Biogeochemistry to infer palaeotemperatures and organic inputs in marine sediments

Prerequisites / Requirements:

GEOS710

Supervisors / Research Group / Project Partners:

Supervisor: Prof. Simon George Simon.George@mq.edu.au
Co-Supervisor: Dependent on project; RA Sophia Aharonovich
Organic Geochemistry group.

Project Description:

Simon George is the Director of the MQMarine research centre, which is funded from 2015-2019. Macquarie University is also a major supporter of the Integrated Ocean Drilling Program (IODP), and this has resulted in Simon George (Exp 317, Canterbury Basin) and Sophia Aharonovich (Exp 355, Arabian Sea Monsoon) sailing on Joides Resolution scientific drilling cruises. Participation in further expeditions is planned, including Simon George on Expedition 378 (South Pacific Paleogene Climate Expedition; Jan-Mar 2020). Samples from the prior expeditions are stored in the organic geochemistry lab, and have only partly been analysed. Sophia Aharonovich working on the biomarkers in the Miocene section from these two expeditions for her PhD, and also from New Jersey Shelf core material from Exp 313 (sampled post-cruise). Key aims of this research are establishing thermal maturity gradients, investigating the variation of organic matter input to the sediments, and establishing palaeo-environmental variables such as water column oxicity and palaeo sea surface temperature. The latter has been made possible by the LC-MS in the Organic Geochemistry lab, an instrument that enables large lipid analysis to be carried out, such the C_{86} GDGTs necessary for the important TEX86 paleothermometer. In this project you will select a different age range to work on (possibly Pleistocene or Pliocene), and investigate organic matter inputs and palaeo-environmental variables.

Figure: The Joides Resolution leaving Fremantle Harbour, August 2015, after a port call which involved Sophia Aharonovich showing visitors around the ship.