East Timor: Structural and Tectonic History of Deformed Passive Margin Sequences

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Timor Island preserves vast tracts of the northern Australian passive margin, with the full stratigraphic record represented on the eastern side (East Timor). Striking similarities with Australian formations throughout the Permian to Jurassic of East Timor. The Timor succession would have been among the first involved in the collision between Australia and the Banda Arc during the Neogene. Despite its relatively turbulent recent history, many of the pre-Neogene sections remain remarkably relatively undeformed, preserved as thick sections in thrust stacks, with little internal deformation in some cases. The identification of previously un-recognised slices of potential oceanic crust (MORB compositions and textures, with cumulates) allows for the possibility that the oceanic material carried thick sequences of the passive margin with it during emplacement. The fact that most of the material remains un-metamorphosed and that conodont and spore-pollen indices generally indicate low temperatures, it is likely that the passive margin sequences remain shallow and protected from high strain during early stage orogenesis. The presence of oil and gas seeps along the southern coast of Timor attests to the presence of a petroleum system at some point in the recent past, and perhaps the present day.

This paper presents a comparison of the structural style of the Timorese sections and their (undeformed) Australian equivalents, and explores models for the preservation of an Australian petroleum system in East Timor. In addition the effects of significant mud-diapirism on the petroleum potential will be explored.