

Book of Abstracts

# **ASSSI-ASPAC-ACMS**

## **National Soils Conference**

*Soil Science Solving Problems*

The University of Adelaide  
December 2006

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Jointly convened by Australian Society of Soil Science Inc. and Australasian Soil & Plant Analysis Council Inc., in association with the Australian Clay Minerals Society.





**ASSSI – ASPAC – ACMS**

## **Abstracts and Programme**

*Soil Science Solving Problems*

## **NATIONAL SOILS CONFERENCE**

Jointly convened by  
The Australian Society of Soil Science Inc (ASSSI)  
The Australasian Soil and Plant Analysis Council (ASPAC)

In association with  
The Australian Clay Minerals Society (ACMS)

**3–7 December 2006**  
**University of Adelaide, South Australia**

Soil Science Solving Problems  
ASSSI–ASPAC–ACMS National Soils Conference  
3–7 December 2006, University of Adelaide

## CONFERENCE SPONSORS

### PLATINUM SPONSOR

*Healthy Soils for Sustainable Farms*  
Land & Water Australia



### OTHER SPONSORS

University of Adelaide  
CSIRO Land and Water  
SA Dept of Water, Land & Biodiversity Conservation  
SA Research & Development Institute  
ARRIS Pty Ltd

## WELCOME TO *Soil Science Solving Problems*

As soil scientists, we have a deep and passionate knowledge of soils and we are always keen to learn more about this wonderful matrix on which all life depends. Often, however, we face problems that challenge us to answer bigger questions than we are equipped to answer from our limited science. For example,

- How can we safely dispose of our waste-products on land?
- How can we equitably distribute our limited fresh-water resources among conflicting agricultural, industrial and urban demands?
- With the increasing occurrence of major droughts, which agricultural and environmental enterprises will we support, and in what parts of Australia will we support them?

We don't pretend to have the answers to such broad questions but I think you'll agree we have good soil science behind us to solve the problems bearing on these bigger issues.

The theme of this Conference is *Soil Science Solving Problems*. We gathered the joint intellectual resources of the Australian Society of Soil Science, the Australasian Soil & Plant Analysis Council, and the Australian Clay Minerals Society to advance our knowledge and apply it to help solve some of the many problems we are being asked to address. To help get the most out of this Conference, the Organising Committee scheduled the usual bevy of interesting oral presentations (along with terrific field and laboratory tours), but we are trying two new presentation-formats, as follows:

First, we have invited two high-profile speakers each morning to address us on a topic close to their hearts. We also invited the very talented Mrs Rebecca Lines-Kelly (plus a panel of scientists familiar with each topic) to facilitate an open forum with the Conference delegates immediately after the two morning presentations. A secretary (probably me) will record the key outcomes and post them on the ASSSI-ASPAC-ACMS websites. We hope you will feel motivated to engage in the open forums and that useful outcomes will arise from them.

Second, we departed somewhat from the rather tired format of multiple, concurrent, standard oral presentations. We were aware of the demand for orals (mainly from fund-managers), but we were painfully aware of the complaints from previous conference delegates about how annoying it is to have to choose one talk over another only to find the oral they chose to attend was cancelled or presented out of sequence. For this reason, we minimised the concurrent oral presentations and introduced the "oral poster". The "oral poster" allows authors to stand on a soapbox and give a short oral introduction to their poster. Immediately afterward they can meet with interested delegates to discuss the minutiae and to develop stronger links with new colleagues. Plenty of time is set aside for this activity with no concurrent activities scheduled, so if you, as an author of a poster, present your poster succinctly and clearly you will have a good result afterward. We are interested to hear your thoughts on how successful the "oral poster" was.

We are pleased to be your hosts at the University of Adelaide this week, and I would draw your attention to the long list of people acknowledged below who have worked with me to make this Conference a big success. In particular, we thank Land & Water Australia for their major sponsorship through the *Healthy Soils for Sustainable Farms* programme. We hope you enjoy this Conference and return to your daily activities with a renewed enthusiasm for *Soil Science Solving Problems*.

Dr Cameron D Grant, Conference Convenor  
University of Adelaide.

## ACKNOWLEDGEMENTS (ALPHABETICAL ORDER , MAINLY)

### Thank you to the Organizing Committee:

Dr Damien Adcock (University of Adelaide), Mr Adrian Beech (CSIRO Land & Water), Dr Jock Churchman (University of Adelaide), Dr Rob Fitzpatrick (CSIRO Land & Water), Dr Cameron Grant (University of Adelaide), Mr Brian Hughes (Rural Solutions SA), Mr Richard Merry (CSIRO Land & Water), Professor Mike McLaughlin (University of Adelaide / CSIRO Land & Water), Dr Ronald Smernik (University of Adelaide).

### Special thanks to those who helped raise funds for the conference:

Mr Jim Kelly (ARRIS Pty Ltd), Professor Mike McLaughlin (University of Adelaide / CSIRO Land & Water).

### Special thanks to those who sponsored the conference:

Land and Water Australia – Healthy Soils for Sustainable Farms (PLATINUM SPONSOR)  
University of Adelaide, CSIRO Land & Water, SA Dept of Water, Land & Biodiversity Conservation, SA Research & Development Institute, ARRIS Pty Ltd.

### Special thanks to the Key Note Speakers who volunteered their time and expertise:

Professor Alan Cooper (Australian Centre for Ancient DNA, University of Adelaide), Mr Richard MacEwan (Victorian Department of Primary Industries), Mr George Rayment (Queensland Department of Natural Resources, Mines & Energy), Professor Sally Smith (Centre for Plant Root Symbioses, University of Adelaide).

### Special thanks to Mrs Rebecca Lines-Kelly, NSW Agriculture (Open forum facilitator) and her “Expert Panels” who volunteered their time and expertise:

Professor Lyn Abbott (University of Western Australia), Dr Richard Doyle (University of Tasmania), Professor Bob Gilkes (University of Western Australia), Assoc. Professor Neal Menzies (University of Queensland + ASSSI President), Dr Kathy Ophel-Keller (SA Research & Development Institute), Dr Albert Rovira (SA-Coordinator ATSE Crawford Fund).

### Special thanks to those who entertained us (pub crawl, conference dinner):

Dr Damien Adcock (University of Adelaide), Professor Bob Gilkes (University of Western Australia), Dr Annie McNeill (University of Adelaide).

### Special thanks to those who organised or helped with the mid-conference tours:

Mr Adrian Beech (CSIRO Land & Water), Mr Dougal Currie (University of Adelaide), Dr Cameron Grant (University of Adelaide), Mr Brian Hughes (Rural Solutions SA), Dr Rai Kookana (CSIRO Land & Water), Dr Mike McCarthy (SA Research & Development Institute), Mr David Maschmedt (SA Dept of Water, Land & Biodiversity Conservation), Mr Daniel Smith (University of Adelaide), Dr Ronald Smernik (University of Adelaide), Mr David Woodard (Rural Solutions SA).

### Special thanks to those who organised the Post-conference tour:

Mr Glenn Bailey (Rural Solutions SA), Mr Andrew Beale (SA Dept of Water, Land & Biodiversity Conservation), Mr Adrian Beech (CSIRO Land & Water), Mr Graham Clothier (Woolumbool Studs), Mr Michael Durkay (University of Adelaide), Mr Greg Fisher (‘Clover Ridge’), Dr Rob Fitzpatrick (CSIRO Land & Water), Lucindale Area School, Camp Coorong, Mr Richard Merry (CSIRO Land & Water), Mr Stuart Sharman (Fosters/Southcorp), Dr Ronald Smernik (University of Adelaide), Mr Chris Williams (Coorong Dairies), Di Giorgio Wines (Connawarra), Mr Bernie Zarcinas (CSIRO Land & Water).

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Mrs Linda Bennison (Australian Society of Soil Science Inc), Mr Vladimir Kowaljenko (NT Dept B.I.R.D., Mr Phil Plevin and Erin Thomas (Plevin & Associates Event Management).

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## PROGRAMME OUTLINE

### Sunday 3<sup>rd</sup> December 2006

Registration  
Welcome reception  
CPSS Board meeting

### Monday 4<sup>th</sup> December 2006

Chair: Professor Roger Swift (*President IUSS, University of Queensland, Australia*)

Keynote Speaker No. 1: Mr George E. Rayment

Keynote Speaker No. 2: Dr Donald L. Suarez

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Robert J. Gilkes, Dr Richard B. Doyle.

Morning tea

Oral Session O1: Salinity & Salt-Affected Soils

*Chair: Dr Don Suarez (U.S. Salinity Laboratory USDA-ARS, USA)*

Oral Session O2: Spatial Patterns & GIS

*Chair: Mr Mark Thomas (CSIRO Land and Water, Australia)*

Oral Session O3A: Productivity & Sustainability

*Chair: Mr Richard J. MacEwan (VIC Department of Primary Industries, Australia)*

Lunch

Oral-Poster Session P3A: Productivity & Sustainability

*Chair: Dr Ann M. McNeill (University of Adelaide, Australia)*

Oral-Poster Session P4A: Soil Formation, Physical Degradation, Reclamation

*Chair: Dr Stephen R. Cattle (University of Sydney, Australia)*

Oral-Poster Session P2: Spatial Patterns & GIS

*Chair: Dr Ken G. Wetherby (KG and CV Wetherby Soil Survey Specialists, Australia)*

Oral-Poster Session P1: Salinity & Salt-Affected Soils

*Chair: Dr Richard J. Harper (Forest Products Commission, Australia)*

Oral-Poster Session P4B: Soil Formation, Physical Degradation, Reclamation

*Chair: Dr Damien Adcock (University of Adelaide, Australia)*

Afternoon tea

Oral Session O4: Soil Formation, Physical Degradation, Reclamation

*Chair: Mr Richard H. Merry (CSIRO Land and Water, Australia)*

Oral Session O5: Waste Disposal, Contaminated Soils & Their Reclamation

*Chair: Associate Prof. Neal W. Menzies (University of Queensland, Australia)*

Oral Session O3B: Productivity & Sustainability

*Chair: Mr David Davenport (SA Department of Primary Industries and Resources, Australia)*

ASSSI AGM

Educational pub crawl

### Tuesday 5<sup>th</sup> December 2006 (World Soils Day)

Field tour 1: Northern Adelaide Plains and Barossa Valley

Field tour 2: Waite Research Environs

Field tour 3: Social tour of the McLaren Vale wines region

### **Wednesday 6<sup>th</sup> December 2006**

Chair: Professor Mike McLaughlin (*University of Adelaide / CSIRO Land and Water, Australia*)

Keynote Speaker No. 3: Professor Sally E. Smith

Keynote Speaker No. 4: Professor Alan Cooper

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Lyn Abbott, Dr Kathy Ophel-Keller.

Morning tea

Oral Session O6: Acid-Sulphate Soils

*Chair: Dr Rob W. Fitzpatrick (CSIRO Land and Water, Australia)*

Oral Session O7: Across the Spectrum of Soil Science

*Chair: Associate Prof. David Chittleborough (University of Adelaide, Australia)*

Oral Session O8: Soil Biology (The Sally Smith Symposium)

*Chair: Professor F. Andrew Smith (University of Adelaide, Australia)*

Lunch

Oral-Poster Session P5: Soil Organic Matter

*Chair: Dr Ronald J. Smernik (University of Adelaide, Australia)*

Oral-Poster Session P6: Waste Disposal, Contaminated Soils & Their Reclamation

*Chair: Dr Rai S. Kookana (CSIRO Land and Water, Australia)*

Oral-Poster Session P7: Soil Biology (The Sally Smith Symposium)

*Chair: Dr Timothy R. Cavagnaro (University of California at Davis, USA)*

Oral-Poster Session P3B: Productivity & Sustainability

*Chair: Dr Richard B. Doyle (University of Tasmania, Australia)*

ASPAC programme

*Chair: Mr Brian Daly (Environmental Chemistry Laboratory of Landcare Research, New Zealand)*

LPC Overview / Update and Results

*Mr George E. Rayment (QLD Department of Natural Resources and Water, Australia)*

Operational Aspects of ASPAC Interlaboratory Proficiency Programs 2006–2007

*Mr Chris Ingram (Proficiency Services Ltd, New Zealand)*

The Enhanced ASPAC Web Site (to include a demo of laboratory proficiency details)

*Dr Roger Hill (Hill Laboratories, New Zealand)*

Fertcare Update

*Mr Nick Drew (Fertilizer Industry Federation of Australia, Australia)*

Quarantine/ Bio-Security Issues Forum

*Mr Greg King (Market Access & Plant Protection, Biosecurity Victoria, Australia)* to give a 10 minute presentation of new VIC regulations followed by comments from other states and New Zealand and discussion on how to improve

Afternoon tea

Oral Session O9: Mobile Soil Constituents

*Chair: Professor John L. Hutson (Flinders University, Australia)*

Oral Session O10: Soil Organic Matter

*Chair: Mr Brian W. Murphy (NSW Department of Natural Resources, Australia)*

ASPAC programme continued

*Chair: Mr Brian Hughes (Rural Solutions SA, Australia)*

Soil biological tests for the grains industry

*Professor Lyn Abbott (University of Western Australia, Australia)*

Using soil tests to assess environmental risks from phosphorus fertilisation

*Dr Phil Moody (Qld Department of Natural Resources and Water, Australia)*

ASPAC strategic planning, including follow-up on the Barossa Resolutions

*Facilitator: Dr Doug Reuter (Reuter & Associates P/L)*

ASPAC AGM

*Mr Vlad Kawaljenko (ASPAC Chairperson)*

Conference dinner (Society Awards)

**Thursday 7<sup>th</sup> December 2006**

Chair: Dr Jock Churchman (*University of Adelaide, Australia*)

Keynote Speaker No. 5: Mr Richard J. MacEwan

Keynote Speaker No. 6: Adjunct Professor Julian Cribb

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Albert Rovira, Associate Prof. Neal W. Menzies.

Morning tea

Oral Session O11: Clay Minerals

*Chair: Professor Robert J. Gilkes (University of Western Australia, Australia)*

Oral Session O12: Soils & Climate Change

*Chair: Dr Jeff Baldock (CSIRO Land and Water, Australia)*

Oral Session O13: Communication of Soil Science

*Chair: Mr Brian Hughes (Rural Solutions SA, Australia)*

Lunch

Oral-Poster Session P3C: Productivity & Sustainability

*Chair: Dr Lucy L. Burkitt (University of Tasmania, Australia)*

Oral-Poster Session P8A: Acid Sulphate Soils

*Chair: Dr Paul Shand (CSIRO Land and Water, Australia)*

Oral-Poster Session P9: Mobile Soil Constituents

*Chair: Dr Jock Churchman (University of Adelaide, Australia)*

Oral-Poster Session P10: Communication of Soil Science

*Chair: Mr Glenn Bailey (SA Department of Primary Industries and Resources, Australia)*

Oral-Poster Session P8B: Acid Sulphate Soils

*Chair: Dr Peter Slavich (NSW Department of Primary Industries, Australia)*

Oral-Poster Session P11: Soils & Climate Change

*Chair: Dr Warren S. Hicks (CSIRO Land and Water, Australia)*

Afternoon tea

Closing ceremonies (Conference Awards)

ACMS AGM

**Friday 8<sup>th</sup> – Sunday 10<sup>th</sup> December 2006**

Post-conference field trip to southeast of South Australia

Convenor: Mr Richard H. Merry (*CSIRO Land and Water, Australia*)

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## KEYNOTE ADDRESSES

### Monday 4<sup>th</sup> December 2006

Chair: Professor Roger Swift

Mr George E. Rayment, "*Problem Soils in Australia and How Soil Science is Helping to Solve Them*"

Dr Donald L. Suarez, "*New Considerations and Tools in the Management of Saline Soils and Waters*"

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Robert J. Gilkes, Dr Richard B. Doyle.

### Wednesday 6<sup>th</sup> December 2006.

Chair: Professor Mike McLaughlin

Professor Sally E. Smith, "*Intrigue, Subterfuge and Collaboration in the Underground*"

Professor Alan Cooper "*Long-Term Genetic Records in Soils: Recording the Effects of Environmental Change*"

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Lyn Abbott, Dr Kathy Ophel-Keller.

### Thursday 7<sup>th</sup> December 2006

Chair: Dr Jock Churchman

Mr Richard J. MacEwan, "*Visualising Soils and Landscapes*"

Adjunct Professor Julian Cribb, "*Can Australian soil science save the world?*"

Facilitator: Mrs Rebecca Lines-Kelly

Expert Panel: Professor Albert Rovira, Associate Prof. Neal W. Menzies.