Welcome to the Soil News

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In this issue...

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

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Have you liked us on Facebook? The NZSSS has a Facebook page and Twitter handle (@NZ_Soil_Soc). If you are already a user, please follow us. You can also keep an eye out for new NZSSS posts by checking the feed from our website

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From the Editor

Welcome to this issue of Soil News.

This will be my last Soil News as editor.

I've accepted a new role elsewhere for family reasons, new opportunities and ongoing science funding cuts etc. The NZSSS team is working towards appointing another editor.

I've enjoyed being your Soil News editor. I'm always curious to see the amazing work and enthusiasm presented by our correspondents, our committee, society members and students, plus the insights from new publications.

Special thanks to our correspondents and the NZSSS team that have supported Soil News, its content and distribution.

Best wishes

John Drewry

Thank you John!

On behalf of the NZSSS I would like to express our heartfelt gratitude to John Drewry for his many years of dedicated service as Editor of Soil News.

A very organised and reliable person on top of an experienced researcher, has kept our community informed, connected, and engaged, keeping our community connected, including through the COVID crisis. The connections within our community are strong: this is reflected in how soil scientists from the four past CRIs hosting soil scientists are merging into the Bioeconomy Science Institute, leveraging those past interactions.

The NZSSS Council wishes John all the very best as he embarks on this next chapter, and makes his move to the bottom of the South Island. It seems only fitting that one of our most devoted soil scientists should find himself among some of New Zealand's most remarkable soils!

Dear John, you will be greatly missed in your Editor role, and we thank you for everything you have given to our society,

Pierre Roudier

President of the New Zealand Society of Soil Science

John’s farewell was well-attended by colleagues in Palmerston North and beyond

NZSSS Awards 2026

Nominations for the following awards open **1 March 2026** (with the exception of the US/NZ Exchange Award, for which nominations open 25 January). Key details regarding nomination requirements are provided in the table below. Please contact the NZSSS Awards Convenor for full award details (Brendon.Malcolm@plantandfood.co.nz).

Award	Presented	Nominations close	Nominee eligibility	Nominator eligibility
NZSSS Fellowship	Annually	31 July 2026	Nominees must be active members of the Society at the time of nomination.	Nominations must be made by two Full Members, or Life Members of the Society.
The Grange Medal	Biennially (conference year)	31 July 2026	Open to both non-members of the Society as well as members, fellows, or life members of the NZSSS.	Nominations must be made by two or more active members of the Society.
The Blakemore Award	Biennially (conference year)	31 July 2026	Open to technicians/support staff who have been employed in the field of science for at least three years.	Any two active members of the NZSSS can nominate an eligible candidate from a university, CRI, or other organisation (e.g. a Regional Council).
The Leamy Award	Biennially (conference year)	31 July 2026	Open to the author or authors of the most meritorious New Zealand contribution to soil science, published in the previous three calendar years.	Any two active members of the NZSSS can nominate an eligible candidate(s) from a university, CRI, or other organisation (e.g. a Regional Council).
The Postgraduate Bursary	Annually	31 July 2026	Open to postgraduate (PhD) students in soil science about to enter their third year of study. Candidates must be either student or full members of the NZSSS and should not be on the academic or technical staff of the department that nominates them.	Nominations must be received in writing from the Head of the Soil or Earth Science Department/Group at a New Zealand University. Only one nomination will be accepted from each University Department/Group.
The Morice Fieldes Award	Annually	31 July 2026	A PhD thesis submitted within the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate the best PhD thesis from their department/group.
The Rigg Award	Annually	31 July 2026	A Masterate thesis submitted within the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate the best

				Masterate thesis from their department/group.
Early Career Researcher (ECR) Award	Biennially (conference year)	31 July 2026	Open to ECR's within eight years of completing their highest research qualification (Masterate or Doctorate).	No more than 2-page written nomination by any two active members of the NZSSS.
Undergraduate Prizes	Annually	31 December 2026	A third-year student in Soil or Earth Sciences.	The Head of the Soil or Earth Science Department/Group at Massey, Lincoln, and Waikato University may each nominate the best third-year student from their department/group.
The US/NZ Exchange Award	Annually	15 April 2026 for initial submission (18 April for final submission)	Nominees are required to have at least seven years of membership in SSSA or the NZSSS. Former recipients of this Award are not eligible.	This award allows self-nominations.
Soil Judging Stipend ($2,000)	Annually	31 July 2026	Open to student teams for attendance at a conference-related soil judging competition in New Zealand or Australia. Priority will be given to the highest performing team from the previous calendar year.	The Head of the Soil or Earth Science Department/Group at a New Zealand University may nominate a team from their department/group.

Nominations and requests for further information regarding NZSSS awards should be addressed to:

Dr Brendon Malcolm
NZSSS Awards Convenor
C/O Plant & Food Research
Private Bag 4704, Christchurch Mail Centre, Christchurch 8140 (normal post), or
Canterbury Agriculture & Science Centre, Gerald St, Lincoln 7608 (courier)
New Zealand

Email: Brendon.Malcolm@plantandfood.co.nz

NZSSS Conference 2026

Save the date!

New Zealand Society of Soil Science Conference 2026 will be in Christchurch

Venue: Chateau on the Park

Conference: Monday 30th November to Thursday 3rd December

Soil Judging Competition: Friday 27th to Sunday 29th November

Call for conference abstracts

SOILS ŌTAUTAHI 2026

BUILDING RESILIENT FUTURES FOR SOILS

CONNECTING SCIENCE, LAND, AND PEOPLE FOR RESILIENT SOILS

30TH NOVEMBER - 3RD DECEMBER 2026

CHATEAU ON THE PARK, ŌTAUTAHI CHRISTCHURCH

CALL FOR ABSTRACTS
OPEN 16 APRIL 2026 / CLOSE 31 JULY 2026

On behalf of the NZ Society of Soil Science 2026 Conference Committee, we are pleased to announce that abstract submissions are now open.

We welcome a broad range of abstracts around our conference theme "Building resilient futures for soils" - Connecting science, land, and people for resilient soils. As you know, healthy soils underpin food production, water quality, climate resilience, and ecosystem health. The programme will highlight the vital role of how we manage soils to achieve the goals of resilient, productive landscapes, healthy ecosystems, and enduring communities.

Individual (oral and poster) submissions are invited in the following subject areas:

- soil biology, soil ecology, soil biodiversity
- soil's role in responding to global change and creating resilient landscapes'
- integrating land management practices and water quality
- soil health and regenerative soil management
- mātauranga Māori, soils and human health
- soil's connecting people and place
- soil science and policy
- urban soils and managed retreat sites: contaminated land and waste issues; land use strategies; the Red Zone.
- pedometrics, quantitative approaches, remote and proximal sensing
- applications and impacts of generative AI (GenAI),
- soil productivity in managed landscapes and the High Country
- nutrient management and carbon fluxes in soils and landscapes
- pedology, soils in the landscape, S-Map and applications
- soil physics and water management
- soil education, professional development, pedagogy and outreach

- other soil-related topics (you tell us)

Please submit an abstract only if you intend to attend and present your abstract in person. For submission instructions and guidelines, please see the website.

2026 KEY DATES

Abstract Submissions – Now Open
Early Bird Registrations Open – mid May

Abstracts Submissions Close – 31 July

Author Notification - 5 September
Early Bird Registrations End – 15 October

Related Society Notices

To keep up with the latest updates, follow NZSSS on LinkedIn and visit our website:

- LinkedIn: https://www.linkedin.com/company/nzsss/
- Website: https://www.soilscience.org.nz/

Release of the Save Science Coalition report

Release of the Save Science Coalition report "Underfunding our future: the human face of science cuts"

The Save Science Coalition is a group of organisations including unions and scientific societies with an interest in ensuring that Aotearoa New Zealand has a well-functioning and well-funded science and research system. As you may have seen in the media over the last few days, it has launched its new publication: “Underfunding our future: the human face of science cuts”.

This publication details the stories of scientists working in the science system who have been personally affected by the science cuts.

The NZSSS is a member of the Save Science Coalition, and invites our members to read the report which is available online: https://scientists.org.nz/Save-Science-Coalition (download the pdf here)

News from the Regions

Waikato/Bay of Plenty

Bioeconomy Science Institute (AgResearch)

"On 25 March, Keren Ding (BSI – AgResearch Group) presented our latest AgEC-supported research, “Drivers of Plantain’s N_2O Mitigation Potential: An Initial Analysis of New Zealand Field Data,” at the online international BNI Plantain webinar, a platform for researchers working on plantain-related programmes.

The presentation highlighted findings from a statistical analysis of eleven New Zealand field studies. Results showed that while plantain (Plantago lanceolata L.) has strong potential to reduce nitrous oxide (N_2O) emissions, its effectiveness is conditional rather than universal.

A key takeaway was the identification of critical “sweet spots” for mitigation. Plantain significantly reduced the N_2O emission factor (EF3) primarily when urine-N application rates ranged between 400 and 600 kg N ha^{-1} and soil field capacity exceeded 0.45 mm mm^{-1}.

These findings suggest that plantain’s mitigation mechanisms—including biological nitrification inhibition (BNI) and moisture regulation via its deep root system—are most effective under specific environmental and management conditions. By defining these thresholds, this work provides a data-driven framework to support the targeted use of plantain as a precision tool for climate-resilient pastoral systems."

University of Waikato

New eddy covariance towers installed
It has been a busy few months with further installations of eddy covariance towers over drained peat soils. Along with BSI (Manaaki Whenua), we are being funded by the Global Research Alliance, the Ag Emissions Centre, and the Waikato Regional Council to determine CO_2 emissions from grazed peat soil with different water table depths and land uses (including cropping and retired sites).

Figure 1. Eddy covariance tower installed in a retired paddock on drained peat that is now supporting a mix of weeds and manuka.

New WaiBER team member

The Waikato Biogeochemistry and Ecohydrology Research (WaiBER) team welcomes Kelly Chow, a new MSc student in Environmental Science at the University of Waikato. She recently completed a Bachelor of Climate Change at Waikato and is now continuing her studies under the supervision of Professor Louis Schipper. She has a strong interest in soil biogeochemistry, greenhouse gas emissions, and nature-based climate solutions. Her master's research focuses on estimating the annual net ecosystem carbon balance of a drained peaty-mineral soil under pasture using the eddy covariance technique. In New Zealand's GHG inventory, soils that fall below the threshold for organic classification are assumed to have no net emissions. However, these soils can still contain considerable amounts of organic carbon, and their carbon exchange with the atmosphere remains poorly understood. Her project aims to assess whether these transition soils may represent an under-recognised source of emissions.

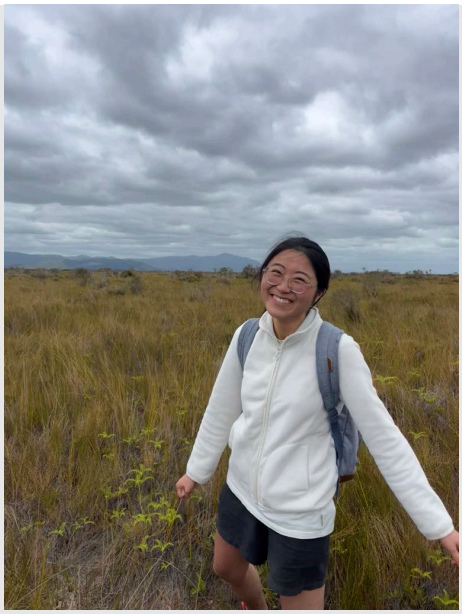


Figure 2. New WaiBER team member Kelly Chow.

WaiBER at NZACCC

On 29 and 30 April, the WaiBER team, represented by Louis Schipper, Vanessa Victor, and Vitor Bianchini, attended the New Zealand Agricultural Climate Change Conference (NZACCC) in Wellington. The event focused on leveraging New Zealand's low-emissions advantage and positioning sustainable agriculture as a key driver of long-term global value.

Figure 3. WaiBER team members Vanessa, Louis, and Vitor, from left to right, at NZACCC 2026.

Waikato Regional Council

Haydon Jones is busy with meetings, procurement, recruitment, and responses including coordinating Land Monitoring Forum (LMF) council responses to requests for spatial representation of soil quality monitoring data; organising LMF on actions for healthy water; and completing S-map for the region. He organised the recent LMF meeting (Haydon is the Convenor).

Malcolm McLeod finished reviewing catchment information sheets; rating FDE units, Hauraki soils, Gley soils moderately well drained; maintaining rain gauges; West Coast S-map with BSI continuing for this year, further S-map contracting, and a proposed Fast-track site visit.

Alice Wheateley-Wilson and Justin Wyatt are working on the peat carbon report and analysing the latest peat surface data.

Tim Norris has an interesting flood-related project. The riparian survey of the Kaniwhaniwha catchment was carried out just before the major flood event and Tim is looking at resurveying. He is also finalising riparian survey technical report, while the Matahuru catchment technical report is ready for peer review.

Matthew Taylor is writing up the soil quality and trace element monitoring trends report, dealing with several consent applications to apply substances to soils, and continuing to work on a biological indicator for soil quality based on eDNA technology.

Manawatū

Massey University

🌱 Massey University Soil Society Field Trip to Organic Farm

The Massey University Soil Society remains active and engaged in hands-on learning, with an upcoming field visit to the Live2Give Organic Farm. This trip will give students the opportunity to explore organic vegetable production systems, with a focus on practical skills such as soil description, as well as learning about cover cropping and mulching practices.

Importantly, the data collected during this visit will contribute to ongoing research by Shiromi Samiraja, whose PhD investigates cover cropping and direct mulch planting as strategies to improve the sustainability of vegetable production in New Zealand. The farm visit highlights the continued role of student-led initiatives in supporting both education and research within the soil science community.

WHERE & WHEN

- Aokautere, Palmerston North
- Fri 8th May 2026
  12-3pm
- Meet at PTC Carpark
  36 Collinson Road
  Massey, Palmy
- Lunch provided
- $ Free for students

WHATS HAPPENING

- Visit local organic farm
- Learn about cover cropping mulching and soil description

Register Now!

PRESENTED BY

MASSEY UNIVERSITY
SOIL SOCIETY

Understanding sources of phosphorus in a hill country catchment, Rangitīkei, New Zealand

Massey PhD student Kevin Perera is currently investigating the sources and pathways of phosphorus in a hill country catchment in the Rangitīkei District. The research responds to persistently elevated dissolved reactive phosphorus concentrations identified through catchment monitoring and aims to better understand the processes driving these patterns.

The project combines field sampling, analysis of existing water quality data, and detailed soil and geological characterisation to distinguish between natural (geological) and land-use contributions of phosphorus. Seasonal dynamics and potential groundwater inputs are also being assessed to build a comprehensive picture of how phosphorus moves through the landscape.

This work, undertaken in collaboration with Horizons Regional Council and local stakeholders, will provide an evidence base to support more targeted and effective freshwater management. It also contributes to building research capability in catchment nutrient dynamics, with findings expected to have broader relevance for hill country systems across the region.

Massey PhD student Kevin Perera out on farm in the Rangitīkei taking soil and sediment samples in April 2026.

Effects of *Toxoplasma gondii* on New Zealand wildlife

Domestic cats in New Zealand can carry a parasitic protozoan called *Toxoplasma gondii*, which reproduces in their gastrointestinal tract and is spread through eggs or oocysts in their faeces. This parasite can infect warm-blooded animals, including humans, causing a range of negative impacts, including inflammation, scarring and loss of sight, particularly for young or immunocompromised animals. The parasites are a cause of death in the endangered Māui dolphin, stimulating research into

how long oocysts can survive in soil and how they can be transported into the marine environment.

Janani Palihakkara is currently undertaking postdoctoral research at Massey University focused on understanding the transport of *T. gondii* oocysts through soils under controlled conditions. Her work uses rainfall simulation experiments to investigate how factors such as soil type, rainfall intensity, slope, and vegetation cover influence runoff generation and oocyst transport. Current trials involve repacked New Zealand soils under 5–15° slope and rainfall intensities of 20–30 mm/hr, comparing bare and pasture-covered systems.

While repacked soils do not fully replicate natural field conditions due to alterations in soil structure and pore connectivity, these controlled experiments allow key transport processes to be isolated before progressing to field-scale studies. Unlike dissolved nutrients, *T. gondii* oocysts are relatively large particles (approximately 10–12 µm) and can be transported through both surface runoff and subsurface flow pathways during rainfall events.

Complementary leaching column and drainage experiments across a range of New Zealand soils, including Allophanic, Gley, and sandy soils, are also being undertaken to improve understanding of vertical oocyst transport through soil profiles. Together, these studies aim to provide new insights into the movement of *T. gondii* oocysts from land to water, supporting future field-scale investigations and mitigation strategies to help protect vulnerable marine ecosystems, including habitats linked to the critically endangered Māui dolphins.

Mini leaching column experiments investigating vertical transport of *Toxoplasma gondii* oocysts through soils.

Rainfall simulation experiments investigating the transport of *Toxoplasma gondii* oocysts under bare and pasture-covered soil systems.

Morice Fields Memorial Award 2025

Janani Palihakkara was awarded the 2025 Morice Fields Memorial Award by the New Zealand Society of Soil Science, recognising her PhD thesis as one of exceptional merit from the previous year. The award was presented by the President of the New Zealand Society of Soil Science, Pierre Roudier, at the Norman Taylor Memorial Lecture held at Massey University on the 2nd of February 2026.

Janani's doctoral research investigated phosphorus dynamics in submerged agricultural soils, providing new insights into how phosphorus behaves under waterlogged conditions and the implications for sustainable nutrient management and environmental protection. The recognition highlights both the scientific contribution of her work and the collaborative support from supervisors, colleagues, and research partners in New Zealand and internationally.

Janani Palihakkara being presented with the Morice Fields Memorial Award at the Norman Taylor Memorial Lecture at Massey University on the 2nd of February 2026 by Pierre Roudier, the President of the New Zealand Society of Soil Science.

Whakamarama i te Onamata: Illuminating past dust flux dynamics in the lower North Island of Aotearoa New Zealand

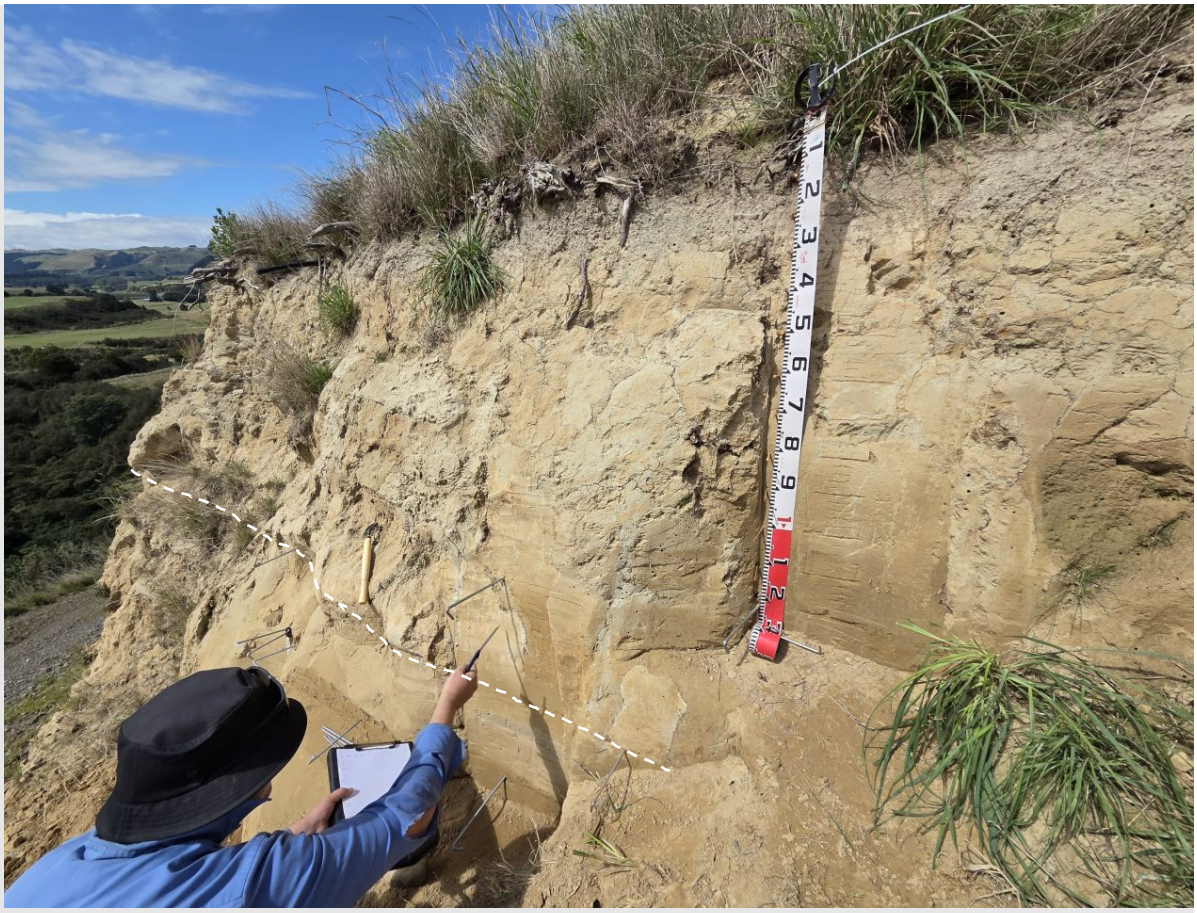
Kaja Fenn (University of Liverpool) has been working with Alan Palmer and Callum Rees (Massey University) on research exploring dust deposits and landscape evolution in the lower North Island of New Zealand. This work forms part of a collaborative initiative involving Massey University, University of Liverpool, iwi partners, and local landowners.

Recent fieldwork across the Rangitīkei and Oroua valleys has focused on mapping and sampling loess, river terraces, and associated deposits to better understand how these dynamic landscapes formed over time. Sites on the Rata (Rātā) and Porewa (Pourewa) terraces, including well-preserved tephra layers, are providing important reference points for reconstructing past environmental conditions. This work complements newly published research, which presents new type sections for the last glacial river terraces in the Rangitīkei River Valley.

Together, these efforts aim to improve our understanding of Southern Hemisphere dust records by developing new chronologies and environmental reconstructions. The collaboration combines field expertise in Aotearoa New Zealand with luminescence dating capabilities at the University of Liverpool, contributing to a growing international research network and laying the groundwork for future research outputs and funding opportunities.

View east over the Rangitīkei Valley at the Rata (Rātā) Terrace type section (photo by Kaja Fenn).

Alan Palmer measures and samples a sand lens within the Rata (Rātā) terrace gravel alluvium for luminescence dating (photo by Kaja Fenn).



Callum Rees describes the Rata (Rātā) Terrace type section. The 25.5 ka Kawakawa Tephra (KT) (Dunbar et al. 2017) is at 1.34 to 1.48 cm depth at this section (base marked by dashed white line). Photo by Kaja Fenn.

The Rata (Rātā) Terrace type section is being described and sampled in ~1 m lifts, carefully measured by tape and level for grain size sampling at 2 cm increments. Base of the 25.5 ka Kawakawa Tephra (Dunbar et al. 2017) is marked by a white dashed line (photo by Kaja Fenn).

References:

Dunbar, N. W., Iverson, N. A., Van Eaton, A., Sigl, M., Alloway, B. V., Kurbatov, A., Mastin, L. G., McConnell, J. R., & Wilson, C. J. (2017). New Zealand supereruption provides time marker for the Last Glacial Maximum in Antarctica. Scientific Reports, 7(1), 12238. https://doi.org/10.1038/s41598-017-11758-0

Canterbury and Otago

Lincoln University

Researchers uncover precise timing of Antarctic ice loss during key warm period

Scientists have long studied Antarctic ice melt as a crucial indicator of the timing of past sea-level rise and for informing projections of future change. To improve the accuracy of these projections, researchers have applied advanced techniques to obtain more precise estimates of Antarctic ice retreat during the mid-Holocene—the most recent period in Earth's history when sea levels were rising. These new

insights greatly enhance our understanding of both the timing and magnitude of past sea-level change.

In *Synchronous mid-Holocene marine and terrestrial deglaciation in the Ross Sea, Antarctica*, published in *Nature Communications*, a research team led by Dr Rebecca Parker (Otago University, now based at the University of Exeter) reconciled previously conflicting marine and terrestrial records from the southwestern Ross Sea. Their findings confirm that marine ice retreat and land-based deglaciation occurred simultaneously – a discovery that has important implications for future forecasts of sea-level rise.

Biogeochemist and Te Whare Wānaka o Aoraki **Lincoln University's Dr Sebastian Naeher** was involved in the project to analyse molecular fossils found in samples to gain a more precise timing of changes to the environment and climate shifts during this timeframe.

"The team analysed marine sediment samples taken by the Korea Polar Research Institute during 2014-2015 to establish accurate timelines for the cores," says Dr Naeher. "Combining our skillsets and the application of new techniques of dating organic material in these sediments enabled us to develop a more accurate method of confirming the timings of marine and terrestrial deglaciation, which found them to fit more precisely than previously thought."

"The Ross Sea plays a significant role in global climate and sea-level dynamics. The Ross Ice Shelf is especially vulnerable to accelerated ice loss, and this is why considerable attention is given to this area to assess the effects of ocean warming on ice retreat. Its collapse could lead to the loss of inland ice sheets and rapid sea-level rising of up to 12 metres."

Interestingly, the study found that the simultaneous retreat of marine and terrestrial ice occurred despite the considerable distance between sampling sites. Researchers found evidence that rapid thinning of glacier ice can be triggered by ice retreat more than 60 km downstream, with thinning likely peaking due to marine ice-sheet instability. These accelerated thinning phases persisted for centuries, contributing to extensive inland ice melt.

However, the research found that in shallow water and areas with complex seabed topography, deglaciation slowed, delaying ice-sheet retreat by millennia. This demonstrates the role of local geography in shaping long-term ice loss.

The study provides scientists with a clearer understanding of where, when and how quickly ice loss occurred during the mid-Holocene, which is highly relevant today, as we observe extensive, rapid Antarctic ice loss due to climate change. This knowledge empowers scientists to develop more reliable models to predict future changes in the Ross Ice Shelf and sea-level rise.

"Our results show that open ocean conditions formed in extensive areas in the Ross Sea that were previously covered by an ice shelf, which occurred together with large-scale retreat of glaciers on the continent between 6.9 and 5.4 calibrated thousand years before present. That's a relatively short period of accelerated melting, resulting in rapid changes from glaciers to open ocean."

“By resolving discrepancies in the timing of glacier retreat and marine ice melt, we now have robust data to identify the major drivers and timescales of ice loss to better understand sea level rise,” says Dr Naeher.

By Rebecca Twidle

Associate Professor Almond's co-authored study wins AAG 2026 Gilbert Award

Congratulations to Associate Professor Peter Almond, who co-authored the paper *The development of terrestrial ecosystems emerging after glacier retreat*, published in *Nature*, which has received the American Association of Geographers 2026 G. K. Gilbert Award for Excellence in Geomorphological Research.

The committee recognised the paper for its clear advancement of geomorphological research through a rigorous, globally scaled synthesis of ecosystem development following glacier retreat, and for the strength of the

evidence supporting its broader significance for understanding rapidly changing mountain and high-latitude landscapes.

The award will be given at the American Association of Geographers annual meeting on 19 March.

By Rebecca Twidle

Department of Soil and Environmental Sciences at Lincoln University

The **Department of Soil and Physical Sciences** at Lincoln University was recently renamed the **Department of Soil and Environmental Sciences**, reflecting recent and ongoing changes in the nature and scope of its teaching and research portfolios. While soil science and sustainable management remain central, the department now covers a wide range of topics, including climate change impacts and mitigation and the assessment and management of water quality.

Soil science has been an integral part of Lincoln's teaching since its early days as an agricultural college. By the 1980s, it was already a well-established discipline, with active research and dedicated academic staff. Over time, the department expanded beyond traditional soil studies to encompass physical landscape processes and environmental science. The name change to Soil and Environmental Sciences reflects this broader scope. It signals a move from a discipline centred on soils and the physical sciences to one that remains focused on soil but now also integrates soil with the wider environment.

The department has grown steadily in size and scope. In the 1970s, soil science was taught by a small group within a broader agricultural framework, which expanded through the 1980s. As Lincoln University developed further in the 1990s and 2000s, departmental structures became more defined, and staff and student numbers increased. At that stage, the group/department supported an extensive teaching programme in soil and physical sciences, which included earth science, environmental chemistry, and environmental physics.

The current department offers courses ranging from introductory soil science to advanced studies in sustainable land management, soil resource assessment, and biogeochemistry. These topics support Lincoln University's focus on investigating land-based systems and environmental challenges. The Department of Soil and Environmental Sciences is led by Distinguished Professor Leo Condron and includes 17 academics and tutors, around 30 technical and professional staff, together with over 40 postgraduate students, postdoctoral fellows, and visitors. The department hosts 3 research institutes, namely Bioprotection Aotearoa (a National Centre of Research Excellence), the New Zealand-China Water Research Centre, and the Centre for Soil and Environmental Research.

By Leo Condron and Josie Mazzetto

Lincoln University students to represent New Zealand at the 5th International Soil Judging Contest, Nanjing, China.

New Zealand will be represented for the first time on the world stage at the 5th International Soil Judging Contest, to be held in Nanjing, China, from 2–6 June 2026. The event forms part of the 23rd World Congress of Soil Science.
A team of four students from Lincoln University has been selected to compete, marking the first time New Zealand has taken part in this international contest. The students representing New Zealand are Meila Picard, Carys Luke, Breanna Holt and Kayley Wiffen. They will be supported by academic coaches Carol Smith and Josie Mazzetto. Selection was based on individual performance at the 2025 Australian Soil Judging Competition in Armidale, with the top four New Zealand students who are currently enrolled chosen to represent the country.

The contest brings together over 20 teams from around the world to assess soils in the field. Participants are required to describe soil profiles, classify them, and interpret their suitability for different land uses using standard methods and guidelines. The competition includes both individual and team components, following several days of technical training.

The event provides a rare opportunity for students to test their practical skills at an international level while engaging with leading soil scientists. It also aims to build global networks and promote careers in soil science.

Lincoln University’s representation is a point of pride for both the institution and New Zealand. It reflects the strength of soil science teaching and student capability within the university.

As the team prepares for Nanjing, their participation signals a step forward for New Zealand’s presence in global soil science. It also highlights Lincoln University’s role in developing the next generation of soil scientists.

By Josie Mazzetto

Photo a) The student team is travelling to Nanjing.

Photo b) The two student teams in Australia last year.

Bioeconomy Science Institute (AgResearch) South Island

Huge congratulations to **Cecile de Klein**, who was named by the Royal Society Te Apārangi in the latest cohort of Fellows – an honour recognising her international leadership in agricultural greenhouse gas research. Cecile's contribution to Aotearoa New Zealand's climate and farming future has been remarkable. As a senior leader within the Bioeconomy Science Institute Maiangi Taiao, she has played a pivotal role in bringing scientific insight into some of the most complex discussions shaping the future of agricultural emissions. Her work has always balanced deep scientific rigour with an ability to integrate across disciplines, sectors and perspectives. Whether helping build understanding of the scale of agricultural emissions, contributing to pathways for mitigation, or ensuring policy discussions are grounded in evidence, Cecile has consistently championed the vital connection between science and decision-making.

Originally from the Netherlands, where adapting to environmental change is part of everyday life, Cecile has spent more than 30 years in New Zealand applying that same sense of urgency and innovation to challenges here. From early research into nitrate leaching to helping develop today's farm-system-level responses to climate change, she has been central to how the sector identifies challenges, tests solutions, and prepares for the future. What makes Cecile's contribution even more special is her collaborative spirit. She is someone who brings people together, connects research with real-world application, and helps translate science into practical and effective action. Her expanding networks across regulatory, scientific, and industry communities have strengthened New Zealand's ability to navigate the transition ahead. Congratulations, Cecile!

Above: Cecile being inducted into the Academy of the Royal Society Te Apārangi in Wellington

After an incredible 50 years of service, AgResearch group recently farewelled Southland stalwart **Chris Smith**, whose work has shaped farming practices and

environmental research across the country. Chris began his career as a field technician with the Ministry of Agriculture and Fisheries at Takapau Research Station in Central Hawke's Bay. Over the decades, Chris contributed to a wide range of research projects – from grass grub mitigation, through to monitoring pasture growth and nutrient impacts, and environmental management. His work has shaped farming practices and informed industry decisions across New Zealand.

One of Chris's most significant legacies is the long-term pasture growth monitoring at Woodlands Farm, in Southland. This work began in the late 1970s alongside similar trials nationwide. While most trials ended in the mid-80s due to funding cuts, Chris fought to keep the Southland trial going. Thanks to his dedication, this dataset is now the second-longest-running pasture growth record in the country. Alongside growth rates, climate conditions have also been recorded, providing valuable insights into climate change impacts on Southland pastures. Chris also played a pivotal role in the soil and environmental research undertaken at the Southern Dairy Hub. He was instrumental in several key research projects at the hub, including a three-year trial investigating nitrogen leaching from grazed winter forage crops. The findings revealed that fodder beet leaches significantly less nitrogen than kale – critical insights for farmers striving to meet environmental standards. Thank you Chris, wishing you all the best for your next chapter.

Above: Chris sampling soil leaching samplers - mid winter, 2010

2026 Soil Science Australia Conference

2026 Soil Science Australia National Conference

Western Australia is hosting the 2026 Soil Science Australia National Conference on Whadjuk Noongar Boodja in Boorloo (Perth), with the theme “Common Ground: Soils for the Anthropocene”.

The conference will be held 1-5 November 2026 at the Pan Pacific Hotel, following the highly-anticipated Australian Soil Judging Competition which is being held 29-31 October.

The 2026 conference is expected to convene over 450 attendees and will serve as a platform for a diversity of voices across science, policy, industry and community to

explore a mutual understanding of soils as the foundation of productivity, security, community and resilience.

Sponsorship opportunities

There are diverse but limited opportunities for organisations to participate as a sponsor or exhibitor. Several sponsors are already on board. The conference sponsorship prospectus is available on the conference website.

Call for abstracts

The call for abstracts to submit oral and poster presentations is now open and will close 24 April 2026. The submission process is simple and is outlined in a comprehensive guide available on the conference website.

Visit the conference website: https://conference.soilscienceaustralia.org.au/

Abstracts

Tamepo, RL, Doscher C, McDowell RW. (2026). No one-size-fits-all: modeling regional environmental and economic performance of diversification from dairy farming. Critical Insights in Agriculture, 1(1). https://doi.org/10.1080/29932106.2025.2610086

Agriculture in New Zealand has historically prioritized specialized monocultures such as dairying, now under increasing scrutiny for environmental impacts. This study evaluated the potential of land-use diversification to improve environmental outcomes, measured as greenhouse gas emissions and nitrogen and phosphorus losses to water, while maintaining economic performance, assessed through profitability and labor demand (full-time equivalents). Scenarios incorporated varying proportions of arable, horticultural, and forestry land uses on farms representative of six major dairy regions. Results demonstrated that horticulture often improved profitability and labor demand while reducing nutrient losses, although the magnitude varied by region. Arable systems showed mixed effects on nutrients and greenhouse gas losses and profitability. Forestry consistently reduced nutrient losses and greenhouse gas emissions. A loss of jobs at the catchment and community scale can be avoided if employment decreases from forestry are confined to non-contiguous areas at farm scale. These findings have direct implications for those trying to use diversification to achieve catchment scale environmental and economic objectives. The contrasting outcomes highlight the need for collective, regionally specific decision-making to manage the role that on-farm diversification may play in achieving catchment outcomes.

Monaghan RM, Smith LC. 2026. The amounts and forms of nitrogen leached from autumn and winter forage crops grazed by dairy cows in southern New Zealand. New Zealand Journal of Agricultural Research 69, e70000. https://doi.org/10.1002/jag2.70000

A 3-year grazing study was undertaken to quantify nitrogen (N) leaching losses from forage crops that were grazed by dairy cows in late autumn (fodder beet, *Beta vulgaris*; FB) or winter (FB and kale, *Brassica oleracea*). The practice of mechanical lifting instead of autumn grazing of FB was also evaluated as an option for mitigating N leaching. Mean annual inorganic-N leaching losses from autumn grazing of FB were large (98 kg N ha^{-1}) relative to those measured for winter-grazed FB. Lifting of FB in autumn had no effect on reducing N loss. Leaching losses from winter-grazed FB were significantly less than those measured from winter-grazed kale (52 vs. 82 kg N ha^{-1} $year^{-1}$), most likely reflecting the effects of the lower protein content of FB and consequent reduced intake and excretion of N by cows. Leaching losses from the forage crop treatments were large relative to those measured from nearby pasture paddocks, confirming the elevated risk associated with forage crops where extended overlapping periods of bare ground coincide with inputs of surplus rainfall. Considerations of grazing and/or harvest timing and crop type are therefore important factors that determine the risk of N leaching losses from grazed forage cropping systems.

Tchodjowiè PI Kpemoua, Marija Stojanova, Claire Chenu, Denis Angers, Amicie Delahaie, Jussi Heinonsalo, Kristiina Karhu, Marine Landrieux, Sam McNally, Cédric Plessis, Christopher Poeplau, Valérie Pouteau, Pierre Roudier, Eva Rabot, Juliette Roussia, Marcus Schiedung, Iñigo Virto, Pierre Barré. 2026. Harmonizing data from different soil organic matter fractionation protocols. Geoderma, Volume 468, 117774. https://doi.org/10.1016/j.geoderma.2026.117774.

Physical fractionation is a prevailing tool for studying the biogeochemical stability of soil organic carbon (SOC). Fractionation methods are straightforward to implement in the laboratory, and allow for the separation of SOC into at least two distinct fractions, either by size (OC_{fine} vs. OC_{coarse}) or density (light vs. heavy fraction), and make it possible to distinguish fractions with contrasting average biogeochemical stability. Methods tend to differ in the protocol for soil dispersion (shaking in water and/or sodium hexametaphosphate (SHMP), shaking with glass beads, or using ultrasonic dispersion), and in the fraction separation (through different sieve/mesh sizes or using chemical density). Several *meta*-analyses combining results obtained using different physical fractionation methods are emerging. In this context, it is important to determine whether the results obtained using different methods are directly comparable or, at a minimum, whether correction functions can be developed to harmonize the results obtained with different methods.
In this study, we compared the results obtained by fractionating 61 wide-ranging soil samples using five methods: dispersion in water with glass beads and sieving at 50 µm (M1) or 63 µm (M2); dispersion in SHMP with glass beads and sieving at 50 µm (M3); ultrasonic dispersion (USD) in water and sieving at 50 µm (M4); and USD in sodium polytungstate and separation by density at 1.6 g cm^{-3} (M5). Our results show that the five methods provide significantly different results and that these differences depend on common soil characteristics: pH, SOC, and texture. For instance, SHMP is the most effective dispersion method for acidic soils, but less effective in alkaline soils. We successfully developed functions that harmonize the data obtained using the different size fractionation methods (M1 to M4). However, results obtained by density fractionation are significantly different from

those obtained by size fractionation and therefore cannot be harmonized effectively at this stage. Nevertheless, when excluding samples with high sand content (>70%), the difference between size and density fractionation measurements remains relatively high, but falls within a more acceptable range. Ultimately, our work shows that combining fractionation results is not a straightforward task and several considerations should be kept in mind. When combining density- and size-based results, sandy soils need to be excluded from the datasets, allowing for a significant reduction in the bias between the two measurements. Furthermore, prior to performing any (meta-)analyses, we therefore strongly recommend the harmonization of results obtained using different size-based fractionation methods, and we urge caution when interpreting results from *meta*-analyses that combine different fractionation methods.

Houlbrooke DJ, Laurenson S, Monaghan RM, Carrick ST, Horne DJ. (2025). Development of a decision framework for matching farm dairy effluent management practices to soil and landscape risk features. New Zealand Journal of Agricultural Research, 68(6), 1381–1400. https://doi.org/10.1080/00288233.2025.2500582

The safe application of farm dairy effluent (FDE) to land has proven to be a challenge for dairy farmers and regulatory authorities throughout New Zealand. Poorly performing FDE systems can have deleterious effects on water quality because contaminants such as phosphorus, nitrogen and faecal microbes enter receiving waters with minimal attenuation by soil. We present a decision framework that supports good management of effluent, particularly during its application to land. The framework considers how FDE management can be tailored to account for soil and landscape features of a location that pose varying levels of contaminant transport risk. High risk soils and landscapes are vulnerable to direct losses via preferential and/or overland flow pathways and include sloping land (e.g. slopes greater than 7 degrees) and soils with mole drainage, coarse structure, poor natural drainage or low surface infiltration rates. Soil types that are well-drained with fine structure typically exhibit matrix flow characteristics and represent a relatively low risk of direct contaminant loss following FDE application. Our framework provides guidance on FDE application timings, rates and depths to different landform and soil types so that direct losses of contaminants to water are minimal and the opportunity for plant uptake of nutrients is enabled. Some potential limitations for using the framework include the potentially severe effects of animal treading damage during wet conditions that can reduce soil hydrological function and consequently increase the risk of overland flow of applied FDE. The spatial distribution of such treading damage should be considered in the framework's application. Another limitation is our limited understanding of the effects of soil hydrophobicity on FDE infiltration and application of the framework.

Matthew Norris, Stephen N. Trolove, Steve R. Green, Jian Liu, Nathan Arnold, Isabelle Sorensen, Carlo van den Dijssel, Steven Dellow, Gina van der Klei, Peter Wright, Glenn Clark, Mike Cummins, Sarah Bromley, Dirk Wallace, Paul R. Johnstone. (2025) Measuring phosphorus losses in drainage from arable and vegetable production systems in New Zealand, New Zealand Journal of

Agricultural Research, 68:7, 2396-2422.
https://doi.org/10.1080/00288233.2025.2519426

Additions of phosphorus (P) into lakes and rivers degrades water quality. The contribution of drainage losses from New Zealand (NZ) arable and vegetable cropping systems is largely unknown, so to address this data gap, a network of drainage fluxmeters (DFMs) was monitored on nine commercial cropping farms around NZ to measure total P (TP) losses in drainage at 120 cm below the soil surface. Two land-use categories were represented, including mixed cropping with livestock grazing ($n = 6$), and mixed cropping with a focus on vegetable production ($n = 3$). Over the reporting period (March 2015–August 2020), median flow-weighted (FW) TP concentrations ranged from 0.008 to 0.078 mg TP/L with annual losses estimated at 0.08–0.31 kg P/ha/y. FW TP concentrations were strongly correlated with soil P retention, with correlations observed to improve with sample proximity to the depth of drainage interception (TP (mg/L) = −0.00064%P retention (80–100 cm) + 0.0722; $r^2 = 0.93$, $p < 0.001$). Topsoil (0–20 cm) Olsen P and degree of P saturation (Olsen P/P retention) were not reliable predictors of TP loss in drainage at 120 cm, this despite a wide range in soil test *P* values observed (13-198 mg/kg).

Saggar S, Palmada T, Berben P, Liang L (2026). On-farm nitrification inhibitor application to urine patches in reducing nitrous oxide emissions. Special Issue: "Nitrogen Cycling and Efficient Utilization Mechanisms in Agricultural Field Ecosystems". Agronomy 16(7), 701. https://doi.org/10.3390/agronomy16070701

In livestock-grazed pastures, urine patches are a major contributor of nitrous oxide (N_2O) emissions, and the use of nitrification inhibitors (NIs) has the potential to reduce N losses from urine patches using New Zealand (NZ) devised Spikey® -a ground-based machine that measures the change in soil conductivity from the deposited urine patches. approach. Our ongoing research suggests that the efficacy of on-farm targeted NIs treatment requires suitable inhibitor concentrations within urine patches to be achieved to reduce N_2O emissions. This study evaluates the effect of varying NIs rate and volume on reducing N_2O emissions. The application rates for NIs were 1.6 g and 3.2 g dicyanamide (DCD) patch-1 and 0.96 g and 1.92 g of 3,4-dimethylpyrazole phosphate (DMPP) patch-1, using 100-, 150-, and 200-mL inhibitor solutions. These rates were higher than those used in previous studies to ensure an adequate supply of inhibitors above the threshold concentration within the urine patch and to enhance the efficacy of inhibitors in reducing N_2O emissions. This study points to two important aspects: i) What is the optimum inhibitor concentration required to eliminate, minimise/reduce? ii) Can the optimised amounts of inhibitor application rates keep inhibitor residues below their Maximum Residue Level (MRL) in the food chain and environment, and eliminate their potential harm to human health and the environment? Determine the optimum inhibitor concentration required to reduce N_2O emissions and ensure that at an optimised amount of inhibitor application, inhibitor residues are below their Maximum Residue Level (MRL) in the food chain and the environment, and eliminate their potential harm to human health.

Shrestha G, Calvelo-Pereira R, Roudier P, Kereszturi G, Jeyakumar P, Martin A, Turnbull R, Anderson C 2026. Rapid analysis of farm-scale soil cadmium concentrations using a regional soil spectral library. Geoderma Regional 44: 12. WOS:001704566600001 https://doi.org/10.1016/j.geodrs.2026.e01063

Monitoring soil cadmium (Cd) at farm-scales (average 3 km^2) can potentially be rapid and cost-efficient by implementing proximal sensing techniques benefiting from a leveraged regional-scale (≥ 40,000 km^2) soil spectral library (RSSL). However, prediction models based on RSSL are often of limited use when applied at farm-scales because the coarseness of the RSSL. In this study, a New Zealand RSSL was used to assess the Cd concentration in a farm-scale sample set. For all samples, total Cd was determined, and visible-near-infrared (vis-NIR), mid-infrared (MIR), and portable X-ray fluorescence (pXRF) spectra were collected. A localisation technique to predict farm-scale Cd using RSSL spectral data was developed, based on spectral similarity or land use similarity relative to the farm-scale samples, and/or supplemented with selected farm-scale samples, as input for partial least squares regression and LOCAL algorithms. A model using MIR data from a RSSL pastoral samples subset (n = 283) spiked with 12 extra weighted (×4) farm-scale samples as an input for a LOCAL algorithm, quantified Cd optimally (root mean square error = 0.22 mg Cd/kg; concordance correlation coefficient = 0.78; ratio of performance to interquartile distance = 1.93). Spiking the RSSL subset with farm-scale samples, including otherwise under-represented attributes such as soil order and Cd concentration range, improved the performance of models predicting farm-scale total Cd concentrations. A hybrid technique of localisation approach considered in this study may reduce compliance costs for Cd surveying and management, benefiting farmers.

Brent V. Alloway, David J. Lowe, Bradley J. Pillans, Peter C. Almond, Alan S. Palmer 2026. Loess studies in Aotearoa New Zealand. New Zealand Journal of Geology and Geophysics 69: e70035. https://doi.org/10.1002/jgo2.70035 (open access)

Loess in Aotearoa New Zealand (ANZ) has been studied since its first documented recognition (on Banks Peninsula) in 1878 by Julius von Haast. A decade later, John Hardcastle revealed that southern ANZ loess was both glacial in origin and contained signals of past climates. As a fine-grained aeolian deposit dominated by quartz and feldspar (± mica), it is derived mainly from greywacke and schist rocks shattered by frost cracking at high elevations, fluvially comminuted then deflated from aggrading floodplains, and from exposed continental shelves during cold periods. Such quartzo-feldspathic loess predominates in eastern and southern parts of both South and North islands and in Westland and Tasman. In addition, subsurface tephric loess prevails in central-western North Island. Unlike many deposits overseas, ANZ loess generally lacks secondary calcium carbonate, is denser (with lower macro- and mesoporosity, higher clay content) and, although less prone to collapse, is susceptible to accelerated erosion including tunnel gullying and landsliding. Mean rates of accumulation in the Last Glacial Maximum were ~3–25 mm/century; mass accumulation rates were generally 70–150 g cm^{-2} yr^{-1} but locally could be as low as 20 g cm^{-2} yr^{-1} and as high as 360 g cm^{-2} yr^{-1}. Studies mapping and characterizing loess have been driven in part by cognizance

of its importance as a widespread parent material (~60%–70% of ANZ's soils contain loess) for arable/pastoral soils underpinning ANZ's predominantly agronomy-based economy. A key feature of ANZ loess studies has been the recognition of developmental upbuilding pedogenesis involving syn-depositional alteration of loess as it accumulates in cold and/or cool (stadial) periods, and stronger alteration (forming more-developed soils, which subsequently become recognizable as buried soil stratigraphic units or paleosols) during minimal accumulation in interglacial and/or warm (interstadial) periods. Multisequal loess-paleosol successions are the result. ANZ loess-paleosol successions have been dated and correlated via a range of dating and age-equivalent techniques including tephrochronology and paleomagnetism. Most loess is ≤500 kyrs old, but occurrences as old as Pliocene (Otago) and c. 1.7-1.0 Ma (Waikato, Wairarapa) are recognized. Loess chronostratigraphy has enabled loess and associated buried soils/paleosols to be correlated to the Quaternary marine oxygen isotope records, which, alongside mapping efforts, have revealed landscape responses to climate and tectonic controls particularly along the eastern regions of ANZ bordering the Hikurangi Subduction Margin.

Simon J. Barker, Stephen B. Piva, Colin J. N. Wilson, David J. Lowe, Bruce L. A. Charlier, Alan R. Orpin 2025. Recycling of ash particles during highly explosive eruptions: multiple glass populations in the 1.8 ka Taupō tephra. Bulletin of Volcanology 87:128.
https://doi.org/10.1007/s00445-025-01913-1

The 1.8 ka Taupō tephra is a key chronostratigraphic marker bed in terrestrial and marine environments in New Zealand. In proximal deposits, juvenile clasts from fall and ignimbrite units of the Taupō eruption display a distinctive narrow chemical range, with groundmass glasses having lower-silica (~ 74–76 wt.% SiO_2, volatile free) than older eruptive units. In contrast, distal Taupō tephra deposits variably contain glasses that span a wider range of compositions (~ 74–79 wt.% SiO_2), with a distinct cluster at ~ 78 wt.% SiO_2. Higher silica glass shards are typically found in the fine ash component and become more common in deposits from the later, most explosive phases of the eruption. Through a systematic assessment of different depositional settings and dispersal axes, we demonstrate that the Taupō tephra contains significant proportions of glass shards recycled from earlier deposits, particularly the 25.5 ka Ōruanui supereruption. Recycling of glass was facilitated by overlapping vent sites, the outstandingly explosive nature of the 1.8 ka Taupō eruption and the fine-grained texture and kilometre-scale intracaldera thicknesses of the Ōruanui deposits. The mixed modal glass compositions found in multiple locations and depositional settings (including Antarctica) represent a unique duplicate chemical fingerprint for the Taupō tephra. Our study highlights that mixed tephra compositions can occur even when the eruption involves only a single unzoned magma body. These results emphasise the need for caution when interpreting tephra compositional fields from single tephra sites, or when inferring magmatic processes from glasses in distal ash deposits, without sound volcanological context.

Max O. Kluger, Richard A. Melchert, José M. Moratalla, Tehnuka Ilanko, David J. Lowe, Vicki G. Moon, Pilar Villamor, Jordanka Chaneva, Nic Ross, Rolando P. Orense 2026. Tephra seismites – understanding seismic hazard of hidden faults by analyzing liquefied tephra layers in lakes. Science Advances 12(8): eads2015 https://www.science.org/doi/10.1126/sciadv.ads2015. (open access)

Assessing seismic hazards in regions with hidden or poorly expressed faults is one of the major challenges in paleoseismology today. Here, we utilized CT imaging to quantify the dimensions and distribution of liquefaction structures in ≤17.5-ka old tephra layers in 18 lakes scattered across the poorly expressed Hamilton Basin fault system in northern New Zealand. These 'tephra seismites', embedded in unconsolidated, organic-bearing lake sediment, increase in occurrence and dimensions towards known faults and indicate the occurrence of a local hidden fault segment. Through incorporating peak ground acceleration modeling, we found that the spatial distribution of tephra seismites directly relates to the ground shaking induced by near-field fault ruptures. We used the variability in tephra seismites within the stratigraphic record, and tephrochronology, to better constrain the recurrence intervals and magnitudes of paleoearthquakes from both the Hamilton Basin and adjacent Hauraki Basin fault systems. Our methodology is globally applicable in volcanic and tectonic regions where liquefaction structures are preserved amongst (hidden) faults.
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Muirhead RW, Peter Green, Rina Hannaford. 2026. Effectiveness of facilitated wetlands for treating agricultural runoff in South Otago, New Zealand. New Zealand Journal of Agricultural Research 69, e70032.
https://doi.org/10.1002/jag2.70032

Facilitated wetlands are promoted as a mitigation tool in agricultural landscapes because of their potential to attenuate contaminant losses while increasing biodiversity. Here, we investigate the contaminant removal efficiency of two facilitated wetlands established on a dairy farm and a sheep and beef farm. Each wetland had a sediment trap installed near the inlet to form a sediment trap-wetland complex. Water flows through the wetland complexes were measured continuously over three calendar years. Water samples were collected manually under low flow conditions and by an automated sampling system during runoff events at high flows. Samples were analysed for sediment, *Escherichia coli*, phosphorus and nitrogen. Effectiveness of the wetlands was assessed based on contaminant concentrations and annual loads. The wetland on the dairy farm did not significantly reduce any contaminants, and this was attributed to the very small size of the wetland (0.06%) relative to the contributing catchment area. The wetland on the sheep and beef farm (0.2% of catchment area) significantly reduced annual loads of sediment (53%), phosphorus (31%) and *E. coli* (10%). To maximise effectiveness, wetlands should be sized appropriately for the contributing catchment area, and sediment traps should be cleaned before they are completely full.

Dumont M, Cleary C, McDowell RW. 2026. Bayesian inference to predict past and future nitrate concentrations. Journal of Contaminant Hydrology 278:104902

DOI: 10.1016/j.jconhyd.2026.104902

Rigorously incorporating the lag between management actions and changes in water quality is essential to better manage NO_3-N (nitrate nitrogen) in groundwater. We present a fast data driven Bayesian inference model. It combines lumped parameter age models with measured NO_3 N concentrations to estimate historical and future NO_3 N concentrations for systems with negligible denitrification. Numerical experiments showed the model to be reasonably accurate. It can accelerate the detection of, and increase the detected effect size of, NO_3 N reductions relative to frequentist approaches. For instance, the model detects 20%–60% of the true effect as compared to 5%–25% for frequentist approaches when the mean residence time is greater than 10 years. Using the model for all groundwater sites with age data in New Zealand, we predict NO_3 N concentrations in New Zealand will increase significantly, with 20% of monitored wells exceeding the drinking water standard at steady state. NO_3 N reductions of 20% or more are required to maintain the current 15% of wells over the standard. The model allows much faster, lower cost, investigations with fewer data requirements than traditional approaches. We find that the model is a useful tool for incorporating lag into NO_3 N management decisions, testing hypotheses about historical land management, and providing parallel lines of evidence to support decision-making.

DeLucca-Agrelo F, Condron LM, Moir J. 2026. Impact of soil phosphate retention capacity on potential phosphorus loss from contrasting fertilisers. Soil Research 64(3) DOI: 10.1071/SR25174

Context Recovery and reuse of phosphorus (P) from waste materials in the form of sparingly soluble struvite may improve P use efficiency and reduce adverse environmental impacts associated with diffuse transfer of P from land to water. *Aims* To compare the immediate P loss by leaching from application of struvite and superphosphate to low and high P-retention grassland soils. *Methods* The equivalent of 100 kg P ha^{-1} of struvite and superphosphate was applied to the surface of soil columns, and P loss was determined over seven consecutive weekly leaching events. *Key results* As expected, application of P significantly increased P loss over seven consecutive leaching events in both soils. The P loss by leaching from the low P-retention soil was approximately 80% higher for superphosphate compared with struvite. The P losses from the high P-retention soil were also higher for superphosphate than struvite, but the differences were not significant. The latter was partly attributed to greater bypass flow in the high P-retention soil (sandy loam) compared with the low P-retention soil (silt loam). *Conclusions* The findings indicated that struvite has potential to reduce leaching P loss risk compared with water-soluble P, which may also be influenced by a combination of soil P retention capacity and texture. *Implications* Further studies are needed to evaluate the potential environmental advantages of using struvite under field conditions in grassland systems, and to investigate the physicochemical mechanisms responsible for the reduced mobility of struvite-P in soil.

Deadline..... for the next issue of Soil News is 10 August

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