



## 9<sup>th</sup> International Acid Sulfate Soils Conference



*Adelaide, South Australia*

*March 26<sup>th</sup>-31<sup>st</sup>, 2023*

The conference organising committee warmly welcome you to the 9th International Acid Sulfate Soils Conference (9th IASSC), the premier interdisciplinary forum for the presentation of new advances and research results in the fields of acid sulfate soil research, policy and management practices.

We kindly thank the following sponsors for their generous support of this conference:



**Government of South Australia**  
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**Conference organising committee:** Prof. Rob Fitzpatrick & A/Prof. Luke Mosley (co-chairs), Dr Brett Thomas, Dr Emily Leyden, All Occasions Group (Patti Sbrissa, Amy Mitchell)

**International Union of Soil Sciences Acid Sulfate Soils Working Group:** Dr Anton Boman (Chair), A/Prof. Vanessa Wong (Vice Chair)

**International Scientific Committee:** Australia – Laurance Fox, Prof. Leigh Sullivan, Phil Mulvey, Bernie Powell, Robert Quirk; Finland – Dr Peter Österholm; UK – Dr David Dent; USA – Prof. Martin Rabenhorst, Dr Mike Melville; Germany – Dr Angelika Kölbl; Indonesia – Dr Wirastuti Widyatmanti; China – A/Prof. Chaolei Yuan, Changxun Yu

**Cover photo:** (credit: Rob Fitzpatrick): *Acid sulfate soil profile from Gillman (site on mid-conference field trip) showing: (i) sulfuric material with prominent pale yellow masses in the form of streaks and mottling patterns containing jarosite (pH <4) infilling old mangrove root channels / pneumatophores in dark greyish subsoil layers between 20cm and 160 cm and (ii) hypersulfidic material with a uniform dark greyish brown colour at a depth below 160 cm.*

**Conference Venue:** Hotel Grand Chancellor, 65 Hindley Street, Adelaide

## Program Overview

Time	Sunday 26th	Monday 27th Day 1	Tuesday 28th Day 2	Wednesday 29th Day 3	Thursday 30th Day 4	Friday 31st
9:00-9:15am	Pre-Conference Field Trip	Opening Addresses	Keynote 3	Mid-Conference Field Trip	Keynote 6	Post-Conference Field Trip
9:15-9:30am		Keynote 1 Del Fanning	Martin Rabenhorst		Angelika Kolbl	
9:30-9:45am			Anton Boman		Emily Leyden	
9:45-10:00am						
10:00-10:30am		Morning tea	Morning tea		Morning tea	
10:30-10:45am		Anton Boman	Virginia Estévez		Rob Fitzpatrick	
10:45-11:00am		Niloofar Karimian	Alexandra Nyman		Nicolaas Unland	
11:00-11:15am		Tapio Sutela	Vanessa Wong		Martin Rabenhorst	
11:15-11:30am		Michelle Martens	Michael Melville		Phil Mulvey	
11:30-11:45am		Robert Quirk	Federico Alvarelllos		Vanessa Wong	
11:45-12:00pm		Chrisy Clay	Makruf Nurudin		Graham Lancaster	
12:00-1:00pm		Lunch	Lunch		Lunch	
1:00-1:15pm			Keynote 2		Keynote 4	
1:15-1:30pm	Peter Osterholm		Andrea Gerson	Andrew Coward		
1:30-1:45pm						
1:45-2:00pm	Leigh Sullivan		Rong Fan	Chaolei Yuan		
2:00-2:15pm	Colee Quayle		Gujie Qian	Andrew Grigg		
2:15-2:30pm	Alan Foley		Andrea Stiglingh	Eko Hanudin		
2:30-2:45pm	Navjot Kaur		Niloofar Karimian	Anders Johnson		
2:45-3:00pm	Thomas Kronberg		Jason Reynolds	Li Bi		
3:00-3:30pm		Afternoon tea	Afternoon tea		Afternoon tea	
3:30-3:45pm		Laurie Fox	Seija Virtanen		Leigh Sullivan	
3:45-4:00pm		Silvana Santomartino	Jeremy Manders		Liubov Kononova	
4:00-4:15pm		Miriam Nystrand	Wirastuti Widyatmanti		Ruby Hume	
4:15-4:30pm		Special Discussion ASS management triggers	Special discussion ASS classification & mapping		Closing Addresses	
4:30-4:45pm						
4:45-5:00pm						
	Welcome Reception 6-7:30pm (Hotel Grand Chancellor)	IUSS Acid Sulfate Soil working group meeting 5-6pm (Hotel Grand Chancellor)	EJSS Special issue outline, Early Career Researcher Networking and Publishing Event 5-6 pm (Hotel Grand Chancellor)	Conference Dinner 6.30 pm (Hotel Grand Chancellor)		
				Keynote 5 Dr David Dent		

## Day 1 - Monday 27th March

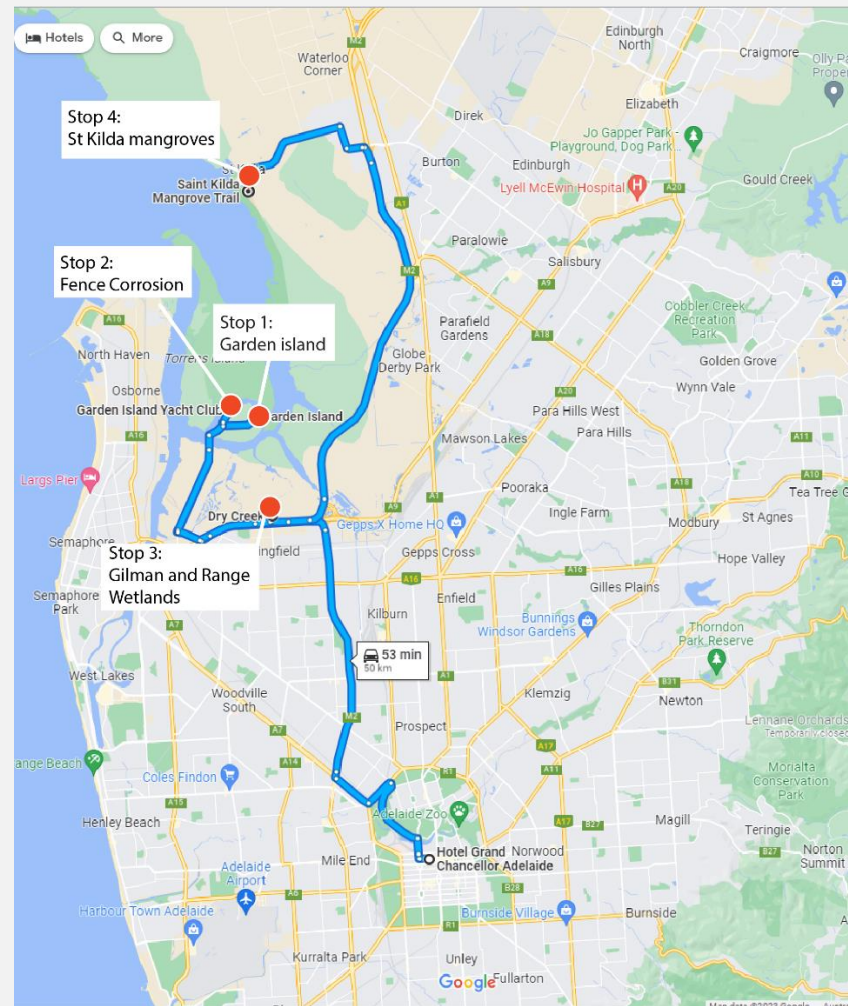
Time	Presenter	Presentation Title
9:00-9:15am	Opening Addresses	Welcome (Prof. Rob Fitzpatrick), President of Soil Science Australia (Ed Scott)
9:15-10:00am	<b>Keynote 1</b> Del Fanning	<b>Historical Developments in the Understanding of Acid Sulfate Soils</b>
10:00-10:30am	<i>Morning tea</i>	
10:30-10:45am	Anton Boman	Potential acid sulfate soils in Arctic regions of Finland: A first survey
10:45-11:00am	Niloofar Karimian	Variations in Fe/S speciation and trace metals mobilisation in fresh water re-flooded ASS wetlands in a highly dynamic climate
11:00-11:15am	Tapio Sutela	The effect of acid sulfate soils on river water quality and fish assemblages in Finland
11:15-11:30am	Michelle Martens	Packaging Acid Sulfate Soil (ASS) science for First Nations storytelling and ecotourism engagement
11:30-11:45am	Robert Quirk	Managing "The soils from Hell"
11:45-12:00pm	Chrisy Clay	28 years of managing broadacre acid sulfate soils on the North Coast of NSW: what have we done and what's left to do?
12:00-1:00pm	<i>Lunch</i>	<i>Formal Poster Session (will be up during whole conference)</i>
1:00-1:45pm	<b>Keynote 2</b> Peter Osterholm	<b>Can identification and risk assessment of acid sulfate soils be simplified?</b>
1:45-2:00pm	Leigh Sullivan	Formal Assurance of professional competence in acid sulfate soil management
2:00-2:15pm	Colee Quayle	Identifying non coastal ASS and the Implications for beneficial reuse in NSW
2:15-2:30pm	Alan Foley	Case Study: Ellenbrook Residential Development, Perth, Western Australia 1994–2020
2:30-2:45pm	Navjot Kaur	Coastal Acid Sulfate Soils Assessment and Management – Story of Removal of Two Rail Crossings in Victoria, Australia
2:45-3:00pm	Thomas Kronberg	Stabilization of sulfide-bearing clays as a new building ground
3:00-3:30pm	<i>Afternoon tea</i>	
3:30-3:45pm	Laurie Fox	Assessing Acidic Soils versus Acid Sulfate Soils – Some Case Studies
3:45-4:00pm	Silvana Santomartino	Modifications to Accepted Acid Sulfate Soil Management Practices to Address External Risk Factors
4:00-4:15pm	Miriam Nystrand	An accelerated incubation method for the identification of acid sulfate soils
4:15-5:00pm	Facilitated by Luke Mosley	<b>Special discussion session on triggers for acid sulfate soils assessment and management</b> Fenn Hinhcliffe & Gunnar Haid - Net environmental benefit of ASS assessment - discussion primer (5 mins) Phil Mulvey - Kinetics and Nature of ASS Systems is Equally Important as Thermodynamics - discussion primer (5 mins) Chris Auricht - Management of peaty soils - discussion primer (5 mins)
5:00-6:00pm		<b>International Union of Soil Science acid sulfate soil working group meeting</b>

## Day 2 - Tuesday 28th March

Time	Presenter	Presentation Title
9:00-9:45am	<b>Keynote 3 Martin Rabenhorst</b>	<b>The Evolving Classification of Acid Sulfate Soils</b>
9:45-10:00am	Anton Boman	Classification of acid sulfate soils and materials in Finland and Sweden: Re-introduction of pseudoacid sulfate soil materials
10:00-10:30am	<b>Morning tea</b>	
10:30-10:45am	Virginia Estévez	Improving prediction accuracy for acid sulfate soil mapping by means of variable selection
10:45-11:00am	Alexandra Nyman	Mapping and geochemical characterization of Acid Sulfate Soils throughout the Swedish coastline – a cost effective and rapid approach to determine environmentally relevant features over a large area
11:00-11:15am	Vanessa Wong	Acid sulfate soil characteristics in a large embayment under different vegetation types in southern Australia
11:15-11:30am	Michael Melville	Changes in cationic plant nutrient availability during Acid Sulfate Soil pedogenesis
11:30-11:45am	Federico Alvarelos	Geochemical and mineralogical composition of acid sulfate soils in Luleå, northern Sweden.
11:45-12:00pm	Makruf Nurudin	Early indications on potential acid sulphate soils formation in the Opak River Lagoon, Bantul, Yogyakarta, Indonesia
12:00-1:00pm	<b>Lunch</b>	
1:00-1:45pm	<b>Keynote 4 Andrea Gerson</b>	<b>Acid mine drainage: source control, standard testing methodologies and a case study of unexpected non-acid drainage</b>
1:45-2:00pm	Rong Fan	Evolution of pyrite oxidation from a 10-year kinetic leach study: Implications for mineralogical characterisations of secondary sulfate minerals
2:00-2:15pm	Gujie Qian	Dissolution of sulfide minerals in single and mixed sulfide systems under simulated acid and metalliferous drainage conditions
2:15-2:30pm	Andrea Stiglingh	Corrosion of zinc-aluminium and galvanised-steel fencing in Anthropogenic sulfuric soils
2:30-2:45pm	Niloofer Karimian	Arsenic and antimony co-sorption onto jarosite: An X-ray absorption spectroscopic study of retention mechanisms
2:45-3:00pm	Jason Reynolds	The geochemistry of arsenic in acid mine drainage: the role of pharmacosiderite
3:00-3:30pm	<b>Afternoon tea</b>	
3:30-3:45pm	Seija Virtanen	The effects of soil ripening on saturated hydraulic conductivity in cultivated acid sulfate soils in Finland
3:45-4:00pm	Jeremy Manders	How does potential and actual acidity of Acid Sulfate Soils (ASS) change over twenty years of soil storage?
4:00-4:15pm	Wirastuti Widyatmanti	Paleo-hydrogeomorphological process identification of peatlands acid sulfate soils using GIS and remote sensing approaches
4:15-5:00pm	<b>Facilitated by Prof. Rob Fitzpatrick</b>	<b>Special discussion session on international acid sulfate soil classification systems and mapping (to be continued in breakout room after 5pm as required)</b>
5:00-6:00pm	<b>EJSS Special Issue &amp; Early Career Researcher Event</b>	<b>Overview presentation (5 min) on Special Issue from 9th IASSC on 'New Horizons in Acid Sulfate Soils Research' in European Journal of Soil Science (EJSS). Followed by Networking and discussion targeted at Early Career Researchers on advice for publishing in EJSS (Dr Mark Farrell, CSIRO, Deputy Editor of EJSS &amp; Luke Mosley, Associate Editor of EJSS)</b>



**Day 3 – Wednesday 29th March – Mid-conference field trip 9am-5pm** – Garden Island, Gillman and St Kilda (refer field trip guide). Meet at 8:45am outside foyer of Hotel Grand Chancellor for bus departure at 9am sharp, return by 5pm.



**Conference dinner 6:30pm-10:30pm, Hotel Grand Chancellor.** The Pons Medal will be presented at the dinner.

**Keynote 5 – Dr David Dent: Coming of age; early acid sulphate soils knowledge and ASS management**

## Day 4 – Thursday 29th March

Time	Presenter	Presentation Title
9:00-9:45am	<b>Keynote 6</b> <b>Angelika Kolbl</b>	<b>Importance of mineral-organic matter interactions for remediation of acid sulfate soils by submergence and organic matter addition</b>
9:45-10:00am	Emily Leyden	Iron and sulfate reduction dynamics in coastal soils undergoing seawater inundation from sea level rise
10:00-10:30am	<b>Morning tea</b>	
10:30-10:45am	Rob Fitzpatrick	Acid sulfate soil change processes during wetting-drying cycles in peaty wetlands on Norfolk Island and impact of climate change
10:45-11:00am	Nicolaas Unland	Managing acid sulfate soil wetlands in a world of changing needs, values and climate
11:00-11:15am	Martin Rabenhorst	Impact of Water Halinity on the Occurrence of Hypersulfidic Materials in Estuarine Tidal Marsh Soils of Chesapeake Bay (USA)
11:15-11:30am	Phil Mulvey	Australian response to ASSs in regulating regional off-farm impacts is a template for measurably responding to climate change
11:30-11:45am	Vanessa Wong	Effect of inundation and lime amendments on greenhouse gas emissions from acid sulfate soils
11:45-12:00pm	Graham Lancaster	ASPAC Global Proficiency Testing, Acid Sulfate Soils Interlaboratory Testing Data and Analytical Methods for the National Guidelines
12:00-1:00pm	<b>Lunch</b>	
1:00-1:45pm	<b>Keynote 7</b> <b>Andrew Coward</b>	<b>How the zebra rock got its stripes: the formation of hematite banding from acid-sulfate fluid-rock interactions</b>
1:45-2:00pm	Chaolei Yuan	Effect of organic matter addition on cadmium and arsenic mobility in paddy soil
2:00-2:15pm	Andrew Grigg	Stability of jarosite in acid sulfate paddy soil from Central Thailand
2:15-2:30pm	Eko Hanudin	Interactive Effects of Nanozeolite and Ca-Humate in Alleviating Acidity and Al Toxicity of Sulfate Acid Soil from Segara Anakan Island, Indonesia
2:30-2:45pm	Anders Johnson	Survey of Swedish acid sulfate soils - microbiology
2:45-3:00pm	Li Bi	Unraveling the diversity and ecological roles of viruses in acid sulfate soil of Australia
3:00-3:30pm	<b>Afternoon tea</b>	
3:30-3:45pm	Leigh Sullivan	Behaviour of biogenic and geologic carbonates in disturbed sulfidic and sulfuric soil materials: particle size effects
3:45-4:00pm	Liubov Kononova	Effect of limestone amount and grain size on acid neutralization and metal release in dredged sulfide-bearing sediments: laboratory oxidation experiment
4:00-4:15pm	Ruby Hume	Monitoring lime application and movement using mid infrared spectroscopy
4:15-5:00pm	<b>Closing Addresses</b>	<b>Discussion on host country and lead for 10th International Acid Sulfate Soils Conference (2026/2027). Conference Closing Address.</b>

## List of Posters (alphabetical order by first author surname)

There will be a formal Poster Session between 12:30-1pm on Monday 27<sup>th</sup> with presenters to be available during this time. Posters will be displayed during the entire conference.

Surname	First name	Presentation Title
Boman	Anton	Does the water quality of stream waters reflect the predicted occurrence of Finnish acid sulfate soils?
Fitzpatrick	Rob	Optimization of sampling and laboratory approaches using chip-tray methods for improved assessment, classification and communication of acid sulfate soils
Mattbäck	Stefan	Finnish Acid Sulfate Soil Land Systems
Mayakaduwage	Sonia	Phosphorus Availability in Acid Sulfate Soils as affected by soil water content and P addition
Michael	Patrick	The importance of establishing terrestrial and aquatic plants to manage sulfuric and sulfidic soils under general soil use conditions
Michael	Patrick	The importance of establishing terrestrial and aquatic plants to manage sulfuric and sulfidic soils under varying soil moisture regimes
Rabenhorst	Martin	Measuring Pore Water Sulfide in in Benthic (Subaqueous) Soils using Indicator of Reduction In Soils (IRIS) Devices
Stiglingh	Andrea	Identification and Characterisation of Corrosive Soil Properties in Coastal Acid Sulfate Soils, for the Prediction of Buried Infrastructure Deterioration Risks.
Tan	Julie	Carbon Sequestration in Coastal Acid Sulfate Soils of Southern Australian Wetlands
Thomas	Brett	Acid Sulfate Soils in the Murray Darling Basin and river regulation
Wang	Meng	Acid sulfate soils in temperate coastal vegetation communities
Williams	Kristie	Changes in Acid Sulfate Soils Training Delivered by Queensland Government

## List of Abstracts

In the interests of sustainability, the abstract booklet (150 pages) is only available in electronic form. It can be downloaded from the conference webpage.

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