

by cooling during the drift phase. The Bass Basin even at the onset of rifting was probably located distant from major high heat flows associated with a conventional spreading ridge and therefore the variations in the heat flow with time are relatively small and consequently have had little influence on the modelled maturity.

#### 10.8 **Thermal Indicators** (Vitrinite Reflectance data-TMAX)

Vitrinite-reflectance ( $R_o$ ) was used as the maturity and thermal indicator with which to check the validity of maturity models. In general the data appear to be of good quality, as shown by the well-defined trend with depth, by sample histograms (not shown) with little scatter, and by good agreement between measurements made on cuttings and cores. Anomalous values are evident around localised zones showing elevated rank immediately adjacent to igneous activity (eg Flinders 1, Koorkah 1, Pipipa 1). Modelling was undertaken so that calculated  $R_o$  values fit closely with measured values. This adds confidence in the maturity model allowing confident prediction of hydrocarbon generation.

Vitrinite-reflectance values can be calculated either using the TTI method (Lopatin 1971; Waples 1980) or the kinetic method, and are then compared with measured  $R_o$  data (Waples *et al.*, 1992). In this study, the kinetic method using parameters derived by the Lawrence Livermore National Laboratory (LLNL) calibrated through BasinMod® has been employed. This method uses a distribution of Arrhenius rate constants to calculate global vitrinite maturation and then correlates maturation with reflectance.

The vitrinite values of the Pipipa 1, Flinders 1 and Pelican 5 wells are illustrated by Figure 10.2. The non-linear nature of measured  $R_o$  data in the Pipipa 1 and Flinders 1 wells is a function of anomalously high values associated with igneous intrusives and have been ignored in the evaluation of gradients.

Although good control was obtained for the variation of  $R_o$  with depth (Pelican 5, Figure 10.3; Flinders 1, Figure 10.4), variations in the type of vitrinite, maceral associations and the possible presence of cavings may influence the results by producing systematically lower values. Both maturity profiles have been drawn to account for these factors.