PESA WA Branch April 10th Luncheon Meeting

Evolution of the Neogene fault population, Laminaria area, Timor Sea

by Jane Cunneen, Tectonics Special Research Centre, University of WA

Abstract

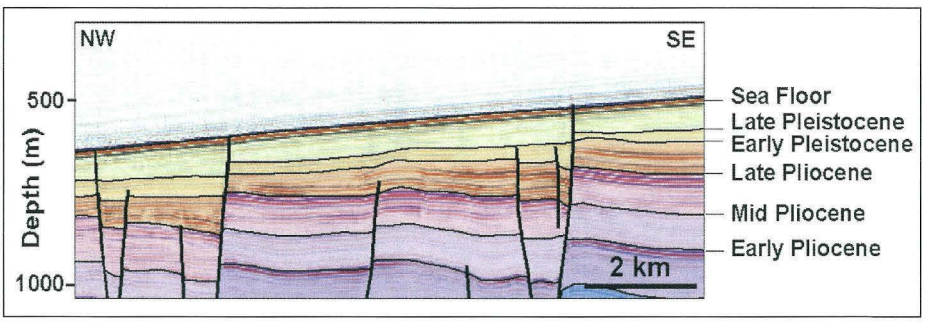
The interaction between reservoir-level Jurassic faults and Neogene faults in the Timor Sea is poorly understood. A fault population analysis of Neogene faults in the Laminaria area uses high resolution 3D seismic data as a tool for determining fault linkage properties and the likelihood of Neogene trap breach. The evolution of the Laminaria fault population is described in terms of fault initiation, fault growth and partitioning of strain.

Fault initiation occurred in two stages. Large E-W trending faults initiated in the Early Miocene, while smaller ENE-WSW trending faults initiated in the Early Pliocene. Maximum fault lengths were rapidly established during the Miocene and fault growth was mainly facilitated by increases in cumulative displacement during the Late Pliocene to Late Pleistocene.

Partitioning of strain onto the major faults occurred from the Late Pliocene and only the major faults remain active today. Although Jurassic horst structures exert a geographic control on the location of Neogene faults, displacement-length relationships indicate that Neogene faults are unlikely to penetrate the Mesozoic sequence, decreasing the likelihood of Neogene trap breach.

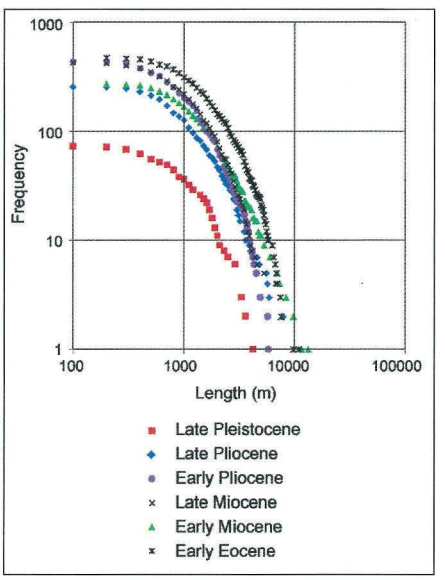
Biography

Jane received her BSc (Hons) in Geology from the University of Western Australia in 1997. She then spent several years working and travelling overseas before returning to UWA in mid 1999 to commence a PhD. Her thesis topic is "Neogene deformation styles and fault reactivation in the Timor Sea, Northwest Australia", supervised by Myra Keep and sponsored by Woodside Energy Ltd. and Shell Development Australia. Jane is currently finishing her PhD and working as a technical consultant for IHS Energy, preparing petroleum prospectivity assessments for major Australian basins.



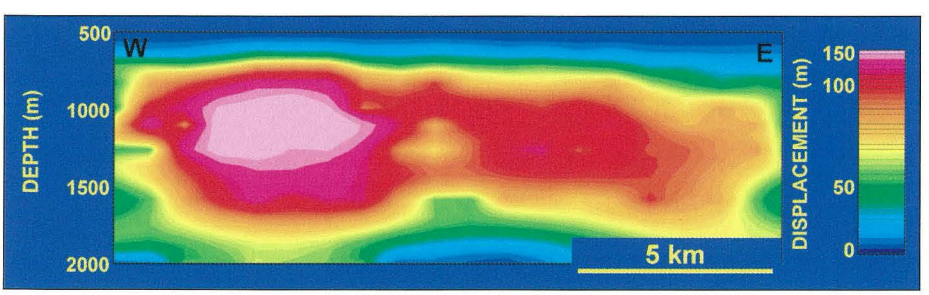
Fault Growth

- *Synsedimentary growth from the Late Pliocene*
- *Large faults extend to Sea Floor*
- *Small faults terminate in the Pleistocene.*



Strain Localisation

- *Proportion of large to small faults increasing over time*
- *Smaller faults become inactive in the Late Pleistocene.*



◀ *Displacement contours on fault surface*

- *Maximum displacement at 1100 m (about Mid Miocene)*
- *Lateral linkage of two segments*
- *Displacement decreasing below 1100 m*
- *Unlikely to link with deeper faults*

PESA News No. 64 (2003)