



The Queensland Geologist

Bi-monthly Newsletter of the Geological Society of Australia Inc. Queensland Division
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INSIDE THIS ISSUE:

- **2007 GSAQ-AIG Field Conference & Guidebook**
- **GSAQ Medal citations**
- **New members**

IMPORTANT DATES:

Wednesday 22 August: GSAQ Seminar:

- Topic:** Stratigraphic complexity in a coastal plain: the potential influence of a hidden palaeovalley on groundwater resourcing and environmental management in Southeast Queensland
- Speaker:** Jonathan Hodgkinson, School of Natural Resource Sciences, QUT
- Where:** The Theodore Club, 333 Adelaide Street, BRISBANE
- Time:** 5:15 for 6pm; finger food and cash bar
- Cost:** \$6 Members, \$8 Non-member, Students, \$2. Finger food & drinks

Abstract:

Buried palaeovalleys influence the stratigraphic architecture in both the coastal plain and in proximal sub-aqueous depositional systems. The geometry of the valley and the nature of the sedimentary fill are controlled by changes in relative sea-level, basin physiography and bedrock lithology. The stratigraphy in palaeovalleys typically consists of a mixed succession of fluvio-deltaic, estuarine and shoreface deposits, the composition of which is controlled by the balance between sediments derived from hinterland drainage systems and longshore drift.

A number of buried palaeovalley drainage systems have been revealed in the coastal plains of southeast Queensland from the analysis of geophysical and drill log data. The stratigraphic architecture common to these valleys consists of basal fluvio-deltaic gravel and sand overlain by clay rich estuarine or floodplain deposits. The top of the succession consists of a mixture of strandplain sediments and tidal sand and mud flats. In hydrogeological terms these depositional systems produce dual aquifer systems. Confined or semi-confined groundwater is trapped below the estuarine and floodplain deposits, and unconfined groundwater is hosted by the overlying strandplains and tidal sand and mud flats. The Elimbah Palaeovalley is presented as a case study to illustrate the delicate state of equilibrium in which these systems exist.

Many of the confined and semi-confined aquifers are hyper-saline, whereas the unconfined groundwater is typically fresh. Interaction between the two systems can be complex. Limited mixing of groundwater between the two aquifers is controlled by lithological heterogeneity and density dependent fluid flow. The deeper hyper-saline groundwater often carries very high concentrations of minor and trace elements in solution. Sub-artesian density driven hydraulic gradients force a proportion of the hyper-saline groundwater through semi-confining layers in the Elimbah Palaeovalley system. This results in degradation of fresh groundwater quality in the overlying unconfined aquifers. The Elimbah Palaeovalley passes ocean-ward beneath Bribie Island, which has been used as a municipal water supply for many years. The hyper-saline groundwater stored in the coastal plain is prevented from contaminating the Bribie groundwater by the presence of low flow variable fluid density zones.

Proposals for future urban and industrial development in the coastal zone have the potential to disturb these delicate systems. The widespread up-welling of contaminant laden hyper-saline groundwater induced by anthropogenic activity has serious ramifications for shallow groundwater quality. The release of high quantities of aqueous iron in particular could cause damage to the local environmental balance. There are also implications for human health linked to toxic algal blooms which proliferate in the presence of abundant iron in Moreton Bay.

10-12 September 2007: The Bicentennial Conference of the Geological Society of London (the world's oldest national scientific and professional society for Earth scientists is 200 years old this year)

Where: QEII Conference Centre, London

Theme: Earth Sciences in the Service of Society Four parallel oral sessions over two days and a plenary session on Day 3 will feature invited speakers, all international leaders in their fields, reporting on the state of the science across four broad themes. A series of pre- and post-conference excursions will visit many of the most important geological sites of the British Isles.

Registration now open. website <http://www.geolsoc.org.uk>

20-21 September 2007: Mines & Wines Conference

Where: Orange, NSW

Theme: Including exploration case history presentations from Qld & other states.

For further details visit website www.smedg.org.au

26 September 2007: GSAQ Seminar & Dorothy Hill Medal presentation

Topic: Neoproterozoic to Early Palaeozoic Thomson Fold Belt of central and north Queensland: the Adelaidean-Delamerian connection and extensional-contractional history

Speaker: Chris Fergusson, School of Earth and Environmental Sciences, University of Wollongong

Where: The Theodore Club, 333 Adelaide Street, BRISBANE

Time: 5:15 for 6pm; finger food and cash bar

Cost: \$6 Members, \$8 Non-member, Students, \$2. Finger food & drinks

Abstract:

The Neoproterozoic to Early Palaeozoic Thomson Fold Belt is exposed in the Charters Towers Province of north Queensland, the Anakie Inlier of central Queensland and is widespread basement to sedimentary basins extending through central and southern Queensland into northern New South Wales and towards the South Australian border where equivalent rocks occur in the Warburton Basin of northeastern South Australia. SHRIMP U–Pb detrital zircon ages in metamorphosed siliciclastic successions in the Charters Towers Province and Anakie Inlier have been used to identify two major successions. The older succession is of probable Late Neoproterozoic age and is considered part of a passive margin associated with rifting at ca 600 Ma. Most detrital zircons have ages in the range 1000–1300 Ma and were probably derived from an extension of a Late Mesoproterozoic (1050–1200 Ma) orogenic belt from the central Australian Musgrave Complex located 1500 km to the west. The younger succession is of Early Palaeozoic age and contains the distinctive 500–600 Ma detrital zircon signature. These ages indicate correlation of the Thomson Fold Belt successions with late Neoproterozoic and Cambrian successions of the Adelaide Fold Belt.

SHRIMP U–Pb zircon ages of deformed and weakly deformed granite in the Argentine Metamorphics of the Charters Towers Province and the western Greenvale Province indicate deformation at 490 to 460 Ma. In the southern Anakie Inlier, K–Ar ages recorded metamorphic cooling at 500 Ma. These ages support a Delamerian to late Delamerian age for deformation and metamorphism in the Thomson Fold Belt and confirm that the belt is a northern extension of the Ross-Delamerian orogenic belt that formed along the Pacific active margin of Gondwana. A feature of the metamorphic complexes of the Thomson Fold Belt has been development of intense foliation, usually interpreted as having formed with a subhorizontal orientation although in many areas the foliation has been subsequently steepened by later contractional folding. In the Cape River Metamorphics of the southwestern Charters Towers Province, a metamorphic progression occurs from medium to high-grade rocks with increasing structural depth in the unit and is consistent with an extensional setting for formation of the foliation-producing deformation. In contrast, recent work (Robin Offler and Glen Phillips in collaboration with the author and Tim Green) indicates crustal thickening accompanied formation of the main flat-lying foliation in the southern Anakie Inlier. The regional history has been interpreted to indicate an alternation of contractional and extensional

events and these observations raise the possibility that syn-metamorphic deformation in the Thomson Fold Belt reflected synchronous contractional and extensional deformation.

Special thanks go to my collaborators Bob Henderson, Ian Withnall and Mark Fanning.

22-25 September 2008: Australian Earth Sciences Convention (including the 19th AGC) Where: Perth

This conference will be a joint event with the Australian Institute of Geoscientists (AIG). The committee has appointed the PCO and expect to soon start advertising more detailed information. The committee is seeking input from members and specialist groups who would like to run a session or present a hot topic. The conference will occur during the International Year of Planet Earth. If you want to know more please email AESC2008@gsa.org.au

2007 GSAQ-AIG Field Conference: Cracow, Mt Rawdon, Kilkivan and Gympie, SE Queensland

GSAQ and the Australian Institute of Geoscientists ran a very successful three-day field conference from the 23rd to 25th June 2007. The trip was well attended by geologists from academia, industry and government, keen to gain and exchange knowledge on the geology of the northern New England Orogen. The group visited surface mining operations of the Mount Rawdon and Cracow gold mines, and inspected core at the historic Shamrock gold mine near Kilkivan.

New publication: 2007 Field Conference Guide

For further details visit the 'Publications' section of the GSAQ website www.qld.gsa.org.au

Acknowledgements:

The committee wishes to thank the Geological Survey of Queensland (Department of Mines and Energy) for logistical support, and Newcrest Mining Limited (Cracow), Equigold NL (Mount Rawdon) and D'Aguilar Gold (Shamrock) who permitted access to their mines and operations.

The GSAQ Awards night, University of Queensland

GSAQ held their Annual Medals Presentation Night on Wednesday 23 May. Lesley Blight was awarded the GSAQ Neville Stevens Medal for 2007. The Neville Stevens Medal recognises contributions to the geological community and promotion of public awareness of Earth Sciences in Queensland. Chris Fergusson is the Dorothy Hill Medal winner for 2007. The Dorothy Hill Medal is awarded for significant contributions to the advancement of knowledge on Queensland geology through publication of original research. The Dorothy Hill Medal presentation will take place on **Wednesday 26 September** at The Theodore Club, 333 Adelaide Street, BRISBANE. All welcome.

GSAQ Medal citations

Dorothy Hill Medal 2007: Chris Fergusson (School of Earth and Environmental Sciences, University of Wollongong)

Chris Fergusson first established an interest in regional geology and tectonics through research as a graduate student at the University of New England in which he developed new understanding of subduction complex processes and facies based on rocks of the Coffs Harbour block within the Tablelands Complex of eastern New South Wales. This led to the recognition, and a much improved understanding, of Late Palaeozoic subduction complex terranes in the southern New England Orogen in general, including those represented in Queensland. Such research led directly to investigation of coastal tracts of the northern New England Orogen of central Queensland, work undertaken in collaboration with Evan Leitch and Bob Henderson. In particular it resulted in the sedimentary, structural, and metamorphic characterization of the Shoalwater and Wandilla terranes and improved

understanding of these and adjoining assemblages within the broad-scale fabric of the northern New England Orogen. An important contribution to the structure of the folded zone of the Bowen Basin and of Permian rocks within the Gogango Overfolded Zone also resulted from investigation of the northern New England Orogen, and research on the Campwyn terrane, in collaboration with Bob Henderson and John Wright, assisted in characterizing and understanding what had previously been a poorly known element of Queensland geology. In recent years Chris, assisted by a range of collaborators, has made great progress in understanding the nature and significance of metamorphic terranes in north-eastern Queensland including the Anakie Inlier, assemblages of the Townville hinterland within the Charters Towers Province and the eastern part of the Georgetown Inlier. This work, now just reaching the stage of publication, has led to a much improved understanding of the Neoproterozoic – Cambrian tectonic setting of the Queensland sector of the Tasman Orogenic Zone, and the recognition of an important Early Ordovician extensional phase in its tectonic history. Besides these direct contributions to Queensland geology, Chris has made a major contribution to understanding of the Lachlan Fold Belt within the New South Wales sector of the Tasman Orogenic Zone, work that has direct implications for the large scale interpretation of crustal fabrics in the eastern part of Queensland.

Neville Stevens Medal 2007: Lesley Blight (Graphical Services Unit, Geological Survey of Queensland)

'A picture is worth a thousand words', and back in 2002 and 2003, when the Queensland Division were trying to get good quality versions of the Rocks & Landscapes Notes onto the webpage, Lesley provided high quality and timely cartographical aid in converting hard copy images into digital copies to be used in PDF versions of the old Notes.

Although the pamphlets would not have been possible without the various geologists writing up their observations, it is also true that without clear, high-quality diagrams to illustrate the explanations within the text, then the appeal of these notes to the public would be diminished. Without Lesley providing her services for free, it would have been a longer, more costly experience to get these notes onto the internet.

Also, given the high levels of traffic that the GSAQ webpage has experienced at times it is obvious that these pamphlets have proven popular with the public. Without Lesley's help, the Queensland Division's role in educating the public about the geology of our state would have been undermined.

New Members

#100953	Michael PICK	Student Member
#100958	Jared GLASBY	Student Member
#100963	Neill A KITE	Student Member
#100974	Terrence BEATTIE	Student Member
#100996	Nicholas GORDON	Ordinary Member
#101000	Ian PARKER	Ordinary Member
#101008	Michael ARCHER	Student Member
#101009	Helen WOOD	Student Member

Membership renewals

Another gentle reminder to renew your membership (if you have not already done so).



If you haven't been receiving TAG or AJES lately, perhaps you forgot to renew and you have become un-financial. Therefore, now is the time to renew your membership. (**Note: to make sure you stay in touch and to subtly remind you, the Queensland Division will continue to send the electronic version of the newsletter for at least another 12 months**).

The **login members** area on the GSA website will now take you to a secure site linked to the GSA database where you can browse your membership details, make a payment online or view the Member Register electronically.

Mines & Wines

A vintage year for the Tasmanides

2007

20 to 21 September 2007, Orange NSW

Mines & Wines Conference for 2007 will be held in Orange from September 20 to 21.

Pre-conference Mine Tours, Workshops and a post-conference Wine Appreciation Excursion.

Technical presentations by prominent explorationists will feature case histories on new exploration activity from New South Wales, Queensland, Victoria and Tasmania.

REGISTER
EARLY BIRD
NOW!

"Conference social events will highlight Orange district wine and food!"

"WORKSHOPS"

Workshop 1 (18th Sept)
Building Earth Science Databases
or
Workshop 2 (18th Sept)
Porphyry Copper/
High Sulphidation Deposits,
A geological perspective

***Mine Tour** (19th Sept)
Wine Tour (22nd Sept)

For further details visit www.smedg.org.au

An event jointly organised by NSW DPI Minerals, Australian Institute of Geoscientists (AIG) and Sydney Mineral Exploration Discussion Group (SMEDG) *Limited numbers



**THE INTERNATIONALLY RENOWNED
INFORMAL WEEKLY GET-TOGETHER FOR EXPLORERS AND MINERS
UNION JACK'S ALE HOUSE –**

English, Irish, Scottish & Welsh Pub - 127 Charlotte St, Brisbane CBD 5.30pm
on every Wednesday evening if your work/spouse/budget/health allows

Queensland Committee 2006-2007

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