

## Regional Assessment of Petroleum Systems and Hydrocarbon Phase in the Deep Water Santos Basin

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Although under-explored in comparison to the prolific Campos Basin to the northeast, the offshore Santos Basin of Brazil remains highly prospective for hydrocarbon exploration. Geochemical analysis of oils indicates the existence of at least two petroleum systems in the basin. The northern and central portions of the Santos Basin are characterized by the pre-salt sourced Guaratiba-Ilha Bela (?) system. These oils are generally of intermediate quality (30° API gravity and less), partly as a result of biodegradation. The main producing trend in the south and central portions of the basin is characterized by the post-salt sourced Itajaí-Açu-Guarujá (!) system. In contrast to the northern system, it is characterized by light oils (around 40° API), and gas (e.g., discoveries in blocks BS-400 and BS-500). Mixing of pre- and post-salt hydrocarbons is evident in several oils, and may be widespread.

Despite the lack of well control, surface geochemical results suggest that these regional petroleum system characteristics extend into the deep water frontier. Analysis of piston core samples collected at over 500 deep water sites shows numerous gas seeps in the offshore extension of the Itajaí-Açu Guarujá (!) system in the southern basin. Surface samples representing an extension of the Guaratiba-Ilha Bela (?) system show little gas seepage, and exhibit both pre- and post-salt source indications.

These findings indicate that the greatest potential for encountering light oil and gas in frontier deep water exploration lies in the southern Santos Basin. In deep water areas to the north, oil contributions from both pre- and post-salt sources can be expected.

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