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New Zealand Soil News

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Your contributions are required - New Zealand Soil News is your newsletter

News, views, letters, articles (serious or otherwise)—send to:

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Deadline..... for the April issue of Soil News is Monday 8th April 2013

Visit our website:

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New Zealand Soil News

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Soil Science: Back to the Future

The Australia and New Zealand Soil Science Conference in Hobart had me reflecting on the past and also the future of soil science, particularly in New Zealand. While I was one of a sizeable number of oldies (it is about 40 years since I was first signed up to NZSSS by its then Secretary, Bruce Miller) among about 450+ delegates, it was the youthful majority there who provide the hope for the future of our science. And some of the presentations provided a bridge between the past and the future.

In this context, I refer to the presentation by Judy Tisdall and Malcolm Oades on their highly cited 1982 paper on the hierarchy of aggregates and to that of Allan Hewitt on mapping soil natural capital; each for different reasons. Tisdall and Oades' J. Soil Sci. paper, at first rejected by a journal, became influential initially because it provided a general principle for our science, but is increasingly being cited now because it explains one of the main causes of carbon sequestration, a concept that was unheard of when the paper was written. Allan Hewitt's talk resonated with me because he used names of soil series from Canterbury with which I am familiar to describe types of soils in the Wairarapa in order to provide examples of calculations of soil natural capital. In one case, the general principle has become useful for explanations about an important and pressing practical issue. In the other, detailed studies in the past to establish soil series have been grafted on to properties of similar soils elsewhere and then used to illustrate a new principle with which to view soils generally.

There was another paper at Hobart that I want to instance for looking to the future. Dealing with the GlobalSoilMap's Oceania Node, it was given by Mike Grundy, of the CSIRO, but included authors from Indonesia, the South Pacific Community and New Zealand (Allan Hewitt). Here, information technology is being exploited to bring key soil attributes from a wide geographical area – and ultimately globally – together in one place for their access from any computer keyboard or tablet. The extremely diverse world of soils is becoming one.

We now know that the world's food production will need to at least double by 2050 or before to provide sustenance for 9 billion people. The challenge for soil science is to achieve this demanding target while sustaining the world's soils. Achievement of these two difficult objectives together will provide some great intellectual challenges for soil scientists now and in the future. There will be a need for generalising from current specific information we have about many particular soils so that data on soils in e.g., Canterbury will be used to inform us about new interpretations of soils even beyond the Wairarapa into larger scales, including globally. There will also be a need for the establishment of general principles of the aggregate hierarchy kind. There will be a further imperative for the application of emerging technologies both for linking data in e.g. global maps and also for conducting hard science studies at the finest, molecular scales.

In my own specialisation of clay mineralogy, modern (hard) X-ray diffraction with computer modelling and soft X-ray and other spectroscopies powered by high-energy synchrotron radiation as well as high-resolution electron microscopy, NMR and neutron diffraction has led us to realise that soil clays are mostly quite different from 'geological' clay minerals. They are comparatively disordered, often incorporate metal oxides and are intimately associated with organic matter, and these associations are important if their role in soils and their effect on soil properties are to be understood. There is much more research work to be done in and around the once arcane sub-discipline of soil clay mineralogy, even if it is labelled otherwise.

To refer to the opening plenary lecture of the recent conference by Henry Janzen from Canada, the challenges for soils are huge and they demand the application of many approaches. There should be many opportunities for soil scientists. Of course, the potential benefits for soil scientists are not just for us to savour, as a kind of closed shop. Like the Lorax, speaker for the trees in Dr Seuss' wonderful environmental fable, one of our most important roles may be to "speak for the soil". Among other tasks, we need to persuade students and recent graduates in other disciplines, including the social sciences that we need them to help meet the pressures exerted by a crowded humanity upon soil, as the support system for us all. Ours is a unique role and nothing less than a liveable Earth is at stake.

Jock Churchman

NORMAN TAYLOR LECTURE – given by Dr Malcolm McLeod

The Title of the Lecture is: 'Progress'



Malcolm McLeod has been a Pedologist since starting with DSIR Soil Bureau back in 1987 when soil survey was his full time mission both in New Zealand and overseas. Malcolm has had published Country soil surveys in the North Island and soil surveys of parts of Fiji and Samoa. The falling from favour of soil surveys led Malcolm to use his pedological skills, in conjunction with colleagues, investigating the potential of soils for transmission of microbes from dairy shed effluent applied to the soil surface. Malcolm has also been active in mapping soils and their chemical and physical attributes in the Antarctic for which he was recently awarded his PhD.

In the Norman Taylor memorial lecture titled "Progress", Malcolm will be reviewing highlights of some of the progress soil scientists have been involved with since joining Soil Bureau. Topics to be covered include Town and Country planning; the Soil Map of Northland; Allophanic Soils that aren't; bypass flow of microbes through soils; LENZ; functional horizons and Antarctic soils.

The Norman Taylor lecture will be given as follows:

- 1. Lincoln University - March 20th from 3.30 – 4.3pm in Stewart Building, Lecture Room S1**
- 2. Massey University - March on Friday 22nd March at 2pm, in the Fitzherbert Room, AgResearch Grasslands, Palmerston North followed by afternoon tea.**
- 3. University of Waikato - 11 April, 3.00 pm in room AG.30 at the University of Waikato. (A block is at the end of the short driveway that comes in via Gate 8 off Hillcrest Road, Hamilton. Parking will be best either in Gate 1 off Knighton Road or Gate 10 off Silverdale Road, both a five minute walk from the venue).**

NZSSS Council Members 2012-2014

New Zealand Society of Soil Science Officers 2012–2014

The new Council was elected in December 2012 for a two-year term. Members are:

President:	Trish Fraser	Plant & Food Research
Vice President:	Reece Hill	Environment Waikato
Immediate Past President:	Allan Hewitt	Landcare Research
Secretary:	Tim Clough	Lincoln University
Treasurer:	TBA	
Council:	Iris Vogeler	AgResearch Grasslands
	Roger McLenaghan	Lincoln University
	David Houlbrooke	AgResearch Ruakura
	Mike Hedley	Massey University
	Hamish Lowe	Lowe Environmental Impact, PN
	Tony van der Weerden	AgResearch, Invermay

Trish Fraser – Plant & Food Lincoln – (President)



I originate from a mixed cropping farm on the Black Isle in Ross-shire in the north of Scotland. I studied Plant and Soil Science at Aberdeen University (Join Honours with Prof Ken Killham) and then came to Lincoln University to study for my PhD on nitrate leaching (with Prof Keith Cameron) in December 1988.

After graduating from Lincoln University in 1992, I joined Crop & Food Research as a soil scientist (based at Lincoln). The first decade or so of my research work with Crop & Food Research had a large emphasis both on soil biology (in particular defining the role of earthworms in the soil) and on cereal crop residue management practices and rates of residue decomposition.

I was first elected onto the Council of the New Zealand Society of Soil Science back in 1992 and took on the role of Secretary in 1996 and continued with this role until becoming President at the end of 2012.

Just over 20 years on I still work at the same place, although Crop & Food Research amalgamated with HortResearch to become Plant and Food Research in December 2008 - and for the last few years I have opted to reduce my workload to only a 75% position.

There are three main reasons why I do not work full time any more... and they are all female! I took three breaks from my work in order to become mother to three fantastic little girls who are now aged 7, 9 and 11 respectively and who in general keep my life very busy!! They currently attend Springston School where I keep a keen interest in their activities by serving as Chair of the Board of Trustees.

My main research interests presently revolve around defining best management practices for minimisation of soil degradation under land use change, which currently includes

investigation of the effects of tillage on soil organic matter, nutrients (especially N), plant water use and soil biota.

The opportunity has recently arisen for me to also rekindle my interest in nitrate leaching research and we (at Plant and Food research) are currently building a lysimeter facility (similar to those used by Keith Cameron et al) to further investigate nitrate leaching processes, but with our current particular emphasis on the influence of irrigation on nitrate leaching in the arable sector.

I live with my husband Steve on a small farmlet (20 hectares) near the Selwyn River, where we breed our own beef (Hereford/ Friesian cows crossed with Simmental bull) cattle. Life is busy but a lot of fun too...

Alan Hewitt– Landcare Research – (Past President)



My first awareness of soil was that it tasted disgusting. However, childhood curiosity won me over when a brilliant red-coloured road cutting near my family farm made me aware of earth materials. I completed undergraduate study in chemistry and geology and worked as an exploration geologist, sampling soils for copper and tungsten content. I realized that I was more interested in the soils themselves than just the metal contents of the samples. Thoughts for the future harked back to that cutting. I had to know more about what that was. The threads all came together when I studied soil science, in a post-grad diploma, at Lincoln University, NZ. There was a feeling of homecoming. I capped it off with a PhD at Cornell.

I have been fortunate to have enthusiastic teachers and I realise the debt we owe to our teachers of soil in NZ. One of the things I have enjoyed about working in the research environment, in the Soil Bureau, and Landcare Research, has been the satisfaction of working in project teams learning together how our landscapes work, and how that may be portrayed.

I have worked and published in many aspects of soil science with the common thread being the soil-landscape. A current focus is to provide better national coverage of soil information, centered on the S-map project. Digital soil mapping has now emerged as a practical means of providing soil information more efficiently. I am keen to see this applied extensively in NZ. This has led to involvement in Global Soil Map which aims to model a few key soil properties globally at 100m resolution. It is encouraging to see a growing demand for soil information, but we have to avoid frustrating the market by making our soil information easy to get and understand.

I work at Landcare Research in Lincoln and live at Rolleston with Liz on an acre of non-high-class soil. My acre keeps me busy mowing the stones, and irrigating. I also paint landscapes and portraits and stretch to painting soil profiles, even using soil as a painting medium.

Reece Hill - Environment Waikato – (Vice President)



My first major soils experience was gained when I went across the ditch to join a team mapping state forest soils in Tasmania, Australia. Highlights of this work were the chance to co-author a book (“Forest Soils of Tasmania”) and the project receiving the National Australian Landcare Research Award in 1997.

I returned to New Zealand to complete my PhD in Soil Science at Lincoln University. Since its completion in November 1999, I have worked for Environment Waikato as a soil scientist and in a variety of management roles (in the Social Science and Economy, Land and Soil and Land Management programmes). I have always maintained a high level of input into the organisation's land and soil projects. In particular, I drove the development of regional soil quality and erosion monitoring within Environment Waikato and its promotion nationally with other councils. Currently, I convene the Land Monitoring Forum, a council-led group which works with research organisations to improve and rationalise land and soil monitoring for regional authorities. Through my role on the NZSSS Council I look forward to building stronger links between soils researchers and developers of land management policy.

In my non-professional life, I carry out important roles as Chief Entertainment Officer for my two young children and Weed and Pest Controller for my challenging Hamilton gully section.

Iris Vogeler –AgResearch Grasslands



Originally from Germany I did my PhD at the Soil Science Department at Massey University under the firm and excellent supervision of David Scotter. I then worked for 12 years in the Sustainable Land Use Group at HortResearch under Brent Clothier (now Plant & Food Research). Since 2009 I have been working as a Senior Scientist in the Agricultural Systems Modelling Group at AgResearch in Palmerston North. My current research focuses largely on modelling farm systems and their effects on the environment. I am an Associate Editor for Soil Research (former

Australian Journal of Soil Research) and a Vice Chair for the International Union of Soil Sciences, Division Soils and Environment.

Roger McLenaghan - Lincoln University



I started my career in soil science at Lincoln College, as it was then named, as a Laboratory Technician way back in 1974. At that time I was working for the late Terry Ludecke with Prof Walker as head of Department. My technical training was from Christchurch Polytechnic where I completed an NZCS in chemistry. Some of the Postgraduate students I worked with in those early days were Bill Risk, Phil Hart and Stuart Ledgard.

Once I completed the NZCS I was fortunate to be able to further my studies and completed a number of Lincoln degree papers, cumulating to a PG Dip Agric Sc in 1990. During this period I was appointed Tutor in Soil Science. A role I continue to this

day. As tutor I am responsible all of the diploma and undergraduate soil science laboratories. I also lecture to the diploma students.

I consider myself as a generalist as I teach into a wide range of soil science topics. Currently my main research focus has been on the use of green manure crops, working with postgraduate students and Leo Condron.

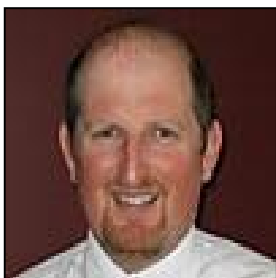
David Houlbrooke - AgResearch Ruakura – (Editor)



I come from an agriculture background having been brought up on family sheep and beef farms in the Wairarapa and the Waikato. I began studying the discipline of soil science in 1991 while completing a B.Sc in Earth Sciences at the University of Waikato followed by M.Sc research investigating the impacts of soil aeration on soil physical properties, root development and pasture growth. I subsequently spent three years working for the Western Australian Dept. of Agriculture looking into soil water-logging, drainage and crop growth. Upon my return to New Zealand in 2001, I undertook a soil science PhD at Massey University investigating the improved management for the land application of farm dairy effluent and the impact of intensive dairy farming on nutrient loss through artificial drainage systems. In 2004, I began employment with AgResearch as a soil scientist at the Invermay campus near Mosgiel where I was until 2011 when I transferred to the Ruakura campus in Hamilton hold the position of Science Team Leader for Nutrient Management and Environmental Footprinting. My current research interests focus on management of farm dairy effluent, soil and forage response to land use intensification, and best environmental management practices under intensive dairy farming.

As editor of the New Zealand Soil News, I will be inviting fellow soil scientists to write guest editorials on “newsy” articles or a topic that interests you which might initiate discussions. I also would like to encourage you to write letters to the editors about any thoughts or comments you might have. And don’t forget contributions are always welcome and can either be sent to me or Isabelle.

Hamish Lowe – LEI Ltd



I hold the qualifications of a Bachelor of Agricultural Science (Honours) and a Master of Agricultural Science (Honours in Agricultural Engineering), as well as a Certificate in Advanced Sustainable Nutrient Management in New Zealand Agriculture. I have over 18 years’ experience in managing and undertaking natural resource and infrastructure investigations, with my key expertise being the land treatment of wastewater from agricultural, industrial and municipal sources.

In recent years my expertise has been called on to assist with project management and strategic direction of rural and urban land development and major resource consent processes. This has involved the bringing together and co-ordination of a range of varying technical expertise, with a focus on natural resource management.

My primary focus has been in two related and overlapping areas. Firstly the sustainable management of nutrients, wastes and environmental impacts in agricultural systems. This includes nutrients in farming systems, animal and processing and wastewaters being applied to production agricultural land and their resulting impact on soil and water quality. The second key area of expertise is the design, evaluation and management of small community wastewater and municipal waste systems.

I am actively involved in the waste land treatment industry, having specialised in waste application to land over the last 18 years, working in New Zealand, Australia and the United States. I have completed two elected terms as Technical Committee Chairman of the New Zealand Land Treatment Collective, and have recently stepped down as a committee member. In 2010 I was presented with a service award for contribution to the Collective during my tenure on technical committee. I have assisted with giving direction to research and extension of land treatment in New Zealand and this has contributed to me being appointed to a number of research based teams in an advisory capacity, including being a member of the ESR/Scion Biowaste Advisory Board.

A large portion of my projects have involved managing soils, nutrients and wastes. While not all, a large number deal with farming systems; and relate to managing water supplies, irrigation, wastes, nutrients and general farm environmental awareness.

Mike Hedley – Massey University



I am Professor and Group Leader Soil and Earth Sciences and Director of the Fertilizer and Lime Research Centre at Massey University. I have extensive research experience in biogeochemical cycles in grazed pasture systems and led the development of the professional development courses in Sustainable Nutrient Management offered by the FLRC.

Tony van der Weerden – AgResearch Invermay



I still remember the flavour of eating dry but, what seemed to me at the time, well-aggregated, soil from my parent's veggie garden – I must have been about 3 or 4 years old. There was a gang of us, transporting soil from one area to another using dump trucks. We found plenty of worms. Time passed, and my interest in soils and plants took me to Lincoln University, where I studied for a B. Hort. Sc. From there I spent 4 years in the UK, with most of this time spent at the North Wyke Research Station in Devon, where I focused on ammonia emissions from agricultural systems.

On returning to New Zealand, I completed a PhD in soil science at Lincoln Uni, where I studied nitrous oxide and methane fluxes from arable agriculture. This was followed by a 3-year period with Crop & Food, working on indicators of soil quality, which was a new area

for me – I enjoyed this work, as I was dealing with a broad range of soils, and a broad range of land owners. And, there I was, counting worms again.

After a five year period in the research & development group at Ravensdown in Christchurch, I joined the Land and Environment group at AgResearch in Invermay in 2008. I have been there for the last 5 years, working with a great group of scientists and technicians. My research area remains with gaseous N emissions from soils, with a primary focus on inventory and mitigation research into nitrous oxide emissions from pastoral systems.

Tim Clough – Lincoln University



I completed a BA(Sci) (Hons) in soil science at Lincoln College and started work at MAF's Ruakura campus and was lucky enough to undertake his PhD while on staff there with Stewart Ledgard, through Lincoln University. I returned to Lincoln University as a Marsden Fellow in 1997, with Rob Sherlock and Keith Cameron, to examine the 'Enigma of 15N balances' and was lucky enough to receive fellowships to study N cycling processes, first with Jim Stevens in Belfast, 1998, and then using a Fulbright Senior Scholarship with Dennis Rolston, 2000, at UC Davis.

I currently hold a position as Prof. in Environmental Biochemistry at Lincoln University with interests in nitrogen and carbon cycling in agricultural and aquatic systems, greenhouse gas emissions, and the use of stable isotope techniques.

Editorial duties encompass serving as a section editor for Soil Biology & Biochemistry, as a technical editor on Journal of Environmental Quality, and as the Senior Editor for New Zealand Journal of Agricultural Research.

Megan Balks – University of Waikato



Dr Megan Balks is a Senior Lecturer in Earth Sciences at the University of Waikato where she teaches soil and environmental sciences. Born in Eketahuna, Megan was brought up on a Wairarapa hill country sheep farm. Megan developed her passion for soil science at Massey University where she completed a BSc(Hons). She then worked, for DSIR Soil Bureau in Dunedin as a soil scientist, undertaking soil mapping for irrigation developments in Central Otago. Megan completed her PhD on the effects of meat works effluent irrigation on soil physical properties while working as an assistant lecturer at the University of Waikato in the 1990s. Megan has had a long involvement in Antarctic Soil Research, having had 18 fieldtrips to "the ice" since 1990. First undertaking her Antarctic "apprenticeship" with Graeme Claridge and Iain Campbell, Megan has since had a long Antarctic Research collaboration with Landcare Research and the USDA.

Megan teaches in two large (150 student) first year courses (ERTH104 and ENVS101) where she works to share her enthusiasm for soils with a wide range of students. Megan also contributes to courses at second and third year level and leads a graduate course related to the Resource Consent Process under the RMA. She has supervised over 40 successfully

completed graduate theses, on a wide range of soil-related topics, many in collaboration with CRIs and Regional Councils.

Megan has served two terms as Chairperson of the Department of Earth and Ocean Sciences at the University of Waikato, two terms on the Waikato Conservation Board (including one as Chair), and she is currently a Director of the QEII National Trust. She is an Honorary life member of the Hamilton Junior Naturalists Club. Megan is married to Errol Balks, a land surveyor, and has one adult son. Megan and Errol own a small hill country sheep farm on the lower slopes of Mt Pirongia which includes over 20 ha of QEII covenanted lowland forest, thus Megan spends much of her weekends killing gorse and possums! Other interests include wool crafts, landscape art and photography, gardening, and NZ flora, fauna, and geology.

Megan is a Fellow of the New Zealand Society of Soil Science, and was honoured as the NZSSS Norm Taylor Memorial lecturer in 2008 (the first women to achieve either of those awards). Megan returns to the NZSSS Council after a break of 15 years (having formerly served on Council from 1991-7). Megan hopes to contribute her skills and energy to helping the NZSSS ensure the strength of New Zealand soil science and to promote the widest possible understanding and appreciation of the importance, and intrinsic interest and beauty, of our soil resource.

News from the Regions

Waikato/Bay of Plenty

AgResearch Ruakura



The technical team were very busy digging out lysimeters during the month of January. 100 lysimeters were collected and the edges sealed with gallons of petroleum jelly. As can be seen in the picture below, it was a team effort with everyone working hard in the summer sun. Thank you all for your hard work!

Seth Laurensen and **Dave Houlbrooke** have recently completed a study investigating the nutrient and microbial runoff risk of different dry matter content dairy effluent products and examining the relationship between the time of application and the arrival of the next rainfall causing runoff event. Dave presented this at the recent FLRC workshop at Palmerston North.



Also at FLRC, **Jie Li** presented some results of her PhD work looking at the effectiveness of DCD in reducing emissions of nitrous oxide and ammonia from dairy effluent. **Bob Longhurst** was also there to give a presentation about standoff pad materials, and **Gina Lucci** presented some results from a Sustainable Farming Fund project looking at winter forage crops.

Once again, Overseer caught a fair amount of limelight at FLRC. **Mark Shepherd** and **David Wheeler** gave presentations about the inner workings of Overseer, and presided over a special Overseer seminar. **Diana Selbie**, **Natalie Watkins** and **Geoff Mercer** were also there on the ground, manning the Overseer station to answer questions, and meet challengers.

Lincoln Agritech



The recent FLRC workshop marked the first major public event for the newly formed *Precision Agriculture Association of New Zealand* (PAANZ), which was introduced to the audience by the association's interim chair, Lincoln Agritech CEO **Peter Barrowclough**. Our Precision Agriculture Manager **Armin Werner** subsequently reported on the European experience with variable rate fertiliser application, which is one of the techniques available to minimise nutrient losses from the root zone.

Nutrients leached from the root zone are the focus of our groundwater processes group, which was pleased to witness markedly increased recognition at the workshop that root zone loss estimates are just the beginning. Transport and transformations below the root zone also need to be understood when the transfer of agricultural nutrients to freshwater bodies is to be managed effectively. Accordingly, **Greg Barkle** (ARL) reported on the fate of a dairy cow urine pulse in the vadose zone of our field site near Lake Taupo. While research on soil zone denitrification has for many years been very strong in New Zealand, the fact that denitrification occurring in the groundwater zone can substantially reduce nitrate pollution is not well known. A poster by **Roland Stenger** and colleagues provided an overview of the processes and field and laboratory research carried out by LAL's Hamilton team. **Simon Woodward's** presentation demonstrated how knowledge on transport and transformation processes can be integrated by use of a modelling approach to describe water and nitrate fluxes through the Toenepi catchment.



Fig. 1: Scott Wilson, Brian Moorhead, Juliet Clague, and Maïke Rath inspecting a core (down to 5m below ground surface) in the Toenepi catchment.

News from Waikato Regional Council

Never enough time in the day here. **Reece Hill** is busy with the Land & Water project, an ecosystems services workshop with Landcare Research, land use suitability, soil windows on the Waikato, organising the Land Monitoring Forum and generally trying to supervise **Matthew Taylor** and **Haydon Jones** (amongst others).

Haydon has been running the riparian survey for the region. This is a major piece of work. Matthew and **Nick Kim** (Massey University) have completed a risk analysis of diffuse contamination issues. The report is currently being reviewed. He has also completed the Waikato soil quality report for 2012 and it is with Reece waiting his signoff. A preliminary study on Hot Water Carbon as a soil quality indicator has been completed with **Anwar Ghani** (AgResearch) and a paper drafted. A paper with **David Lowe** (Waikato University) and German co-workers on enhanced weathering associated with the use of phosphate fertilisers is about to be submitted.

Waikato University

Early announcement WaiBoP Soils 2013 Thursday 5 December 2013, University of Waikato

Following the success of the inaugural WaiBoP soils meeting in late 2011, another regional soils conference, mainly (but not restricted to) for Waikato-Bay of Plenty members, is to be held at the University of Waikato, Hamilton, on **Thursday 5 December, 2013**. This date coincides with World Soil Day (http://www.iuss.org/index.php?option=com_content&view=article&id=405).

Please mark dairies now for what promises to be a stimulating, informative, and enjoyable day!
More information later.

David Lowe & Louis Schipper (convenors)

Manawatu/Hawke's Bay

Plant & Food Hawke's Bay

Christina Waldon is working in the Land Use Management team as part of the Plant & Food Research Summer Studentship programme. With one semester of study remaining, Christina is graduating in 2013 from the University of Auckland with a Bachelor of Science, Majoring in Biological and Environmental Sciences. Her studentship is entitled 'Sustainable Cropping Systems' for which she is working alongside **Paul Johnstone**, **Dirk Wallace** and **Nathan Arnold** at the Havelock North site. A major focus of her studentship is quantifying the rate of nitrogen mineralisation from different effluent types once they have been applied to the soil. This information will eventually be used to help farmers optimise the use of effluent nutrient source in crop systems.

Massey University, Palmerston North

Each year always begins quickly for our group with the annual FLRC workshop being a major focus in February. This year there were a record number of delegates at 270 – luckily they didn't all turn up at once as that is beyond the limit of the lecture room! Rather, attendance was staggered over the three days as people chose to attend the sessions that were most relevant for them. The sustainability theme continued with the title 'Accurate and Efficient Use of Nutrients on Farms'. Collaboration with the recently formed Precision Agriculture Association of New Zealand (PAANZ) provided a focus for presentations on the final day. Seventy three papers were presented in the three-day programme with keynote presentations from Tom Sims, University of Delaware, Newark, USA; Phil Murray, Rothamsted Research, United Kingdom; David Rassam, CSIRO Land and Water, Brisbane and Michael Mersmann, Amazonen-Werke H. Dreyer GmbH & Co. KG, Germany. A key session on the first day was a series of invited presentations from five Regional Councils who outlined the state of their current policy for setting limits for nutrient loss, and a facilitated forum followed to discuss the implications of policy implementation for science, resource requirements and capability building. It is hoped that people found this session to be particularly relevant and informative. Within a few weeks the Proceedings of this workshop will be available online in the form of individual manuscripts of the papers presented.

Tom Sims with Mike Hedley



For the final session of the workshop delegates were bussed to Massey's No. 1 Dairy Unit, where four fertiliser spreaders were on show, spreading urea and demonstrating the latest technology available to accurately spread and record fertiliser applied to land.

The New Zealand manufactured Robertson Transspread solid fertiliser spreader

FLRC are also looking at a very busy year ahead for delivery of their Professional Development short courses. Courses scheduled in the next three months include 'Farm Dairy Effluent: System Design and Management' as well as several 'Intermediate' and 'Advanced' courses in 'Sustainable Nutrient Management'. With the latter two courses now an integral part of the Nutrient Management Adviser Certification Programme (being driven by MPI funding through DairyNZ and the Fertiliser Association), it is anticipated that there will be continued demand in the foreseeable future.

The students are back, the sun is shining and another year is off to a positive start. Several PhD students have recently submitted or are close to completion and these will be documented in the next volume of Soil News. Most staff and students involved in field

experimentation are wondering when the rains will come; it doesn't get much drier than this in the Manawatu.

Landcare Palmerston North

Craig Ross, Pierre Roudier and Carolyn Hedley attended the soils conference in Hobart in December. Craig gave an oral presentation on the Denniston/Stockton Plateaux soils, and was pleasantly surprised by a very positive feedback on Twitter soon after he had presented his oral paper. Craig was also radio interviewed by ABC for his comments on soil issues for "World Soil Day". Craig reports that he really enjoyed catching up at the Conference with former Soil Bureau colleagues Richard Doyle, Mike Laffan & Peter McIntosh, particularly discussions on field pedology with Richard and Peter on the Mt Wellington & Huon Valley field trip. The trip culminated in Craig being co-presented with Prof Bob White at the field trip winery dinner with a recently published book on *Landscape Logic: Integrating Science for Landscape Management* for asking the most 'curly questions'!



Fig. 1 Richard Doyle and Peter McIntosh discuss the pedology of a Yellow Brown Soil on solifluction deposits on Mt Wellington, Hobart. Soon after this Dec 5th photo was taken it snowed!

Pierre Roudier presented a paper of EM mapping with Vis-NIR soil spectroscopy for farm-scale soil carbon mapping. A key finding presented in this oral was that our results indicate that Vis-NIR could accurately predict soil organic carbon using only 40% of the soil samples as a calibration set.

Carolyn Hedley presented latest developments in our precision irrigation research, and reported a real-time soil water balance tracking method using soil moisture sensors installed under a variable rate irrigator. The monitoring positions were selected using a statistical analysis of EM survey-derived digital elevation and electrical conductivity datalayers, so that a subset of data points is selected with the same statistical distribution as the full dataset.

Plant & Food Research – Palmerston North

The Production Footprints team farewell our summer students and we thank **Kerry Clarke**, **Charlotte Robertson** and **Pourya Shapoury** for their hard work and contributions to our research. We would like to think that they have enjoyed the experience as well and will continue on in science – look out for them!

Kerry's summer studentship has flown by with the highlight being six days of field work in the sunny Hawke's Bay. He says it was "a bit of hard yakka but good to get hands on experience, measuring tree diameters, slip areas and talking to the farmers themselves."

Charlotte has enjoyed getting her hands dirty with the Australian PIPS project and is nervously looking forward to presenting some of her nitrogen mineralisation results with the team's project poster at the FLRC workshop.



Tyson Brandt hard at work. He's sieving soil and he's still smiling!

We also welcome **Tyson Brandt**, who joined the team to help Edouard Perie with his –boring– 2 mm sieving of several hundred soil samples, in preparation to measure carbon content for Edouard's PhD research on apple orchards. His six weeks of work are financed by a scholarship from Massey University. Tyson is a hard worker, and a very positive and enthusiastic person. He is studying sport and exercise at Massey but he also plays for the Young Heart Manawatu soccer team! Welcome Tyson and thank you for your great help!

(Tyson is also always keen to do a bit of work beside his studies, so please email him at soccer_tyson@hotmail.com if you need his help.)

Canterbury

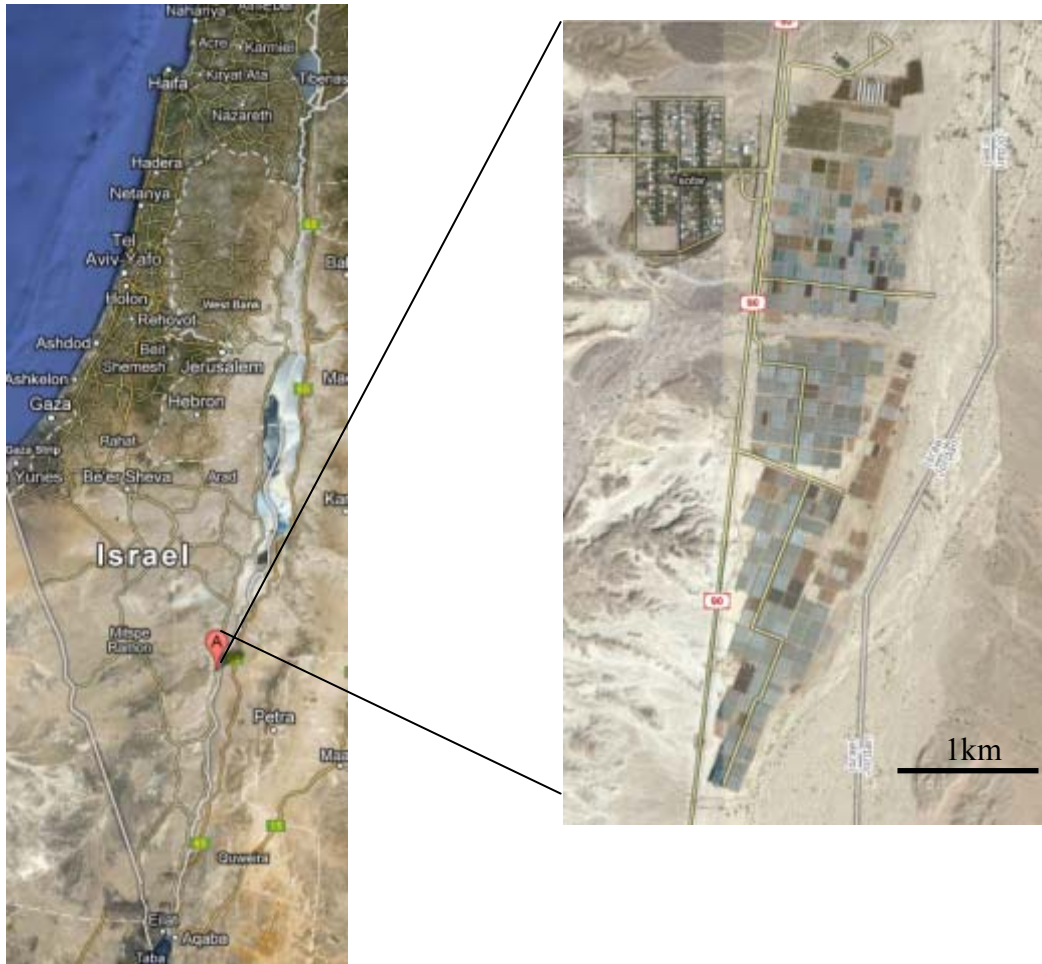
Lincoln University

Department of Soil & Physical Sciences welcomes Jen Owens (PhD student). She will be working on "Understanding spatial and temporal dynamics of nitrous oxide and methane fluxes in a grazed and irrigated pasture" supervised by **Tim Clough** and Dr. **Johannes Laubach** at Landcare. **Nicolas Ruoss** (Masters Student, University of Giessen, Germany) is working on "The effect of NH₃-loaded biochar on gross N transformations in soil" with Tim Clough & **Leo Condron** and **Christoph Müller** (Giessen). **Christian Honig** (Masters Student, University of Giessen, Germany) is working on "Characterization of N-loaded Biochars for development of new Biochar based N-fertilizers" with Tim Clough & Leo Condron and Christoph Müller (Giessen).

Shamim Al Mamun has arrived from Bangladesh to conduct his PhD in the Soil Science department on "The use of organic amendments to mitigate the threat of cadmium in NZ's agricultural systems" with Brett Robinson. Guilhem Chanson is also working with Brett on his MSc investigating the role of lignite to reduce cadmium levels in selected vegetable crops. Guilhem is a student at EPFL, Switzerland. Blanca Montalbán Ginés from the University of Madrid has come to work with Brett for 3 months on bioenergy production on contaminated land.

Plant & Food Lincoln

Capsicums in the desert...



While visiting Israel over the New Zealand summer, **Craig Anderson** managed to squeeze in a short visit to a capsicum growing operation in Tzofar, Negev Desert, Israel. The area has about 300 hectares of summer vegetable production (grown in winter) including cucumbers and capsicums. Capsicum production is managed over 6 month period with 1 hectare planted per day over three week period, translating to approximately 2-3 months constant picking to meet winter demand in Europe. Produce is then trucked in refrigerated containers to the Mediterranean port, Ashdod, and shipped to Europe within 4 days.

The European market is very strict about the use of pesticides. Insect pests are managed first with a cohort of beneficial insects such as predatory mites and spiders (reared in the Netherlands), and if that fails organic pesticides are then used. The growers are highly organised with all management coordinated to improve pest management. Liquid fertilisers are strategically applied to minimise volume required and water use is minimised. The desert soils are salty requiring each plant to have its own dripper with constant water otherwise plants rapidly perish due to the salt.

It's an impressive operation but sustainability issues are coming to the fore. The local economy is heavily dependent on agriculture and locals are quickly realising how precious their water resource is. A local engineer said to Craig: "We used to always strike water at 100m, now wells are always deeper, more like 300 meters." The Negev is one of the most

water stressed areas on earth, receiving only 30mm a year on average, some wells are brackish, some sweet, and all are combined into one supply system that then requires energy input, not only for pumping, but also for desalination. Their market hasn't yet forced the growers to come to terms with this side of the sustainability equation since they are focused mainly on pesticide use, but the local growers are extremely concerned and are already ahead of the curve in trying to streamline every aspect of their operations to minimise water and energy use.



From this....↑

...To this →



Craig Anderson, Soil Water and Environment Group, PFR, Lincoln.

Otago/Southland

AgResearch Invermay

Cecile de Klein and Hong J Di (Lincoln University) and the N₂O research team of the NZ Agricultural Greenhouse gas Research Centre (NZAGRC) presented key outcomes and future plans of N₂O research programme to the International Science Advisory Group (ISAG) during the official review of the NZAGRC science programme in February. The review was very constructive and positive and the ISAG presented some challenging questions and suggestions that are invaluable to further improve the programme.

Rosalind Dodd has finished all her field and lab work for her PhD, and is now chained to her desk engrossed in data analysis and writing up.

Ross Monaghan has been busy with science and policy initiatives that seek to improve the way cows are wintered in southern New Zealand. Presentations at the Grasslands Association in November 2012 and at FLRC in 2013 describe some of the potential environmental impacts of this practice. Fortunately there are a number of measures that can avoid or minimize some of these impacts and risks, although some of these will require major adjustments to the way cows, crops and soils are currently managed.” The role of Herd Shelters as one measure to minimize environmental risk is a particularly complex topic that impinges on animal welfare, environmental, financial and social issues.

Climate Change Research Strategy handbook available

AgInstituteAustralia reported that the Proceedings from the 2012 Climate Change Research Strategy for Primary Industries conference in Melbourne at the end of November have now been compiled into a handbook. Click on the link to download the [online handbook](#)

Global Soil Partnership report available

The GSP has published 'The State of the Art Report on Global and Regional Soil Information' on

[http://typo3.fao.org/fileadmin/user_upload/GSP/docs/tor/Soil information Report.pdf.pdf](http://typo3.fao.org/fileadmin/user_upload/GSP/docs/tor/Soil_information_Report.pdf.pdf)

Sections include Soil legacy data and information, Soil information users needs, State of the art methods and tools for soil mapping, Global soil mapping initiatives and Conclusions and recommendations.

IUSS Bulletin 121 is now available online via www.iuss.org

April 2013

- 13th ISSPA (International Symposium on Soil and Plant Analysis) Queenstown New Zealand, 7th -12th April 2013
www.isspa2013.com
- Spring School on DSM and World Soils and their assessment, 22-26 April 2013 Wageningen
<http://www.isric.org/content/isrics-spring-school-2013>

May 2013

- Third Global Workshop on Proximal Sensing May 26-29 2013 Potsdam Germany www.atb-potsdam.de/gwpss2013

June 2013

- IUSS Global Soil C Conference, Madison USA 3-7 June 2013
http://www.iuss.org/index.php?option=com_content&view=article&id=407&Itemid=31
- 12th International Conference on the Biogeochemistry of Trace Elements. University of Georgia's Conference Center & Hotel (<http://www.georgiacenter.uga.edu/>) in Athens, GA from June 16-20, 2013. <http://icobte2013.org/>
- Four Decades of Progress in Monitoring and Modeling of Processes in the Soil-Plant-Atmosphere System: Applications and Challenges to be held in Napoli (Italy) on 19-20 June 2013. www.spa-conference-naples2013.org

August 2013

- Pedometrics 2013 Conference, Nairobi, Kenya 26-31 August 2013
<https://sites.google.com/a/cgxchange.org/pedometrics2013/>
- XIIth International Symposium and Field Workshop on Paleopedology 10-15 August 2013, Kursk & Voronezh regions, Russia <http://agora.guru.ru/display.php?conf=paleopedology2013>

September 2013

- 5th International Contaminated Site Remediation Conference, Melbourne, Australia 15-18 September 2013 www.cleanupconference.com
- 7th International Conference of the Urban Soils Working Group, Suitma, of the International Union of Soil Sciences Torun Poland 16-20 September 2013 www.suitma7.umk.pl
- 22nd edition of the international symposium Soil Forming Factors and Processes from the Temperate Zone, 20-22 September, 2013, Iasi, Romania. www.soilscience.ro

- Rates of soil forming processes in Mediterranean Climate, 24-28 September 2013, Calabria and Baillicata, South Italy. <https://ppsg2011.uni-hohenheim.de/94442>

October 2013

- Soils in Space and Time - First Divisional 1 Conference of IUSS, Ulm/Danube, Germany. September 30- October 4 2013.
contact: Karl Stahr (karl.stahr@uni-hohenheim.de) Chairman Division 1
- 11th International Conference of the East and Southeast Asia Federation of Soil Science Societies (ESAFS) IPB International Conference Center (IPB-ICC), Bogor - West Java, Indonesia on 21 - 24th October 2013. www.esafs11ina.org

November 2013

- 6th International Nitrogen Conference Kampala Uganda 18-22 November 2013
www.N2013.org

IUSSS

Soil videos

The Soil Science Society of America has made a series of soil videos named The Story of Soil, check them out at www.iheartsoil.org Students from Technical University in Berlin have created short videos to raise the awareness of soil. They produced several videos, including The day soil died; Check out www.youtube.com/user/mediasoil FAO produced a video titled Soils, see here www.youtube.com/watch?v=l8TYaL2DAPA, here a video named Let's Talk About Soil <http://vimeo.com/53618201>

Conferences

European Geosciences Union General Assembly 2013 will be held in Vienna (Austria) from 07 to 12 April 2013. Session SSS 8.3 will address Cost effective tools for soil organic carbon monitoring. The demand for quantitative and updated soil information is increasing worldwide in order to deal with global concerns such as food production and climate regulation. However, traditional soil maps are not able to cope with quantitative changes as well as estimates of the state of several key soil properties. Cost effective tools to monitor soil properties across continents are required. The challenge of monitoring soil organic carbon is that a uniform and innovative methodology would be required to compare trends across countries/continents, but at the same time the approach should be flexible enough to allow updating and inserting new data for downscaling to resolve local demands. This session will be convened by Bas van Wesemael (UCL, Belgium), Luca Montanarella (EC-JRC, Italy) and Christian Walter (INRA, France). The keynote will be delivered on behalf of Keith D Shepherd (ICRAF, Kenya). For further information and submission of abstracts: <http://meetingorganizer.copernicus.org/EGU2013/sessionprogramme/SSS#SSS8>

The Soul of Soil and Civilization, October 14–16, 2014. Soil Science Society of Turkey (SSST) was established in 1964 in order to develop, disseminate, and introduce the theoretical and applied Soil Science in Turkey. 9th International Soil Science Congress on “The Soul of Soil and Civilization” is going to be held at SSST, in collaboration with Federation of Eurasian Soil Science Societies (FESSS), October 14–16, 2014 in Side, Antalya, Turkey. The congress will focus on multidisciplinary approach to soil science, with special interest on basic research, latest and technological developments for soil use and management. The scientific sessions and panels will also emphasize basic concepts of soil.

The **IUSS Global Soil C Conference** will be held 3-6 June 2013 in Madison, Wisconsin, USA. The IUSS Global Soil Carbon Conference is the first IUSS interdivisional and intercommisisonal conference that focuses on soil C in space and time, soil C properties and processes, soil C in relation to soil use and management, and the role of soil C in sustaining society and the environment. Abstracts can now be submitted at <http://iuss-c-conference.org/> - deadline 1 February 2013.

The call for papers is now open for **Pedometrics 2013** Conference to be held in Nairobi, Kenya 26-31 August 2013. Abstracts can be submitted at <https://sites.google.com/a/cgexchange.org/pedometrics2013/> The International Center for Tropical Agriculture (CIAT) and the World Agroforestry Centre (ICRAF) will be co-hosting the Pedometrics 2013 conference in Nairobi, Kenya. Conference objectives include: showcase innovative research on the mathematical spatial and temporal modeling of soil through interactive discussions and technical sessions, with specific examples from the tropics. And to encourage the recognition of results from pedometric analyses on informing management decisions and public policy. Student scholarships are available.

A **Soil-Waste-Water 2013** workshop will be held 3-5 April 2014 in Landau, Germany. The workshop aims to integrate the currently widely spread and heterogeneous discussion on the benefits and risks of the use of wastes and wastewaters in agriculture. It aims to bring together specialists from soil science, environmental chemistry, ecotoxicology and agriculture in order to start a joint discussion with you on how to sustainably use agricultural wastes and low quality water in agriculture. Please submit your abstracts by 15th January. For more information: www.soil-waste-water.de

The International Conference **Four Decades of Progress in Monitoring and Modeling of Processes in the Soil-Plant-Atmosphere System: Applications and Challenges** will be held in Naples (Italy), 19-20 June 2013. Papers can be submitted at <http://www.spa-conference-naples2013.org>. Since we are now witnessing a growing convergence between the monitoring and modeling activities related to the soil-plant-atmosphere (SPA) processes, this event is organized to bring together researchers from different background not only to discuss the achievements obtained thus far, but also to outline future research directions being of interest to the younger generation.

Nicolaus Copernicus University of Torun & Polish Soil Science Society would like to invite you to join us for the **7th International Conference of the Urban Soils Working Group, SUITMA**, of the International Union of Soil Sciences. SUITMAs (Soils in Urban, Industrial, Traffic, Mining and Military Areas) are one of main components of urban ecosystem. They are very diverse and heterogeneous, and fulfill primary functions of utmost importance. However, knowledge related to SUITMAs is still insufficient, which impairs the administration of urban areas and limit the role of soil science in the decision making process for urban land management. SUITMA 7 would be held in UNESCO World Heritage city of Torun, famous for its gothic architecture. One-day pre-conference tour (Northern Poland red brick gothic castles), two-day mid-conference field tour (18 & 19 September 2013) will be offered in the Kuyavian-Pomeranian Province and a post-conference tour (20 - 23 September 2013) will be organized in Poland and Czech Republic, finishing in Prague, to address issues related to urban and industrial soils of Central Europe. Registration and Abstract submission is open. For more information visit conference website: www.suitma7.umk.pl or email Przemyslaw CHARZYNSKI, Chairman of SUITMA 7: suitma7@umk.pl You are also welcomed to join SUITMA 7 group on Facebook to be instantly informed on news and updates concerning the Conference.

Positions Vacant:

Researcher - Nitrous oxide Mitigation Research

This position will focus on agricultural greenhouse gas sources and sinks, particularly the measurement and mitigation of gaseous emissions of nitrogen from pastoral soils at a range of spatial and temporal scales.

The applicant's primary role would be to study the processes regulating gaseous emission of nitrogen and its mitigation through nitrogen transformation inhibitors and other management technologies. The applicant will play a lead role in conducting field and laboratory experiments of greenhouse gaseous fluxes, and related soil analysis to improve the robustness of emissions estimates and to develop and improve mitigation technologies.

To be successful in this position you will need a PhD in soil and/or environmental science, with a strong background in chemistry or physics, and in biochemistry or microbiology. Ideally, you will be familiar with nutrient transformations and greenhouse gas emissions and sinks. You should be familiar with a range of techniques, including some of the following: static chambers, automated chambers, micrometeorology, gas chromatography and statistics. You will be expected to contribute to communication with stakeholders of this research through contract reports, seminars, publications in peer-reviewed national and international journals, and interactions with clients.

This role is full-time and will be based at our Palmerston North site. The term of employment is fixed-term for 3 years.

To find out more about our organisation, to view the Position Description, or to apply for this position please go to our website www.landcareresearch.co.nz/jobs. The closing date for applications is 1 April 2013 11:59pm.

Abstracts

Interplay between environmental signals and endogenous salicylic acid concentration

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Abstract: Salicylic acid (SA), a naturally occurring plant hormone, is primarily associated with the induction or activation of defence mechanism responses by higher plants when they are attacked by pathogens. Attack of these plants by pathogens rapidly triggers changes in a wide range of the plant's metabolic pathways which in turn are followed by modifications in the plant's growth and development. There are a number of references in the recent literature where SA was applied to plants that are being subjected to changes in environmental signalling without the involvement of pathogens. In these examples, SA appears to be functioning as a hormone. Significant changes (usually positive) in shoot growth and photosynthesis occur when SA is applied at low concentrations to plants subjected to environmental stresses. In this review we focused on the interplay between changes in endogenous SA concentrations and key environmental signals, i.e. light intensity and quality, temperature, soil water availability and carbon dioxide levels. In doing so, we evaluated the concept that endogenous SA functions as an

important signalling hormone in the plant's growth response to a changing environment, even in the absence of pathogen attack.

Key words: salicylic acid, environmental signals, light, temperature, water stress, carbon dioxide, growth, photosynthesis.

Reference: Kurepin LV, Dahal K, **Zaman M** and Pharis RP 2013. Interplay between environmental signals and endogenous salicylic acid concentration. (Eds. Hayat S, Ahmad A and Alyemini MN) *Salicylic Acid: Plant Growth and Development*. Springer, The Netherlands. pp1-41.

The effect of urease and nitrification inhibitors on ammonia and nitrous oxide emissions from simulated urine patches in pastoral system: a two-year study

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⁴*Department of Soil & Environmental Sciences, Faculty of Agriculture, Gomal University Dera Ismail Khan, 29050, KPK, Pakistan.*

Abstract. This field study evaluated the effects of applying a combination of urease (UI) and nitrification inhibitors (NI) on ammonia (NH₃) and nitrous oxide (N₂O) emission from urine patches, using zeolite, single superphosphate (SSP) and urea fertilizer as a carrier. The trial was conducted on a *Typic Haplustepts* silt loam soil, near Lincoln, Canterbury, New Zealand during 2009-11. The treatments in 2009 included: a control (no urine or inhibitor), urine alone at 600 kg N ha⁻¹, and urine with either double inhibitor (DI) a mixture (1:7 ratio w/w) of UI (N-(n-butyl) thiophosphoric triamide (nBTPT- trade name Agrotain[®]) and NI, dicyandiamide (DCD) or DCD alone at 10 kg ha⁻¹ using zeolite and SSP as carriers. In 2010 trials, both zeolite and urea were used as carriers for DI and DCD. DI-zeolite and DI-urea were equally effective and reduced the average NH₃ losses from applied urine over two years by 34.6% in autumn and 40% in spring respectively. The nBTPT in DI-SSP was decomposed by the free acid produced during its dissolution and therefore increased NH₃ emission as does DCD alone. DCD consistently increased NH₃ emissions by 39% and 15.6% in autumn and spring respectively. Spring application resulted in NH₃-N losses of 16.9% as a percentage of the total N applied compared to 8.4% in autumn. Over the two years, the DI reduced N₂O emissions by 53% in autumn and 46% in spring over urine alone treatment; the equivalent reductions for DCD were 42% and 39% for autumn and spring, respectively. These results suggest that applying DI in autumn and spring using zeolite or urea carrier five days prior to grazing has the most potential to reduce NH₃ and N₂O losses from specific urination event than using DCD alone; and therefore warrants further research to improve its longevity.

Keywords: Agrotain; nBTPT; DCD; mitigation; NH₃; N₂O; urine, zeolite

Science of the Total Environment <http://dx.doi.org/10.1016/j.scitotenv.2013.01.014>

Algorithms for quantitative pedology: A toolkit for soil scientists, Computers & Geosciences

D.E. Beaudette, P. Roudier, A.T. O'Geen,

Abstract. Soils are routinely sampled and characterized according to genetic horizons, resulting in data that are associated with principle dimensions: location (x, y), depth (z), and property space (p). The high dimensionality and grouped nature of this type of data can complicate standard analysis, summarization, and visualization. The “aqp” (algorithms for quantitative pedology) package was designed to support data-driven approaches to common soils-related tasks such as visualization, aggregation, and classification of soil profile collections. In addition, we sought to advance the study of numerical soil classification by building on previously published methods within an extensible and open source framework. Functions in the aqp package have been successfully applied to studies involving several thousand soil profiles. The stable version of the aqp package is hosted by CRAN (<http://cran.r-project.org/web/packages/aqp>), and the development version is hosted by R-Forge (<http://aqp.r-forge.r-project.org>).

Keywords: Soil data; Soil profile; Soil classification; Soil survey; Numerical soil classification; Aggregation of soil data; Visualization

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Effect of sheep and cattle treading damage on soil microporosity and soil water holding capacity

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Abstract. With the recent introduction of a large scale district irrigation scheme into the North Otago Rolling Downlands (NORD) of New Zealand, land use has intensified including a shift from dryland sheep farming to irrigated dairying. Land use change and intensification has lead to considerably greater physical pressure on soils and has been associated with a decline in soil physical condition. A farmlot trial was established in the NORD to compare the influence of four farm management systems; cattle irrigated, cattle dryland, sheep irrigated and sheep dryland on soil structure. Soil compaction under irrigated cattle grazed pasture caused a significant decline in readily available water (RAW) relative to all other treatments. A decline in total porosity and pore size indicated a lower irrigation volume applied more frequently will be required to maintain soil matric potential between irrigation trigger point (-100 kPa) and field capacity (-10 kPa). Changes in soil water release characteristics under animal grazing may also limit the rate of natural soil structural recovery thereby increasing the risk of repeated soil damage with on-going grazing, particularly under cattle irrigated pasture , where the initial damage was most severe.

Additional keywords: *irrigation management, water use efficiency, soil water holding capacity, soil compaction, treading damage.*

A revised age for the Kawakawa/Oruanui tephra, a key marker for the Last Glacial Maximum in New Zealand

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The Kawakawa/Oruanui tephra (KOT) is a key chronostratigraphic marker in terrestrial and marine deposits of the New Zealand (NZ) sector of the southwest Pacific. Erupted early during the Last Glacial Maximum (LGM), the wide distribution of the KOT enables inter-regional alignment of proxy records and facilitates comparison between NZ climatic variations and those from well-dated records elsewhere. We present 22 new radiocarbon ages for the KOT from sites and materials considered optimal for dating, and apply Bayesian statistical methods via OxCal4.1.7 that incorporate stratigraphic information to develop a new age probability model for KOT. The revised calibrated age, ± 2 standard deviations, for the eruption of the KOT is $25,360 \pm 160$ cal yr BP. The age revision provides a basis for refining marine reservoir ages for the LGM in the southwest Pacific.

Quaternary Science Reviews (online 31 Jan 2013)

<http://dx.doi.org/10.1016/j.quascirev.2012.11.006>

The Impact of Relict Organic Materials on the Denitrification Capacity in the Unsaturated–Saturated Zone Continuum of Three Volcanic Profiles

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² Dep. of Agriculture & Life Sciences, PO Box 84, Lincoln Univ., Lincoln, New Zealand.

The denitrification capacity of wetlands, riparian zones, and aquifers in glacial outwash areas is well documented, but little or no information exists for volcanic profiles, particularly those containing relict organic matter contained in or on top of paleosols (old soils buried by volcanic deposits) below the groundwater table. Relict carbon contained in these layers could provide the necessary electrons to fuel heterotrophic denitrification. To the best of our knowledge, this is the first study investigating the denitrification capacity in both the unsaturated and saturated zone of volcanic profiles. Samples from three profile types with differing organic matter distribution were amended with ¹⁵N-enriched nitrate (NO₃⁻) and incubated in the laboratory under anaerobic conditions.

Dinitrogen (N₂) dominated the ¹⁵N gas fluxes; averaged across all samples, it accounted for 96% of the total ¹⁵N (nitrous oxide [¹⁵N₂O] and ¹⁵N₂) gas fluxes. Dinitrogen fluxes were generally highest in the A horizon samples (4.1–6.2 nmol N g⁻¹ h⁻¹), but substantial fluxes were also observed in some paleosol layers (up to 0.72 nmol N g⁻¹ h⁻¹). A significant correlation ($p < 0.001$) was found between the concentration of extractable dissolved organic carbon and the total ¹⁵N gas flux produced in samples from below the A horizon, suggesting that heterotrophic denitrification was the dominant NO₃⁻ attenuation process in this study. Extrapolation of lab-derived denitrification capacities to field conditions suggests that the denitrification capacity of profiles containing relict soil organic matter in the saturated zone exceeds the estimated N leaching from the root zone.

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doi:10.2134/jeq2012.0239

Establishment of reference or baseline conditions of chemical indicators in New Zealand streams and rivers relative to present conditions

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Abstract


The management of streams and rivers can be aided by knowledge of reference conditions. Data from > 1000 sites across New Zealand was used to develop a technique to estimate median ammoniacal-N, clarity, *Escherichia coli*, filterable reactive phosphorus, nitrate-N, suspended solids, and total nitrogen and phosphorus values under reference conditions for streams and rivers as classified by the River Environment Classification (REC). The REC enabled us to account for natural variation in climate, topography and geology when estimating reference conditions. Values for minimally disturbed sites (i.e. < 5% in intensive agriculture) were generally within the confidence limits for estimated reference values. Metrics that described 1) the percentage of anthropogenic contribution to analyte values and 2) the degree of enrichment beyond the reference conditions, showed that lowland sites classified as warm-wet, warm-dry or cool-dry exhibited the greatest anthropogenic input and enrichment. Accounting for natural variation by REC class informs the setting of water quality objectives by avoiding water quality limits or targets that are either too restrictive, and impossible to meet (e.g. below reference conditions), or too high that they have little ecological benefit. We recommend the approach be considered by regulatory authorities when assessing water quality impacts, objectives and limits.

Marine and Freshwater Research: April (in press)

Conferences:




UNIVERSITÄT
KOBLENZ · LANDAU




Soil – Waste – Water Workshop 2013

Second circular



Soil
Waste
Water
2013

3rd – 5th April 2013
Landau in der Pfalz
Rheinland - Pfalz
Germany



3-5th April 2013 in Landau
(Pfalz) Germany

This workshop aims to integrate the currently widely spread and heterogeneous discussion on the benefits and risks of the use of wastes and wastewaters in agriculture. It aims to bring together specialists from soil science, environmental chemistry, ecotoxicology and agriculture in order to start a joint discussion with you on how to sustainably use agricultural wastes and low quality water in agriculture.

www.soil-waste-water.de

Confirmed keynote speakers are:

Kostas Chartzoulakis, National Agricultural Research Foundation, Greece

- Roberto García Ruiz, University of Jaén, Spain
- Yael Laor, Agricultural Research Organization, Israel
 - Laura Delgado Moreno, University of California Riverside, USA
 - Uri Yermiyahu, Agricultural Research Organization, Israel
 - Cristos Xiloyannis, University of Basilicata, Italy

<http://www.biohydrology2013.de/>



- 2nd announcement -

BIOHYDROLOGY 2013
Landau/Pfalz - Germany



CALL FOR ABSTRACTS

21st - 24th May 2013
Landau in der Pfalz / Germany





Recycling of organic residues for agriculture: from waste management to ecosystem services

From the 3rd to the 5th of June 2013
Université de Versailles St-Quentin-en-Yvellines, Versailles
www.ramiran2013.org



International Interdisciplinary Conference on
Land Use and Water Quality
Reducing Effects of Agriculture
The Hague, the Netherlands, 10-13 June 2013

www.luwq2013.nl

Abstract submission possible, deadline for submission is 20 October 2012
Abstract submission extended till Wednesday 24 October 2012

NEW ZEALAND SOCIETY OF SOIL SCIENCE
NZSSS 2014 Soils Conference

Soil Science for Future Generations

December 1-4, 2014 · Hamilton, NZ



Please submit ideas for:

·Themes· ·Fieldtrips· ·Guest Speakers· ·Sponsors·

to any of the organizing committee members: Dave Houlbrooke, Gina Lucci,
Natalie Watkins, Megan Balks, Louis Schipper, Reece Hill, Hayden Jones or Sharn
Hainsworth



BIT's 3rd Annual World Congress of Agriculture-2013

Time: September 23-25, 2013, Place: Hangzhou, China

On behalf of the organizing committee of BIT's 3rd Annual World Congress of Agriculture - 2013, which will be held on September 23-25, 2013 in Hangzhou, China, we cordially welcome you to give a speech at **Track 3-6: The Significance of Soil Science in Agriculture**. WCA-2013 is always committing itself to be one of the world's leading conferences in the field of Agriculture technology. Under our theme The Key to Feeding the World a particularly rich technical program will leave you struggling to decide which concurrent session to attend.

Some Topics of the track are as the following. Please do not hesitate to contact me if you have any other ideas.

- Topic1 : Application of Soil Moisture Monitoring Technology
- Topic2 : The Role of the Soil in Planting System
- Topic3 : Soil Fertility in Agricultural Systems
- Topic4 : Soil Classification and Characterization
- Topic5 : Soil Microbiology Research
- Topic6 : Edaphology and Environmental Science
- Topic7 : Research Tendency of Soil Science
- Topic8 : Research on Soil Mineralogy
- Topic9 : Sustainable Soil Management

This conference will seek the views and creative ideas on technologies for improvement and application of agriculture technology. The sessions will present the most recent advances in the fields of Plant Biology & Plant Biotechnology, New Energy Sources from Agriculture, Crop Production and Management, Pillar Industries, Food Science and Nutrition for Agriculture, and so on. Selected high qualified speakers will be from all over the world, and heads of the most important developing projects on the use of agriculture technology in many applications. These presentations will identify or offer solutions to problems, utilize case studies, identify knowledge gaps or collaboration opportunities, and discuss broader applications and implications of material presented.

For more details about the conference, please log on:

<http://www.bitconferences.com/wca2013/>

International Conference on Recent Advances in Pollution Control and Prevention for the Livestock Farming Industry (PAPCP 2013)

Jiaxing City, Zhejiang Province, China: 25-26 October, 2013.

The economic development, population growth and demand for a better quality of life have resulted in the growth of the livestock farming industry. This industry generates a large amount of wastewater and wastes. It is one of the largest agricultural pollution sources. In China, it contributes to 96%, 38% and 56% of chemical oxygen demand (COD), total nitrogen (TN) and total phosphorus (TP) of the agricultural industry, respectively. Thus, pollution control and prevention for the livestock farming industry is critical in China and will be of increasing importance for the sustainable development of this industry.

Great efforts have been made worldwide to facilitate pollution control and prevention for this industry. Innovative technologies for pollution control have emerged in recent years, in addition with advanced management measures. Yangtze Delta Region Institute of Tsinghua University Zhejiang is organizing an **International Conference on Recent Advances in Pollution Control and Prevention for the Livestock Farming Industry in Jiaxing City, Zhejiang Province, China in 25-26, October, 2013.**

Conference themes

The topics covered in PAPCP2013 will include:

1. Policies and regulations on management of animal waste
2. Technologies for animal waste prevention
3. Pollution control technologies
4. Resource recovery technologies and practice
5. Greenhouse gas emission mitigation for livestock farming

Conference proceedings

All conference presentations will be included in conference proceedings. Papers selected from the conference proceedings will be published on Waste Management and Journal of Environmental Science and Health, Part A.

Important dates

- Abstract submission (2 page): Tuesday, the 30th April, 2013
- Invitation of submission of full papers: 30th May, 2013
- Submission of full paper: the 30th July, 2013

Contact

Submission and queries are through:

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E-mail: rapcp2013@gmail.com

Address: Department of Environment, Yangtze Delta Region Institute of Tsinghua University, Zhejiang, Jiaxing, China

Postcode: 314006

Conference registration Conference registration will start from Monday, the 1st April, 2012.