

The Pelican Deep Model (Figure 10.20) shows that with depth and increasing maturity, the sediments trend toward over-maturity. At depths greater than 5500 metres (Cretaceous), R_o (max) values exceed 2.6%, indicating overmaturity. Sediments at these depths within the centre of the trough have already passed through the oil and gas generation window.

10.12 Timing and Generation

Generation of hydrocarbons has been triggered by various events in the burial history of the sediments within the Pelican Trough (Figure 10.21 and 10.22).

On the margins (Flinders Model), hydrocarbon generation is presently immature to early mature (Figure 10.23). The onset of early generation has occurred most recently around 22 MMYBP, coinciding with a period of mid-Miocene tectonism (Figure 10.24).

Progressing down into the trough (Figure 10.25), the deepest sections are at present overmature, indicating all the hydrocarbons present have been expelled most probably after middle *M.diversus* time (~ 50 MMYBP).

The Top *L.balmei* is presently at a mature oil generating stage, of which only 60% of the formations total kerogen has been transformed to hydrocarbons (Figure 10.26). The Cretaceous section at the Pelican 5 location is still within the main gas generation phase.

The palaeo reconstruction of basement maturity (Figures 10.13 to 10.18) shows that by the end of Demon's Bluff deposition a significant proportion of the deepest sediments of T/25P were mature for hydrocarbon generation. In the depths of the Pelican Trough some sediments had even begun gas generation. Fortunately all structures identified as leads in this study were in place as possible traps by this time should vertical migration of hydrocarbons have commenced. Cretaceous trapping geometries, such as the pinchout plays on the Southwest Ramp, could have been receiving laterally migrated hydrocarbons during the Demon's Bluff Formation's deposition.