# Combined Australian Regolith Geoscientists Association and Australian Clay Minerals Society Conference 7-10 February 2012

# Program

# **Tuesday 7 Feb**

Session 1: C	hair: Lisa Worrall	
8.15 AM	Opening	
8:30 AM	Keynote: J Bowler Reconstructing hydrologic change: messages from the Murray Basin	1
9:00 AM	<u>S Mclennan</u> , S Hill and K Barovich Some regolith and landscape evolution highlights from the Murray Basin's Loxton Parilla sands	3
9:20 AM	<u>A McPherson</u> , D Clark, M Cupper, CDN Collins and G Nelson The Cadell Fault: a record of long-term fault behaviour in south-eastern Australia	7
9:40 AM	<u>JL Keeling</u> , AJ Mauger, T Wilson and MD Raven Diagenetic clay mineral distribution in Mesoproterozoic sandstones of the Cariewerloo Basin, South Australia – implications for uranium mobilisation	17
10:00 AM	P Mulvey Hadean/Archean regolith formation is the key to Archean geomorphology and geology	
10:20 AM	Morning Tea - Posters	
POSTERS-	on display throughout Conference with discussion at lunch and morning and afternoon teas	
Reg	<b>Thomas, J Wilford and T Cudahy</b> olith expression and character of ore deposits and potential for remote sensing lications	23
	ick, MD Raven and PG Self ag forensics to inspire the next generation of regolith, soil and clay scientists	25
	A Ayoko, RL Frost and SJ Couperthwaite thesis and characterisation of organo-beidellite	29
	, H King How and C Siang Piao dification of halloysite nanotubes with glycidyl methacrylate	33
	ng airborne electromagnetic data for regional stratigraphic and landscape evolution lies, Murray Basin, South Australia	37
· · · · · · · · · · · · · · · · · · ·	<b>5 Kulasegaram, WP Gates, TW Turney, A Patti and W Daoud</b> dification of clay liners to improve barrier capabilities for hypersaline leachates	41

# Session 2: Chair: Will Gates

10.40 AM	Keynote: <u>SA Wilson</u> and DL Bish Stability of Mg-sulphate minerals in the presence of smectites: Possible mineralogical controls on H <sub>2</sub> O and nutrient cycling on Mars	43
11:10 AM	<u>G Taylor</u> and RA Eggleton All pisolithic Bauxite deposits are transported – Really?	47
11:30 AM	<b>RA Eggleton and <u>G Taylor</u></b> Glassy (Al,Fe) <sub>2</sub> O <sub>3</sub> in bauxites from the Southern Highlands of NSW	51
11:40 AM	<u>R Gilkes</u> , S Tawornpruek and N Prakongkep Corundum and hercynite in Bauxite from South Western Australia	57
12:00 PM	<u>CT Henry</u> , MV Fey and MP Dobrowolski Synthesis and characterisation of hydrotalcite from bauxite residue liquor and magnesium nitrate	63
12:20 PM	Lunch - Posters	
Session 3: C	Chair: Jock Churchman	
1:20 PM	Keynote: AJ Mason The development of the later stages of the Murray Basin and the development of the smectite (bentonite) clays	67
1:50 PM	<u>WP Gates</u> , Y Liu, R Martand Singh, and A Bouazza Improving the swell index and fluid loss methods for compatibility testing of Bentonites	69
2:10 PM	<u>Y Liu</u> , WP Gates and A Bouazza Effectiveness of polymers on improving the fluid loss of Bentonite used in geosynthetic clay liners	75
2:30 PM	<u>Y Park</u> , GA Ayoko, and RL Frost Thermal analysis of organoclays and application for water purification	79
2:50 PM	<u>FL Theiss</u> , MJ Sear-Hall, SJ Couperthwaite, GA Ayoko, and RL Frost Layered double hydroxides as iodine sorbents	83
3:10 PM	<u>LP Aldridge</u> , WP Gates, HN Bordallo and GJ Churchman Water mobility in smectite	87
3:30 PM	Afternoon Tea - ''The Hope Factor'' book promotion	

Session 4:	Chair: Richard Cresswell	
4:00 PM	Keynote: <u>MD Raven</u> and PG Self Winning the 5th International Reynolds Cup Quantitative Mineralogy Competition	91
4:30 PM	<b><u>B Pillans</u>, P Simmonds, W Hitchcock and B Alloway</b> Tektites, minitektites and microtektites from the Kalgoorlie region, Western Australia	95
4:50 PM	<u>M Thomas, T Cudahy and M Cacetta</u> Recent developments in ASTER Geoscience products for Australia	99
5:10 PM	<b>B Fritz, C Noguera, A Clement and <u>H Zwingmann</u> Illite authigenesis - new constrains on fundamental clay crystallization processes using the NANOKIN code</b>	103
5:30 PM	MS Żbik , RL Frost, Y-F Song and C-C Wang Synchrotron based Transmission x-ray microscopy reveals smectite fine structure in an aqueous environment	105
5:50 PM	ACMS AGM	

#### Wednesday 8 Feb

#### Mid-Conference field trip to Lake Mungo and Arumpo Bentonite mine operations

6:45 AM	Depart Mildura (in front of Arumpo Bentonite Offices on Deakin street – same block as conference venue)
8:15 AM	Mungo National Park tour
12:15 PM	Lunch at Mungo Lodge
2:00 PM	Arumpo Bentonite mine
4:00 PM	Depart for Mildura
5:30 PM	Arrive Mildura (in front of Arumpo Bentonite offices on Deakin Street)

Dress should be suitable for a day in the sun: good shade-producing hat, long-sleeved shirt, long pants, sturdy shoes and sun cream

### **Conference Dinner**

6:30 to 6:45 PM For departure from Mildura wharf

Return to Mildura wharf approximately 10:30 PM

The Conference Dinner will be a leisurely sunset cruise along the River Murray on the <u>PV Rothbury</u>. Dinner will be carvery style with drinks available at the bar.

After dinner Tony Hope will present his recollections on the topic of "Exploration successes under cover in the Murray basin: The Arumpo bentonite and Ginkgo heavy mineral deposits."

# Thursday 9 Feb

Session 5:	Chair: Balwant Singh	
8:30 AM	<b>Keynote: MJ Kennedy</b> Are clay minerals a fundamental biogeochemical regulator of the Biosphere at Earth system scales	111
9:00 AM	SC Löhr, MJ Kennedy, J Brugger and B Etschmann The role of mineral surfaces in the preservation and transformation of organic carbon: meso- to nano– scale spatial complexity of organic matter forms in organic-rich shales	113
9:20 AM	GJ Churchman, AD Noble and DJ Chittleborough Additions of clays and clay minerals to enhance the sequestration of Carbon in soils	117
9:40AM	<ul> <li><u>Y-T Huang</u>, GJ Churchman, DJ Lowe, NJ Rawlence, L Schipper and A Cooper</li> <li>Evaluating the character and preservation of DNA within allophane clusters (microaggregates) in buried soils on Holocene tephras, northern New Zealand</li> </ul>	121
10:00 AM	<b><u>E Yusiharni</u> and R Gilkes</b> The forms of plant nutrient elements in Australian native plant ash derived from several species and the incubation effects on soil	125
10:20 AM	Morning tea - Posters	
Session 6:	Chair: Keith Scott	
10.40 AM	Keynote: <u>DJ Gray</u> , RRP Noble and N Reid Advances in understanding regional hydrogeochemical patterns in Australia	129
11:10AM	<u>P Shand</u> , AJ Love, T Gotch, MD Raven and S Priestley Extreme acidic environments associated with carbonate Mound Springs: the western Great Artesian Basin	133
11:30AM	I Bibi, <u>B Singh</u> and E Silvester Dissolution of clay sediments in acid-sulfate systems	137
11:50AM	<u>V Wong</u> , SG Johnston, ED Burton, RT Bush, LA Sullivan, PG Slavich Will sea-level rise solve our coastal acid sulfate soil issues?	143
12:10PM	ARGA AGM	

12:40PM Lunch - Posters

## Thursday 9 Feb (continued)

#### Session 7: Chair: John Keeling

1:30PM	<u>RW Fitzpatrick</u> , MD Raven, PG Self, P Shand, L Mosley, S Simpson and A Baker	
	Occurrence, genesis and environmental significance of schwertmannite in re- flooded Acid Sulfate Soils in the Lower Murray Reclaimed Irrigation Area	147
1:50PM	I Bibi, <u>B Singh</u> and E Silvester Inland wetlands with sulfidic sediments provide ideal conditions for Akaganéite formation	153
2:10PM	<u>A Marchuk</u> and P Rengasamy The nature of clay-cation association dictates clay behaviour in aqueous suspensions	155
2:30 PM	<u>S Marchuk</u> , P Rengasamy and GJ Churchman Cation exchange as influenced by the type of cations in different clay minerals	159
2:50PM	<b>B Newman</b> River Murray salinity management and irrigation	163
3: 10PM	<b>R Cresswell</b> Banrock, Bockpurnong and Chowilla - approaches to management of the Murray River water quality	
3:30 PM	Closing remarks	
3:40 PM	Afternoon Tea	

#### Friday 10 Feb

### Post-Conference field trip to the Murray Riverland

7:00 AM Depart Mildura (from Quality Grand Mildura Hotel)
9:00 AM Chowilla Floodplain
12:00 PM Banrock Station wetlands and lunch
2:00 PM Bookpurnong Salt Interception Scheme
6:00 PM Arrive Mildura

Dress should be suitable for a day in the sun: good shade-producing hat, long-sleeved shirt, long pants, sturdy shoes and sun cream

Notes