

Revised seismic stratigraphy for the Mentelle Basin based on the results of IODP expedition 369.

O J Oye¹, R W Hobbs¹ and the IODP Expedition 369 Scientists²

¹Dept Earth Sciences, Durham University, DH1 3LE, UK,

²iodp.tamu.edu/scienceops/precruise/swaustralia/participants.html

The Mentelle Basin lies off south-west Australia separating the Naturaliste Plateau continental fragment from the continent of Australia. The basin records the tectonic breakup of Gondwana into India, Australia and Antarctica and the paleo-oceanographic changes associated with the opening of the Tasman gateway. Between the four sites cored in the basin, IODP Expedition 369 recovered a nearly continuous record of sedimentation from the Valanginian to the present day. The basin is floored by Valanginian basalts of unknown thickness related to the initial rifting of Greater India. A sequence of clastic sediments through to Aptian age lie on the basalts and show evidence of continuing magmatic activity with intrusive sills and possible lava flows throughout this unit. Volcanic activity ceases in the Aptian and the sediments change in character to layered claystones. Above this is an Albian-age claystone section which is highly fractured with a seismic signature that suggests this unit has undergone polygonal faulting associated with over-pressured fluid escape that is typically caused by rapid burial and subsidence. The claystone lithology continues through to the end of the Cenomanian when sediments change to nannofossil oozes and chalks with occasional more clayey intervals which continue through to the present day.

A major discovery is that the interface between the claystone and nannofossil ooze and chalks is the locus of a basin-wide slide with a volume of approximately 1,000 km³. Which since the Cenomanian appears to have transported much the later succession in the central part of the basin and from the continental margin of Australia adjacent to the basin northwards onto the Perth Abyssal Plain. In the pre-expedition 369 interpretation, the complex structures in these post-Cenomanian sediments were thought to be an extensive channel/levee system but a decollement zone cored at site U1514 on the northern margin of the basin challenges this interpretation. The lack of discernible post-movement sediment on the seismic images and structure at the sub-metre scale, revealed on high-resolution sub-bottom sonar recorded on *RV Investigator* cruise IN2016-V01, infer that this slide has been active within the past 1 Myr.