The Tasmanian Geologist

April 2023

Save the date:

18th of May Thursday 6 PM Dr Katharina Hochmuth (ACEAS). "From rainforests to icesheets – a brief history of Antarctica and the Southern Ocean".

22nd of June Thursday 6 PM AGM, Speaker TBA

29th of July Thursday Film Night

13th of August Student Night

9th of September 1 day field trip, north of Launceston

10th of September joint meeting with the Royal Society of Tasmania, Northern Branch, Dr Michael Roach

NEXT MEETING:

Thursday 27th April 6PM

Introducing the new CODES postdoctoral team

Yamila Cajal, Mohammad Fahti, Wei Hong and Owen Missen

Earth Science Lecture Theatre
University of Tasmania
Join us for drinks and nibbles available from 5:30 PM

NEXT MEETING:

Four new Research Fellows have recently commenced at the Centre for Ore Deposit and Earth Sciences at the University of Tasmania. All are working on the Critical Metals Regional Research Collaboration program. They have different backgrounds and research interests. Each will each give an approximately 15-minute presentation on their past projects. We hope you can join us to meet them and make them feel welcome.

Yamila Cajal C. After completing her undergraduate studies at the Universidad de Concepcion, Yamila worked in Cu-Au mining and exploration in Northern Chile. Then, she moved to Australia to pursue PhD studies at the Research School of Earth Sciences of the Australian National University, where she investigated the magmatic evolution and fertility of the supergiant porphyry copper deposits from Central Chile.

Yamila's talk: The role of magmatic sulphide saturation in the formation of the supergiant porphyry copper deposits from Central Chile

Copper is used in every aspect of our society and its demand is increasing due to its critical role in the transition from fossil fuel to green energy. Porphyry copper deposits, which are the world's primary source of this metal, have been widely studied; however, it is still unclear why some systems are fertile while others are not. This work explores this question by studying igneous rocks associated with the world's largest and third largest copper deposits, the Rio Blanco and El Teniente Cu deposits, located in Central Chile, with special emphasis on the role that sulphide saturation plays in magma fertility. In this talk, I will present new whole-rock, major and trace elements data, including platinum group elements (PGE), from intrusions related to these deposits. I will use these results to discuss new insights into the Rio Blanco and El Teniente magmatic systems, including the duration and size of the systems, the different mineral phases that controlled their magmatic evolution and the timing of sulphide saturation. Finally, I will discuss why the timing of sulphide saturation did not play a key role in the formation of these deposits and the other factors that were fundamental in the formation of two of the world's largest copper deposits.

Photo La Invernada Lake and Cerro Azul Volcano (inactive), both located in the Andes of the Maule region, central Chile (photo provided by Y. Cajal).

Owen Missen is working on the environmental mineralogy and geochemistry of Critical Elements. His research focuses on mineralogy and biogeochemistry in the oxidation zone, favouring a multidisciplinary approach to mineralogical research. He completed his PhD at Monash University in 2022, with his thesis focused on tellurium biogeochemistry incorporating a review, a field study in Mexico, and detailed characterisation of weathering zone minerals.

Owen's talk: Critically important: What we can learn from understudied biogeochemical cycles of Critical Elements

Biogeochemical cycles are commonly studied for major elements, but minor elements – including critical elements – are also cycled throughout Earth's surface environments. My research focuses on the cycling of elements such as tellurium and cobalt, analysing their

behaviour in both naturally (around outcropping ore deposits) and artificially enriched settings (such as tailings storage facilities).

Tellurium on baryte from Mexico (photo provided by O. Missen).

Understanding biogeochemical cycles is important so that (1) critical elements do not become future contaminants of concern and (2) we can develop new processes for mobilising critical elements out of waste materials, using natural processes as a guide.

Mohammad Fahti

My full name is Mohammadbagher Fathi (Mohammad Fathi), I'm from Iran, I hold my PhD in Mining-Mineral Processing (2017) at Amirkabir University of Technology, Tehran, Iran. I also did my sabbatical leave in Curtin University in 2017. I have a more than 10-year experience in University-level teaching, learning and supervision of several industrial research thesis at Urmia University, Urmia, Iran. My professional background is actually on Flotation and Hydrometallurgical beneficiation of critical minerals and rare earth elements. I have contributed to several industrial projects (REEs, potash, magnesite, magnetite, ilmenite, and sulphide minerals).

Mohammad's talk will be on **Challenges in Beneficiation of Critical Minerals.**

Mohammad at a metal processing plant (image from M. Fahti)

Wei Hong was awarded his PhD degree in August 2017 at CODES and continued to work there as a postdoctoral researcher until September 2019. Wei was appointed as an embedded MinEx CRC researcher in the University of Adelaide and Geological Survey of South Australia between 2019 and 2022. His research interest involves application of mineral chemistry and isotopes to the genesis and exploration of magmatic-hydrothermal ore deposits, including granite-related Sn-W, porphyry Cu-Mo-Au, and skarns.

Wei's talk: Metallogenic setting and chronologic history of the Delamerian porphyry mineral systems. Porphyry-style hydrothermal alteration and mineralisation has previously been recognised within the Delamerian Orogen, South Australia. However, limited exploration due in part to thick post mineralisation cover hinders the understanding of these deposits. A large set of zircon U-Pb, molybdenite Re-Os, and white mica Rb-Sr ages have been determined to constrain the timing for

emplacement of magmatic intrusions, precipitation of metal-bearing sulphides, and duration of hydrothermal alteration in the orogenic belt. The Delamerian porphyry systems are revealed to have postdated subduction-related magmatism in the region (514–490 Ma), but instead, formed within an inverted back arc regime, where mineralised magmas and fluids ascended along favourable lithospheric-scale structures, probably due to asthenospheric upwelling triggered by mafic delamination. Porphyritic stocks, dikes, and aplites with ages of 470–460 Ma are the most likely hosts to porphyry-style mineralization in the Delamerian Orogen.

If you cannot make it in-person you can zoom in on the evening using the link below:

Join meeting

PREVIOUS MEETINGS

30th of March 2023 Clive Calver and Phil Sansom provided an introduction to the rocks and fossils of the Florentine Valley 'Florentine Reflections – a review of a 45-year long rocky relationship'.

The presentation by Clive and Phil was a prelude to the autumn field trip held on the 15th of April. It showcased the work that has been done on the thickest part of the shallow marine successions that deposited in the Ordovician to Silurian in Tasmania. Clive commenced with an outline of the stratigraphy and the main units that make up the rocks of the Florentine Valley, including the oldest Denison Group, the Gordon Group and the uppermost Tiger Range Group. All successions contain both limestone and siliclastic formations.

Important units for fossils were indicated including the Florentine Valley Formation, younger shallow marine Benjamin Limestone and the uppermost unit in the Gordon Limestone, The Arndell Sandstone which may be lower Silurian.

Phil took over and showed some interesting fossils including a starfish he found in the Early Ordovician rocks which was described by Peter Jell who named it *Maydena roadsidensis.* It is still in Brisbane, despite it having a UTAS fossil ID number. Other notable fossils were cephalopods that were described by Brian Stait. A variety of corals are present as well as trilobites, abundant shelly fossils and bryozoans. Graptolites and conodonts within these faunas allowed the recognition of 20 fossil zones which correlate across Tasmania and allow national and international correlation to accepted Ordovician age divisions.

Despite excellent work on the succession of the Florentine Valley, most of this was done a long time ago in the 60s and 70s and there is room for some new work to answer outstanding questions. Clive and Phil suggested isotope chemostratigraphy to see if the patterns in the Florentine Valley match those elsewhere in the world; look for the onset of the Ordovician Meteor Event by searching for chondritic chromite; and resolve the age of the Arndell Sandstone.

Phil brought some excellent representative specimens for the audience to examine and discuss in the end of the talk.

Phil and Clive's presentation prompted many questions and they were thanked by Peter McGoldrick.

Clive Calver and Phil Sansom compare speakers wines (photo K. Orth).

Fossils brought in for viewing after the talk (photo K. Orth)

If you missed the talk or want to revisit it after the field trip (very useful) please contact Karin Orth karin.orth@utas.edu.au

Florentine Fossil Frolics

'Fossil hunters' conjures up pictures intrepid palaeontologists excavating barren painted landscapes. The rocks revealing the remains of vertebrate creatures long extinct. However, the science of geology owes a much greater debt to previous generations of palaeontologist who studied the fossil remains of (mostly) small invertebrate creatures. Their work forms the basis for (bio)stratigraphic correlation and saw the development the detailed geological time scale we know today. Arguably geology's greatest contribution to modern scientific thought.

On Saturday 15th April about thirty Tasmania Division members and friends (see back page) assembled in Maydena to embark on an invertebrate fossil hunt in the nearby Florentine Valley. The area is a synform that exposes Ordovician to Lower Silurian fossiliferous limestones and sandstones of the Gordon Group. We were fortunate to be led on the trip by Phil Sansom and Clive Calver who have a long connection to the Florentine Valley geology. They both did Honours theses in the mid-1970s on rocks and fossils from the area, a time when forestry operations had newly created many of the road-cutting and quarry exposures we visited. Despite the re-growth over subsequent decades we were able to locate several sites and a number of interesting fossils were found. These included trilobite fragments, intact brachiopods, fragmentary bryozoans and corals, crinoid ossicles and a coralline alga.

Left coralline alga in the Benjamin Limestone (photo K. Orth) and right trilobite from the Arndell Sandstone (photo M. Giddings)

A great time was had by all. Special thanks to Phil and Clive for the work they put in to organise the trip.

While perhaps not quite as exciting as digging up dinosaurs, there is still something special about breaking open a piece of rock to reveal a creature that once lived in a warm shallow sea more than 400 million years ago!

Peter McGoldrick

Student Members

Great to see some of you at our recent field trip to the Florentine Valley.

Students in the Florentine Valley beneath the western face of Mt Field (photo O. Wycisk)

And some great fossils were discovered!

Bryozoan from the Arndell Sandstone deposited during the late Ordovician or early Silurian (photo A. Tai)

Trace fossils from the shallow marine portions of the Benjamin Limestone (photo A. Tai)

Honours, Masters and PhD students

Endowment Fund
THE GEOLOGICAL SOCIETY OF AUSTRALIA

Applications have closed but we are awaiting an announcement on who has been the recipient of the grant for Honours/Masters in Tasmania in 2023. We can share that one of our local PhD students is in the mix for the big award. Watch this space!

Olivia Wilson won the Honours Endowment Scholarship for Tasmania in her honours year in in 2020. Despite the lockdowns of that year, she eventually managed to get into the field to spend her money. Olivia is now employed by Entura in Hobart. She was an undergraduate member of the GSA and here is her testament to how it can be helpful for your future.

'Being a student member of the Geological Society of Australia enriched my experience of studying geology. Especially important to me were the opportunities to make connections and learn about the research of other society members. As a student, it is also invaluable to have an environment in which you can interact with geoscientists from all career stages – hearing their experiences allows you to develop your own career aspirations. GSA membership also demonstrates that you have a level of passion and commitment to your field beyond the compulsory courses in your degree, helping your resume stand out as you transition to professional life.'

Olivia Wilson (supplied by O. Wilson)

You can become a member here https://www.gsa.org.au/

There are also **special rates for graduate membership** so no need to miss out once you have graduated. We would love to keep in touch!

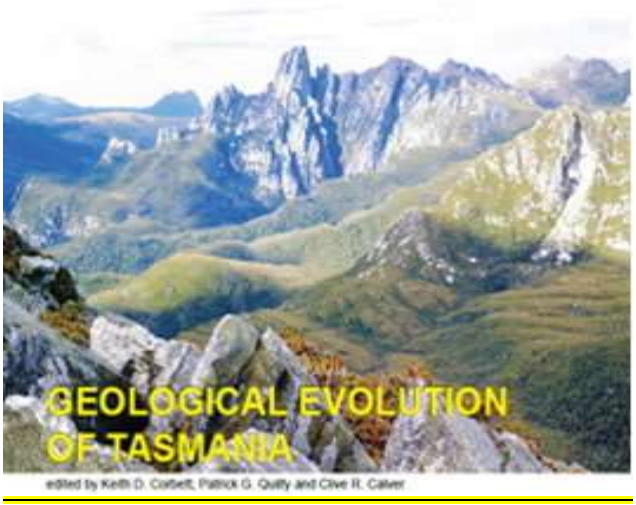
Any queries about your membership contact our membership officer Rebecca Carey (Rebecca.Carey@utas.edu.au).

Undergraduate Student Members
Special price on the
Geological Evolution of Tasmania!

Become a GSA Member and you can obtain 'The Geological Evolution of Tasmania' for $75 including GST.

Students Join Here

Once you are a member, please contact Caroline Mordant for your special price book. See details below.



The flagship publication of the Tasmanian Division of the GSA, 'The Geological Evolution of Tasmania' (Special Publication 24 of the GSA) is available for ordering. All details are available on a specific part of the Utas CODES web site: http://www.utas.edu.au/__data/assets/pdf_file/0003/55313/Flyer_Order.pdf

Copies of the book can be obtained personally from Caroline Mordant (publications@CODES.utas.edu.au or phone on +61 3 6226 7537.

Members Price is A$90 + GST + postage where appropriate. Undergraduate student price is $75. Postage can be avoided by buying in person from Caroline Mordant in Earth Sciences (University of Tasmania). The book is also available at Fullers Bookshop and at TMAG in Hobart, and at Petrach's Bookshop in Launceston and the Devonport Bookshop, Devonport. Prices at these sites may vary from GSA prices, and the member price is not available at these sites either.

Membership Renewal
Don't forget to renew your membership for 2023 to stay in touch and enjoy the many benefits of being a part of the GSA. The AESC is face to face in Perth this year and members will be accorded a discount for registration.

AESC2023 in Perth
27-30th of June 2023.
Registration Open Now

Geology books for grabs

Anne Walley has some books that belonged to Russell Shaw she wants to give away. If you are interested in any of these please contact Anne annemwalley@gmail.com

Bebout, G.E., Scholl, D.W., Kirby, S.H. and Platt, J.P. (Editors), 1996: Subduction top to bottom. Geophysical Monograph 96, American Geophysical Union.

Blakeley, R.J. 1996: Potential theory in gravity and magnetic applications. Cambridge University Press.

Fliervoet, T.F., 1995: Deformation mechanisms in fine grained quarto-feldspathic mylonites - an electron microscopy study. Geologica Ultraiectina, No. 131, Universiteit Utrecht.

Flower, M.F.J., Chung, S-L, Lo, C-H and Lee, T-Y. (Editors), 1998: Mantle dynamics and plate interactions in east Asia. Geodynamics Series, Volume 27, American Geophysical Union.

Foster, N.H. and Beaumont, E.A., 1992: Structural traps VI. Treatise of Petroleum Geology, Atlas of Oil and Gas Fields. American Association of Petroleum Geologists, Tulsa.

Glikson, A.Y., Stewart, A.J., Ballhaus, C.G., Clarke, G.L., Feeken, E.H.J., Leven, J.H.,

Sheraton, J.W. and Sun, S-S., 1996: Geology of the western Musgrave Block, central Australia, with particular reference to the mafic-ultramafic Giles Complex. Bulletin 239, Australian Geological Survey Organisation, Australian Government Publishing Service, Canberra.

Lowell, J.D., 1985: Structural styles in petroleum exploration. OGCI Publications, Tulsa.

Mereu, R.F., Mueller, S. and Fountain, D.M. (Editors), 1989: Properties and processes of earth's lower crust. Geophysical Monograph 51, IUGG Volume 6, American Geophysical Union.

McDougall, I. and Harrison, M.T., 1988: Geochronology and thermochronology by the 40Ar/39Ar method. Oxford Monographs on Geology and Geophysics No.9, Oxford University Press.

Magoon, L.B. and Dow, W.G. (Editors), 1994: The petroleum system - from source to trap. Memoir 60, American Association of Petroleum Geologists.

Meissner, R., 1986: The continental crust - a geophysical approach. International Geophysics Series, Volume 34. Academic Press Inc.

Pakiser, L.C. and Mooney, W.D. (Editors), 1989: Geophysical framework of the continental United States. Memoir 172, Geological Society of America.

Sharma, P.V., 1986: Geophysical methods in geology, 2nd edition. Elsevier.

Stewart, A.J. and Blake, D.H. (Editors), 1992: Detailed studies of the Mount Isa inlier. Bulletin 243, Bureau of Mineral Resources. Australian Government Publishing Service, Canberra.

ALSO: a collection of 1:250000 geological maps and explanatory notes, and some BMR regional geology Reports and Bulletins, all mostly from the 1960s to the 1980s.

Final Words

From Noel Kemp

GSA Tasmania Division Committee 2022-2023

Chair: Karin Orth
Secretary: Sebastien Meffre
Sebastien.Meffre@utas.edu.au
Treasurer: Claire Kain

Committee Members:
Sheree Armistead
Jeremy Asimus
Rebecca Carey (Membership)
Acacia Clark (Student Rep)
Jacqueline Halpin
Wei Xuen Heng
Claire Kain (Geotourism)
Peter McGoldrick
Sebastien Meffre
Phil Sansom (Education)
Olivia Wilson

Geological Society of Australia website:

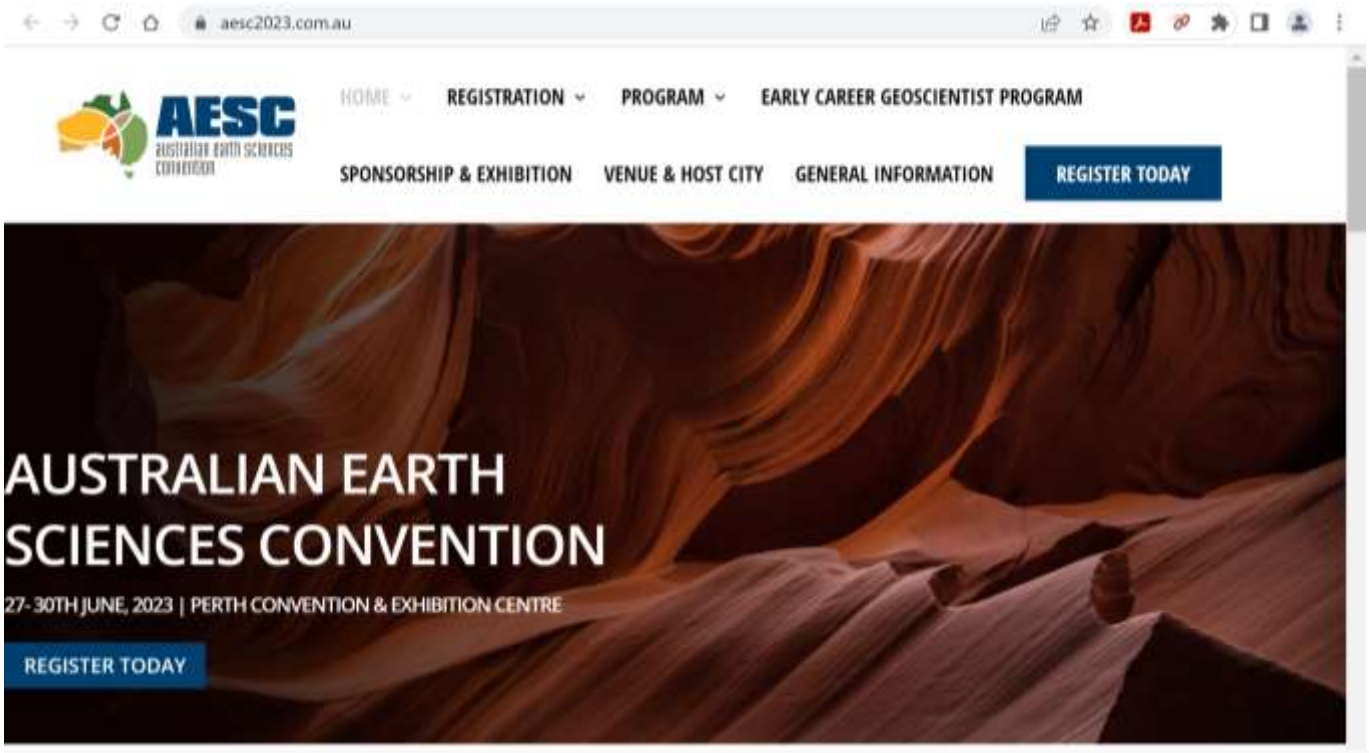
www.gsa.org

and our own website

http://www.gsatasmania.org

Any news, announcements or interesting photographs of Tasmanian Geology you would like to include in the next Newsletter, please send it through via email to karin.orth@utas.edu.au prior to the 11th of May 2023

Two group images from the Florentine Ramblings Field Trip, 15th of April 2023 (photos from M. Giddlings and S. Meffre)



Keys Dates

Abstracts Opening	Now Open
Registrations	Now open
Abstracts Close	1 March 2023
Early Bird Deadline	27 April 2023
Work Shops	26 June 2023
Conference Welcome Reception	26 June 2023
Conference Day one	27 June 2023
Field Trips	Pre and Post Conference