

Integrated Modeling Approach and Quantitative Assessment of Petroleum Charge to the Structurally Complex Kupe Field, New Zealand

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Regional models of the Kupe Field within the Taranaki Basin, New Zealand, are developed to predict: a) the velocity and volume of fluid circulating within the petroleum system through time, b) the paleopressure regime, especially the timing and duration of overpressure episodes, c) the effects of paleotopography and erosion on gravity-driven fluid flow during late evolutionary stages of reverse faulting. Ceres 2-D forward modelling software is applied for the first time to a New Zealand situation on an east-west oriented 2-D section through the Kupe Field. Changes in geometry related to deposition, compaction, reverse faulting, uplift and erosion are accurately simulated, and the model is calibrated to wells in this soon-to-be-developed gas-condensate field. Petromod3-D© software is used in conjunction with the 2-D model to predict petroleum expulsion and migration from potential kitchens and to develop a more complete charge history for the field.