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**ORAL PRESENTATION**

# New Insights into the Tectonic Architecture and Evolution of the Offshore Papuan Plateau, PNG

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The tectonic architecture and evolution of the Offshore Papuan Plateau (OPP) has remained enigmatic until recent years due to the sparsity of marine seismic reflection data.

Following new data acquisition in 2016-2017 by Searcher Seismic, remarkable imaging to 14 seconds TWT provides a window into the mechanics and rheology of the lithosphere. Light is shed on possible, multiple 'Cretaceous' rifting events and the consequent transition from rift to drift that led to the formation of the Coral Sea in the Early Tertiary. The style of rifting and resulting structural architecture varies, depending on the tectonic origin of the extension and the thermo-mechanical state of the lithosphere. The earlier rifting event(s) affecting the OPP are associated with extension generated in a back-arc setting. The resulting architecture is typified by low angle normal faults, multiple detachments and crustal core complexes. The later rift event which concluded with the formation of the Coral Sea was formed in a westward propagating rift propagator setting. Higher angle normal faults rooting into deeper detachments, that point to a contrast in rheological behaviour of the OPP crust and the influence of inherited fabric, can be observed between the early and late rift events.

The transition from rift to drift of the Coral Sea is interesting, as neither the presence of mantle exhumation or typical packages of seaward dipping reflectors (SDR) are recorded. Despite the absence of voluminous flood basalts, the continent to ocean transition (COT) displays many geometries normally associated with magmatic margins. Seaward dipping flows (SDF) are observed underlain by landward dipping normal faults detaching within a shallow brittle to ductile transition. However, the packages containing the SDF appear to be primarily composed of sediments and are significantly thinner than their counterparts from volcanic margins. A large reservoir of highly ductile lower crust and normal faulting processes associated with formation of core complexes is interpreted to facilitate the transition from rift to drift and the rise and increasing role of melt. We propose that final break-up and the formation of oceanic crust occurs when the supply of mobile ductile material to the transition zone is restricted by crustal welds; and once the remaining crust at the point of breakup is thinned to a critical thickness.

This aim of this presentation is to show with new, high quality seismic reflection data the tectonic architecture and evolution of the OPP and new insights into the transition from continental rifting to seafloor spreading in a rift propagator setting.