

## 9. Conclusions

Our 1D thermal models fit vitrinite reflectance data measured in the offshore wells and heat values measured in surficial sediments (Lewis et al., 1991a) using a moderate heat flow ( $100 \text{ mW/m}^2$ ) during rifting which then decays exponentially. As a result sediments experience warm conditions over a longer time and are predicted to be more mature than previously modeled. In contrast, Hannigan et al. (2001) used a very high initial heat flow which decayed rapidly and stayed fairly cool to match slightly cooler heat flow values measured in the wells.

In our models only the heat flow within the last ~10 Ma is important for the maturation of Cenozoic sediments; older thermal events postulated to occur at 80 Ma and 180 Ma have negligible effects on maturation of Cenozoic sediments.

Paleo-heat flow seems to increase from north to south. In northern Hecate Strait (South Coho, and Tyee wells) a good calibration was achieved to available data using a cold heat flow scenario. In southern Hecate Strait a good calibration was achieved using the hot scenario (Murrelet and Auklet wells), but in Queen Charlotte Sound a hot heat flow scenario underestimates the vitrinite reflectance data (Osprey well).

We can exclude large areas of Cenozoic sediments in Hecate Strait and Queen Charlotte Sound (Figure 56) as non-hydrocarbon generating by an initial mapping of hydrocarbon formation from Cenozoic sources. Extensive generation of oil and gas lies in a fairway approximately 75 km wide and 380 km long that extends northwest to southeast roughly parallel to the axis of the basin on its western side. This is consistent with other reports (e.g., Hannigan et al. 2001).

The Neogene-age areas expected to be most productive in forming oil and gas correspond to an approximate area of  $23,000 \text{ km}^2$  (Table 2); in other words ca. 36 % of the basin holds promise for the formation of Cenozoic-sourced hydrocarbons. We also suggest that the Neogene source rocks of interest comprise ca. 38 % of the offshore areas in question.

## Cenozoic Source Potential in Queen Charlotte Basin

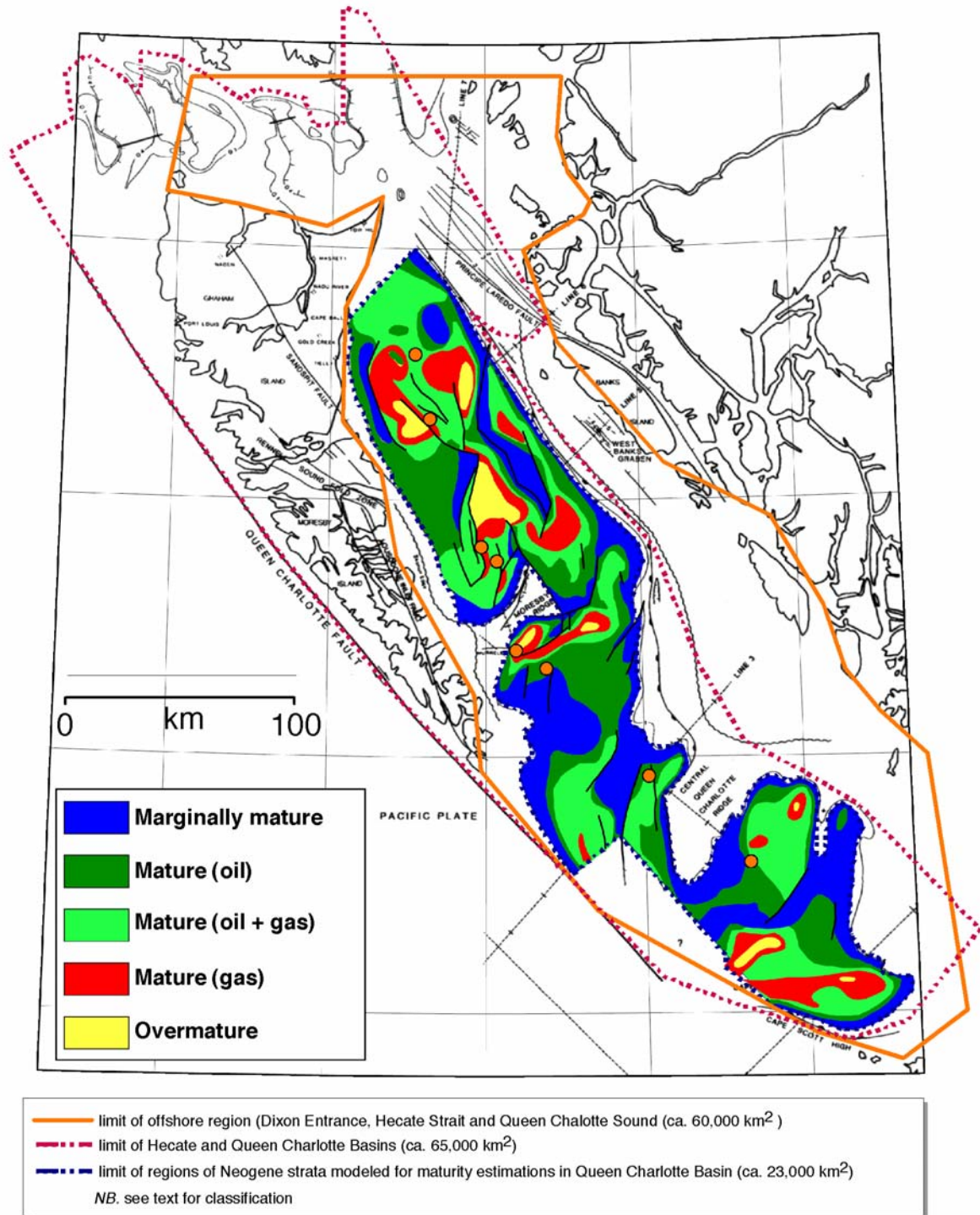


Figure 56. Map of Queen Charlotte Basin region showing the present day maturity zones of the Neogene sediment package and the outlines of the offshore region and the Hecate + Queen Charlotte Basin. The structural information is from Rohr and Dietrich (1992).