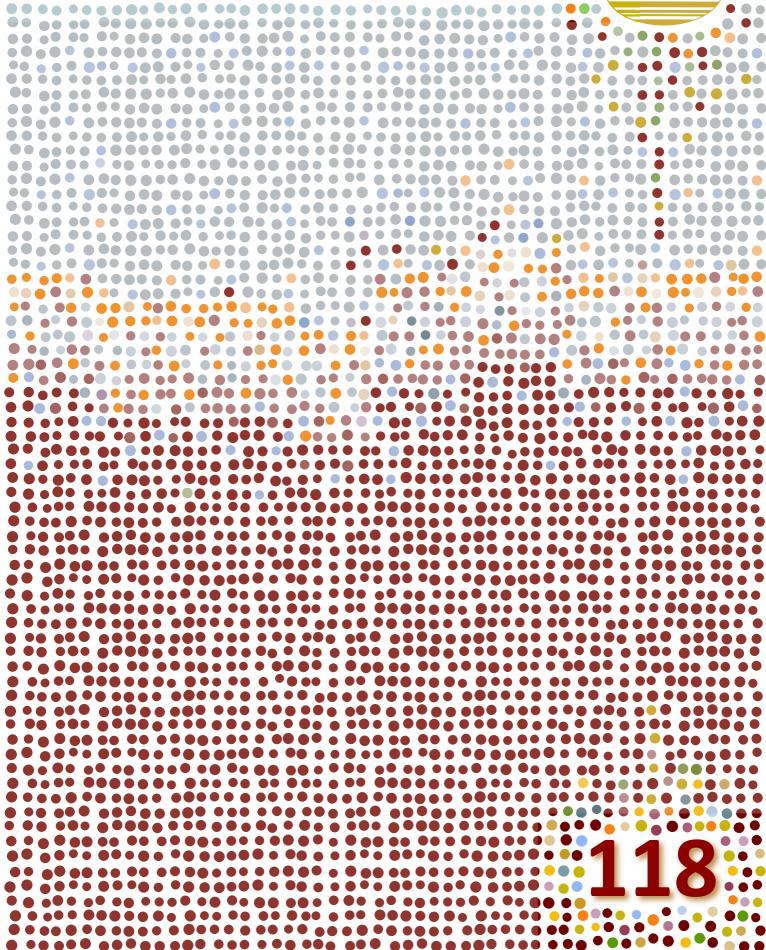
## IUSS Bulletin

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### International Union of Soil Sciences (IUSS)

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 send to the editor.

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JUNE 2011

### **Editorial**

In January 2011 I officially took over the IUSS Secretary General position from Stephen Nortcliff. In this editorial I would like to look back a little and make a few personal notes; in the next section we will discuss some of the ideas and future plan for the IUSS.

I arrived at ISRIC in Wageningen (The Netherlands) in January 1999 after a decade of soil research in several tropical countries. Being slightly bibliophilic I soon became friends with Hans van Baren who was the Book Review Editor of the IUSS Bulletin and the Deputy Secretary General. Through Hans I developed a keen interest in the IUSS and when I proposed in 2001 that the IUSS should start a website Hans was immediately supportive and arranged for some funds. IUSS Bulletin 99 produced by Winfried Blum was the first IUSS Bulletin to be placed on the website (not as a PDF but all sections as separate HTMLs). The IUSS website rapidly expanded and grew to over 140,000 visitors per year. It is an essential element in the communication with our global membership and for anyone interested in the global union of soil scientists.

Hans van Baren mentioned in early 2002 that he would like to step down as Deputy Secretary General and he and Wim Sombroek (Secretary General from 1978 to 1990) asked whether I was interested in taking over the position. At the 17th World Congress of Soil Science in Bangkok the IUSS council elected me to that position and at the same time Stephen Nortcliff was elected Secretary General. Stephen had been my PhD co-supervisor so we knew each other well when we started in 2002. In the past eight years Stephen and I have worked as a team effectively and collegially. Stephen has greatly contributed to the many advances that the union has made - organisationally, financially and scientifically. Thank you Stephen for all your hard work for the union and for the many years of friendship. The IUSS can be extremely pleased that Stephen has agreed to become the Budget and Finance Committee chair so will remain active in the IUSS. This is good for our corporate memory.

In 2008, I had informed the IUSS council that I had no longer the desire to stay on as deputy after 2010. At the same time, Alex McBratney of the University of Sydney (Australia) and I worked out a proposal to solicit for the vacant Secretary General and Deputy positions. We have worked together on many different global projects and publications since 2000 and presented our interest to the council at the World Congress of Soil Science in Brisbane. In the next section we will present some of our ideas.

Now a bit on this IUSS Bulletin. This is the 16th IUSS Bulletin that I have compiled and edited (for comparison, Prof. F.A. van Baren - Secretary General from 1950 to 1975 produced 44 Bulletins). In the last 16 Bulletins there has been a section in which some of our members have been put in the spotlight through the "Five Questions to a Soil Scientist" and through section on "Favourite Soil Science Books". We have also had several short articles on specialised topics of interest to the wider soil science community and of course many reports of many meetings, book reviews and other contributions of the global soil science community. The aim of all that is to inform the global membership but also to give the IUSS a face and a podium for the exchange of professional views and personal information. The IUSS an union of national societies and from now on we will give national societies the opportunity of discussing how it attracts and engages its members and other noteworthy activities. In this bulletin we start off this series with an article by Ellen Bergfeld of the Soil Science Society of America who discusses some of their activities. In each Bulletin a national society will be able to share its ideas and it is hoped to be inspirational for other societies.

One of the activities on our work slate is to produce a Strategic Plan for the IUSS. We hope to have a draft for consideration and feed-back by the national societies and divisions, commissions and working groups by the mid-term meeting in the Republic of Korea in June 2012.

I have taken up a position in the Department of Soil Science at the University of Wisconsin, Madison

(USA) and will start there in September 2011. This relocation of myself and some IUSS systems will cause some disruption for which I apologise in advance. I will try to minimise that as much as possible.

Finally, on behalf of the IUSS I wish to thank ISRIC for hosting the ISSS/IUSS Secretary General and Deputy Secretary General for the past 45 years. The institute has always been very supportive of the work and has made many substantial contributions to the running of the IUSS. On behalf of the global soil science community I thank ISRIC for all its support to the IUSS, and look forward to its ongoing support.

Alfred Hartemink Secretary General International Union of Soil Sciences May 2011

# Some ideas on the International Union of Soil Sciences

When the vacancies for the IUSS Secretary General and Deputy Secretary General were advertised we wrote a statement of interest. It was distributed at the IUSS Council meetings. We send in our statement as a team as we think that these positions are best filled by two people that work well together. Here a little sum-up of our joint activities of the past decade: We have formulated at the second IUSS global workshop on Digital Soil Mapping in Rio de Janeiro, Brazil (July 2006), the idea of a new digital soil properties map of the world. It lead to the GlobalSoilMap.net project which has received 18 million US\$ funding from the Bill & Melinda Gates foundation. It is a global IUSS project that involves soil science centres in each of the continents and many soil scientists. We are both Editors-in-Chief of Geoderma (Alex since 1995, Alfred since 2006) and initiated and edited the book series *Progress in Soil Science*. We have edited the book Digital Soil Mapping with Limited Data (2008) and the over 1,600 pages Major Reference Work Soil Science, published by Earthscan (2009). Here we present an abridged version of our statement of interest to share we the global soil science community:

The IUSS should primarily serve and cement the global soil science community, and promote soil science and all its activities. This should be done by:

- enhancing the management of the organization,
- stimulating all soil science initiatives inside and outside the IUSS, and
- improving communication with other scientific disciplines and the general public.

We should have, at any given time, a clear idea of our priority projects for enhancing the functioning and impact of the IUSS. Some of these will be existing projects, and some will be yet to start. Some will be relatively achievable within a short time-frame, and some will address issues that are a little more intractable. All IUSS members should have enough information about these projects to be able to contribute ideas and track their progress. For this reason, we intend to develop a Work Slate of around ten priority projects. It is a list of projects, linked to our yet-to-bedeveloped Strategic Plan, which need particular attention and includes those issues raised as most urgent.

We shall update the Work Slate frequently on the IUSS website and encourage members to submit their thoughts and comments.

In order to achieve the IUSS mission the work slate for the next four-year period includes:

- Creation of an IUSS Strategic Plan for the next eight years with agreed mission, goals, performance indicators, and external evaluations
- Speeding -up and improved transparency of decision making within the organization using a variety of strategies, e.g. online voting for positions, council teleconferencing and voting electronically whenever needed
- Improved communication via the IUSS website, e.g. RSS feed, content management system (allowing password users to add content) making the website more interactive
- Comparison of cost models and management structures of other (geo)unions
- Refresh current division and commission structures
- Continue to increase the soil science profile by plugging the IUSS and soil science into the wider scientific arena (e.g. Millennium Devlopments Goals, UNEP-GEO, World Bank, ICSU Geo-unions etc.)
- Publish a series of popular brochures for the general public on current themes in soil science
- Develop strategies for attracting more young people and women into the IUSS community

There are a large number of activities and responsibilities for the IUSS Secretary General and the Deputy, these include:

- day- to-day management and administration of IUSS including close communication with IUSS officers, national member societies and representatives, and individual members
- representation of IUSS at meetings of national member societies, the International Council of Science (ICSU), and other organizations such as the FAO, UN-FSCO:
- conducting elections of division and commission officers; working with the IUSS Treasurer and Chair of the Budget and Finance Committee to ensure the collection of dues and certification of members;



- with the President, members of the Bureau and with other IUSS officers, prepare and disseminate the agenda, reports, and minutes for Executive Committee and Council meetings;
- publish the IUSS Bulletin;
- maintenance of the IUSS website; and dissemination of further information about IUSS, e.g., IUSS Alerts. Since we have worked on several projects and activities together for the past 10 years we clearly envision sharing this workload.

We realise there is a large task ahead positioning the IUSS and to enhance our scientific discipline. We look forward working with all of you and are open to all your suggestions to make the IUSS an effective global union of soil siences!

Alfred Hartemink Alex McBratney May 2011

### From the National Soil Science Societies:

# Soil Science Society of America: Today and Tomorrow

#### by Ellen Bergfeld

I was asked to write a short column on how the Soil Science Society of America (SSSA) has been working to attract and engage (retain) members. While SSSA has undergone a fair amount of change in the past decade plus, my perspectives encompass the past eight years and from all indications, we will continue to accelerate in terms of our continued evolution in the coming years.

#### **Structure**

SSSA has desired an independent image from that of the American Society of Agronomy and the Crop Science Society of America for decades. From a structural standpoint, within the past 5 years this was achieved through the creation of a support organization, the Alliance of Crop, Soil and Environmental Science Societies (ACSESS) which provides the management and staff for SSSA and other scientific organizations. This restructuring also allowed us to streamline the SSSA Board and hone our programmatic focus.

### **Programs and Services**

The Soil Science Society of America has prioritized *member value* throughout the last three strategic plans/updates, spanning nearly 8 years. Overarching goals include:

- Expand and enhance services provided to the increasingly diverse range of soil scientists in public and private sectors who will benefit from membership in SSSA,
- Foster the advancement of soil science and the international exchange of ideas and knowledge of soils by disseminating, through publications, professional meetings and other communication and outreach efforts, the contributions and applications of fundamental and applied soil science research,

- Participate in relevant public policy issues by providing science based, relevant and timely input for decision-making, and
- Promote relationships, interactions, partnering, and institutionalization of soil science.

While these are lofty goals and we have plenty of room to continue to advance, there are a few areas where we are making progress and which deem mentioning.

Within the Society, there have traditionally been numerous opportunities for members to become involved and hone their leadership skills. SSSA has more than 100 committees with nearly 600 SSSA members participating, including the governing board, certification, publishing, membership, meetings, science policy and the like. Committees and task forces are now provided defined charges as well as timeframes for engagement and goal completion so that our volunteer members are able to provide expertise for a given, defined period. As we prioritize new areas of opportunity, such as K-12 education, committees increasingly include both members and non-members (K-12 teachers) as outside expertise. This dynamic approach to addressing the goals within the larger context of what is needed in the K-12 teaching community allows us to make more rapid and beneficial advances than what had been possible working on our own.

We continue to evaluate opportunities to enhance our collaboration with other organizations to leverage our message about the fundamental importance of soil. Our participation and collaboration with Smithsonian's National Museum of Natural History to develop *DigIT! The Secrets of Soil* exhibit provided an excellent opportunity to reach millions of adults and children.

Through our science policy office, SSSA strives to educate policymakers and staff within U.S. federal departments and agencies to interject science into policy and positively influence federal funding for, and

legislation impacting, soil science. Through our grassroots program we work closely with the more than 6,000 constituent member scientists as ultimately the success of our efforts and future federal funding of our sciences depend on the critical relationships developed with Congressional delegations.

In 2010, SSSA determined that we weren't adequately addressing the needs and values of our graduate students and early career members. To gain a more comprehensive understanding of this void, we held a graduate student and early career summit last summer. Important outcomes included the creation of an early career board position, a grad student/early career advisory committee and additional K-12 activities including book projects, participation in outreach activities, and dissemination of teacher resources. An additional outcome was a greater realization that the division structure of the society was viewed as inflexible, outdated and unwelcoming to many prospective members. A reorganization task force was subsequently appointed and is in process of executing their charge of examining the society structure to maximize appeal and engagement.

On the publishing front, SSSA historically published primarily with our members in mind; whereas we now publish with the broader educational context in mind—more audiences across a wider range of ages, education levels, and areas of interest that may intersect with soil, as well as more formats and potential for collaborations. All of our educational outreach activities spring from our core mission: to advance soils as fundamental to life.

SSSA has also invested in the profession through promotion of both certification and licensing programs and through developing performance objectives, national exams and recognizing state licensing and certification processes. These activities have defined the practice of soil science thus providing a more comprehensive understanding of what type of work soil scientists perform as well as assurances of the competency of soils practitioners.

### **Looking Ahead**

Our 2011 foci include science communications, science policy, and science education. With the celebration of the 75<sup>th</sup> anniversary of SSSA this year, we are making a concentrated effort to focus outwardly, to increase public awareness of soils and the grand challenges facing the soil science disciplines. We need to expand the perception and knowledge of the general public about the fundamental role of soil and soil science

ence in our everyday lives and general welfare.

We will continue to face the future challenge of significantly expanding our image to include a broad spectrum of interests in soils, such that SSSA is attractive to a much larger audience and is valued by a much more diverse cadre of potential members. SSSA is looking forward to the next 75+ years in its history, as the importance of the soil ecosystem moves to the forefront of discussions about climate change, food security, water quantity and quality, contamination, and human health. Anniversary celebrations will culminate at the 2011 Annual Meetings, 16–19 Oct. 2011 in San Antonio, TX.

For more information on the Annual Meetings, visit www.acsmeetings.org. Additionally, to celebrate its anniversary, SSSAJ will publish historical perspectives throughout 2011.

# Charles Darwin and the discovery of bioturbation in the year 1837

by Hans-Peter Blume Professor Emeritus, 24098 Kiel University, Germany hblume@soils.uni-kiel.de

This is a shortened version of a paper which appeared in Annals of Agrarian Science , Vol. 9, no. 1, pp. 69-74

When in autumn 1836 Charles Robert Darwin (1809-1882) returned to England from his great five years lasting expedition aboard the Beagle round the world, the Geological Society of London waited for his report on his impressions and discoveries as an explorer. On the 1st of November, 1837, he gave instead of the expected information the lecture On the Formation of Mould, talking about the effects of earthworms on the soil under meadows in Maer Hall, Staffordshire (Darwin 1838). In the following Darwin's observations and their importance for soil science will be presented.

Darwin had learnt from Josia Wedgwood (1769-1843), his uncle and later on his father-in-law from Maer Hall that in several cases gravel disappeared some years later which had been deposited on the soil surface (Darwin 1838). By digging the soil to several cm depth, the gravels were found again. The farmers believed that they had sunk in. Darwin

found that The top three inches of the soil, the mould, were completely free of gravels, followed by a gravel layer. Below the gravels he found earthworms. On the soil surface he saw earthworm excrements among the blades of grass. Therefore Darwin assumed that the upper 3 inches (7.5 cm), respectively the mould, had been completely swallowed by the earthworms during the last 15 years and had been excreted and deposited again on the soil surface. He was confirmed in his results in two other sites. He suggested to better call this loose, crumby, gravel- and stone-free vegetable mould of meadows as animal mould, because it had completely passed the animals' intestinal canals. Because of that idea Darwin had discovered the bioturbation by earthworm activity.

Darwin's last published book The formation of vegetable mould through the action of worms of the year 1881 also deals with bioturbation. It describes that he 1843 again had studied the three sites which he already had investigated before in the year 1837. Then he found a depth increase of the pebble layer. Investigating seven other sites he found an average annual depth increase of the pebbles of 4.8 mm. From these results he derived an average annual transfer of 1.8 - 4.5 kg soil m-2 by earthworm activity (Tab. 1).

animals	ecotop	amount
earthworms	meadows (UK) [Darwin 1881]	1.8 – 4.5
earthworms	gardens (Central Europe)	1.0 – 2.5
earthworms	forests (USA)	1.8
earthworms	tropics	3.6 - 27
ants	forests (Central Europe)	3.1
ants	steppes	3.1
ants	moist areas (USA)	2.0
ground squirrels, susliks	steppes (Russia)	1.8
prairie dogs	prairies	7.0
termites	savanna	1.2
lugworms	mud flats (Europe) [Cadeé 1976]	

**Tab. 1:** Bioturbation in soils by animals; in kg/m<sup>-2</sup> a<sup>-1</sup> (after Darwin, Cadeé; Blume et al. 2002: Tab. 3.2-14-7)

### The importance of the discovery for contemporary soil scientists

In the year 1862 the Swedish quarternary geologist and pedologist Hampus von Post (1822-1911) was the first to describe, investigate and classify the forms of humus Mylla (engl. mull), Torf (peat) as well as Dy (dy or peat mud) and Gyttja (gyttja or eutrophic mud). In his paper Studier öfverNutidenskoprogenajordbildningar (Studies about coprogenic soil formation 1862) he showed with observations in the field and with the microscope similar to Darwin that many top horizons of soils consist of crumby coprogenic aggregates.

In the years 1870/80 the Danish forest soil scientist Peter E. Müller (1840-1926) investigated forest soils, in fact mainly their humus forms under beech forests (Müller 1879; 1887): Loamy soils from till showed a 20 - > 60 cm thick loose and humose topsoil under freshly fallen beech litter. In a moist condition its colour changed with the depth from black-brown to grey-brown. The humus contents con-tinuously decreased from 7 to 1%. The follow-

ing subsoil was denser and free of humus. The topsoil mostly had a lower clay content than the subsoil which (correct from actual view) was interpreted as a consequence of a clay migration from the topsoil to the subsoil. He called the form of the humus of such loamy soils (today Luvisols) Bøgemuld (beech mull). Sandy soils from gravel sands showed a humus layer with more than 30 % humus which was black-brown and relatively dense. With a sharp transition a humus-free light-grey sand followed, which was classified Blysandet (lead sand). This layer had a thickness of 1- >20 cm and then changed into a dark-brown to red-brown layer which contained 1-5 % humus. In a loose condition it was called Røtjord (red earth), in a solid condition Rødjordslag (iron pan or ortstein). Beneath a light sand to loamy sand followed. The form of humus of these sandy soils was called Bøgemor (beechmor or duff mull). From today's view the described soil was a Podzol (Müller (1879) subdivided von Post's Mylla (Post 1862) into muld and mor.

Inspired by Darwin's (1838) and von Post's (1862) research, Müller also investigated the animals of the described soils as well as their tracks in the field and

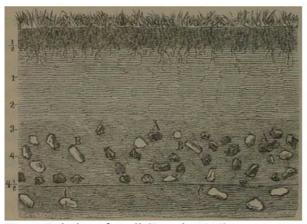


Fig. 1: Painting of a soil (Darwin 1838)

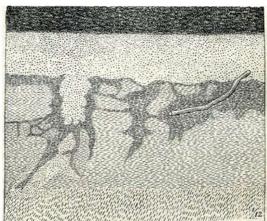


Fig. 2: Painting of a soil (Müller 1879)





Fig. 3: Road cut of Ethopia; loose stone-free above Fig. 4: Stone ring near Casey, Continental Antarctic stone layer above weathered granite (Blume 1968) (centre with a 10 cm long red knife: Blume 1990)

**JUNE 2011** 11 under the microscope. In the soil of the humus form Bøgemuld he found earthworms (Lumbricus terrestris and L. rubellus) as well as their tubes in the topsoil and subsoil, and their excrements on the soil surface. Furthermore, he found moles. Therefore he concluded that the humus enriched topsoil was loosened and eaten by earthworms and deposited as excrements or crumbs on the soil surface. So for him the humus form Bøgemuld was a consequence of litter decomposition, bioturbation and crumbling by earthworms. In contrast he did not find earthworms or moles or even their marks in the soil of the humus form Bøgemor. He only found some enchytraeids, larva of insects and land crustaceans (perhaps mites). There was no bioturbation.

The Russian soil scientist Vasilij V. Dokuchaev (1846-1903) wrote in his thesis Russian Chernozem (1883) about Darwin's book (1881), but he did not recognize the importance of earthworms and other soil organisms for the formation of Chernozems. He preferred the hypothesis that chernozem is loess permeated by vegetal humus by water percolation through the soil. But 1892 he changed his mind and accepted bioturbation as a soil forming process. He included soil organisms in his equation of soil formation (Dokuchaev 1899):

soil = f(cl, o, p) tr

in which cl is regional climate, o vegetation and animals, p the "geologic substratum", and tr relative age (youthfulness, maturity, and senility).

### The actual importance of the discovery

Today bioturbation by soil organisms is a generally accepted process of soil formation (Blume et al. 2002: chapter 8.2.7 Turbations). In the steppe areas of Eurasia earthworms as geophages together with burrowing animals (susliks, hamsters, mice) deeply mixed loamy and silty soils, and create Chernozems with partly >1 m thick Ah-horizons (animal moulds). In the prairies of North America earthworms and ground squirrels do a similar work. Mainly under deciduous woods of the European temperate zone earthworms together with moles, cockchafers, and dung beetles as shovel digger live producing 10-30 cm thick, crumby, humose Ah horizons by decomposing, loosening and mixing the soils [4]. In sandy soils ants as mouth digger can work in a similar way (Tab. 1).

In silty Tidali-salic Fluvisols of the North Sea coasts

of the Wadden Sea mainly the lugworms (Arenicola marina) as geophages permanently mix with high intensity the upper 15 to 25 cm of the soils (Tab. 1). They form a loose top soil above a layer of coarse sand and shell of mussels (Cadeé 1976) similar to the gravel layer of Darwin (1838).

In African and Australian savanna areas and deserts mainly termites as mouth digger dig several meter deep, to transport moist fine soil material for building mounds upon the soil surface as well as for subsurface galleries and chambers (Holt & Lapage 2000). Often they have formed thick, loose, graveland stone-free soils above a buried gravelly and stony layer.

Other soils are formed by cryorturbation or peloturbation. Cryosols are formed in permafrost areas. After the melting period in summer the soils freeze again from the surface, and the underlying soil which is water-saturated above the permanently frozen subsoil gets under pressure and is transported upwards as a wet and mixed paste. In this process gravels and stones are transported to the surface where they form stone circles or on slopes stone stripes (Blume et al. 1997).

In Vertisols similar processes occur. During the dry seasons cracks are formed by shrinking which can be several m deep and several cm wide. They are filled by the wind with very small clay aggregates which were formed at the soil surface by self mulching. This process depends on dew falling at the end night which alternates with drying periods at noon (Yaalon & Kalmar 1978). Deep-founded remoisturing during the rainy season leads to soil swelling. The dry cracks filled with topsoil produce a swelling pressure upwards. A soil mixture occurs which creates deep-founded Vertisols. At the soil surface circular sinks appear, at the slopes stripelike sinks which appear as a gilgai relief (Hallsworth et al. 1955). We call this peloturbation (Greek pelos = clay). Peloturbationoccurs gravels (particles of rocks or hard iron and carbonate concretions) move upwards. Peloturbation even occurs in the clayrich soils of the European temperate zone. There are Vertic Cambisols with distinct slicken sides in the subsoil (German: Pelosole) and a clay-impoverished topsoil (Blume et al. 2002).

I assume that swelling and shrinking processes not only influence the North German clay soils, but also — with a reduced effect—the loamy Luvisols, which causes a movement of gravels and stones to the soil surface. So I declare that I under pasture did not find the loamy soils of till described by Darwin with

a stone-free animal-mould above a gravelly and stony-layer.

As a result I can emphasize that bioturbation causes the migration of fine soil to the soil surface and the occurrance of gravelly and stony layers below. In contrast, cryoturbation and peloturbation lead to an active movement of gravels and stones to the soil surface.

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# The Action 'Soil of the Year' in Germany

by Monika Frielinghaus frielinghaus@zalf.de

"There is no matter in nature that is more relevant and more worthy to contemplate as soil"

This sentence was already formed in 1862 by Frederic Albert Fallou and it has not lost its significance until today. Soils are threatened in their multifunctionality by pollutants and chemical substances, climate change, sealing and erosion which are caused by any wrong or mal-adapted soil use. Any human activity uses soil in a direct or indirect way. Therefore, everybody is a "soil stakeholder" and has to take over responsibility. However, without the awareness how valuable soils are, soil conservation can not be successful. This insight, which means the understanding of soils and their problems, has to be build by education and knowledge transfer. This was the background for members of the German Soil Science Society and the Federal Soil Association of Germany to initiate the action "Soil of the year" in 2004.

#### The start of the Action

A curator ship had prepared a concept for the start and a well documented selection about the first submitted nominated Chernozem, Soil of the Year 2005. The Soil of the year 2006 was the Albic Luvisol ("Fahlerde"), followed by the Podzol ("Podsol") (2007), the Cambisol/ Arenosol ("Braunerde") (2008), the Calcareous Marsh ("Kalkmarsch") (2009), the UrbicAnthrosols/ Technosols ("Stadtböden") (2010) and the Vega – Fluvic Cambisol or Fluvisol ("BraunerAuenboden") (2011)

The special target Groups for the action were the complete community like

- nursery schools,
- schools, universities,
- research institutes,
- all soil experts and societies
- all kind of medias,

- museums.
- land owners in agriculture, forestry, horticulture,
- landscape architects and planning agencies,
- nature and water conservators,
- all responsible experts in offices, who support and force politicians to make intelligent decisions and help to apply them,
- all of citizen in towns and rural areas.

In the planning phase members of the curator ship learned the necessity of a didactic specification for the soil understanding and the action.

The modern environmental communication underline the preference of activities against long term, persistent or inveterate processes due to soil change and soil degradation. These processes are running low visible and often without dramatic. This kind of communication needs knowledge about the complexity of soil problems with all different aspects to start an expert feeling, mental attitude for regarding emotions, own moral concepts and action readiness, real behaviour to react in everyday situation. These didactic specific has to consider in every soil action.

### Organization of the 'Action Soil of the Year'

The initiators of the action are members of the German Soil Society (DBG) and the German Federal Association for Soil (BVB), supported by the Federal Environment Agency (UBA) and the German Scientific-technical Association for Environmental Remediation and Redevelopment (ITVA). The curator ship provide continuous the evaluation and selection of the proposals, the preparation and circulation of materials (posters, flyers, CD's, homepages, publications) the presentation on the World Soil Day.

More information: http://www.dbges.de

### The learning process

The members of the curator ship learned the different acceptability of the soils in the course of the years.

Soil of the Year	didactic quality	regional importance	interest and request	appropriate to demonstration
2005:	high didactic quality,	good regional map-	The interest was very	very good design, two hori-
Chernozem	interesting history,	ping,	small in the first year	zons with clear border and
CHCHIOZCHI	clear function for food	many publications,	sman in the inst year	different colours, powerful
	production	special Chernozem		black humus horizon about
	production	museum in Eicken-		yellow Löss -horizon
		dorf/ Börde,		clear transparency of soil
		· ·		· · · · · · · · · · · · · · · · · · ·
		long-term experi-		fertility
2006	1 1 1: 11	ments with profiles		1:
2006:	bad applicable,	regional	slow growing interest-	complicated design,
Haplic Albeluvi-	difficult	occurrence in north-	ing of soil scientists,	unclear differentiated soil
sol	understandable gene-	east and east Ger-	geologists, museums,	horizons, not enough infor-
	sis,	many, small in other	regional politicians,	mation at the poster
	scientific clash about	regions	medias.	
	genesis		Patronage: Minister for	
			agriculture and envi-	
			ronment of the federal	
			state MV.	
			Central presentation in	
	1.1 1.1		Berlin (World Soil day)	
2007:	high didactic quality,	good regional mapping	increased interesting of	high aesthetic value,
Podzol	interesting history	for instance for big	soil specialists, media,	clear colour differences of
	dependent on land use	areas in north-west	schools.	horizons, interesting
	change and human	and south-west Ger-	Patronage: Prime minis-	blanched horizon about dark
	influence,	many, many interest-	ter of the federal state	brown horizon about sandy
	great attraction in areas	ing soil profiles in	Niedersachsen:	coloured
	with special plants like	different federal	Central presentation	horizon, interesting root
	Erica and Juniper and	states	Berlin on the World Soil	plait
	sheep herds		Day	
2008:	moderate didactic	a widespread soil type	first soil as an interna-	moderate for demonstration,
Arenosol or	quality,	with many variations,	tional action (Germany-	not so aesthetic and appeal-
Cambisol	challenging soil, as the	good mapping in	Austria)Increased inter-	ing profile like Chernozem or
	fourth Soil of the Year	Germany and Austria	esting of international	Podzol,
	possible,		soil science community.	but the stone and the plants
	convincing soil: name		Patronage: Austrian	increase the design
	and colour are identical		Ambassador in Berlin	
2009:	high didactic quality,	regional	increased interesting of	very high aesthetic value,
Gleyic Fluvisol	the history was very	occurrence in north-	soil scientific and regional	clear colour differences
(calcaric)	good demonstrated by	west and north Ger-	community and schools	between the small layers of
	the stratification of	many, small in other	in north-west, small	sand and alluvial mud
	the exclusive profile	regions, good mapping	interest in other regions	
	(poster), the stories of		Patronage: Minister of	
	the development were		Agriculture and Environ-	
	very demonstrative		ment of the federal state	
	for the community		Schleswig-Holstein	
2010	this soil was very	very high importance	high interest in many	very interesting for demon-
UrbicAnthrosols/	successful for the	in all regions and	towns, different stu-	stration, but a different task
Technosols	action, because the	countries, late scien-	dent and school pro-	resulted on the diversity of
	most peoples are	tific notice and inves-	jects, high interest for	soils, situations, aggregated
	living in soils, the	tigation,	an special exhibition	factors and so on.
	didactic quality was	problem-oriented	and a very interesting	The curator ship worked
	different and a com-	substantial data base	publication	together with a large group
	promise resulted on		Patronage; Senator for	of scientists, teachers, soil
	the difficult definition		Health, Environment	and nature protectors and
			and Consumerism in Berlin	other specialists.
2011	good didactic quality	small occurrences	high scientific interest,	a river landscape with water
Vega – Fluvic	combined with river	nearby the big rivers	regional actions in	and special trees is the
Cambisol or	landscape, very impor-	(Rhein, Elbe),	south-west and north	requisite for an interesting
Fluvisol	tant for understanding	good mapping and data	Germany	demonstration and under-
	of man-made soil deg-	base for environmental	,	standing of the soils
	radation with extreme	renaturation of river		
	outcome like flood	landscapes		
			1	l

### IUSS Alerts November 2010 - April 2011

### **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 from November 2010 till April 2011.

### **New IUSS Newsletters**

#### Commission 1.1

#### Soil Morphology & Micromorphology

In this newsletter: Report of the 19th WCSS, Courses: Tübingen 2011, London 2010, Awards: Kubiëna Medal, Philippe Duchafour Medal, Young Micromorphologist, Publication Award. Research notes: Julie Bell and Zeng-Yei Hseu write about their research projects. Publications: Stoops, Marcelino and Mees "Interpretation of micromorphological features of soils and regoliths." News from the Archaeological Soil Micromorphology Working Group. Future meetings, workshops and congresses: Pisa 2011, Reading 2011, Vienna 2011, Lleida 2012

#### **Commission 1.6 Paleopedology**

In this newsletter: Change of commission officers, Dan Yaalon receives Dokuchaev Award, Commission activities at the WCSS 2010 in Brisbane, Commission events scheduled for the period 2011-2014, Information on INQUA Congress 2011 in Bern, Switzerland, Information on Joint Meeting of the Commissions on Paleopedology and Soil Geography in 2011, Report: First International Field Summer School on Paleopedology, August 3-7, 2010, Siberia, Russia, Report: International Geochronology Summer School, September 5-10, 2010, Switzerland, Papers presented at the 19th WCSS in 2010 in Brisbane Both Newsletters are available on www.iuss.org under <IUSS Newsletters>

#### **Commission 4.5**

#### History, philosophy, and sociology of soil science

The 2011 History, Philosophy, and Sociology of Soil Science newsletter has been published. This latest edition of the newsletter includes information on the history, philosophy, and sociology sessions at the 2010 WCSS and SSSA meetings, news items, ar-

ticles, book reviews, and information on new history, philosophy, and sociology publications. The newsletter can be viewed by going to <a href="https://www.iuss.org">www.iuss.org</a>, clicking on "IUSS Newsletters", and then scrolling down to "Commission for History, Philosophy, and Sociology of Soil Science."

### News from Wiley and how to write...



Read "How to Write for European Journal of Soil Science and Soil Use and Management", a presentation given by the editors Steve Jarvis and Donald Davidson during

the World Congress of Soil Science in Brisbane in August 2010.

For their presentation, go to: http://www.black-wellpublishing.com/pdf/soilscience\_presentation.p df. To buy a copy of *Writing Scientific Research Articles* by Margaret Cargill and Patrick O'Connor, go to wiley.com or http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1405186194.html

#### Hi Nicole



NICOLE is a leading forum on contaminated land management in Europe, promoting co-operation between industry, academia and service providers on the

development and application of sustainable technologies. NICOLE's objectives are to:

- Provide a European forum for the dissemination and exchange of knowledge and ideas about contaminated land arising from industrial and commercial activities;
- Identify research needs and promote collaborative research that will enable European industry to identify, assess and manage contaminated sites more efficiently and cost-effectively; and

 Collaborate with other international networks inside and outside Europe and encompass the views of a wide a range of interest groups and stakeholders (for example, land developers, local/regional regulators and the insurance/financial investment community).

More: www.nicole.org

### Anthropogenic Soils in Soil Taxonomy

ICOMANTH (International Committee for Anthropogenic Soils) has drafted a 7th Circular Letter to introduce classes to recognize human-altered or –transported soils. If you have interest, your constructive feedback is welcome. We have posted this Circular at http://clic.cses.vt.edu/soils/~ICOMANTH The main proposals concern how to recognize and classify deposits of human-transported material 50 cm or more thick. These changes are referenced to pages in the 11th Ed. of the Keys to Soil Taxonomy found online.

Please response to john.galbraith@vt.edu

### **Universal Soil Classification**

At the recent World Congress, the International Union of Soil Sciences leadership unanimously supported the formation of a Working Group to research the potential of developing a Universal Soil Classification System.

The Working Group is chaired by Jon Hempel, USDA-NRCS Jon.hempel@lin.usda.gov in Lincoln, NE and vice chaired by Erika Micheli, Head Department of Soil Science and Agricultural Chemistry, Szent Istvan University Gödöllő, Hungary Micheli. Erika@mkk.szie.hu It is the vision for the Working Group to consist of any and all Pedologists that have an interest in this important topic. A small core group of Pedologists geographically representing the International Soil Science Community has been assembled and is scheduled to meet in the spring of 2011 to begin the discussion. The following link provides background information relating to the Universal Soil Classification and the Working Group: ftp://ftpfc.sc.egov.usda.gov/NSSC/Universal\_Soil\_Classificat ion\_Background/

### Your own geophysical lab? Eijkelkamp makes it possible



Since soil compaction has become such a hot item again, Eijkelkamp Agrisearch Equipment has developed, in close cooperation with the Christian Albrechts University in Kiel (Germany), a serie of instruments for measuring

various parameters which are of direct importance for soil tillage in relation to soil campaction. The series consists of: Air permeameter (08.65), Surface shear test apparatus (08.66), Shear test apparatus (08.68), Compression test apparatus (08.67), Hauben water permeameter (09.03). For more information please download our brochure at http://www.eijkelkamp.com or send an e-mail to balie@eijkelkamp.com or call +31 313 88 02 00.

### Intergovernmental Platform on Biodiversity and Ecosystem Services



A new international body aimed at catalyzing a global response to the loss of biodiversity and world's economically-important forests, coral reefs and other ecosystems was born by governments at the

United Nations 65th General Assembly (UNGA). It underlines the success of the UN's International Year of Biodiversity and should provide a boost to the International Year of Forests which began in January 2011, and the international decade of biodiversity. The adoption, by the UNGA plenary, was the last approval needed for setting up an Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES). The independent platform will in many ways mirror the Intergovernmental Panel on Climate Change (IPCC) which has assisted in catalyzing worldwide understanding and governmental action on global warming. The new body will bridge the gulf between the wealth of scientific knowledge on the accelerating declines and degradation of the natural world, with knowledge on effective solutions and decisive government action required to reverse these damaging trends. Its various roles will include carrying out high-quality peer reviews of the wealth of science on biodiversity and ecosystem

services emerging from research institutes across the globe in order to provide gold standard reports to governments. These reports will not only cover the state, status and trends of biodiversity and ecosystems, but will also outline transformational policy options and responses to bring about real change in their fortunes. The IPBES will achieve this in part by prioritizing, making sense of and bringing consistency to the great variety of reports and assessments conducted by United Nations bodies, research centres, universities and others as they relate to biodiversity and ecosystem services. Time for an IP Soil or IP Land?

### **Working Group on Soil Monitoring**

Last year the IUSS accepted a proposal for a Working Group (WG) on Soil Monitoring. Ben Marchant from Rothamsted has been appointed the secretary of this working group and Dominique Arrouays from INRA, Orleans, France is the chair. The WG is now starting to plan a program of events. The first will be a Special Session at the Pedometrics 2011 conference at Trest Castle in the Czech Republic (Aug 30 - Sept 3). Further details of this conference can be found at: http://sites.google.com/site/pedometrics2011/ There is still time to submit abstracts to this website before the Feb 1st deadline. If you do intend your talk to be part of the special session could you please email a copy of the abstract to Ben.Marchant@bbsrc.ac.uk in addition to the normal submission process. The WG is also proposing a workshop on statistical aspects of soil monitoring at the EuroSoils meeting in Bari, Italy next year. If anybody has any other ideas for Working Group events, they would be greatly appreciated. Could you please contact Ben.marchant@bbsrc.ac.uk

#### Review of Chinese soil science

ZHAO Qi-Guo, HE Ji-Zheng, YAN Xiao-Yuan, ZHANG Bin, ZHANG Gan-Lin and CAI Zu-Cong. 2011. Progress in Significant Soil Science Fields of China over the Last Three Decades: A Review. Pedosphere 21, 1-10. Due to continuous decreases in arable land area and continuous population increases, Chinese soil scientists face great challenges in meeting food demands, mitigating adverse environmental impacts, and sustaining or enhancing soil productivity under intensive agriculture. With the aim of promoting the application of soil science knowledge, the paper reviews the achievements of Chinese scientists in soil

resource use and management, soil fertility, global change mitigation and soil biology over the last 30 years. During this period, soil resource science has provided essential support for the use and exploitation of Chinese soil resources, and has itself developed through the introduction of new theories such as Soil Taxonomy and new technologies such as remote sensing. Soil fertility science has contributed to the alleviation and elimination of impeding physical and chemical factors that constrain availability of essential nutrients and water in soils, the understanding of nutrient cycling in agroecosystems, and the increase in nutrient-use efficiency for sustainable crop production. Chinese soil scientists have contributed to the understanding of the cropland's role in global change, particularly to the understanding of methane and nitrous oxide emission from rice fields and the effect of elevated carbon dioxide and ozone on the rice-wheat system. Soil biology research has progressed in biological N fixation, distribution of fauna in Chinese soils, and bioremediation of polluted soils. A new generation of soil scientists has arisen in the last three decades. The gaps between research and application in these soil science fields are also discussed.

### Skeptical soil scientists ....

Skepticism about human-induced global warming is not fashionable, even dangerous, for scientists these days. It used to be that skepticism was the engine of scientific discovery, creativity and change. Two of our most experienced and distinguished soil scientists. Miroslav Kutilek and Don Nielsen, have produced an impelling long essay on the global warming issue. It's a bit of a page turner. It seems important and well worth reading. MioslavKutilek and Donald R. Nielsen 2009 Facts About Global Warming. 227 pp. Catena Verlag, Reiskirchen. Skeptical soil scientists ....

### The American Dust bowl - revisited

There is a long review by Stanley Trimble of UCLA in the newish journal Aeolian Research of a book originally published some 30 years ago, Donald Woster's *Dust Bowl: the Southern Plains in the Nineteen Thirties*, OUP. The review seems well worth a read by the soil science community. See Trimble, S.W., 2010. Donald Worster's "Dust Bowl". *Aeolian Research* 2, 1-4.

### Soil Science Aid

Since 2002 Timor Leste has been trying to improve infrastructure that was destroyed in the lead up to independence. In this poor country agriculture provides livelihoods for more than 80% of the population and as such it is recognised that better understanding of soils is important. ASSSI decided to assist soil science in Timor Leste partly because ACIAR (Australian Centre for International Agricultural Research - Seeds of Life program) is operating there to improve the local capacity to increase food security. Thus, this ASSSI project aims to improve the soil science facilities for a young developing nation that has many needs, including the development of soil science. Last year surplus soil testing laboratory instruments and apparatus were donated from laboratories across Australia and this equipment is now ready for freighting to Timor Leste. The response for equipment was far greater than anticipated with several spectrophotometers, an oven, centrifuges, balances, a tonne of glassware and many other items being collected. The cost of shipping the goods from Australia is \$10,685. Currently the ASSSI has raised \$3690 towards the freight costs. All funds donated are for the project and there are no administrative costs or fees applied to this project. Link to further information on the soil science in East Timor project go to:

www.soilscienceaustralia.com.au/index.php?option=co m content&view=article&catid=5%3Afrontpage&id=12 0%3Aoverseas-soil-science-project&Itemid=118

### Land grabbing



Development is the flagship journal of the Society for International Development (SID). A special issue of the journal "Development" focuses on land grabbing. Land grabbing is the con-

tentious issue of large land transactions; the buying or leasing of large pieces of land in developing countries, by domestic and transnational companies. Those transnational corporations are often supported and encouraged by central governments. The land then mainly is used around the production and export of food and biofuels. Researchers from the University of Utrecht and the Land Research Action Network present the dilemmas of the current global land grabs in Africa, Latin America and Asia and how to ensure that the benefits from foreign land development are passed on to local people. See: Development, Volume 54, Issue 1 (March 2011)- Global Land Grabs. For articles visit:

www.palgrave-journals.com/development/archive/ 2011\_issues.html#Volume-54-1

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### 5 questions to a soil scientist

### 5 questions to Jon Chorover



Position: Professor (since 1995)

Age: 49

Address: University of Arizona, Tucson, AZ E-mail: chorover@cals.arizona.edu

1. When did you decide to study soil science? I majored in Environmental Science during college and over the summers I worked on a trail crew in the Sierra Nevada Mountains of California. Much of my job was digging trenches for retaining walls and trail tread and I became fascinated with the structure of soils during that experience. I began studying soil science as a graduate student at University of California at Berkeley.

2. Who has been your most influential teacher? My most influential teacher was a Mr. Smith who taught environmental science and marine biology in my high school in Boston. Growing up in the city, I knew little about the functioning of the natural world until I took his classes, which involved field trips to natural areas outside of the city. He also taught a class on outdoor sports (rock climbing, kayaking, etc.) and he asked me to assist him with teaching that class, which was an honor.

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

As the most complex natural material on the planet, soils are a remarkable challenge to study from the perspective of chemistry. This is because they contain multiple phases (gas, liquid and solid) and multiple components within each of those phases. Understanding chemical reactions (many of which are mediated biologically) in such a milieu is quite an exciting undertaking for a chemist that has an interest in the functioning of the natural world.

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

I would introduce them to the microscopic patterns in soils. Under a microscope, the beauty and complexity of soil becomes more evident than when soils are viewed with the naked eye. One can begin to see the patterns and distributions of crystals, and how they bind together with organic particles. This immediately makes apparent several things that are otherwise abstract, such as why soils can store the largest reservoir of organic carbon at the Farth's surface.

5. How do you see the future of soil science? Soils are increasingly recognized as a central functional component within the larger context of Earth surface science. While soil science has its roots in agricultural sustainability and will always be central to that application, it now contributes also – and to a much larger extent than in the past – to our evolving understanding of how the Earth responds to changes in climate and land use. Soil science will become increasingly associated with other spheres of Earth science (atmospheric science, geology, hydrology) as it continues to mature as a discipline.

### 5 questions to Dani Or



Position: Professor of Soil and Terrestrial

Environmental Physics (since 2008)

Age: 55

Address: ETH Zurich, Switzerland E-mail: dani.or@env.ethz.ch

1. When did you decide to study soil science?
As a member of a farming community in Israel (Kibbutz) I was always fascinating by how plants grow, the seasons and the annual cropping cycle. I was de-

bating between Structural Geology and Soil and Water and decided to pursue the latter for the mix of physics and biology.

2. Who has been your most influential teacher? I had several, but the one that stands out is Eshel-Bresler from the VolcaniCenter and the Hebrew University of Jerusalem. He was a pioneer in quantitative modeling of water flow and solute transport, salinity studies and helped introduce and establish spatial statistics and stochastic hydrology. Eshel taught me how to make educated and defensible approximations and encouraged all his students to always take a quantitative approach to the study and prediction of soil processes and other natural phenomena.

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

It is the science that focuses on the Earth life support skin – soil is the meeting place of physics, biology, chemistry and atmosphere. The understanding of the incredible biodiversity hosted in soil with billions of microorganisms in every handful of soil and the central role soil played and is playing in human history and daily experiences.

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

Present the broader function of soil not only for crop production (which is important), but as the matrix of life that everyone needs to understand more about its function and role. Explain more vividly the wide arrays of soil eco-hydro-biochemical functions and the imprint of earth ecological (and anthropogenic) history found in it. For the quantitative crowd, describe and emphasize the heterogeneities, complexities, and nonlinearities they'll be facing in exploring this vast frontier beneath that is so essential to life on earth,

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

The prominence of soil science is rapidly growing in all central issues faced by society – from interactions with climate change, to food security, to more balanced approach to ecosystem services. In all these central issues, soil plays a prominent role, one that cannot be treated by geologists or geotechnical engineers, or by ecologists alone – the proper place of soil issues is best represented by professionals trained in holistic understanding of soil function as a system with solid foundations in the chemistry, bi-

ology, and physics as well as clear understanding of interactions with water resources below and atmosphere above. I see a great future for soil scientists in the coming years when issues of resource scarcity become front page news and as the secrets of microbiological life migrate from bench top studies to real soil.

### 5 questions to Rosa M. Poch



Position: Professora Titular d'Universitat, since 1998 Accreditation for Catedràtica (Full Professor), since 2011. Universitat de Lleida

Age: 48

Address: ETSEA - UdL, Av. Rovira Roure 191, Lleida

25198

E-mail: rosa.poch@macs.udl.cat

1. When did you decide to study soil science?

During high school I enjoyed biology, physics and maths. But it was only after reading old writings of my grandfather, who was a viticulturalist and political activist in favour of the farmers, that I understood his love for the land and I decided to go for Agricultural Engineering, at the Polytechnic University of Catalonia. Somehow, I must have it in my genes. Soil Science was a compulsory subject, and I found it fascinating. The year after I passed the subject I was dropping now and then in the Department of Soil Science to join field trips to see more soils. In one of these drop-in's, my professor told me that in half an hour they were leaving to the west of Spain to look for alkaline soils, with Christian Walter, who was a visiting student at that time; and invited me to join them. At first I said no, but being half way home, I turned back and accepted. In our way we crossed Madrid and visited Carlos Roquero, an old Soil Science professor, who impressed me because of his deep knowledge of spanish soils. Now I think that hunting natric horizons in that field trip made me decide to be a soil scientist.

2. Who has been your most influential teacher?

My professor at that time, Jaume Porta, was the most influential, because he made me realize the importance of soils, and encouraged me to continue my studies in Ghent. Since then, I'm also very much indebted to Georges Stoops, who made me aware of how fascinating are soils through the microscope. Both of them were my PhD co-promoters. Other people that I admire for their rigour, honesty, value of hard work in science and love for soils are Jaume Boixadera, Josep M. Alcañiz, Rob Fitzpatrick, E.A. FitzPatrick and Jan Hopmans. And I'll never forget NarcísTeixidor, who was never a lecturer, but whose enormous knowledge and enthusiasm for soils I deeply admired.

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

The fact that, more than in other sciences, there are always things to discover about how soils are formed, how they behave and how they will answer to future changes. In soil science it is amazing how paradigms and theories can appear and disappear in a short period of time. Also, my oppinion is that you can't be a soil scientist without being an activist, which doesn't happen in most of the disciplines or professions.

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

I have been lecturing to first year students, and I find it a challenge to convey them my excitement and the pleasure I feel when I try to understand soils and their environment. When I am with students, I try to remember how I felt when I was a student and try to use the arguments that would convince me at that time. I was working with secondary school teachers for some years, preparing the University access tests on Earth and Environmental Sciences, and I was always trying to write questions where you could realize the usefulness of soil science as an individual science, considering soil as a natural body. We organize also a summer course where we spend most of our time in the field showing the soils of the Pyrenees, to school teachers, students of secondary school, naturalists,... and it's amazing how much they can learn only looking at them. Definitely, the best place is in the field.

5. How do you see the future of soil science? Much discussion is going on on the subject, and to

make it short, I don't like to dilute soil science in environmental sciences. I have seen how the credithours devoted to earth sciences are being progressively reduced in each change of curricula, in spite of our efforts fighting against new waves, as biotechnology, for instance. This is leading to anomalous situations where you have to explain basic soil science to MSc students. There is no magical solution, but I think that it's partly our fault, and we rather must make people aware, in each of our reports, theses, projects, works for companies, and so on, of the usefulness and uniqueness of soil science in environmental studies.

### 5 questions to Edward R. Landa



Position: Ground Water Geochemistry Research
Group, U.S. Geological Survey, Reston,
Virginia (1978-present)
Adjunct Professor, Department of
Environmental Science and
Technology, University of Maryland,
College Park (2010-present)

Age: 62 Address: USA

E-mail: erlanda@usgs.gov

#### 1. When did you decide to study soil science?

I was a junior in college, majoring in geology, in 1968. I had, until then, only a rudimentary knowledge of soils from classroom discussions of weathering. The existence of soil science as a field of study was unknown to me. While taking a class in mineralogy, I read a recent paper in *Science* by clay mineralogist Charles Rich of the Agronomy Department at Virginia Polytechnic Institute [Brown, JL, Rich, CI (1968) High-resolution electron microscopy of muscovite. Science 161:1135-1137]. I found the kind of varied and highly dynamic systems described here —of frayed edges, interlayers, and ion exchange— to be of real interest. With that in mind, and wanting some exposure to the field of soil science, I got a summer job at the Charles Lathrop

Pack Forest in the southeastern Adirondack Mountains of New York, working with Dr. Albert Leaf (Ph.D., soil science, University of Wisconsin) of the State University College of Forestry. The project looked at factors influencing the growth of red pine on a soil developed on outwash sand. That summer-of-1969 experience, crystallized in my mind by the Apollo 11 moon landing, set me on the path to a career in soil science.

2. Who has been your most influential teacher? Without a doubt, it has to be Dr. Robert G. Gast of the Department of Soil Science at the University of Minnesota. Bob came to Minnesota to join the faculty in soil mineralogy/chemistry just before my arrival as a new graduate student in the summer of 1970. I did my MS work on the characterization and adsorptive properties of ferric oxides and hydrous oxides, and Ph.D. work on the behavior in soils and plants of the long-lived fission product technetium-99, under Bob's guidance. Bob went on to become the Vice President of Research and Graduate Studies at Michigan State University before retiring in 1998. Sadly, Bob passed away last year. I will always remember his scholarship, mentorship, and personal example.

3. What do you find most exciting about soil science? Much of my work at the U.S. Geological Survey has focused on uranium mill tailings, the waste rock left after uranium extraction from the ground ore. Once deposited on the land surface, soil-forming processes, superimposed on minerals created in the milling circuit, govern the evolution of these tailings. Training in soil science thus provides a unique lens for examining the biological, physical, and chemical processes controlling the mobility of contaminants from such materials. The dynamism and multi-faceted nature of what C.C. Nikiforoff called the "excited skin of the earth's crust" is what I find exciting about soils (& soil-like materials) and their study.

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

As practitioners in an inherently interdisciplinary field, I think soil scientists view the environment in a holistic way, and tend not to see formal disciplinary boundaries as limiting what is within our grasp for investigation. Although we may occasionally visit silos in our work, "silo thinking" in which there is limited communication, cooperation and under-

standing across such boundaries is generally not part of our make-up.

I recently joined the faculty of the Department of Environmental Science and Technology at the University of Maryland. This has been an invigorating experience for me, and I thank the graduate students and faculty for the chance to be a part of the activity here. Our department (http://agnr.umd.edu/departments/enst/) has a tremendous breadth of research underway—ranging from ecological technology design & engineering and environmental & ecological health, to wetland science and soil science. It creates a unique learning community where the sum is truly greater than the parts.

I think that such intellectual diversity, supported by a shared ecological framework, can be appealing to students, and that its presence can enhance recruitment to soil science. Within that broader setting, I also believe that students will find the tight-knit nature of our soil science community to be appealing. As a student coming from another discipline, I felt that immediately when I attended my first SSSA meeting in 1970, and that sense has stayed with me ever since. I hope that such a human component is part of the personal message we convey when discussing our field of study with students and potential recruits.

- 5. How do you see the future of soil science? The traditional employment bases of soil scientists are changing, and this flux can be often be disconcerting. My hopes are that:
- As our students move out into perhaps non-traditional positions, they will maintain their core self-identity as soil scientists, and continue to see the soil science societies as their prime professional affiliation and disciplinary base.
- We all will be active participants, not pessimistic bystanders, in the future changes in soil science.
   Each of us needs to get out and actively spread the message of the importance of soils in a sustainable future for Planet Earth, and of soil science as a player in that future.

### 5 questions to Teodoro Miano



Position: Full Professor (since 2001)

Age: 51

Address: Dept. of Chemistry and Biochemistry of AgroForestry and Environment, University

of Bari, Italy

E-mail: miano@agr.uniba.it

1. When did you decide to study soil science? It happened by chance. I was about to decide my major when an offer came from the Soil Chemistry Group at the Faculty of Agriculture. I ended up working with Nicola Senesi on soil organic matter management, humus chemistry and metal-organic matter interactions. That experience was extremely significant and I decided to work in soil science.

- 2. Who has been your most influential teacher? For sure Nicola Senesi introduced me to soil science, to the scientific approach and attitude, to organize an experiment and to write in English, basically everything. Later on, I have met several renowned scientists in various places of the world, Masters in their disciplines, I worked with some and I enjoyed learning from all of them also from the human point of view.
- 3. What do you find most exciting about soil science? Soil is the source of life on earth. I love its diversity in time and space, its countless equilibria, its interactions with hydrosphere, atmosphere and biosphere, its origin and its evolution. I found it a fascinating world which is still largely unknown.
- 4. How would you stimulate teenagers and young graduates to study soil science?

I try to let them understand what I like most, why I like it and why soil is so important for them and for future generations. I also try to show them how many jobs can be connected to soil science out there. Soil is really located in the center of our uni-

verse and no matter where or when, sooner or later everybody has to get in touch with soils. This is my main messages in classes.

5. How do you see the future of soil science?
A see very important opportunities for soil science in the future. It is extremely important though that the soil community widen his horizons and perspectives, trying to relate and connect with other major disciplines, such as hydrology, geomorphology, biogeochemistry, natural hazard, and others. The future is multidisciplinarity, integration of diverse expertise, common research interest and especially communication. A strong effort should be devoted to communicate the kingdom of soil science to younger generations using all possible means. They are the real future and the main driving forces of the future of the planet.

### 5 questions to Reinhold Jahn



Position: Professor of Soil Science (since 1997)

Age: 63

Address: University of Halle, Institute of agricultural

and nutritional sciences,

D-06120 Halle (Saale), Germany

E-mail: reinhold.jahn@landw.uni-halle.de

- 1. When did you decide to study soil science? About 1980 by doing my diploma work about soil erosion in Nepal. There at first I realized the dependency of people from soil and how endangered soils are.
- 2. Who has been your most influential teacher?
  My first teacher was Hans-Peter Blume. I learned to look if something is behind the obvious things. My second teacher was Karl Stahr. I could accompany him often times for field work and excursions. He taught me soil genesis, soil mineralogy, field work, soil classification and some others and I enjoyed his enthusiasm for soil science.

3. What do you find most exciting about soil science? I am happy for having the chance to see soils in many different environments and there various occurrence and behavior. The complexity of soils and there linkages to so many needs of our life makes it challenging to work and to teach about.

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

To go from the simple things to the more complex ones and to show how many things of our life are connected to soils. We should more work in schools and the public to show the practical impact of soil science.

5. How do you see the future of soil science? I am a bit pessimistic. On the one side I am sure that the demand of knowledge about soils will increase. On the other side I see that the importance and increasing environmental problems (and available money) have attracted other disciplines to deal with soils without understanding the soil itself. This is probably one reason why we are stumbling from one problem to the other. I hope I am not right and we are able to come more in the focus of the society.

### **Report from IUSS Working Groups:**

# World Reference Base for Soil Resources

The World Reference Base for Soil Resources (WRB) is a worldwide applicable soil classification system. The first edition was published in 1998. In the same year, WRB was adopted by the IUSS Council (in that time: ISSS) as the IUSS system for international correlation of soils. WRB was built on the experiences of the FAO-Unseco Soil Map of the World (Legends of 1974 and 1988) and earlier ISSS initiatives like the International Reference Base for Soil Classification (1982).

### Classification of pedons

At the 2006 World Soil Congress in Philadelphia, the second edition of WRB was presented (World Soil Resources Reports 103, FAO, Rome). It has been elaborated by the IUSS Working Group WRB through a long process of discussion. In 2007, an Electronic Update was published at the WRB's homepage at FAO (http://www.fao.org/nr/land/soils/soil/en/) to correct some errors that have been found in the printed document. Translations of the second edition into Arabic, Chinese, German, Latvian, Polish, Russian, Spanish, and Ukrainian are available. Some other translations are also being worked on.

WRB has two categoric levels. The upper level comprises 32 Reference Soil Groups (RSG), identified by a key. At the lower level, the soil names are constructed by adding adjectives, called qualifiers, to the name of the RSG. The qualifiers are defined in a common list. For each RSG, a specific list of possible qualifiers is provided. This list is subdivided into Prefix Qualifiers and Suffix Qualifiers. The qualifiers of a RSG have a required sequence but no ranking of importance. For correct classification, every applying qualifier has to be added. This system is flexible, easy to apply and provides a lot of information about soils.

### **Construction of map legends**

Although WRB was originally designed for the classification of individual soils (pedons), there is an in-

creasing demand to use WRB for making map legends. To satisfy this demand, the IUSS Working Group WRB issued "Guidelines for constructing small-scale map legends using WRB" and published them in January 2010 on the WRB homepage http://www.fao.org/nr/land/soils/soil/en/.These Guidelines are recommended for scales of 1:250 000 and smaller. Without changing definitions, the Guidelines provide a different allocation of qualifiers. For every RSG, they are subdivided into Main Qualifiers (ranked) and Optional Qualifiers (not ranked). This allows the number of qualifiers used for the soils of a map unit to depend on the map scale.

### **Applications of WRB**

The IUSS Working Group WRB is grateful to the Joint Research Centre of the European Commission for publishing many applications of WRB, among them a series of soil atlases using WRB. To date the "Europe" and "Northern Circumpolar Region" atlases have been published.

#### **Future**

The third edition of the WRB is planned to be published at the 2014 World Soil Congress in Seoul. It is expected that most WRB definitions and the key will undergo only minor changes. The testing of WRB 2006 and the feedback from the soil science community revealed most definitions to be good and workable. Criticism was, however, received for the manner of allocating the qualifiers as Prefix Qualifiers and Suffix Qualifiers with a compulsory sequence, but without ranking. The Guidelines for constructing small-scale map legends with their Main Qualifiers (ranked) and Optional Qualifiers (not ranked) can guide the way to the third edition of WRB. In addition, a family level should be added giving information of practical value like parent material, texture, clay mineralogy, carbonates, soil reaction, organic surface layers, and depth.



WRB excursion in Norway, 2010

### (Field) Meetings

Several meetings related to the WRB were held since 2006. In 2007, the German Soil Science Society hosted a field tour on the newly-introduced Reference Soil Groups Technosols and Stagnosols. Suggestions for refining the definitions of the Technosols and for a better delimitation of Stagnosols with Planosols and Albeluvisols have been made. In 2008, the conference "Problems of soil classification and diagnostics" in Cernivtsi (Ukraine) discussed many WRB issues. The "International Conference & Field Workshop on Soil Classification" in Chile, an activity of the IUSS Commission on Soil Classification, was broadly dedicated to testing WRB for classifying soils. The meeting "Soil Geography: New Horizons" which was held in Huatulco Santa Cruz (Mexico) in 2009 and the related field tours allowed intensive discussions about the suitability of WRB for classifying soils in arid and humid tropical environments. At the World Soil Congress in Brisbane, several symposia were related to WRB, especially the symposium "The WRB ®evolution" that was organized by the Working Group. Several pre and post congress tours gave the opportunity to discuss WRB in the field. In September 2010, the Working Group accepted an invitation by the Norwegian Soil and Landscape Institute to study interesting Norwegian soils, among them various soils strongly influenced by water.

This year, the IUSS Working Group WRB will have a field trip to Southwest Poland from August 30 to September 3, organized by the Wroclaw University of Environmental and Live Sciences.

### **Further information**

For further information, please download the WRB newsletters from our homepage at FAO: http://www.fao.org/nr/land/soils/soil/en/

Peter Schad
Chair of IUSS Working Group WRB
schad@wzw.tum.de

### **Report from IUSS Working Groups:**

# Universal Soil Classification System

The IUSS Working Group on an Universal Soil Classification System met in West Lafayette Indiana at Purdue University (USA) from May 6 – May 11, 2011. The meeting was hosted by Dr. Phillip Owens of the Purdue Agronomy Department. Ninety percent of the core working group was able to attend this working session. There was significant progress made during the 5 day session and a framework for moving forward was developed. The entire report for the meeting will be made available to the overall IUSS in the near future.

It was agreed that the new system should include the following principles.

- · Provide professional disciplinary challenge
- Meet multiple global challenges (climate, food, water etc.)
- One system
- Larger user groups than the current systems
- Reduce and preferably reduce the number of classes that serve as "catch all"
- Standardization of methods and assessment of diagnostics
- Allow other diagnostics (e.g. soil biology) and greater depths than 2 m
- Should be able to include soils from all over the

- Incorporate the latest knowledge and insights
- Mechanism to organize new information
- Expanding the scope of taxonomic consideration (e.g. Anthropogenic, Urban, Subaqueous, Paleosols, Other planets)

In addition to universal soil classification, the group is charged with proposing standards for diagnostic criteria, correlation methodology, nomenclature and horizon designations/definitions, laboratory methods, guidelines for field descriptions and new observation methods.

Task groups were developed to pursue each of these designated areas.

An interesting concept that was presented to the group by Sergey Goryachkin related to the how the ochricepipedon has been used as a "catch all" for a wide variety of surface horizon conditions. The group decided that the timing is right to look into the potential of developing new surface classes that document a diverse variety of conditions that are important to management issues and communication of environmental state and transition information.

The group also decided to explore the potential to develop a dual or parallel nomenclature that in-





Sergey Goryachkin points his way ahead to Dick Arnold and John Galbraiht

cludes and accommodates both a scientific and nontechnical language and vernacular. The group sees this as an important means of communicating soil information to the lay community.

The group will develop a website that will be open to all interested individuals. This information will be communicated to the overall IUSS community in the near future.

The next meeting of the task group will be at the American Society of Agronomy meetings in San Antonio, Texas October 16-19, 2011. This meeting will be open to all interested parties. The dates for the meeting will be posted at the meeting and in an IUSS alert before the meeting.

Jon Hempel
USDA-NRCS
Chair WG Universal Soil Classification System

### **Favourite soil science books**

### **Paul Hallett**

Scottish Crop Research Institute Invergowrie, Dundee DD2 5DA Paul.hallett@scri.ac.uk

Two of my three favourite soil science books are well-thumbed textbooks found in my office (or usually sitting on the desks of colleagues). The other book is popular nonfiction that is not a soil science book per se but a very influential recent advocate of our discipline.

Mitchell, J.K., and K. Soga. 2005 Fundamentals of soil behavior 3rd ed John Wiley & Sons, Hoboken, NJ. ISBN 13: 978-0-471-46302-7

This is a gem of a textbook aimed at geotechnical engineers but arguably the most valuable reference available to anyone interested in the mechanical behaviour of soils. The first few chapters appreciate how the formation of soil underlies its complexity. Topics such as biological influence on soil behaviour, clay chemistry, organic matter and rheology are included. Soil mechanics theory is covered in depth, but unlike many other textbooks in this area, the concepts are accessible and easy to follow.

Marshall, T.J., Holmes, J.W. and Rose, C.W. 1996. Soil physics. (3rd Edition). Cambridge University Press, Cambridge. ISBN 0-52145-151-5

My second edition copy of this textbook is starting to fall apart after 18 years of constant use. It is concise, well written and a good reference for anyone with a basic knowledge of soil science that needs information on physical behaviour. Like all soil physics textbooks, soil-water relations are the central theme. However, topics such as soil structure, mechanical behaviour and physical conditions for plant growth are also included. Soil physics is a discipline blessed with many excellent textbooks, each with particular strengths. Marshall, Holmes and Rose is in my view the best 'all-rounder'.

Wright, Ronald. 2004. A Short History of Progress. Anansi, Toronto. ISBN 0-88784-706-4.

Ronald Wright found a common theme to explain the downfall of past civilisations. From the fall of the first city, Uruk, to modern agriculture, he cites how the mismanagement of soil destroys resources, food and eventually life. Originally a Massey Lecture in Canada, this is an incredibly well researched and argued thesis. By advocating the importance of soil in the popular press, Wright has done a great favour for our discipline. This book was not intended to be a soil science book, but it helps overcome the old cliché of 'soil being treated like dirt'. Useful ammunition if you come across unenlightened individuals who find your profession bizarre, boring or unimportant.

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#### Victor B. Asio

#### **Visayas State University, Philippines**

Soil science is a rapidly growing ecological earth science. Consequently, the number of books on the subject has greatly increased in the last two decades. So to choose my top three soil science books, I thought of this criterion: the book must have been very useful to me when I was a student and it is still useful now in my research and teaching activities as a professor of soil science. The criterion automatically disqualifies some very good books that I used as a student but for various reasons I seldom or do not use them today as well as some outstanding soil science books published in recent years but were not yet available during my student days.

My first choice is the *Properties and Management* of Soils in the Tropics by Pedro A. Sanchez published in 1976 by John Wiley and Sons. It discusses in a simple but in-depth manner the tropical environment (climate, vegetation types, geology, land use and farming systems); the classification of tropical soils using Soil Taxonomy, FAO and some other important systems; the physical and chemical properties, clay mineralogy, and exchange processes of tropical soils; soil acidity and liming; soil nutrients and fertility evaluations; and soil management under different tropical land use systems. This outstanding book certainly belongs to the most important and influential books on tropical soils. I still use it regularly and even require my graduate students to read certain parts of it.

My second choice is *Tropical Soils. A Comprehensive Study of their Genesis* by E.C.J. Mohr, F.A. van Baren, and J. van Schuylenborgh (3<sup>rd</sup> revised edition) published in 1972 by Mouton-IchtiarBaru-Van Hoeve. The book has three parts. Part I deals on the fundamentals of climate, rock and mineral weathering, and organic matter transformation. Part II discusses oxisols, leteritic soils, podzolic soils and podzols, vertisols, paddy soils, and andosols. Part III covers the experimental and physico-chemical study of soil-forming processes. I find it an excellent and unique book on tropical soils because of the coverage and details in which the topics are presented. It has been very useful to me especially during my

masteral and doctoral studies (we used it for the course on tropical soils in Hohenheim). I still consult this book often which is an important part of my personal library.

My third choice is the standard soil science textbook in German-speaking countries, the Scheffer/ Schachtschabel Lehrbuch der Bodenkunde (Textbook of Soil Science) now in its 16th edition (Spektrum Academisches Verlag). The book has undergone several revisions under different teams of authors. The latest edition was prepared by H.P. Blume, G.W. Bruemmer, R. Horn, E, Kandeler, I. Koegel-Knabner, R. Kretzschmar, K. Stahr, and B.M. Wilke, all leading soil scientists. It covers the origin and development of soils; physical, biological and chemical properties of and processes in soils; nutrients and contaminants; soil systematics and geography; soils and soil landscapes of Europe and the world; soil evaluation and protection. It is an excellent textbook for students who understand German. I find it also a vital reference for my research and teaching activities.

### **Awards**

### Miroslav Kutílek



The President of the Czech Republic grants The Medal of Merit to Prof. Ing. Miroslav Kutílek, Dr. Sc. to recognize meritorious service to the state in the field of science. Professor Miroslav Kutílek (1927) is a distinguished Czech scientist focusing on soil science, soil physics and climate change. His works in these fields met with an international acclaim. He is a member of international scientific societies and gave lectures at many universities abroad. During the totalitarian regime he published his non-fiction works under a pseudonym in samizdat editions

### Awards

### Rudi Dudal



Professor Emeritus Raoul (Rudi) Dudal, Geo-Institute, KatholiekeUniversiteit Leuven, Belgium has been awarded the Guy Smith award by the Commission on Soil Classification of the International Union of Soil Sciences, at the event of the 19th World Congress of Soil Science in Brisbane, Australia.

### Laudatio for Prof Rudi Dudal by Prof. Jozef (Seppe) Deckers Secretary-General of the Soil Science Society of Belgium

Distinguished delegates, Mr. President of the Soil Science Society of Belgium, Mr. Chairman of the IUSS Division of Soil in Space and Time, it is a real honor for me to provide this laudatio for Professor Rudi Dudal at the occasion of the handing over of the first Guy Smith medal for soil classification.

Let me start by providing a brief overview of Rudi Dudal's professional career. After Rudi Dudal graduated as PhD in agricultural sciences from the KatholiekeUniversiteit Leuven (K.U.Leuven), Belgium he joined the Belgian Soil Survey Centre at Leuven as Party Chief. The soil survey was still in its early stage and aiming at inventorying our land re-

sources for the purpose of sustained food production. Rudi contributed to setting up the morpho-genetic Belgian soil classification system. With his PhD in 1955 on the loess soils of Central Belgium, Rudi set a bench mark on soil genesis and classification.

He then joined FAO as technical assistant on Soil Resources Appraisal in Indonesia, where he also served as Professor in Soil Science at the University of Indonesia. At that time he travelled across Indochina by elephant to assess the soil resources of the area. As of 1960 he was posted at the FAO headquarters in Rome to become the correlator of the FAO/Unesco Soil Map of the World of 1960. This was not an easy task in view of the cold war which was still causing big political tensions between the Western countries and the east-block countries. But Rudi managed to overcome these problems by developing friends all over the world independent of political or religious conviction. This approach is clearly reflected in the soil names of the World soil map legend which find roots from all over the globe. From then onwards things moved very fast: in 1970 he was the Chief, Soil Resources Development and Conservation Service of FAO. At that time Rudi was elected as Secretary-General of the International Soil Science Society (IUSS). From 1976 till 1984 he was the Director of the Land and Water Development Division in FAO.

In 1984 he joined the K.U.Leuven University as full professor in Soil Geography, Soils of the Tropics and Land Evaluation at the Faculty of Agricultural and Applied Biological Sciences.

Let me now highlight the Rudi's contributions to soil classification. By developing the Legend of the FAO/Unesco Soil Map of the World, Rudi made a major contribution towards harmonizing existing national soil classification systems. Thanks to his good personal relations at the time with Guy Smith from USDA, Rudi took the fortunate decision to adopt the concept of diagnostic horizons, properties and materials and implemented it at World scale in the FAO Legend of the Soil Map of the World. This was so successful that afterwards many

countries used the Legend of the Soil Map of the World for soil mapping and as a classification. When in 1980 FAO and UNEP took the initiative of the International Reference base for Soil Classification (IRB). Rudi was there to steer the initiative and became its secretary as of 1986 through to 1992. During the famous meeting of IRB at Montpellier in 1992, Rudi has played a key role in aligning the IRB with the revised legend of the FAO Soil map of the World. As such the World Reference Base for Soil Resources (WRB) was born and could count on the full support from FAO and other organizations of the United Nations. In 1998, during the World Congress of Soil Science at Montpellier, the IUSS adopted WRB as its system for soil correlation and classification. Presently Rudi continues to play an important role by supporting harmonization in soil classification, particularly in our recent project on the translation of the soil map of Belgium and Luxembourg to WRB. With his phenomenal background rooting back to his time as a Belgian soil surveyor and all what followed during his career as prominent soil scientist, we are very happy and proud to have Rudi on this team. We are very happy with Rudi's continued presence at the Geo-Institute at K.U.Leuven University where he is still keeping in close touch with the scholars in soil science, stirring up scientific debate on major world issues such as carbon cycles and soil evolution under the global change scenario.

We are very proud and happy that the selection committee of the Guy Smith Prize decided to award its first prize to Professor Rudi Dudal. May I now request Prof. Karl Star Chair of IUSS Division of Soil in Space and Time, to hand over the Guy Smith prize to Rudi Dudal.

Seppe Deckers
Secretary-General, Soil Science Society of Belgium

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### **Awards**

### **Roland Buresh**



The laureate of the 2011 IFA Norman Borlaug Award for excellence in crop nutrition research is Dr Roland Buresh of the International Rice Research Institute (IRRI) in the Philippines. Dr Buresh is Principal Scientist at IRRI where he leads the Institute's work on site-specific nutrient management (SSNM). The award recognizes his work in transforming the scientific concept of SSNM to innovative knowledge transfer tools based on decision-support software, the Internet, mobile phones and field practices readily usable by rice growers. Such tools bring precision agriculture techniques to small-scale farmers in developing countries.

Dr Buresh has been working on nutrient and crop management for the past 30 years. He joined IRRI in 2000 and has since been involved in work focusing on rice, such as sustainable management of intensive irrigated rice, crop residue management and management of rice-maize cropping systems. Through his involvement with the Irrigated Rice Research Consortium (IRRC) — a partnership between IRRI, national research centres in ten Asian countries and the private sector, Dr Buresh initiated the development of innovative knowledge transfer tools targeting specifically small-scale farmers in Asia and potentially in

many more regions. These tools include:

- computer-based decision support software available to extension workers, crop advisors, and farmers through the internet and mobile phones;
- videos for farmers; and
- quick guides for fertilizer best management.

Dr Buresh's most recent and recognized accomplishment is 'Nutrient Manager', an IT-based decisionsupport tool that provides extension workers, farmers and researchers field-specific nutrient management practices for rice. Nutrient Manager can be adapted to the conditions of any country or region and requires little data input. Each country- or region-specific tool consists of ten to twenty questions that can be easily answered with no need for soil or plant analyses. Nutrient Manager for Rice has been tested and implemented successfully in the Philippines and in Indonesia by rice growers using local languages. Through an innovative public-private partnership in the Philippines, involving the Department of Agriculture and two national mobile phone service providers, Dr Buresh led the development of a mobile phone application of Nutrient Manager for Rice using interactive voice response

(IVR). With this service, a rice farmer calls a toll-free number, answers questions by pushing the phone keypad as prompted by a voice recording, and then receives a text message with a fertilizer guideline customized for the farmer's field and cultivation practices. *Nutrient Manager* is expected to be adopted by many more countries. Local versions for Bangladesh, China, India, Vietnam, and West Africa are under development.

Prior to joining IRRI, Dr Buresh was Principal Soil Scientist at the International Centre for Research in Agroforestry (ICRAF) in Nairobi, Kenya and Soil Scientist at the International Fertilizer Development Centre (IFDC), where he led a collaborative project between IFDC and IRRI in the Philippines.

Dr Buresh is the 20th recipient of the Award. He was nominated by Atlas Fertilizer Corporation in the Philippines, and has been selected by an independent jury among twelve high-level candidates from developed countries and international agricultural research and development centres. Dr Buresh graduated from Louisiana State University in 1978 with a PhD in Marine Sciences. He also received an M.Sc. in Soil Science from North Dakota State University. Dr Buresh will accept the Award at the Opening Session of the IFA Annual Conference on Tuesday, 24 May in Montreal.

#### In Memoriam

## **David Stewart Jenkinson**

1928-2011



David JenkinsonFRS was an internationally recognised soil scientist and a long-standing member of Rothamsted staff. He died after a short illness on 16th February 2011. His research on carbon and nitrogen cycling in soil over a period of some 50 years had enormous influence in setting patterns of thinking in a diverse range of areas including food security and global climate change. He was elected a Fellow of the Royal Society in 1991, one of very few soil scientists to achieve this honour. He was awarded Honorary Membership of the Soil Science Society of America in 1995 and of the British Society of Soil Science in 2007. He received the Massey Ferguson National Agricultural Award in 1993 for his work on increasing the efficiency of use of nitrogen in agriculture

David was born in California on 25th February 1928 but his family returned to Ireland when he was four years old and bought a farm in County Armagh. In later years he explained that growing up on a farm

showed him the back-breaking labour involved in practical farming. He was keen that science should be used to ease this burden and was impatient with those calling for "traditional methods" in agriculture. He attended the Royal School, Armagh for 6 years from 1940. After under-graduate and post-graduate study in chemistry at Trinity College Dublin, he took his first soil science post at the University of Reading. He joined Rothamsted in 1957 where he remained until his retirement in 1988. After retirement he was appointed a Lawes Trust Senior Fellow at Rothamsted and Visiting Professor in Soil Science at the University of Reading. For over 20 years after formal retirement he continued to guide and inspire numerous younger scientists from around the world, and to publish highly influential papers.

David was a pioneer in soil science research, setting trends that others followed. During the early1960s he was among the first soil scientists to exploit the use of radioactive 14C labelling to study the transformation

of plant residues entering soil, utilising incubation experiments carried out under field conditions. This work, later repeated in the tropical climate of Nigeria (through collaboration with colleagues at the International Institute of Tropical Agriculture, IITA), laid the foundations for much of our current understanding of soil carbon dynamics. It eventually led to the development of one of the first soil carbon simulation models, RothC, initially through collaboration with James Rayner who was a specialist in the mathematical treatment of X-ray crystallographic data. Later developments were in collaboration with Kevin Coleman, including an updated version published in 2008. Versions of RothC are widely used worldwide, both in research and for quantifying changes in soil carbon stocks as part of emerging carbon accreditation schemes. At the last count there were over 1000 registered users in 80 countries. David was among the first to draw attention to the significance of soil organic carbon stocks in the context of the global carbon cycle and climate change. His paper in Nature in 1991 was the first quantitative assessment of the potential for a "positive feedback" in which carbon dioxide released from decomosition of organic matter in soil accelerates climate change.

He is perhaps best known for his development of a technique for measuring the quantity of carbon held in the cells of living microorganisms in soil. In a 1966 paper he introduced the concept of the soil microbial biomass in which soil microbes are treated as a single entity rather than using classical microbiological techniques to identify and count the different species. This concept was revolutionary, opening the way for a new wave of research in soil biology, decades before current developments facilitated by molecular biological methods. Papers with David Powlson in 1976 described a detailed appraisal and a practical method for measuring biomass carbon content. A 1987 paper, describing a further development of the methodology (with Phil Brookes and Eric Vance), is still the most highly cited paper in the journal Soil Biology and Biochemistry and the most highly cited paper by a Rothamsted scientist. Other work, especially with Phil Brookes, drew attention to fascinating issues regarding the survival of a large microbial population in soil with only meagre inputs of substrate.

David was a strong advocate of the value of longterm field studies in agricultural and environmental science and frequently used data from the Rothamsted Experiments in his research, often in association with "Johnny" Johnston or Paul Poulton. He was an enthusiastic participant in the SOMNET (Soil Organic Matter Network) evaluation of soil carbon models organised at Rothamsted in 1995 by Pete Smith and David Powlson. RothC was among nine models evaluated using data from long-term field experiments worldwide. This activity was influential in stimulating further global networking involving long term experiments and models.

During the 1980s, working with David Powlson, Paul Poulton, Andy Macdonald, Margaret Glendining and numerous others, he conducted research on nitrogen dynamics in the crop/soil system, using 15N-labelled fertilizers in field experiments. As well as leading to practical results on fertilizer management to increase efficiency of nitrogen use and decrease losses to the environment, this work drew attention to the significance of nitrogen deposition from the atmosphere in rain and as "dry" deposition of gases including ammonia and oxides of nitrogen. These inputs of nitrogen, which were not well recognised at the time, were subsequently measured directly by Keith Goulding and others. David's nitrogen research also formed the basis for work on modelling of soil nitrogen dynamics in collaboration with Jo Smith, Andy Whitmore and many others. This included research-oriented modelling and also a practical decision support system to assist farmers in determining nitrogen fertilizer applications.

Many scientists now in senior positions around the world attest to the way in which David's guidance and kindness at an early stage in their careers gave them direction and inspiration. Many students and young scientists comment on their delight and surprise that such a respected figure found time to listen to their research plans and make constructive criticisms or assist them in interpreting the meaning of their results.

A conference "Soil Organic Matters" was held at Rothamsted in 2009 to mark David's contributions to soil science research, and to emphasise current developments in the areas where he laid foundations. In 2008 the Jenkinson Building was opened; it house facilities for processing plant and soil samples, soil physics laboratories and high grade controlled environment rooms.

In addition to his scientific expertise, David was a polymath with an extensive knowledge of history, literature, music and the theatre. He also had a great love for the countryside: he and his wife Moira enjoyed walking in England and Ireland. They were especially fond of the countryside around the Rothamsted Estate; Moira and his family have planted an "Irish Oak" (Quercuspetraea) in his memory in the garden of Rothamsted Manor.

#### In Memoriam

### **Armand Van Wambeke**

1926-2011



Dr. Armand Robert Henri Van Wambeke, age 84, a Professor Emeritus at Cornell University, died Monday afternoon at Kendal at Ithaca. Dr. Van Wambeke was born on May 16, 1926 in Ghent, Belgium and enjoyed a rich and diverse professional career. He worked for many organizations around the world before he and his family settled down in Ithaca after receiving a position as Professor of International Soils at Cornell University in 1976, which he held until his retirement in 1995.

Armand's education was based in Ghent where he graduated from the Royal High School in 1944, and studied Tropical Agriculture at the University of Ghent from 1945 to 1949. He was also an accomplished basketball player and represented his country at the 1948 Olympics in London. After military service in the Ordinance Corps, Armand worked as a soil surveyor in the Belgian Congo, Rwanda and Burundi from 1951 to 1960. This formed the basis for his Doctorate dissertation at the University in Ghent (1958) on the properties and classification of soils in the Kivu area, eastern Congo. This work was expanded in a 1974 publication for the FAO on the management of Ferralsols, the most highly-weathered and supposedly infertile soils of the tropics.

During this time, Armand and Francine had seven children - Paul, Jan, Luc, Philippe, Annika, Caroline and Elisabeth. Armand assumed a number of assignments around the world: the University of the Congo (1960-61), the United Nations Food and Agriculture Organization (Colombia 1961-64, Nepal 1965), and the Belgian Center for Soil Survey (1965). He became acquainted with Cornell University during an interim position as International Professor in 1966, after which he returned to Latin America as the regional soil survey officer for the FAO, and in 1970 to the University of Ghent to serve as project leader for the soil survey program. His arrival at Cornell University in 1976 initiated a very productive phase as Professor of Tropical Soil Science.

He regularly traveled around the world in support of soil survey and educational efforts and did two sabbaticals in Ghent. Armand made many contributions to the field of soil science, especially on tropical soils and land evaluation.

His language skills (fluent in Dutch, French, English and Spanish) allowed him to effectively work in many international settings. He taught undergraduate and graduate students about tropical soils and his research contributed to their appraisal and classification. For ten years his group supported the international outreach of the US Soil Survey with a series of practical publications on cartography, map unit names, evaluating the quality of soil surveys, and soil moisture and temperature regimes. He gained international recognition for his research in land evaluation and the development of a computer based expert system with his PhD student David Rossiter (ALES, Automated Land Evaluation System, 1987), which is used around the world.

He was an enthusiastic early adopter of any technology that could improve his work, including personal computers and geographical information systems. Towards the end of his career he wrote a textbook (1992) on the geography, properties and management of tropical soils, which was later

adapted by the FAO (2003) to their new international soil classification.

Armand was known for his great analytical mind and ability to bring structure to the evaluation of complex soil systems. He took pride in challenging his students to think both broadly and in depth. His reputation was that of a critical and demanding scholar and a fair and inspiring teacher.

Armand enjoyed traveling from the moment he married his wife, Francine, and together they spent their honeymoon in the Democratic Republic of the Congo and it was at that point the family began to develop an appreciation for world travel and learning about different cultures. Dr. Van Wambeke will always be remembered for his favorite sayings:

"To make progress in soil science one must go outside of it;"

"I speak many languages, all equally badly;"

"There is only one acceptable quality of work, and that is high quality;"

"We don't want to be Dutch, we don't want to be French, we definitely don't want to be German, so we are Belgian,"

and referring to his Olympic experience where Belgium was eliminated in the group stage despite winning three of five games,

"The important thing is not to win, it is to compete."

Survivors include his wife of 60 years, Francine Van Wambeke; six children, Paul (Christine) Van Wambeke, Jan Van Wambeke, Dr. Philippe Van Wambeke, Annika (Gordon) Black, and Caroline Kinne, Elisabeth (Paul) Griep; twelve grandchildren and two great-grandchildren; a brother, Andre Van Wambeke; several nieces and nephews.

#### In Memoriam

### **Arno Semmel**

1929 - 2010



Prof. Dr.Dr.h.c. Arno Semmel, 81, died Sunday, October 10, 2010 at his home in HofheimTaunus, Germany. Arno Semmel was an inspirational geomorphologist and soil geographer. The German scientific community holds him in high esteem as a renowned expert in quaternary geology, loess stratigraphy and pedology. Particularly his research on periglacial cover beds, loess stratigraphy and palaeosols has to be emphasized. Along with his merits in fundamental research, he always made an extra effort to clarify and communicate the relevancy of his research to practice, and to fascinate laymen about soils and geomorphology.

Arno Semmel graduated from Rostock and East-Berlin with a degree in Geography. He received his PhD in 1959 from the University of Frankfurt/Main. After his education, he worked for the Soil and Geological Survey of Hesse, at that time called "HessischesLandesamtfürBodenforschung". During that time, he developed the first practical cover bed classification to describe the parent material of soil formation and designed the first soil map of Hesse at a scale of 1:25.000. In 1967, he received his habilitation from the University of Frankfurt/Main. Two years later, he joined the world-famous geomophologist Julius Büdel at Würzburg University as assistant professor. He returned to the University of Frankfurt/Main as full professor for Physical Geography in 1970 where he stayed until his retirement in 1991. During this time, Arno Semmel wrote a number of highly acknowledged text books, for example "Geomorphologie der Bundesrepublik Deutschland" (5th edition, Steiner), "Grundzüge der Bodengeographie" (3rd edition, Teubner), "Periglazialmorphologie"(2nd edition, Wiss. Buchges.) and "Relief, Gestein, Boden" (Wiss. Buchges.). All of them have served as benchmark books in Landscape System Sciences for many generations of students.

The scientific work of Arno Semmel was based on field observations. His profound field experience is documented in nearly 300 publications. Most papers address the role of genesis, composition and properties of the regolith cover for soil formation and spatial distribution across landscapes. His research was inspired by numerous worldwide expeditions to the Artic, Spitzbergen, Canada and Scandinavia as well as to the tropics, Africa and Latin America, although the home of his tremendous field experience has always been Central Europe. Among others, his findings on the stratigraphy of loess and loess-paleosol sequences in Central Europe are regarded as directive for future research and are widely accepted throughout Europe. After retirement from university business Arno Semmel dedicated himself to research which he did with great success until only a few weeks before his death. Pleistocene periglacial cover beds remained a central topic of research during his lifetime. Until

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the very last moment, he was ready to impart his profound knowledge and experience to everyone and enjoyed field-work and scientific discussions wherever he was.

Arno Semmel has received numerous honors and awards and is a member of several scientific institutions. These include honorary doctorate from the University of Heidelberg for his outstanding research on the Quaternary stratigraphy of the middle and upper rhine valley and his integrative research approaches in Brazil and Ethiopia. The German Quaternary Union (DEUQUA) awarded him with the Albrecht-Penck-Medal for his dedication and outstanding achievements. A particular concern of Arno Semmel was the education of school children in geography, to which he was vehemently committed to. From 1987 to 1989 he was chairman of the VDGH and the German Geographic Society, from 1988 to 1991 he served as a senator of the German research foundation (DFG) and as representative of the German geographers in the Alfred-Wegener-Foundation. He was chairman of the Frankfurter Geographic Society for many years and lifetime honorary chairman.

In 2009 on the occasion of his 80th birthday, a one week anniversary excursion on 'his topic', the spatial distribution and genesis of periglacial cover beds, was organized by former students and co-workers of Arno Semmel. The purpose of this trip was to honor his scientific achievements and his extraordinary engagement in enlarging our understanding of soil geography from a field perspective. We will definitely miss his presence and the intensive discussions on Quaternary geology, geomorphology and soil science. The scientific community lost a prominent colleague and well-known scientist but the lasting memorial of his students and his work will always remain.

Heinrich Thiemeyer, Frankfurt Jürgen Heinrich, Leipzig

## Reports of meetings

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# The Celebration of World Soil Day 2010 in Italy: The Perception of Soil

Soil performs unique roles for needs and wellbeing of human society. Looking at the increasing human pressure on it, frequently without regard to its preservation, is the soil importance recognized?

The Celebration of World Soil Day 2010 in Italy was an important occasion to try to answer to this question. To honour this yearly recurrence, on 2-3 December 2010, the Italian Society of Pedology (SIPe), the Italian Society of Soil Science (SISS) and the Chair of Pedology of the University of Palermo (chaired by Carmelo Dazzi), under the patronage of the International Union of Soil Sciences (IUSS), European Confederation of Soil Science Societies (ECSSS), European Society for Soil Conservation (ESSC) and the International Humic Substances Society (IHSS), jointly organized in Palermo a two-day meeting entitled "The Perception of Soil". The main aim of the convention was to investigate how the soil is perceived in the different aspects of our contemporary society. To achieve this objective, the meeting was organized in 14 speeches of notable speakers, invited to discuss about theperception of soil, in their own specific area of expertise, such as: soil regulations, environmental emergencies management and calamities prevention, urban and landscape planning, finance and valuation, crops production, pedology, medical geology and journalism, and in a Poster Session. The conference was opened to researchers, teachers, students, managers, delegates of regional and national institutions. In the Opening Ceremony, delegates of national and regional institutions and of scientific societies, supporting the event, welcomed the conference and Carmelo Dazzi, coordinator of the organizing committees, inaugurated the Celebration of World Soil Day 2010 and introduced the topic (Fig.).

The convenors, Nicola Senesi (President of SISS) and Fabio Terribile (President of SIPe), introduced



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the invited speakers to make their speeches, opening the debate with the assembly.

At the end of the talks, a Service Awards Ceremony was dedicated to retired professors that, with their scientific careers, contribute to create and spread the soil culture in Italy, as: Angelo Aru, Paolo Baldaccini, CorradoBuondonno, Giovanni Fierotti, Fiorenzo Mancini and FiorenzoUgolini. The first meeting day ended convivially with the social dinner. The second day was dedicated partly to further talks, and to the Poster Session, in which PhD students and researchers exhibited their scientific activities in the Soil Science.

The choice of the specific theme "The Perception of Soil" allowed us to discover so many different, sometimes unknown, perceptions of it, all according to the specific implications for human life and activities involved. However, out of the strict scientific point of view, the soil is rarely recognizes as a complex and living system. The conclusive remarks of the Celebration of World Soil Day 2010, concern the knowledge of a widespread "no perception" of the soil in our society and of a unawareness of its vitality, functions and complexity, out of the strict soil science scientific area. For this reason, the final official motion of the meeting asks, unanimously, a more active role of local and national institutionsto



Opening ceremony and Carmelo Dazzi's introduction to the topic "The Perception of Soil" of World Soil Day 2010 in Palermo (Italy)

legislate, according to the european strategy, to preserve the soil resource and to cooperate to create, on regional and local scale, a strong cooperation net to support the environmental policies; to consider the soil health and, in general, the environmental quality as an valuable and countable factor planning investments and productive activities; to support the initiative to spread the soil culture also through mass media, to sensitize the society of human impact on soil and its consequences.

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## **New Publications**



Dealing with Contaminated Sites. From Theory towards Practical Application. Edited by Frank A. Swartjes (National Institute of Public Health and the Environment, the Netherlands), Springer, Hardcover, 1114 p., January 2011, ISBN 978-90-

481-9756-9. This standard work on contaminated site management covers the whole chain of steps involved in dealing with contaminated sites, from site investigation to remediation. An important focus throughout the book has been on Human health, Ecological and Groundwater-related Risk Assessment. In addition, the book includes chapters on characterization of natural and urban soils, sampling, bioavailability, natural attenuation, policy and stakeholder viewpoints and Brownfields. Typically, the book includes in-depth theories on soil contamination, along with offering possibilities for practical application. More than sixty of the world's top experts from Europe, the USA, Australia and Canada have contributed to this book. The twenty-five chapters in this book offer relevant information for experienced scientists, students, consultants and regulators, as well as for 'new players' in contaminated site management. For details see http:// springer.com/978-90-481-9756-9.



Sulphur in Soils, Crops and Fertilisers – from research to practical application. By Tandon, HLS. 2011. ISBN: 81-85116-62-8. Pages 204+x. Fertiliser Development and Consultation Organisation, 204-204A Bhanot Corner, 1-2 Pamposh Enclave, New Delhi 110 048

(India), email: fdco@airtelmail.infdco@vsnl.net-Price US\$ 60 (inclusive of airmail delivery). This is the 48<sup>th</sup> practical and reference book published by FDCO on various aspects of plant nutrients, fertilizers and integrated nutrient management .This book is a continuation of their efforts in providing technically sound and easily understandable synthesis of scientific information on plant nutrient sulphur (S) for practical use by various stake holders. The main theme chapters in the book deal with (i) the role of sulphur in plants and its deficiency symptoms, requirement by crops and their critical concentra-

tions,(ii) sulphur status of soils and the extent of sulphur deficiencies,(iii) sulphur uptake by crops in relation to yield, (iv) the effect of S application on crop yield and produce quality,(v) interactions of sulphur with other nutrients, (vi) sulphur management in cropping systems to assess the residual effects, (vii) sulphur uptake, removal and balances, (viii) impact of continuous use of S-free fertilizers on crop productivity, (ix)economics of sulphur fertilization, (x) sulphur fertilizers- their characteristics, transformation, production and consumption, (xi)guidelines for sulphur management and practical recommendations followed by an exhaustive list of references and appendices. The easily readable text is supported by a large number of tables and diagrams.



Soil Fertility, Fertilisers and INM. By H.L.S. Tandon. 2011. ISBN: 81-85116-59-8. Pages 156+vi. Fertiliser Development and Consultation Organisation, 204-204A Bhanot Corner, 1-2 PamposhEnclave, New Delhi 110 048 (India).

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Email: fdco@airtelmail.infdco@vsnl.net PriceUS\$ 60 (inclusive of airmail delivery). This user-friendly dictionary by Dr HLS Tandon goes well beyond providing definitions of terms as is usually done in a conventional dictionary. It can be considered as a source book which provides definitions and elaborated explanations with examples in simple English of the most important terms in soil fertility-chemistry, nutrient management, agronomy, fertilizer trade and integrated nutrient management (INM) covering all major and micro plant nutrients, conventional fertilisers, micronutrient carriers, speciality fertilisers, liquid fertilizers, organic manures, composts, biofertilisers etc. The elaborate coverage is illustrated by the fact that nearly 30 aspects are discussed under the generic term nutrient ranging from nutrient availability to nutrient uptake. Under the main heading of Soil, about 40 terms/descriptors are discussed ranging from soil acidity to soil testing. Similarly under, compost the aspects discussed are compost accelerators, compost enrichcompost preparation. The text is ment and supported by several tables and diagrams. This

sourcebook-cum dictionary is expected to be a handy and useful ready reference book for all those who are interested in soil and crop management through the integrated management of plant nutrients through diverse sources, whether mineral, organic or microbial.



Suelos de la Región Pampeana. Procesos de Formación. By: Perla Amanda Imbellone, Jorge Eloy Giménez and José Luis Panigatti. Ediciones INTA. Buenos Aires, Argentina. 2010. 320 pp. ISBN: 978-987-1623-40-2 (In Spanish).

The Pampean Region covers an area of about 600.000 km<sup>2</sup>. Its soils, largely formed in loess sediments, are the most fertile of Argentina and are mainly used as cropland or for livestock raising. The book describes in five chapters the main pedogenic processes operating in the Region: melanization, illimerization (argilluviation), hydromorphism, vertisolization and sodification, salinization, plus an introductory chapter on general aspects of pedogenic processes. Each chapter includes the genesis of the process, the influence of the soil-forming factors, the macro- and micromorphological, physical, chemical and mineralogical properties which reflect the process, the classification of the soils according to different systems (mainly Soil Taxonomy and WRB) and their distribution in the Region. Finally, applied aspects are discussed such as limitations for different uses, degradation evidences and recommended management practices. The description of the processes is largely based on information from local research works. The book includes tables, graphs, maps and colour photographs of soil profiles and associated landscapes. It is addressed mainly to researchers, educators and students in soil science and related disciplines.

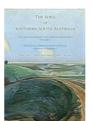
To order see: libreria@correo.inta.gov.ar



Is it possible for the World Soils to feed 9 billions of Humans? Les Sols du Monde pourront-ilsnourrir 9 milliards d'humains. French publication ByYves Coquet and Alain Ruellan. Le Pommier Editions, Paris, 2010. ISSN 1625-1245 ISBN 978-2-7465-0463-9.

Can the world soils feed 9 billion human beings? That is the question to which Yves Coquet and Alain

Ruellan try to formulate an answer, in a small and short book, that is meant for a large public to discover, at the same time, what are the soils and their functions and how soils have to be better known and used. Why this book? First because it is clear that this question is an accute high préoccupation of the world. Secondly, because today more and more answers are given without taking the soils in consideration. Thirdly, it is urgent that soil scientists give their opinion about this question; to find solutions, soils and their diversity have to be taken in consideration.



The Soils of Southern South Australia. Hall, James (Ed); Maschmedt, David; Billing, Bruce. Government of South Australia. 2009, 446 pp. Hardcover. ISSN: 0016-7673; ISBN: 978-1-9215-2816-3.

A comprehensive and beautifully presented reference on the geology, nature, distribution, management, use, conservation, potential and limitations of South Australian soils. The book contains previously unpublished information sourced from over two-decades of field-based scientific endeavour. It describes the soil resources of South Australia's non-arid zone; summarises concepts, issues and data specifically relating to soil type; and includes numerous colour maps, graphs and data tables, together with colour photographs of soil profiles and associated landscapes, an extensive introduction, and comprehensive appendices. The book is designed to complement Australian Soils and Landscapes (McKenzie et al. 2004) - providing more detail for a productive and diverse part of the Australian continent. Soils are categorised into 15 groups and 61 subgroups based on features of most importance to land use and management in South Australia. 61 representative soil profiles are shown with full classifications according to *The Australian Soil Classification* (Isbell 2002). The book is intended to build interest in, and knowledge and understanding of, our precious soil resources for improved natural resource management and land-use decision making; is designed to assist farmers, grape-growers, wine-makers, irrigators, planners, ecologists, researchers, policy-makers, educators and students; and should appeal to anyone with an interest in our key natural resource assets. To order see: www.environment.sa.gov.au/dwlbc/land/soil

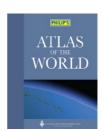
TUSEC - Technique for Soil Evaluation and Categorization for Natural and Anthropogenic Soils. By: Andreas Lehmann, Susanne David and Karl Stahr. Publisher: Hohenheim University, Institute for Soil Science and Land Evaluation, 2010. The "TUSECbook" is an innovative manual for soil evaluation in the temperate zone, comprising an English and a German version in one volume. New and innovative are the explicit consideration of anthropogenic soils with the TUSEC-evaluation and the differentiation of the evaluation system into two evaluation methods for different levels of detail. The publication starts with a short retrospection on soil evaluation and an introduction to the background of soil functions. Moreover, the restrictions and possibilities of schematic methods for soil evaluation are highlighted in some detail. A glossary is also added to the text. According to the different levels of detail of the methods, the book is partitioned into two parts. The first part focuses on exact evaluation which requires the input of primary soil data and some additional information. The second part comprises a low input method for soil evaluation for overview purposes basing on the input of secondary soil data and further information. Such secondary data are e.g. information read out from hydrological maps, building ground maps, but also information about the transport of soil material. Both, the part describing the detailed method and the part showing the overview method, are again divided in chapters with step-by-step descriptions of methods for the evaluation of the widely known soil functions. Every of these chapters are introduced with principal explanations on the according soil functions and descriptions of the specifities of the method are given. Thereby, details on the methodological extensions which are necessary for the evaluation of anthropogenic soils are highlighted. The book comprising 217 pages is published as volume 86 in the "Hohenheimer Bodenkundliche Hefte" and could be ordered by mail to kstahr@uni-hohenheim.de or by fax to +49 711 4592 3117. The price including shipment is 10,50 EUR.



A Practical Guide to Geostatistical Mapping is a FREE book by Tom Hengl. It uses R+gstat/geoR, SAGA GIS and Google Earth combo of software packages. It includes seven diverse data analysis exercises. Materials pre-

sented in this book have been used for the five-day advanced training course "GEOSTAT: spatio-tempo-

ral data analysis with R+SAGA+Google Earth", that is periodically organized by the author and collaborators. Visit <a href="http://spatial-analyst.net/book/">http://spatial-analyst.net/book/</a> to obtain a digital copy of the book and R scripts / data sets used. This is an Open Access Publication.



Philip's Atlas of the World. (RRP £75), Published 4th October 2010, ISBN: 9781849071222. The world is facing a serious threat of a food shortage within the next 60 years, global food reserves are at their lowest for 30 years and

with the population soaring, expected to reach 9 billion by 2050, there will be an extra 2.5 billions people to feed. This combined with our demand for more meat and variety of fresh produce in our diet is putting a huge pressure on ever diminishing resources. The new Philip's Atlas of the World, published on October 4th in association with the Royal Geographical Society is the ultimate, top of the range atlas for personal and professional use. Completely updated and revised, it is packed with spectacular satellite images of the earth, a detailed and informative World Geography section, maps and city-centre plans for 69 of the world's largest and most economically important cities, plus world statistics and a glossary of geographical terms. It particular, it looks in detail at the increasing threat to Food Security in a fascinating article written exclusively for Philip's by a team led by Keith Goulding. To order see: www.philips-maps.co.uk



Trace Elements in Soils and Plants, Fourth Edition, by Alina Kabata-Pendias, Institute of Soil Science and Plant Cultivation, Pulawy, Poland. CRC Press. ISBN: 9781420093681. This highly anticipated fourth edition of

the bestselling Trace Elements in Soils and Plants reflects the explosion of research during the past decade regarding the presence and actions of trace elements in the soil-plant environment. The book provides information on the biogeochemistry of these elements and explores how they affect food quality. Incorporating data from over 1500 new resources, this edition includes the most up-to-date information on the relationship of trace elements to topics such as: Soil natural/background contents, Sorption/desorption processes, Anthropogenic impact and soil phytoremediation, Phytoavailability and functions in plants, Contents of food plants.

The book discusses the assessment of the natural/background content of trace elements in soil, bioindication of the chemical status of environmental compartments, soil remediation, and hyperaccumulation and phytoextraction of trace metals from the soil. The table of contents reflects the IUPAC's recommendation for numbering element groups, giving the new edition an updated organizational flow.



Growth and Mineral Nutrition of Field Crops, Third Edition, by Nand Kumar Fageria, EMBRAPA, San Antonio de Goias, GO, Brazil; Virupax, Baligar, USDA/ARS SPCL, Beltsville, MD, USA; Charles Allan Jones, Texas A&M University, Dallas, USA. CRC Press. ISBN: 9781439816950.

By the year 2050, the world's population is expected to reach nine billion. To feed and sustain this projected population, world food production must increase by at least 50 percent on much of the same land that we farm today. To meet this staggering challenge, scientists must develop the technology required to achieve an "evergreen" revolution — one that increases crop productivity without degrading natural resources. With 30 percent new material, the updated and revised third edition of Growth and Mineral Nutrition of Field Crops covers all aspects of crop growth and mineral nutrition that contribute to sustainable, high-yield agriculture. Bringing together international scientific knowledge of crop production and the impacts of agriculture on the environment, this book: Includes two new chapters on remediation of heavymetal contaminated soils and cover crops; Covers theoretical and practical aspects of mineral nutrition of field crops; Provides recommendations for judicious use of fertilizers, which will reduce cost of crop production and enhance high crop yields without risking environmental pollution; Provides growth patterns for annual crops and forages; Includes a handful of color pictures of nutrient deficiencies for easy diagnostic purposes. To make the book as practical as possible, each chapter is supported by experimental results and extensive references. A large number of figures and tables are also included to save readers time when researching. The overall emphasis of this reference is on the soil's ability to sustain high crop yields and a healthy human population.



Facts About Global Warming. Rational or Emotional Issue? By Kutílek, Miroslav and Nielsen, Donald R., 2010, 227 pp. Essays in GeoEcology, Catena Verlag GMBH, Reiskirchen, Germany. ISBN 978-3-923381-58-6, US ISBN 1-59326-242-0. Price 45.00 € + mailing costs. The book is an

essay about a politically abused problem which is not only a subject of climatologists but of utmost interest for researchers in the fields of Soil Science, Hydrology and Environmental Science dealing with the principles of sustaining life on our planet. In an easily understandable presentation the authors discuss comprehensive reports and peer-reviewed scientific publications on global warming, and how temperature of earlier time is estimated when thermometers did not exist. The underestimation of temperature of the Medieval Warm Period in many climatologic studies is critically reported. Stating that greenhouse effect is not the dominant cause of the recent climate change, the authors explain the role of eight factors acting upon the climate in the geological history of planet Earth. They show that climate change was important in man's evolution and in the development and crisis of civilizations. They do not consider the recent magnitude and speed of warming as a signal of an approaching catastrophe. Their analyses of analogical warming oscillations in the Holocene are found not to be dangerous for life, but quite the opposite. The catastrophic scenarios of approaching disasters caused by global warming are rationally rejected at the end. To order the book contact Catena Verlag, Ärmelgasse 11, D-35447 Reiskirchen, Germany, catenaverl@aol.com, or see www.catena-verlag.de



Soil Enzymology. Series: Soil Biology, Vol. 22. Shukla, Girish; Varma, Ajit (Eds.) 1st Edition., 2011, XVI, 385 p., Hardcover. ISBN: 978-3-642-14224-6. Soil enzymes are one of the vital key mediators involved in nutrient recycling and the decomposition of or-

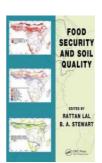
ganic matter and thereby in maintaining soil quality and fertility. This Soil Biology volume covers the various facets of soil enzymes, such as their functions, biochemical and microbiological properties and the factors affecting their activities. Enzymes in the rhizosphere, in forest soils, and in volcanic ash-derived soils are described. Soil enzymes covered include

phosphohydrolases, lignocellulose-degrading enzymes, phenol oxidases, fungal oxidoreductases, keratinases, pectinases, xylanases, lipases and pectinases. Several chapters treat the soil enzymatic activities in the bioremediation of soils contaminated with pesticides and pollutants such as oil, chlorinated compounds, synthetic dyes and aromatic hydrocarbons. The role of soil enzymes as bioindicators is a further important topic addressed.



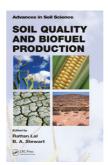
Actualización en métodos y técnicas para el estudio de los suelos afectados por incendios forestales. Title in English: Review of methods and techniques for the study of soils affected by forest fires. Edited by Artemi Cerdà (University of

Valencia) and Antonio Jordán (University of Seville). Published by FUEGORED and Cátedra de Divulgació de la Ciència (University of Valencia) ISBN: 978-84-370-7887-8. More than 50 authors have worked in this book, edited by A. Cerdà and A. Jordán. This publication reviews methods and techniques for the study of soils affected by forest fires, including studies in the long, medium and short term. New approaches are included and some classical methods are updated. Each chapter provides laboratory and field, as well as examples of their application and interpretation of results. The book is divided into four sections, besides introduction and conclusions. These sections are dedicated to: i) the hydrological and erosive processes in areas affected by forest fires, paying attention to aggregate stability, soil water repellency and soil erosion studies at different scales; ii) the impact in chemical and physical properties of soils, including new approaches as NIR methodologies applied to the study of burning temperatures, the study of impacts in organic substances, acidity and other chemical properties, as well as the assessment of ashes; iii) methods and techniques for studying the impact of forest fires in ecosystems, post-fire hydrogeomorphological monitoring, image analysis, the assessment of changes in plant communities and the use of spectroradiometry as a tool for the study of fire severity; and iv) methods of studying the effects of wildfires in biochemical and microbiological properties. The text is aimed at Spanish language speaker students and researchers in the area of fire-affected soils, soil science, ecology and environmental sciences, as well as national and international policy makers and a number of organizations dealing with environmental protection and management of natural resources.



Food Security and Soil Quality. Edited by: Rattan Lal, The Ohio State University, Columbus, USA; B.A. Stewart, West Texas A&M University, Canyon, USA. Series: Advances in Soil Science. CRC Press. ISBN: 9781439800577. Just five years ago, it was generally believed that the number of food in-

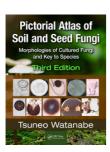
secure people in the world was on continuous decline. Unfortunately, widespread soil degradation along with resistance to recommended agronomic practices, and little attempt to restore degraded soils have conspired with significant droughts (in regions that could least tolerate them) to swell the ranks of the food insecure to over a billion people. The U.N. Millennium Development Goals' intent to halve hunger by 2015 will not be realized. Food Security and Soil Quality brings together leading experts from across the world to provide a concise and factually supported exploration of the problem at hand and the critical steps needed to reverse it. This book does provide policymakers and others with an understanding of the depth, complexity, and immediacy of this crisis, but more than a call to action, it also offers soil scientists working in this area with an understanding of what is being done and what needs to be done. Most importantly, this book helps us understand that the situation is not beyond remediation were we to act with great resolve and a sense of urgency.



Soil Quality and Biofuel Production. Edited by: Rattan Lal, The Ohio State University, Columbus, USA; B.A. Stewart, West Texas A&M University, Canyon, USA. Series: Advances in Soil Science. CRC Press. ISBN: 9781439800737. In eight concise chapters, Soil Quality and

Biofuel Production presents a state-of-the-knowledge review of soil properties and processes negatively impacted by crop residue removal. It outlines the ecological consequences of biofuels and evaluates land use in the production of raw material for biofuel. The book then spotlights pressing issues related to corn and cellulosic ethanol and also soil

erosion. It offers advice for achieving economic balance in the competition for arable land between food and biofuel along with residue harvest management techniques. A thought-provoking discussion of the opportunities and challenges that biofuel presents rounds out the book's coverage. The logistics of producing biomass in a sustainable manner remain a major challenge and will continue to be so for the foreseeable future. Serious questions linger concerning viable sources of biofuel feedstock, competition for resources needed to produce biomass, and energy output/input ratios. Soil Quality and Biofuel Production provides environmental scientists and agricultural engineers with the knowledge they need to address them.



Pictorial Atlas of Soil and Seed Fungi: Morphologies of Cultured Fungi and Key to Species, Third Edition. Tsuneo Watanabe, Institute for Biological Resources and Functions, National Institute of Advanced Industrial Science and Technol-

ogy (AIST), Tsukuba, Ibaraki, Japan. CRC Press. ISBN: 9781439804193. Dr. Watanabe describes all fungi alphabetically under the orders of Oomycota, Zygomycota, Ascomycota, Basidiomycota, Anamorphic (Deuteromycetous) fungi. For each genus, he includes type species, references, morphology, and materials. Morphologies of cultured fungi are briefly described and illustrated together with the description of the isolation sources and methods. The book illustrates all fungi alongside morphologies and colonies of their fresh agar cultures or dried specimens, providing ready access to morphologically similar fungi for quick comparison. Most of the fungi are isolated from soil, plant roots, and seeds, and the rest are from wood-inhabiting fruiting bodies, their spores, or the spore-like structures associated with them. They are mostly collected in Japan, but some are from the Dominican Republic, Paraguay, Switzerland, and Taiwan, R.O.C.



The Black EarthEcological Principles for Sustainable Agriculture on Chernozem Soils. Series: International Year of Planet Earth, Vol. 10. Krupenikov, IgoriArcadie, Boincean, Boris P., Dent, David.

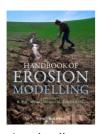
Springer, 2011, X, 190 p. Hardcover. ISBN: 978-94-007-0158-8. €99.95. Soil is the Earth's living skin.

It provides anchorage for roots, holds water long enough for plants to make use of it and the nutrients that sustain life - otherwise the Earth would be as barren as Mars. It is home to myriad microorganisms and armies of microscopic animals as well as the familiar earthworm that accomplish biochemical transformations from fixing atmospheric nitrogen to recycling wastes; it receives and process all fresh water, provides the foundations for our built environment; and comprises the biggest global carbon store that we know how to manage. This book is about the best soil in the world - the black earth or chernozem: how it is being degraded by farming and how it may be farmed sustainably. Industrialisation of farming has laid bare contradictions between the unforgiving laws of ecology and economics. Soil organic matter is the fuel that powers soil systems and the cement that holds the soil together - and in place – but agriculture is burning it up faster than it is being formed: even the chernozem cannot long survive this treatment. Here is the evidence for this trend and, based on long-term field experiments, ecological principles for sustainable agriculture that can reverse the trend and, at the same time, feed the world. Unlike other volumes in the series, this is not an edited collection of scientific papers.



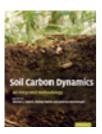
Ecological Aspects of Nitrogen Metabolism in Plants. Joe C. Polacco, Christopher D. Todd, ISBN: 978-0-8138-1649-4, Hardcover, 448 pages, March 2011. Price €156.00. Ecological Aspects of Nitrogen Acquisition explores not only how plants compete for

nitrogen in complex ecological communities The book also looks in greater detail at the associations plants recruit with other organisms, ranging from soil microbes to arthropods, as nitrogen acquisition strategies, and how these contribute to individual and evolutionary fitness. The book is divided into four sections, each addressing an important set of relationships of plants with the environment and how this impacts the plant's ability to compete successfully for nitrogen, often the most growth-limiting nutrient. *Ecological Aspects of Nitrogen Acquisition* provides thorough coverage of this important topic, and will be a vitally important resource for plant scientists, agronomists, and ecologists.



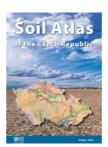
Handbook of Erosion Modelling. Roy P. C. Morgan (Editor), Mark Nearing (Editor), ISBN: 978-1-4051-9010-7, Hardcover, 416 pages, December 2010, Wiley-Blackwell. Price €102.00. The movement of sediment and asso-

ciated pollutants over the landscape and into water bodies is of increasing concern with respect to pollution control, prevention of muddy floods and environmental protection. In addition, the loss of soil on site has implications for declining agricultural productivity, loss of biodiversity and decreased amenity and landscape value. The fate of sediment and the conservation of soil are important issues for land managers and decision-makers. In developing appropriate policies and solutions, managers and researchers are making greater use of erosion models to characterise the processes of erosion and their interaction with the landscape. A study of erosion requires one to think in terms of microseconds to understand the mechanics of impact of a single raindrop on a soil surface, while landscapes form over periods of thousands of years. These processes operate on scales of millimetres for single raindrops to mega-metres for continents. Erosion modelling thus covers quite a lot of ground. This book introduces the conceptual and mathematical frameworks used to formulate models of soil erosion and uses case studies to show how models are applied to a variety of purposes at a range of spatial and temporal scales. The aim is to provide land managers and others with the tools required to select a model appropriate to the type and scale of erosion problem, to show what users can expect in terms of accuracy of model predictions and to provide an appreciation of both the advantages and limitations of models. Problems covered include those arising from agriculture, the construction industry, pollution and climatic change and range in scale from farms to small and large catchments.



Soil Carbon Dynamics. An Integrated Methodology. Edited by: Werner L. Kutsch, Michael Bahn, Andreas Heinemeyer. Hardback, ISBN: 9780521865616, 2010. Cambridge UP 298 pages. Carbon stored in soils represents the

largest terrestrial carbon pool and factors affecting this will be vital in the understanding of future atmospheric CO2 concentrations. This book provides an integrated view on measuring and modeling soil carbon dynamics. Based on a broad range of indepth contributions by leading scientists it gives an overview of current research concepts, developments and outlooks and introduces cutting-edge methodologies, ranging from questions of appropriate measurement design to the potential application of stable isotopes and molecular tools. It includes a standardised soil CO2 efflux protocol, aimed at data consistency and inter-site comparability and thus underpins a regional and global understanding of soil carbon dynamics. This book provides an important reference work for students and scientists interested in many aspects of soil ecology and biogeochemical cycles, policy makers, carbon traders and others concerned with the global carbon cycle.



Soil Atlas of the Czech Republic. Edited by Josef Kozak, Czech University of informationLife Sciences, Prague 2010, 150 p. hard-cover, ISBN: 978-80-213-2028-4. The book involves in the introductory part and principle information, concerning soil

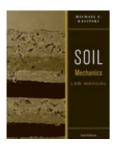
functions, its degradation and contamination, endangered areas, soil survey, digital soil mapping, soil rating, modelling and GIS demonstrated on 66 figures. Predominant part of the publication is devoted to the taxonomic classification system of the Czech Republic, compared with WRB and to soil maps. It includes 71 pictures of soil profiles, micromorphological features, moisture regimes and tables of principal diagnostic properties. Presented are map of soil associations dominants at scale 1:250.000, parent materials at 1:500.000, geomorphological soil regions 1:500.000 and soil regions in the SOTER system at scale 1:1 million.



Physical Soil Mechanics. Series:Advances in Geophysical and Environmental Mechanics and Mathematics. Gudehus, Gerd. 1st Edition., 2011, XIII, 840 p. 1000 illus., Hardcover. ISBN: 978-3-540-36353-8. Price

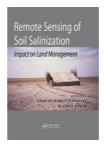
199,95 €. Soil is matter in its own right. Its nature can be captured by means of monotonous, cyclic and strange attractors. Thus material properties are defined by the asymptotic response of sand- and clay-like samples to imposed deformations and stresses. This serves to validate and calibrate

elastoplastic and hypoplastic relations with comparative plots. Extensions capture thermal and seismic activations, limitations occur due to localizations and skeleton decay. Attractors in the large characterize boundary value problems from model tests via geotechnical operations up to tectonic evolutions. Validations of hypoplastic calculations are shown with many examples, possible further applications are indicated in detail. This approach is energetically justified and limited by critical points where the otherwise legitimate continuity gets lost by localization and decay. You will be fascinated by the fourth element although or just as it is so manifold.



Soil Mechanics Lab Manual 2e. by Michael E. Kalinski, ISBN 978-0-470-55683-2, 2011. Paperback, 208 pages. Price €61.60. Soil Mechanics Lab Manual prepares readers to enter the field with a collection of the most common soil

mechanics tests. The procedures for all of these tests are written in accordance with applicable American Society for Testing and Materials (ASTM) standards. Each chapter in the manual describes one test. Instructor may choose to combine more than one test during a given laboratory session. For example, the moisture content and specific gravity laboratory exercises are relatively short, so it would be reasonable to combine these exercises into one three-hour laboratory period. Laboratory exercises and data sheets are included at the end of each chapter. Brief video demonstrations are available online for each of the laboratory experiments described in this manual. Each demonstration includes a brief background of the test, required equipment, and step-by-step procedure for the measurement and reduction of experimental data. Data sheets are written to be used for practical purposes as well as educational purposes, with places to insert information regarding project, boring number, and soil Recovery Depth/Method. The procedures for all of the tests described in this manual are written in accordance with applicable American Society for Testing and Materials (ASTM) standards. It is important to be familiar with these standards to under-stand, interpret, and properly apply laboratory results obtained using a standardized method. Each test described in this manual has an associated ASTM standard number.



Remote Sensing of Soil Salinization. Impact on Land Management. Edited by Graciela Metternicht and Alfred Zinck. CRC Press, Francis & Taylor Group, 2009, 377 pp. Catalog no. 65025. ISBN: 978-1-4200-6502-2. Providing an overview of soil salinity as-

sessment using remote sensing technologies, this book analyzes basic issues of remote detection, such as the spectral behavior of salt type and vegetation influence. Each remote sensing platform is evaluated for its advantages and disadvantages. International contributors present the latest technological developments and image classification techniques used to detect and map land degradation caused by soil salinization. An accompanying CD-ROM includes color images.

# **IUSS Honorary members**

Year	Member	Country	Year	Member	Country
1924	L. Cayeux †	France	1990	G. Aubert †	France
	K. Glinka †	USSR		E.G. Hallsworth †	Australia
	Jos. Kopecky †	Czechoslovakia		J.S. Kanwar	India
	E. Ramann †	Germany		P. Schachtschabel †	Germany
	Sir John Russell †	UK		R.W. Simonson †	USA
	S. Winogradski †	USSR		I. Szabolcs †	Hungary
1927	P. Treitz †	Hungary	1998	G. H. Bolt	Netherlands
1935	E.A. Mitscherlich †	Germany		R. Dudal	Belgium
	A. d'Sigmond †	Hungary		K.H. Hartge	Germany
	J. Stoklasa †	Czechoslovakia		M. Kutilek	Czech Rep.
	G. Wiegner †	Switzerland		J. Quirk	Australia
1950	A. Demolon †	France		W.G. Sombroek †	Netherlands
	D.J. Hissink †	Netherlands		K. Wada	Japan
	W.P. Kelley †	USA		D.H. Yaalon	Israel
1954	S. Mattson †	Sweden		S.V. Zonn †	Russia
	E. Truog †	USA	2002	R.W. Arnold	USA
1956	G. Bertrand †	France		G.V. Dobrovolsky	Russia
	E.C.J. Mohr †	Netherlands		W. Gardner	USA
1960	F.A. Bear †	USA		H.M. Hamdi †	Egypt
1964	J.A. Prescott †	Australia		L.A.L. Sarmiento	Colombia
1968	F. Hardy †	UK		F. Mancini	Italy
	W.L. Kubiena †	Germany		B.S. Nosko	Ukraine
	L.A. Richards †	USA		R. Rosell	Argentina
	A.A. Rode †	USSR		A. Ruellan	France
1974	R. Bradfield †	USA		A. Tanaka	Japan
	G.V. Jacks †	UK		P.B.H Tinker	UK
	Ch.E. Kellogg †	USA	2006	W.E.H. Blum	Austria
	M.K. Kononova †	USSR		H-P. Blume	Germany
	A. Oudin †	France		J. Bouma	Netherlands
	F. Scheffer †	Germany		S-J. Cho	South Korea
1978	G. Barbier †	France		J. Glinski	Poland
	V. Ignatieff †	Canada		M.G.H. Jamagne	France
	Y. Ishizuka †	Japan		D.R. Nielsen	USA
	L. Krolikowski †	Poland		J.H.V. van Baren †	Netherlands
1000	L. Vettori †	Brazil	2212	L.P. Wilding	USA
1982	Ph. Duchaufour †	France	2010	C. Feller	France
	W. Flaig †	Germany		K. Kumazawa	Japan
	V. Kovda †	USSR		K. Kyuma	Japan
	E. Mueckenhausen †	Germany		J. Ryan	Syria
1000	E.W. Russell †	UK		B.A. Stewart	USA
1986	H. Jenny †	USA		V. Targulian	Russia
	D. Kirkham †	USA		G. Varallyay	Hungary
	S.K. Mukherjee †	India		J.S.P. Yadav †	India
	R. Tavernier †	Belgium			

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