

Girassol — Angola's First Deepwater Pre-salt Discovery?*

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Introduction

The Girassol discovery in 1996 kicked off a prolific string of giant deepwater discoveries in Oligo-Miocene turbidite reservoirs in Angola's Lower Congo Basin ([Figure 1](#)). Initial work by one of us and many others indicated a post-salt Iabe Formation marine source for the hydrocarbons. However, just as a tiny sample set of oil indicators with nonmarine characteristics triggered our discerning a lacustrine, pre-salt source for the Santos Basin of Brazil (Dickson, Schiefelbein and Requejo 2005), we saw weak signals of a similar story in Angola. Key piston core and crude oil samples from the Kwanza and Lower Congo (K-LC) basins ([Figure 2](#)) are being re-analyzed for diamondoid abundances. Where present in anomalous concentrations, these thermodynamically stable compounds may indicate that lacustrine, pre-salt oils have contributed to the volumes discovered at Girassol and its neighbours.

Brazilian Analog Study

Although expected because of giant pre-salt discoveries in the conjugate Santos-Campos-Espírito Santo basins, pre-salt source in the K-LC basins is known only in proximal wells near the Angolan coast. Our poster illustrates data and reasoning that developed our Santos Basin understanding, pre-dating the Tupi trend discoveries. The Santos, like most Brazilian basins, bears contributions from multiple source intervals. Although post-salt indications of a lacustrine source were scant and volumetrically tiny, this was due to excellence of a regional salt seal, rather than lack of source or generation.

Angolan Indicators

Similar data (oils, piston cores, SAR slicks, basement depth, sediment thickness, and basin structure) across the K-LC basins out to the COB highlight clues to a widespread lacustrine source. In deeper water along the Angola Escarpment, we found pre-salt-sourced oil

within a dominant marine-sourced volume in two key re-analyzed piston cores that initially gave micro-indications of lacustrine source. Lighter oils (as in the Oligocene reservoirs at Girassol) have a dominant Iabe-sourced, black-oil component, but the light oil/condensate component may prove to be lacustrine-derived (and over-printed), as in Lagoa Parda, Jubarte, and Cachalote fields of Espírito Santo.

Study Aims and Acknowledgements

Our work aims to confirm presence and distribution of the hypothesized lacustrine source interval which would charge both pre- and (where salt windows exist) post-salt reservoirs. The latter scenario is important for basin-floor fans beyond the Angola Escarpment where the Iabe may be immature.

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Reference

Dickson, W., C. Schiefelbein, and A.G. Requejo, 2005, A Busted Flush In The Santos Basin (Brazil) Becomes A Winning Hand - Hydrocarbon Generation and Multi-path Migration on Shallow and Deepwater Flanks of the Basin: AAPG Annual Convention, June 16-19, 2005, Calgary, AB, Canada. Web accessed 18 April 2012. Search and Discovery abstract #90039.
http://www.searchanddiscovery.net/documents/abstracts/2005annual_calgary/abstracts/dickson.htm

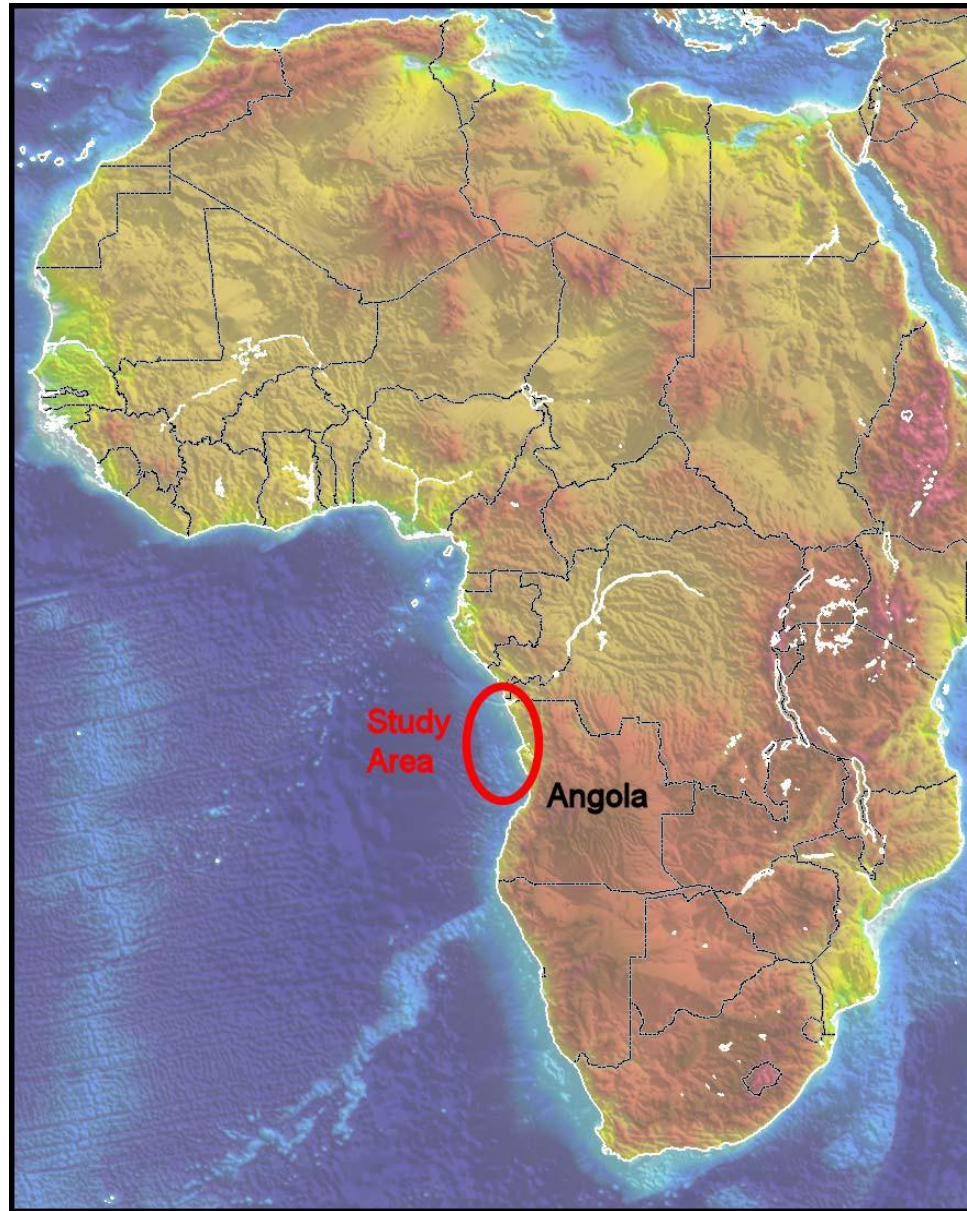


Figure 1. Study area: offshore Angola, West Africa.

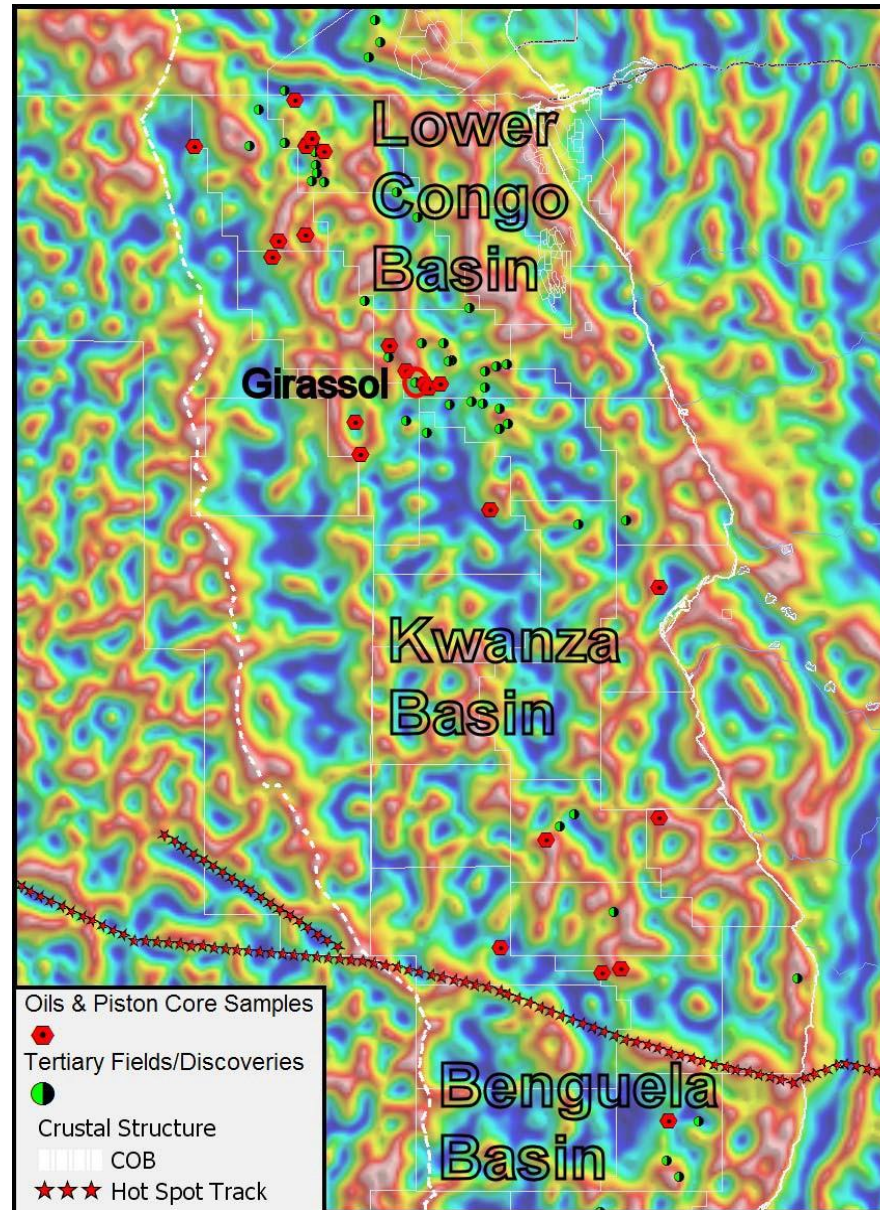


Figure 2: Study Area showing selected oils and piston core sample points on backdrop of gravity isostatic-AGC attribute. Tertiary discoveries, block outlines, continent-oceanic crust boundary (COB) and the Sumbe Hot Spot Track shown for reference. Girassol Field shown by red oval.