

3. Margin Basin Analysis (Brazil and West Africa) using a G3 Approach

By William Dickson, Dickson International Geosciences; Craig Schiefelbein, Geochemical Solutions International, Inc.; and Mark Odegard, GETECH USA, Houston

Abstract

The continental margin basins of Brazil and West Africa share similar tectono-stratigraphic units resulting from their proximity in Late Jurassic/Early Cretaceous time. Paleogeographic ties between the South American and African plates mean that oil habitats of the margin basins can often be correlated. Five stages of basin development are generally recognized: pre-rift intracratonic; continental rift; evaporite (the well-known Aptian salt); post-evaporite transgressive; and post-evaporite regressive. Historic production has largely been generated from lacustrine sediments deposited during Neocomian rifting. As spreading continued, Late Cretaceous post-evaporite sediments accumulated in shallow marine and fluvial-deltaic environments; these latter sources should dominate future production.

Our investigation of margin basins used geological, geophysical, and geochemical data, hence called our G3 approach. This combination greatly assists defining the controlling structural and tectonic features that influenced basin and source rock development, and reservoir emplacement. Geochemical data representing basins along both margins include oil chemistries based on an evaluation of about a thousand samples with supplementary data obtained from surface geochemical techniques and basin modeling.

Results identify correlations between sediment pathways and gravity signatures, redefining the depocenters or source sub-basins. We demonstrate the long-lived influence of transfers or zones of weakness that segment the margins (basin framework) and separate oil types. Our talk illustrates the interpretation process with examples of clear and unclear correlations from the Greater Campos Basin (Santos/Campos/Espírito Santo) of Brazil in particular.