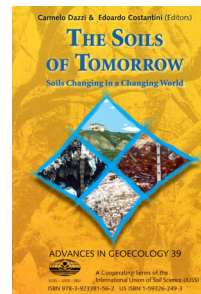
Soil and Land Survey Field Handbook, Third Edition, by the National Committee on Soil and Terrain. 2009. Australian. CSIRO Publishing. 264 pp.



The Australian Soil and Land Survey Field Handbook has been widely used throughout Australia, providing one reference set of definitions for the characterisation of landform, vegetation, land surface, soil and

substrate. The book advocates that a comprehensive suite of land and soil attributes be recorded in a uniform manner. This approach is more useful than the allocation of land or soil to preconceived types or classes. The third edition includes revised chapters on location and vegetation as well as some new landform elements. These updates have been guided by the National Committee on Soil and Terrain, a steering committee comprising representatives from key federal, state and territory land resource assessment agencies.

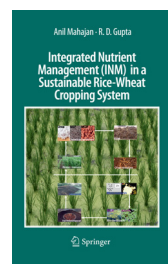
The Soils of Tomorrow - Soils Changing in a Changing World, by C. Dazzi and E. Costantini. Catena Verlag, 2008. Hardcover, 728 pp. ISBN 3923381562.



Man is considered the sixth factor of soil formation and his action can be so intense to completely modify the future evolution of the soils. The book reports selected papers from the 5th international congress of the European Society for Soil Conservation. The conference main goal was to promote

exchange and discussion about the consequences of man pressure on soil and landscape, and to stimulate the awareness in the civil society. The book is arranged under eighth interrelated chapters: Soil and society, Soil erosion, Soil organic matter, Soil degradation and desertification, Soil pollution and contamination, Soil conservation and soil quality, Policies for environmental conservation in a global society, and new approaches and technologies for soil assessment. A key note on the related state of the art opens each chapter. The book offers reflections, analysis, facts, new data, suggestions and recommendations, to questions linked to the unbalanced relationships between man and soil. An editorial and a resolution summarize the main outcomes of the conference.

Integrated Nutrient Management (INM) in a Sustainable Rice-Wheat Cropping System, by Mahajan, Anil, Gupta, R.D. Springer, 2009. 268 p., Hardcover ISBN: 978-1-4020-9874-1 .



India's rice and wheat crops are in crisis – a dangerous situation for a nation where 75 per cent of the population depends on agriculture for a living. Today's falling or static yields in these two key crops have been the result of the intensification of agriculture from the 1960s on. That so-

called 'Green Revolution', which depended heavily on chemical fertilizers and pesticides, saw crop production keep pace with population growth until the end of the last millennium. Today, however, the sector is suffering from depleted soils and reduced ground water levels. Past excesses have even left the current generation of farmers with health hazards. The authors of this volume, experts in agriculture and agronomy in the subcontinent, say a new approach is needed. India's population will rise from today's 1.18 billion people to as many as 1.5 billion by 2020, with 25 per cent more mouths to feed. Not only that, but agriculture's pre-eminent place in the country's economy, where it is 18 per cent of total GDP and the biggest single export sector, make any problem in the industry one of national importance.

Guidelines of the soil survey and data informatization methods (Linee guida dei metodi di rilevamento e informatizzazione dei dati pedologici) In Italian, with extended English abstract, Edoardo A. C. Costantini editor. CRA-ABP. Paperback, 280 p., CD-Rom, ISBN 9788890352102.



Soil knowledge is an essential element for the environment protection and for agricultural and soil use planning. The guidelines of the methods for soil investigation and data informatization is the reference text for Italy, supported and created under the auspices of the Italian Ministry of Agricultural Food and Forestry Policies. It collects the experiences of several national and regional research and academic Institutes on soil survey at different scales and makes reference to the European and International standards. The book is freely distributed on request to: CRA-ABP Piazza D'Azeglio 30 Firenze 50121 Italy (adding 3.95 euros in stamps).

Hormones and Pharmaceuticals Generated by Concentrated Animal Feeding Operations Transport in Water and Soil. By Shore, Laurence S.; Pruden, Amy (Eds.) Springer, 2009, X, 138 p. 23 illus., Hardcover. ISBN: 978-0-387-92833-3.



This book examines how hormones, antibiotics and pharmaceuticals generated from concentrated animal feeding operations (CAFOs) of cattle, poultry, swine and aquaculture are transported in water and soil. Little is known of the environmental fate of the tons of phys-

iologically active steroid hormones released each year. In the last 20 years considerable attention has been given to a wide variety of natural and anthropomorphic agents known as endocrine disrupting compounds (EDCs). While some advances in the understanding of the fate of these compounds in water has been made, little is known about the processes that govern their transport in soil or how they eventually reach groundwater. It is somewhat of a mystery how steroids, with their lipophilic nature, strong binding to humic acids and extensive metabolism by soil bacteria, can be transported through even a few centimeters of soil, let alone 20 to 40 meters to the groundwater. With respect to antibiotics, the emphasis is on their fate and transport in the environment and on the emergence of antibiotic resistant bacteria. Impacts on soil ecology, including the impact of antibiotics on the metabolism of other active agents, is also discussed. Similarly, the acaricides and insecticides used in animal husbandry are widely used and their environmental pathways have been studied and have significant impacts on soil and dung ecology. Active compounds with potential environmental impacts, such as growth promoters generated from CAFOs, are described.

Soil Science. Edited By A.E. Hartemink, A.B. McBratney and R.E. White. Earthscan Reference Collections 2009. 1667 pages. ISBN 9781844076468.



This four-volume set, edited by leading experts in soil science, brings together in one collection a series of papers that have been fundamental to the development of soil science as a defined discipline. Some of the papers were first published many years ago, but they remain classics in their fields and retain their relevance to the understanding of current issues. The papers have been selected with the assistance of an eminent international editorial board. The set includes a general introduction and each volume is introduced by a new overview essay, placing the selected papers in context. The range of subject matter is considerable, including traditional subjects such as soil genesis, physics and mineralogy, applied disciplines such as soils and hydrology, land degradation and plant nutrition, as well as more contemporary topics such as soil pollution, land use and environmental change. Overall, the set provides students and teachers, confronted with thousands of jour-

nal articles, book chapters and grey literature stretching back over nearly a century, with a ready-made selection of and commentary on the most important key writings in soil science. It will be an essential reference for libraries concerned with earth sciences, environmental studies, agriculture and forestry.

Soil and Culture. By Landa, Edward R.; Feller, Christian (Eds.). Springer, 2009, Approx. 500 p., Hardcover. ISBN: 978-90-481-2959-1.



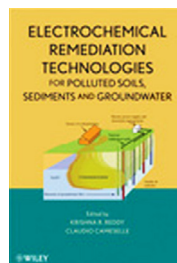
Soil has been called the final frontier of environmental research. The critical role of soil in biogeochemical processes is tied to its properties and place—porous, structured, and spatially variable, it serves as a conduit, buffer, and transformer of water, solutes and gases. Yet what is complex, life-giving, and sacred to some, is ordinary, even ugly, to others. This is the enigma that is soil. *Soil and Culture* explores the perception of soil in ancient, traditional, and modern societies. It looks at the visual arts (painting, textiles, sculpture, architecture, film, comics and stamps), prose & poetry, religion, philosophy, anthropology, archaeology, wine production, health & diet, and disease & warfare. *Soil and Culture* explores high culture and popular culture—from the paintings of Hieronymus Bosch to the films of Steve McQueen. It looks at ancient societies and contemporary artists. Contributors from a variety of disciplines delve into the mind of Carl Jung and the bellies of soil eaters, and explore Chinese paintings, African mud cloths, Mayan rituals, Japanese films, French comic strips, and Russian poetry. This is a non traditional volume which will serve the soil science community well while also reaching a broader earth science community such as geologists and geographers, as well as in the arts and social science communities.

Soils, Society & Global Change. EU JRC, 2009.

This book highlights how our ability to manage soils plays an important role in global challenges such as climate change, biodiversity reduction, food and water security, and economic and social progress. It explores policy and legal challenges, knowledge management issues, and the crucial role of soil in the successful implementation of the global environmental conventions. The book concludes with the Programme for Action which includes a number of proactive recommendations on

how global policies can be improved to protect soil as a resource.

Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater. By: Krishna R. Reddy, Claudio Cameselle. ISBN: 978-0-470-38343-8. Wiley, 2009.



Electrochemical technologies are emerging as important approaches for effective and efficient pollution remediation, both on their own and in concert with other remediation techniques. *Electrochemical Remediation Technologies for Polluted Soils, Sediments and Groundwater* provides a systematic and clear explanation of fundamentals, field applications, as well as opportunities and challenges in developing and implementing electrochemical remediation technologies. Written by leading authorities in their various areas, the text summarizes the latest research and offers case studies that illustrate equipment, installation, and methods employed in real-world remediations. Divided into nine sections, the coverage includes: Introduction and fundamental principles; Remediation of heavy metals and other inorganic pollutants; Remediation of organic pollutants; Remediation of mixed contaminants; Electrokinetic barriers; Integrated (coupled) technologies; Mathematical modeling; Economic and regulatory considerations; Field applications and performance assessment.

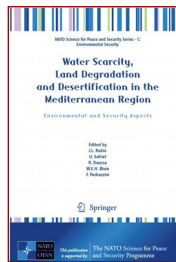
Fundamentals of Soil Mechanics for Sedimentary and Residual Soils. By: Laurence D. Wesley. ISBN: 978-0-470-37626-3. Wiley, 2009.



Despite its prevalence in under-developed parts of the United States and most tropical and sub-tropical countries, residual soil is often characterized as a mere extension of conventional soil mechanics in many textbooks. Now, with the rapid growth of construction in these regions, it is essential to gain a fuller understanding of residual soils and their properties—one that's based on an integrated approach to the study of residual and sedimentary soils. One text puts this understanding well within reach: *Fundamentals of Soil Mechanics for Sedimentary and Residual Soils*. The first resource to provide equal treatment of both residual and sedimentary soils and their unique engi-

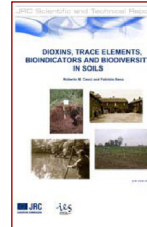
neering properties, this skill-building guide offers: A concise introduction to basic soil mechanics, stress-strain behavior, testing, and design; In-depth coverage that spans the full scope of soil engineering, from bearing capacity and foundation design to the stability of slopes; A focus on concepts and principles rather than methods, helping you avoid idealized versions of soil behavior and maintain a design approach that is consistent with real soils of the natural world; An abundance of worked problems throughout, demonstrating in some cases that conventional design techniques applicable to sedimentary soils are not valid for residual soils; Numerous end-of-chapter exercises supported by an online solutions manual.

Water Scarcity, Land Degradation and Desertification in the Mediterranean Region. Environmental and Security Aspects. Proceedings of a NATO Advanced Research Workshop. NATO Science for Peace and Security Series . Rubio, J.L.; Safriel, U.; Dausa, R.; Blum, W.E.H.; Pedrazzini, F. (Eds.). Springer 2009. ISBN: 978-90-481-2525.



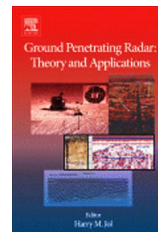
This book is the outcome of an international workshop promoted and organised by the Organisation for Security and Cooperation in Europe (OSCE) and by the Science for Peace and Security Programme of NATO. Its focus is the emerging issue of environment and security aspects in terms of water scarcity, land degradation and desertification in the Mediterranean Region. This region has been identified as one of the most vulnerable areas with respect to environmental security threats. Conversely, due to its climatic and topographic features, the cross-boundary dimension of the Mediterranean Basin, and its mix of cultural, political and economic diversity, the region also represents an area that poses the potential for social and political instability. The Euro-Mediterranean Region is affected by frequent severe environmental events, such as forest fires, floods and landslides, droughts, torrential rains, heat waves and water scarcity. The Southern and Eastern shores of the Mediterranean undergo even more harsh environmental impacts affecting the availability of water resources and the soil quality & productivity. These environmental conditions contribute to the development of negative processes, like social marginalization, conflicts and migrations.

Holistic approach to biodiversity and bioindication in soil. By Cenci, R.M. and Jones, R.J.A. (Eds). Office for the Official Publications of the European Communities, 2009.



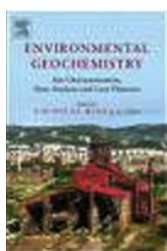
To study and investigate soil biodiversity is a difficult task because of the complex interactions that exist in soil and the need for considerable expertise to undertake the necessary investigations. The factors that influence biodiversity are diverse: some are natural, for example soil acidity, water retention, temperature and organic matter content, others are anthropogenic, for example human population pressure. This report summarises the results of the multidisciplinary BIO-BIO study of biodiversity.

Ground penetrating radar: theory and applications. Edited By H. Jol, Elsevier, Hardbound, 544 pages, 2008 ISBN-13: 978-0-444-53348-7.



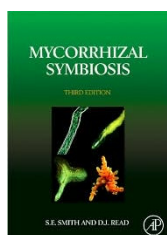
Ground-penetrating radar (GPR) is a rapidly developing field that has seen tremendous progress over the past 15 years. The development of GPR spans aspects of geophysical science, technology, and a wide range of scientific and engineering applications. It is the breadth of applications that has made GPR such a valuable tool in the geophysical consulting and geotechnical engineering industries, has led to its rapid development, and inspired new areas of research in academia. The topic of GPR has gone from not even being mentioned in geophysical texts ten years ago to being the focus of hundreds of research papers and special issues of journals dedicated to the topic. The explosion of primary literature devoted to GPR technology, theory and applications, has led to a strong demand for an up-to-date synthesis and overview of this rapidly developing field. Because there are specifics in the utilization of GPR for different applications, a review of the current state of development of the applications along with the fundamental theory is required. This book will provide sufficient detail to allow both practitioners and newcomers to the area of GPR to use it as a handbook and primary research reference.

Environmental geochemistry: site characterization, data analysis and case histories. Edited by B. De Vivo, H. Belkin, A. Lima. Elsevier Hardbound, 350 pages, 2008 ISBN-13: 978-0-444-53159-9. Contents: 1)Introduction. 2)The role of geochemistry



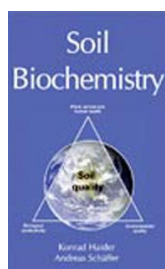
in environment and health problems. 3) Regional Programs. FOREGS. Sampling methods for different media - Stream sediments, soils, waters. 4) Environmental impact of the disposal of solid by-products from waste incineration processes. 5) Household hazardous waste disposal as a pathway for environmental pollution. 6) Sampling methods for site characterization and waste disposal. 7) Site investigations of stream and groundwaters: How to avoid getting into deep water. 8) Methods of chemical analysis of organics and quality controls. 9) Data base management at regional scale. 10) Data analysis and treatment, at local scale, using GIS and GeoDAS. 11) Evaluation of background/baseline values. 12) Geochemical mapping of urban areas. Examples on the municipal soils of Napoli, Avellino, Caserta, Benevento and Salerno towns. 13) Thermodynamics of platinum, palladium, and rhodium with inorganic ligands in the environment. 14) Trace metals speciation and bioavailability in soil. 15) Environment pollution, epidemiology and Workers problems. 16) Medical Geology: Application to arsenic and fluorine poisoning in southwest Guizhou Province, China. 17) Contaminated land in Britain. 18) The US brownfields program: Case studies reflect progress and challenges. 19) Case history of site characterization in Italy: Bagnoli brownfield site.

Mycorrhizal Symbiosis, 3rd edition. By S. Smith and D. Read. Academic Press, Hardbound, 800 pages, 2008. ISBN-13: 978-0-12-370526-6.



The roots of most plants are colonized by symbiotic fungi to form mycorrhiza, which play a critical role in the capture of nutrients from the soil and therefore in plant nutrition. *Mycorrhizal Symbiosis* is recognized as the definitive work in this area. Since the last edition was published there have been major advances in the field, particularly in the area of molecular biology, and the new edition has been fully revised and updated to incorporate these exciting new developments. Audience: Microbiologists, Applied Microbiologists, Biotechnologists, Soil microbiologists/scientists, Agricultural scientists, Plant scientists, Mycologists, Molecular Biologists.

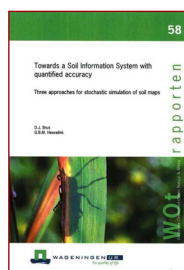
Soil Biochemistry. By Konrad Haider & Andreas Schäffer. Science Publishers, 1009. ISBN 978-1-57808-579-8; 132 pages.



Soils play a central role in the conversion of organic matter and element fluxes because of the large number of microorganisms present in the soil. In this book the more important processes that are driven by microbiological activity are discussed.

It will be of interest to students of chemistry, biology, ecology, soil science and related areas. Researchers from these fields will profit from extended literature surveys in each chapter comprising important findings from early as well as the most recent investigations. Contents: 1. Soil and Soil Life; 2. Aerobic and Anaerobic Degradation of Monomer and Polymer Plant Constituents by Soil Microorganisms; 3. Humus and Humification; 4. Turnover of Nitrogen, Phosphorus and Sulfur in Soils and Sediments; 5. Composting and Fermentation of Organic Materials; 6. Trace Gases in Soil; 7. Heavy Metals as Pollutants: Toxicity, Environmental Aspects, Resistance and Biotechnological Aspects

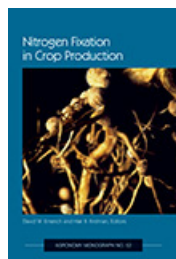
Towards a Soil Information System with quantified accuracy. Three approaches for stochastic simulation of soil maps. D.J. Brus & G.B.M. Heuvelink, WOT Natuur & Milieu. ISBN: ISSN 1871-028X.



Soil maps are usually constructed such that these provide the best estimate of the spatial distribution of the soil. However, the estimates contained in the soil map are typically based on limited knowledge and limited information. To acknowledge that soil maps are not free of errors, the uncertainty in the estimates may be represented with probability distributions. This report uses (geo)statistical methods to derive maps of soil type and soil properties from soil observations and explanatory information. A principal property of these methods is that these do not only produce a map but also quantify the associated uncertainty. Also, rather than storing maps, the new prototype Soil Information System stores geostatistical models and their input data, such that a map can be made upon request with the latest information available. Quantified uncertainty is needed, among others, to analyze how uncertainty propagates through process models that use soil maps as input. Methods are illustrated with examples from the Netherlands. Freely downloadable from:

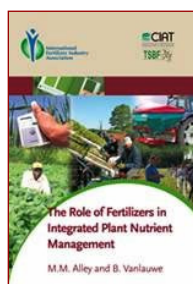
<http://library.wur.nl/way/bestanden/clc/1866662.pdf>

Nitrogen Fixation in Crop Production, by David W. Emerich and Hari B. Krishnan (Eds). Hardcover, 422 pages, 2009; ASA, CSSA, SSSA. Agron. Monogr. 52. ISBN: 978-0-89118-170-5.



The only book of its kind to present the science, application, and politics of the use of nitrogen-fixing crop plants across the globe in various environments, *Nitrogen Fixation in Crop Production* is a problem-solving look forward to the next Green Revolution. Nitrogen fixation can help provide a growing population with a nutritious, environmentally friendly, sustainable food supply. From new “omics” approaches to the role of nitrogen fixation in mitigating greenhouse gas emissions, from farming strategies in nonindustrialized nations to nitrogen fixation in the global economy, scientists will find the key issues and expanding research areas, and how they contribute to the next wave of advancements related to agriculture and the environment.

The Role of Fertilizer in Integrated Plant Nutrient Management, by Mark Alley and Bernard Vanlauwe, IFA Paris, 2009.



This booklet is written for farmers, students, researchers, extension personnel, agribusiness representatives and policy makers to provide an overview of the concepts of Integrated Plant Nutrient Management (IPNM) and Integrated Soil Fertility Management (ISFM).

Integrated Plant Nutrient Management focuses on efficiently utilizing all available sources of essential nutrients for crops. Integrated Soil Fertility Management provides a framework for managing soil fertility to sustain and improving soil quality and production capacity. The combination of these concepts provides a holistic view of providing plant nutrients and maintaining and/or enhancing soil productivity. Specific aspects of IPNM and ISFM are discussed, as well as the use of nutrient budgets for assessing nutrient use on a farm, watershed, regional or national basis. It is hoped that this booklet will lead to more efficient use of plant nutrients for increasing food production and sustaining and increasing soil productivity in an environmentally sensitive manner. You can download it at: www.fertilizer.org or order hardcopies from the IFA Secretariat sending an e-mail to:

publications@fertilizer.org

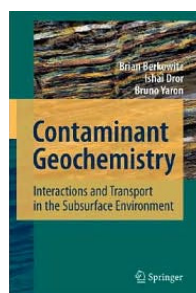
Soil: Earth's living skin (Dossiers d'Agropolis International n°8), by Benoît Jaillard (INRA) and Roland Poss (IRD), 52 pp. 2009 (in French and English).



The main objective of this “dossier” is to provide a better understanding and a better knowledge of the competence and of the potential of the several hundreds of scientists involved in soil research and teaching located in southern France—a major European hub of

activities in soil science. It also aims at facilitating the contacts for the development of scientific and technical exchanges and cooperations. This “dossier” was certified by the French committee of the International Year of Planet Earth. Table of content: Soils produce food and clothing for people; Soils regulate inland water flow; Soils regulate biogeochemical nutrient and pollutant cycling; Soils are living environments that harbour multifunctional organisms; Soils maintain an evolutionary record of ecosystems and humankind. Download this brochure from: www.agropolis.org/pdf/Dossiers-Sols-Eng-52p.pdf Contact: Nathalie Villeméjeanne, Agropolis International – villlemejeanne@agropolis.fr

Contaminant Geochemistry: Interactions and Transport in the Subsurface Environment. Brian Berkowitz, Ishai Dror & Bruno Yaron, Springer 2008 ISBN: 978-3-540-74381-1.



This book combines soil science, subsurface hydrology and environmental geochemistry, providing a comprehensive background for specialists interested in the protection and sustainable management of the subsurface environment in soils vadose zone, and ground water. Initially the reader

is introduced to the characterization of subsurface environment, to selected geochemical processes, and the chemistry of selected contaminants in the soil and subsurface. The major focus of the book is on contaminant partitioning and reactions in porous media solid phases, soil solutions, and groundwater, accounting for their persistence and transformation in the subsurface, as they are transported from the land surface into groundwater. Case studies discussions are provided for each part of the book illustrating many of the subjects presented.

Frontiers in Soil Science Research: Report of a Workshop, by the Steering Committee for Frontiers in Soil Science Research, National Research Council. Paperback, 80 pages, 2009; National Academies Press. ISBN: 978-0-309-13891-8.



Interest in soil science has been renewed with the recognition that biogeochemical processes occurring at the Earth's surface influence global climate change, land degradation and remediation, soil and water conservation and quality, food sufficiency and safety, and many other issues pertinent to the stewardship of land and water resources. Addressing these challenges will require advances in soil science research that need to be communicated to all stakeholders. In December 2005, the National Academies convened the Frontiers in Soil Science Research Workshop, summarized in this volume, to identify emerging research areas by addressing the interaction of soil science subdisciplines, collaborative research with other disciplines, and the use of new technologies in research. <http://www.nap.edu/catalog/12666.html>

Manual of Methods for Soil and Land Evaluation. Editor Edoardo A. C. Costantini. Science Publishers, Enfield, 2009. 600 pp. ISBN 978-1-57808-571-2.

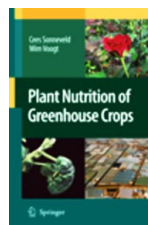
The goal of the manual is to supply an operational tool for pedologists, agronomists, environmentalists, and all of the other specialists who carry out land evaluation for agriculture and forestry or, more generally, stakeholders and policy makers who make decisions at the local level based on the knowledge of the nature of soil. Discussion of the topics is not only technical and operational, but also in-depth and didactic; therefore, the text may also be used as a valid complement for students majoring in subjects that involve soil use, management and conservation. The literature offers a wide choice of possible soil and land evaluation methods, while knowledge of the relationships existing between the physical characteristics of lands, particularly those of soils, and the requirements of specific uses is limited.

Chemical Elements in Plants and Soil: Parameters Controlling Essentiality. By Fränzle, Stefan 2009, Approx. 180 p., Hardcover ISBN: 978-90-481-2751-1. Earlier works on plant essential elements have revealed a series of complicated, counter-intuitive relationships among various chemical elements in different plant species, due to both unlike usage of



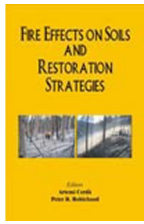
certain elements in plants and to different carriers effecting resorption and transport. In an attempt to provide a more coherent theory behind plant mineral nutrition, this groundbreaking book adopts a very different approach from the existing literature, presenting an explanation of the essentiality of chemical elements in biological systems and the application of stoichiometric network analysis (SNA) to the biological system of elements. Starting with data from biochemical environmental analysis, and a discussion of the phenomena involved in metal ion partition and autocatalytic behaviour, conditions and criteria controlling the partition of metals into biomass are investigated. Several rules are derived and investigated in terms of their interaction both in comparisons among contemporary organisms and in terms of evolution. This allows the construction, for example of a map which directly traces the biological feature of essentiality to parameters of coordination chemistry.

Plant Nutrition of Greenhouse Crops. By Sonneveld, Cees, Voogt, Wim. 2009, XV, 431 p., Hardcover ISBN: 978-90-481-2531-9.



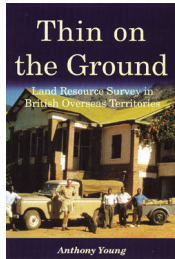
Greenhouse cultivation is noted for its high uptake of minerals, consistent climatic conditions, exclusion of natural precipitation and control of salt accumulation. Acknowledging that plant nutrition in greenhouse cultivation differs in many essentials from field production, this volume details specific information about testing methods for soils and substrates in a greenhouse environment. It does so while offering a universally applicable analysis. This is based on the composition of the soil and substrate solutions, methods for the interpretation of tissue tests, and crop responses on salinity and water supply in relation to fertilizer application. Fertilizer additions, related to analytical data of soil and substrate samples, are presented for a wide range of vegetable and ornamental crops. The subject is especially apt now as substrate growing offers excellent possibilities for the optimal use of water and nutrients, as well as the potential for sustainable production methods for greenhouse crops.

Fire Effects on Soils and Restoration Strategies. Edited by: Artemi Cerdà and Peter R. Robichaud. 2009 Science Publishers, USA. ISBN 978-1-57808-526-2.



This book has been published a decade after *Fire's Effects on Ecosystems* by DeBano, Neary, and Folliott (1998), and builds on their foundation to update knowledge on natural post-fire processes and describe the use and effectiveness of various restoration strategies that may be applied when human intervention is warranted. The chapters in this book, written by leading scientists, have been compiled to provide relevant and accessible information to students, land managers, and policy-makers as well as other scientists.

Thin on the Ground: Land Resource Survey in British Overseas Territories, by Anthony Young. The Memoir Club, 2007, paperback 978-1-84104-175-9, £14.50.



Gives an account of soil survey and other types of land resource survey for agriculture in 48 tropical and subtropical countries of the former British Commonwealth. Beginning with the pioneering period between the two world wars, the main account covers what is referred to as the "golden age" of soil survey, 1950-1975. The work of soil surveyors in the colonial service was continued after countries achieved independence by the Land Resources Division and in surveys by FAO and consultant companies. The author draws upon his own extensive experience together with accounts by over 90 former soil surveyors. The uses to which surveys were put, including reasons for insufficient use, are discussed. The final chapter is a retrospect on the achievements of these surveys, and what should be the role of the field study of soils, including soil monitoring, in land resource development at the present day.

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	Sir John Russell †	UK		1990	G. Aubert †
S. Winogradski †	USSR	E.G. Hallsworth †	Australia		
1927	P. Treitz †	Hungary	J.S. Kanwar	India	
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	A. d'Sigmond †	Hungary	R.W. Simonson †	USA	
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	D.J. Hissink †	Netherlands	K.H. Hartge †	Germany	
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	F.A. Bear †	USA	S.V. Zonn †	Russia	
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	M.K. Kononova †	USSR	A. Ruellan	France	
	A. Oudin †	France	A. Tanaka	Japan	
	F. Scheffer †	Germany	P.B.H Tinker	UK	
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	V. Ignatieff †	Canada		H-P. Blume	Germany
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	L. Krolkowski †	Poland		S-J. Cho	South Korea
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	V. Kovda †	USSR	J.H.V. van Baren †	Netherlands	
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