



Helen Shackleton Award

Report by Benjamin Panting
MSc Petroleum Geoscience

Chemostratigraphic Characterisation of Australian Sedimentary Basins

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is the federal government agency for scientific industrial research in Australia. Its chief role is to improve the economic and social performance of industry for the benefit of the community. To achieve this, CSIRO partners with leading organisations and scientists from around the world applying science to solve real issues making a difference to people, industry and the planet.

Western Australia boasts one of the most diversified and productive mineral and petroleum provinces in the world. Fittingly the Australian Resources Research Centre (ARRC) is based in Perth, from where CSIRO's Mineral Resources department seeks outstanding students for its annual "Discovering Australia's Mineral Resources" internship programme. The programme gives students the opportunity to apply and develop their knowledge and skills to a project over a 3-month period and aims to build relationships with universities for ongoing research.

During November 2016, I was engaged with the MSc Petroleum Geoscience course at Royal Holloway and was fortunate to receive an offer to undertake the internship programme at CSIRO. Accordingly, I made arrangements to change my mode of study Royal Holloway to part-time and, following the completion of the first semester and the relevant exams travelled to Australia to begin my research project in February 2017.

The aim of the project was to gain experience and develop a workflow for using Isotope Ratio Mass Spectrometry (IRMS) to measure stable isotopes (^{13}C and ^{18}O) from Ordovician ($419.2 \pm 3.2 - 485.4 \pm 1.9$ Ma) aged carbonate rock samples recovered from a drilling campaign in the Amadeus Basin (Central Australia).

The rationales for generating isotopic data include providing basic information on the depositional environment, interaction with organic matter during carbonate precipitation and chiefly for correlating with global isotopic curves documenting long term excursions in the carbon cycle. Consequently, this leads the study to better understand the large-scale earth processes archived in isotopic data for the Ordovician rock record in the Amadeus basin.

However, in practice IRMS is not a trivial method of laboratory analysis and with this project testing the application of IRMS for carbonates here at CSIRO I was required to focus my attention to overcoming several issues surrounding the technical workings of the mass spectrometer, testing optimal sampling methods and revising operating procedures to ensure reliable and reproducible experiments for scientifically robust measurements.

In April the internship came to an end. Having established a workflow, I achieved the goal of generating the dataset required for the strata of interest and at the time of writing, the data is under review progressing toward publication.

To conclude the internship I was requested to deliver a presentation during a seminar here at ARRC. This proved to be a great opportunity to demonstrate the outcomes of my work and advertise the capabilities of the IRMS for other CSIRO projects. Fortunately, I was privileged to be offered a position here with CSIRO Energy where part of my work involves the measurement of isotopes in carbonates from an underexplored offshore Australian basin for a commercial research project.

In closing, I am incredibly grateful for the support received from Royal Holloway as this has been fundamental in helping support access to what has been a very rewarding experience, enabling me to realise my ambitions in starting a career as a Geoscientist.

Kindest Regards

Benjamin Panting

Experimental Geoscientist
CSIRO Energy

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