

Petroleum Geology of the Southern South Atlantic (Geological Society of London, October 2021)

The Southern Toe - A Closer (Zoom) Look

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Twenty years into our teamwork, a super-regional view of South Atlantic conjugate basins continues to develop, even as our set of crude oils has nearly doubled to almost 1700 from the initial selection. Detailed geochemical data from these representative samples is tested against their tectono-structural setting, comparing paleo- reconstructions of the region against the paleo-depositional settings inferred from the oils data.

The tectono-structural interpretation now uses vintage-2020 compilations of geophysical data (bathymetry, gravity, magnetics, basement depth, sediment thickness) to direct and refine mapping of tectonic elements and basin features. We review the continental terraces from Southern Brazil across Argentina. The northern segment, influenced by a Proterozoic craton, contains relatively shallow margin basins extending from Pelotas to the Salado-Colorado Mesozoic aulacogens. The southern segment, Patagonia, extends from the Colorado Anomaly to the Malvinas (Falkland) Plateau. This region benefits from a newly-developed magnetics RTP (reduction to pole) algorithm which greatly improves imaging of Triassic and Jurassic volcanism (LIPs) and related features.

In this presentation, we examine southern South Atlantic conjugate basins of Uruguay, Argentina and Chile for plays related to Upper Jurassic-Neocomian syn-rift lacustrine source rocks. The geochemical point control has iterated through an expanding data volume (Schiefelbein & Dickson 2014) using a combination of multivariate statistical analysis (MSA) and spatial comparisons to tecto-structural mapping (Dickson et al., 2016). We discuss examples of MSA significance, matching rift basin and sub-basin containers with inferred paleo-geographies and associated ages derived from the oils analysis.