

Organic geochemistry of the Wandrawandian Siltstone

Prerequisites / Requirements:

GEOS710/920

Supervisors / Research Group / Project Partners:

Supervisor: Prof. Simon George Simon.George@mq.edu.au
 Co-Supervisor: Dr Stefan Löhner stefan.loehr@mq.edu.au
 Organic Geochemistry group. Shirin Baydjanova (previous MRes student)

Project Description:

Over the last few years several masters students have worked on organic geochemical studies of Permian sedimentary rocks from the southern part of the Sydney Basin. The objectives of the projects have been to determine the depositional environment, organic matter inputs, thermal maturity and petroleum generation potential of these formations, which were deposited when Australia was close to the South Pole. We have utilised outcrop samples from the coastline S of Ulladulla (GEOS206 area), and core from boreholes held by NSW Resources and Energy at the core library at Londonderry, and have carried out biomarker studies on the extractable organic matter.

One intriguing finding has been the very high and variable amounts of rearranged hopanes (a type of biomarker) in the Wandrawandian Siltstone at outcrop at Warden Head, Ulladulla. The amount of diahopanes are some of the highest seen anywhere in the World. Classic interpretations relate high relative abundances of rearranged hopanes to oxic environments, clay-rich environments, high thermal maturity and low total organic carbon contents, but none of these hypotheses can apply unambiguously as the main control for the Wandrawandian Siltstone. The initial outcrop study is submitted to *Organic Geochemistry* (Baydjanova and George, in review).

This is a combined biomarker and petrographic project using Nanomin, which will re-sample the Wandrawandian Siltstone at outcrop and use existing outcrop samples to establish and test correlations between rearranged hopane content and sedimentology, including degree of soft-sediment deformation, clay abundance, clay type, and organic matter distribution and abundance. The project will build key skills in project design, fieldwork, organic geochemistry and petrography of organic-rich rocks, and is suitable for a masters students as it is highly achievable, as well as being innovative.

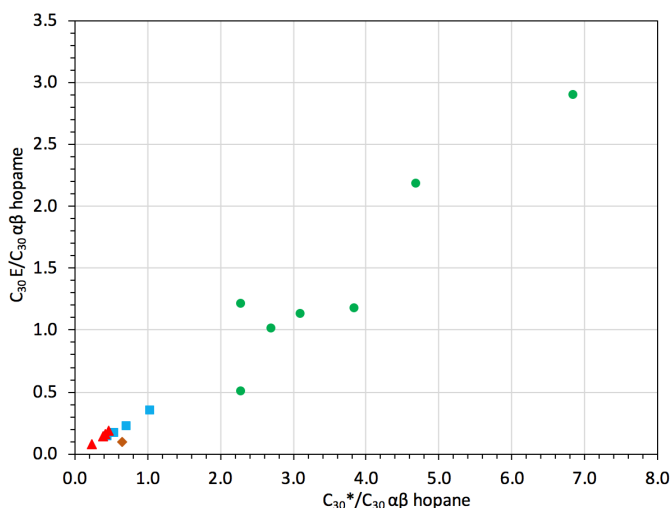


Figure: Cross plot of hopane parameters (C₃₀E/C₃₀αβ hopane versus C₃₀*/C₃₀αβ hopane) for the Wandrawandian Siltstone (green circles), the Snapper Point Formation (blue squares) and the Pebbley Beach Formation (red triangles) and the fossilised wood from the Pebbley Beach Formation (brown diamond). Data from Baydjanova and George, in review.