Evaluating the Petroleum Systems of the Southern Atlantic Conjugate Margins

Jean A. Malan[1], Emma Sutcliffe[1], Stan Mazur[1], David A. Sagi[1], and Peter Webb[1]

[1]Getech, Leeds, United Kingdom.

ABSTRACT

Large frontier areas of the conjugate Southern African and Argentinean margins remain sparsely drilled and largely unexplored. Studying conjugate South Atlantic data sets provides explorationists with a powerful toolset with which to compare and contrast basins and assess exploration risk in the region. Combined with these data sets are Getech's gravity and magnetic database, a revised model of Atlantic plate kinematics, a high-resolution global structural database and underlying crustal architecture, which can all provide vital insights into the petroleum systems of frontier basins. In this talk, potential field data and seismic profiles with well control are complemented by crustal-scale gravity modelling and plate reconstructions to study the evolution of the South Atlantic conjugate margins, to review basin development and to assess the petroleum systems of the conjugate margins on both sides of the Southern Atlantic Ocean. Using our Atlantic plate kinematic model, we 1) highlight a revised fit, 2) compare margin-opposed basins, their syn-rift histories and subsidence characteristics, 3) review the timing of break-up, 4) identify and map flood basalts and seaward-dipping sequences, and 5) bring together important facies relationships. The results were integrated with tectonostratigraphic data for the South Atlantic margins using a workflow that brings together geophysics, tectonics, stratigraphy, palaeogeography, drainage analysis, petroleum geology and geochemistry. Where available these data were combined with the stratigraphic data within the wells; thus providing control data for basin modelling. The consistent data set has allowed comparisons to be made between the stratigraphic units of the Argentinean (Salado, Colorado, Valdes, Rawson, San Jorge, San Julian and, Argentina Deep) and Southern African (Walvis, Luderitz, Orange, Cape and, Outeniqua) basins. Using the data set we gain a better understanding of the petroleum systems and play potential of some truly frontier exploration basins. This, together with our Globe data- and knowledge-bases, provides explorationists with a unique insight into the region, allowing a thorough assessment of exploration risk in the emerging South African, Namibian and Argentinean basins.