

# THE VICTORIAN GEOLOGIST

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THE GEOLOGICAL SOCIETY OF AUSTRALIA

July 2015

Victoria Division

General Meeting

**Thursday 30th July at 6:15 p.m.**

## **Student Night**

**Yu-Chen Ling**

**Biogeochemistry, The University of Melbourne**

**Hamed Aghaei**

**Petroleum geology, Monash University**

**Vhairi Mackintosh**

**Thermochronology, The University of Melbourne**

**Fritz Loewe Theatre, School of Earth Sciences, University of Melbourne**

Talk will be preceded by drinks from 5:30 pm in the 4th floor tearoom, cost \$2;  
and followed by pizza, FREE.

Students who have been sponsored by the GSAV in the past year to attend conferences will be presenting an aspect of their research. All speakers are PhD candidates or recent graduates at their respective universities.

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**STUDENT ABSTRACTS AND BIOS****Yu-Chen Ling**

*Yu-Chen is a Ph.D. student in University of Melbourne, who plans to submit her thesis in September 2015. She was supported by the GSAV attend the 15th ISME (International Symposium on Microbial Ecology) Conference, where she presented her research, which was also published in **Frontiers in Microbiology**.*

**Microbial community dynamics in a coastal acid sulfate soil system, East Trinity wetlands, Australia**

Coastal acid sulfate soils (CASS) systems cause soil acidification and heavy metal contaminations, which has cost the Australian government \$10 billion worth of legacy impacts. Tidal inundation treatment, as a cost effective remediation compared to lime treatment, has been proven to remediate acidity and decrease heavy metals in a CASS system. Microbial reductions contribute to more than 50% of the acid remediation during tidal inundation remediation, but limited knowledge about microbial distribution and activity hinder long-term efficacy evaluation. This work used 16s rRNA genes to investigate how microorganisms are distributed in a tidal inundation-treated coastal acid sulfate soils (CASS) system. The results showed environmental parameters such as pH, Eh, water saturation, organic content, and mineral deposition played important roles in microbial biogeography in the CASS system.

**Hamed Aghaei**

*Hamed graduated with a Bachelor of Petroleum Exploration Engineering from Petroleum University of Technology, Abadan/Ahwaz, Iran (2002-2006), and a Masters degree in the same field from Amirkabir University of Technology, Tehran, Iran (2008). He also has one year experience of lecturing several Petroleum Engineering courses at Azad University, Iran (2009-2010). Hamed came to Australia in September 2010 and graduated recently with a PhD in Petroleum Geoscience from Monash University.*

**Stratigraphic reconstruction of the Strzelecki Group outcrops in west Gippsland based on vitrinite reflectance and palynology analyses; new ideas on the amount of erosion and present day thickness**

The Strzelecki Group is the oldest Mesozoic formation within the Gippsland Basin and mainly consists of interbedded mudstones, sandstones and thin coal beds. This group forms the economic basement in the eastern, oil and gas rich part of the basin, but is exposed in the west and forms spectacular outcrops, especially along the coastal area between San Remo and Inverloch in west Gippsland.

Questions still exist regarding the present day thickness of this group in west Gippsland and the amount of erosion that occurred during Late Cretaceous uplift. In order to address these, the outcrops were mapped and logged in detail, and carbonaceous sediments were sampled and analysed for vitrinite reflectance (VR) and palynology. Because the area is highly faulted it

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## STUDENT ABSTRACTS AND BIOS

was not always possible to match stratigraphic sections in different fault blocks based only on lithology. This was largely achieved by using a combination of VR, using an Early Cretaceous geothermal gradient of 50 °C/km, and the results of palynology determinations.

Although no sediment section greater than 200 m thick is exposed in any one fault block, a total thickness of 1000 m is inferred to be exposed between Harmers Haven and Inverloch. However, because of the amount of faulting and probable repeated sections, the true thickness of upper Strzelecki Group exposed in the coastal outcrops is only about 300 m. This compares closely with the maximum thickness of about 400 m encountered in eight drill holes that penetrated to Palaeozoic basement in the eastern Wonthaggi coalfield.

Based on palynology results, the reconstructed Strzelecki Group stratigraphic column has been classified into three distinct "bio-blocks", with a range of eroded section from 1.4 km (0.3-2.6 km at  $\pm 95\%$  confidence limits) to 2.6 km (2.2-3 km at  $\pm 95\%$  confidence limits) modified from extrapolation of estimated palaeogeothermal gradient into an assumed palaeosurface temperature of 15 °C. Moreover, comparison of the estimated amount of erosion based on extrapolation of measured VR value into a palaeosurface VR of 0.2% shows reduction of this method's precision with raising thickness of vertical sections.

### Vhairi Mackintosh

*Vhairi is a second year PhD candidate in the Thermochronology group within the School of Earth Sciences at the University of Melbourne. She completed a Bachelors of Science with first class honours in Earth Science from the University of Glasgow.*

#### **Phanerozoic evolution of the Zimbabwe Craton: a low-temperature thermochronology study**

Thermochronology systems provide an invaluable toolkit for deciphering the Phanerozoic history of cratons that is often undetectable in the field. The strength of these systems lie in their ability to quantitatively record the thermal signals of upper crustal rocks in response to processes operating over geological time scales, such as burial and exhumation, distal plate boundary reorganisations and dynamic mantle flow. The Zimbabwe craton is one such setting where the Phanerozoic record is largely unresolved and thermochronology studies are considerably lacking. The few studies that are available are restricted to the temperature range, corresponding crustal depths and thus the time period, applicable to the technique used, i.e. apatite fission track thermochronology. In this study, the combined use of multiple thermochronometers will be employed to unravel a significant portion of the unexplored Phanerozoic history of the Zimbabwe craton. This research will present the first apatite and zircon (U-Th)/He ages in an attempt to constrain the younger and older thermo-tectonic evolution of the craton than that currently available from the existing apatite fission track data. Initial results show that the combined thermochronology data generate thermal histories that have important implications on past cooling, exhumation and possible surface uplift events in the late Phanerozoic evolution of the Zimbabwe Craton.

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**CONGRATULATIONS SUSAN WHITE, OAM**

We would like to congratulate **Dr Susan White**, who was awarded a **Medal of the Order of Australia (OAM)** in this year's Queen's Birthday Honours, in recognition of her "service to science, particularly to speleology, and to youth".

Susan obtained B.A. (1965), Dip. Ed. (1966), B.Sc. (1977) degrees from the University of Melbourne with majors in Geography, History and Geology. These were followed by a M.Sc. in Geography (Melb) (1984) and a Ph.D. at LaTrobe in Earth Sciences in 2005, with a thesis titled *Karst and Landscape Evolution in parts of the Gambier Karst Province, Southeast South Australia and Western Victoria, Australia*. Susan is currently a Lecturer in Environmental Geoscience, School of Life Sciences, College of Science, Health and Engineering, La Trobe University.

Susan's main research interests are landscape evolution and karst geomorphology and hydrogeology. Her involvement in speleology includes being a member since 1967 of the Victorian Speleological Association (and President, 2010-12), a member since 1988 of the Australasian Cave and Karst Management Association, a member since 1962 of the Melbourne University Mountaineering Club (who have recognised her with Honourary Life Membership), a Joint Editor of *Helictite* since 1998 and a member of the Caves Advisory Committee, Parks Victoria, since 2010.

Also having a broader interest in geology and a strong interest in geological heritage and conservation, Susan has been a member for many years of the Geological Society of Australia, the Australian and New Zealand Geomorphology Group and the Australian Quaternary Association. Her involvement in GSA includes being Convenor of the Federal Standing Committee for Geological Heritage (2004-10) and of the Geological Heritage Committee, Victorian Division GSA, since 1995.

Being a Guide Leader for over fifty years, Susan has held many positions of responsibility with Girl Guides Victoria and remains active in multiple divisions across Victoria. Girl Guides Australia have honoured her dedication with a 50-year Long Service Award.

**CONGRATULATIONS!****CONGRATULATIONS SUSAN WHITE, OAM**

The GSA June meeting was not, as usual, at the University of Melbourne, but in the city at the Chinese Museum. The guided tour of museum concentrated on the lower level where the special exhibition opened our eyes to the experience of Chinese people on the 19th century Victorian goldfields, but we did finish up on one of the upper levels with more modern information about the Chinese community in Victoria. Sophie, our very knowledgeable tour guide, enthusiastically explained various aspects of the areas of Guangdong where most of the miners came from and their experiences on the Victorian goldfields. The displays were very interesting and we were able to see cultural aspects of living on the goldfields as well as the mining technologies used. Several misinterpretations of Chinese mining techniques were discussed.

The Chinese Museum is located at 22 Cohen Place, a lane off Little Bourke St. The museum is open daily, 10 am – 5 pm. Guided tours are available (booking required) and are a really worthwhile city based activity with a geological flavour.

Many of us ended up at a nearby dumpling restaurant as a great finish to an interesting evening.  
*By Susan White*

## AUSTRALIAN EARTH SCIENCES CONVENTION NEWS



Uncover Earth's Past to  
Discover Our Future

26 - 30 June 2016 – Adelaide Convention Centre

[aesc2016.gsa.org.au](http://aesc2016.gsa.org.au)

### Call for AESC theme and session suggestions

An exciting series of themes, symposia, fieldtrips and workshops is being put together by the AESC 2016 Organising Committee.



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A preliminary taste of what is to come and who to contact if you want to make suggestions is outlined below.

- Earth's Environment** – Past to Present
- Tectonics of the Earth and Other Planets** – Craton and Continental Formation and Evolution, Ocean Plate Tectonics, Plate Margin and Plate Interior Tectonism
- Deep Earth Geodynamics** – Core, Asthenosphere and Lithosphere Dynamics, Coupling the Dynamic Deep Earth with Surface Tectonics
- Mineral Endowment** – Formation and Exploration of Mineral Deposits, their Tectonic and Geochemical Environment and Significance
- Geoscience for Society** – Geotourism, Education, Integration and Translation of Earth Sciences for Societal Benefit, Open the Gate, Geoscience and Community Engagement
- The Earth Science of Energy** – From Hydrocarbons to Hot Rocks

### Committee

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#### POSTER ENQUIRIES:

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**PHOTO:** Pleistocene sediments of the Hindmarsh Clay (red) and unconformably overlying Bridgewater Formation (white) in cliff exposures at Balgowan, Yorke Peninsula, South Australia. Photo courtesy of Caroline Forbes

[www.aesc2016.gsa.org.au](http://www.aesc2016.gsa.org.au)

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**STUDENT FUNDING OPPORTUNITIES****Geological Society of Australia (Victoria Division) Student Research Scholarships**

The scholarship is valued at up to \$500 for travel within Australia and \$700 for travel outside of Australia. The number of and value of the scholarships awarded each year is made at the discretion of the GSA(Vic) committee.

Funding will not be granted retrospectively and applicants are asked to submit forms no later than 6 weeks prior to their trip to give the committee time to consider the application.

**Eligibility**

Applicants must be members of the GSA and enrolled in a full-time degree at a Victorian Tertiary institution and undertaking research in Geology. The scholarship will be awarded to assist with conference travel for honours and postgraduate students, who are presenting (either poster or talk) at the conference.

Honours and postgraduate students that receive this scholarship will be required to submit a report for publication in 'The Victorian Geologist' newsletter following to their trip. A presentation may also be requested by the committee, which will consist of a short 10-15 minute presentation prior to the monthly seminar.

Students who have previously received a GSAV research scholarship are not eligible. Scholarships and bursaries from other sources are acceptable.

Applications forms can be scanned and emailed to: [secretary@vic.gsa.org.au](mailto:secretary@vic.gsa.org.au)

or mailed to:

Geology Research Scholarships Victoria  
Geological Society of Australia (Victoria Division)  
GPO Box 2355  
Melbourne VIC 3001

More information can be found by contacting Barbara Wagstaff ([wagstaff@unimelb.edu.au](mailto:wagstaff@unimelb.edu.au))

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**Something interesting to share? Want to see your name in print?**

Don't be bashful, contribute to the GSA(V) monthly newsletter!

If there are any events, happenings, news, or views that would be of interest to the membership, please send your details and information to Kieran Iles at [kiles@student.unimelb.edu.au](mailto:kiles@student.unimelb.edu.au)

**We'd be glad to hear from you**

## FORTHCOMING SEMINARS AND EVENTS

to be presented at  
GSA (Victoria Division) meetings

Note: unless otherwise indicated, all 2015 talks will be held in the  
Fritz Loewe Theatre, Earth Sciences Building, University of Melbourne.

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July 30th:

**Monthly Meeting:** Students Night

Three short talks from scholarship recipients over the past year

August 27th:

**Monthly Meeting:** Ken Grimes

Northern Australian sandstone pseudokarsts

Later this year (watch this space!):

Robbie Rowe

Helen Green - Dating Aboriginal Rock Art

Please welcome our newest members

Helen McFarlane

Nicolas Molnar

Chelsea Wemyss



Visit the GSAV on [www.gsavic.org](http://www.gsavic.org) or the GSA on [www.gsa.org.au](http://www.gsa.org.au)  
• Renewing your GSA membership is easy - it can now be done online. •

### CONSIDER CONTRIBUTING TO TAG!

It is member contributions which make TAG a member magazine – please keep the contributions coming and assist with informing all of the membership (not just your Division) about your activities.

Please send your news to: [tag@gsa.org.au](mailto:tag@gsa.org.au)

### GSA (VICTORIA DIVISION) COMMITTEE

Please address all correspondence to the GSA Victoria Division  
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#### OFFICE BEARERS

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#### Newsletter deadline:

First Friday of the month except Dec & Jan  
[kiles@student.unimelb.edu.au](mailto:kiles@student.unimelb.edu.au)

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