

FÖRÄM.S. 2010

Keynote Presentation

Tuesday, September 7, 2010

Room XXXXX

08:30 **David Haig:** *Untangling an Orogeny: Foraminiferal Calibration of Neogene Phases of Timor Collision*

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The late Neogene collision of the Banda Arc with the Australian continent had a major restrictive effect on the oceanic "gateway" between the western Pacific and northeast Indian oceans. It may have influenced Earth's climate system, the terrestrial biogeography of the region, and the development of late Neogene petroleum-trap structures on Australia's Northwest Shelf. The timing of collision has been controversial with dates ranging from 16 Ma to 2.5 Ma cited by various authors. Three main phases are recognized in the continuing orogeny: (1) initial collision with subduction and crustal shortening; (2) locking of subduction causing quiet tectonic conditions and widespread pelagite sedimentation over the developing orogenic pile; and (3) detachment of the stalled subducting slab and isostatic rebound causing uplift. This talk will show how biostratigraphic and palaeobathymetric investigations of foraminifera have been critical in developing our new understanding of the palaeogeography and timing of collision phases. In the Timor region the collision was between a submarine continental terrace (Timor Plateau contiguous with the Australian continent) on the Australian Plate and the volcanic Banda Arc on the Asian Plate. In the resultant orogenic belt that forms the present-day island of Timor (part of the non-volcanic Outer Banda Arc), four main tectonostratigraphic units are recognized: (1) Permian to Middle Jurassic Gondwana Megasequence deposited in the East Gondwana Rift System; (2) Upper Jurassic to lower Upper Miocene Australian Margin Megasequence deposited on the post-breakup Australian passive margin; (3) Upper Mesozoic to Lower Miocene Banda Terrane units of Asian affinity emplaced in the orogenic pile during collision; and (4) Pliocene-Pleistocene synorogenic units deposited during phases 2 and 3 of the orogeny. Phase 1 of the collision is marked by a major unconformity (9.8-5.5 Ma) between planktonic foraminiferal zones N15 and N18. The style of deformation in pre-collision strata is very different from that in relatively undeformed strata overlying the unconformity. Phase 2 is represented by widespread chalk belonging to zones N18-N19 (5.5-4.5 Ma). A reconstruction of the submarine topography on top of the orogenic pile during the tectonic quiet phase has been made from interpretations of foraminiferal palaeobathymetry. The chalk successions grade upwards into marls in zone N20 and then clastic turbidites in zone N21 signifying the uplift of the island (post 4.5 Ma). The main phase of uplift occurred during the Middle Pleistocene.