The Canterbury Basin Petroleum System and Recent Exploration Results

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Two of the four wells drilled in the Canterbury Basin, offshore New Zealand were non-commercial gas-condensate discoveries, which not only prove an active petroleum system, but also suggest possible hydrocarbon source limitations. The Galleon-1 well revealed that the Galleon structure was not filled to spill and it also intersected intrusive volcanics at total depth. The extent of source and reservoir facies within the basin was not well constrained and neighbouring structures were complicated by possible intrusive volcanic cores. Mapping of these structures also was hindered by overlying, deep seafloor canyons and an inadequate seismic velocity dataset. In order to address these various issues and better define the prospectivity of the basin, a comprehensive geological and geophysical study was initiated. Existing marine seismic and magnetic data from the Canterbury Basin were reprocessed and interpreted in concert with geological and petrophysical constraints from the wells within the basin. These data provide for improved imaging of the Late Cretaceous coal measure source and reservoir facies, overlying strata and basement structure. Analyses include time and depth mapping of key seismic events, paleogeographic mapping, potential field modeling and inversion, and basin modeling. Results of these studies have advanced two prospects, Barque and Cutter, to drillable status. Barque is a giant structure in deep water with multi-billion barrel potential. Cutter is due to be drilled first in mid 2006 given its shallow water location and current rig contraints. Results of this well will have significant implications for the exploration potential of the basin.