



AN OUTLOOK ON THE PETROLEUM POTENTIAL OF THE BRAZILIAN DEEP-WATERS

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Abstract

In the middle 50's, at the beginning of its exploratory history, Petrobras focused its efforts on the large paleozoic basins and on the onshore portions of the Brazilian marginal basins. Large intracratonic basins spreaded from the Equatorial Amazon jungle (Acre, Solimões and Amazon basins) and arid northeast (Parnaíba Basin) to the well developed south-southeast region (Paraná Basin), and small onshore cretaceous marginal basins from the northern coast (São Luiz and Barreirinhas basins) to the eastern coast (Recôncavo, Tucano, Sergipe-Alagoas, Bahia-Sul and Espírito Santo basins) were explored. Field geology, gravity, and magnetics surveys, followed by seismic and finally by wildcat wells, were the tools used on those early years. Despite some occurrences in the paleozoic basins, important commercial discoveries in onshore basins were restricted to the Recôncavo and Sergipe-Alagoas marginal basins.

In the late 60's the exploration was extended towards offshore, as a strategy to improve the reserves. This decision was supported by an exploratory model based on the knowledge acquired from the exploration in the onshore portions of marginal basins and on an extensive 2D seismic reflection survey (11,289 km), from Cabo Frio to Recife. Several exploratory opportunities were identified and the first oil accumulation discovery (Guaricema Field) resulted from the second well drilled in the offshore Brazilian marginal basins (Sergipe-Alagoas Basin).

At the same year (1968) the first seismic survey carried out in the Campos Basin (fig 1) made possible the delineation of the structural and stratigraphic architecture of the basin, defining a series of exploratory opportunities. The first well was drilled in 1971 (fig. 2) and the first discovery (1974) occurred in albian carbonate reservoirs (the Garoupa Field), which highlighted the potential of the Brazilian marginal basins. In the middle 80's, supported by a well established exploratory model and good quality of the 2D seismic, the exploration focused their efforts towards deeper waters, resulting in the discovery of the first deep-water giants, the Marlim and Albacora fields. At that time, 3D seismic became an usual procedure to delimitate discoveries, and a phase was initiated characterized by substantial increase in 3-D seismic acquisition using multisource and multistreamer vessels. Specific acquisition software were introduced, which resulted in reduced costs and better subsurface coverage. In the Campos Basin, this new phase was characterized by the massive use of 3-D seismic as a guide to the exploration, resulting in an expressive number of discoveries (Barracuda, Caratinga, Bijupirá, Marlim Leste, Espadarte, Guarajuba and the Roncador Field).

At the beginning of the 90's Petrobras made an extensive effort to evaluate the deep-water hydrocarbon

potential along the entire margin. Deep water wildcats were drilled from the Santos Basin, in the South, to the Para-Maranhão Basin, in the Northern coast. A giant accumulation of heavy oil in Eocene turbidites was found in the Santos Basin, and a smaller accumulation of oil of good quality was found in Cretaceous turbidites in the Sergipe-Alagoas Basin as a result of this campaign.

The perspective for the future points out to continuously increasing the exploration in deep-water regions along the entire Brazilian margin, supported by the encouraging results in the Santos and Sergipe-Alagoas basins.

The Campos Basin still holds great exploratory opportunities in deep-waters, and also in unexplored areas, such as in the ultra-deep water region (> 2,000 m isobath), where massive quantities of 2D and 3-D seismic data have been acquired. This ultra-deep waters in Campos Basin and the deep waters area along the entire Brazilian coast represent a new challenge to Petrobras in its effort to incorporate expressive hydrocarbon reserves in the future.

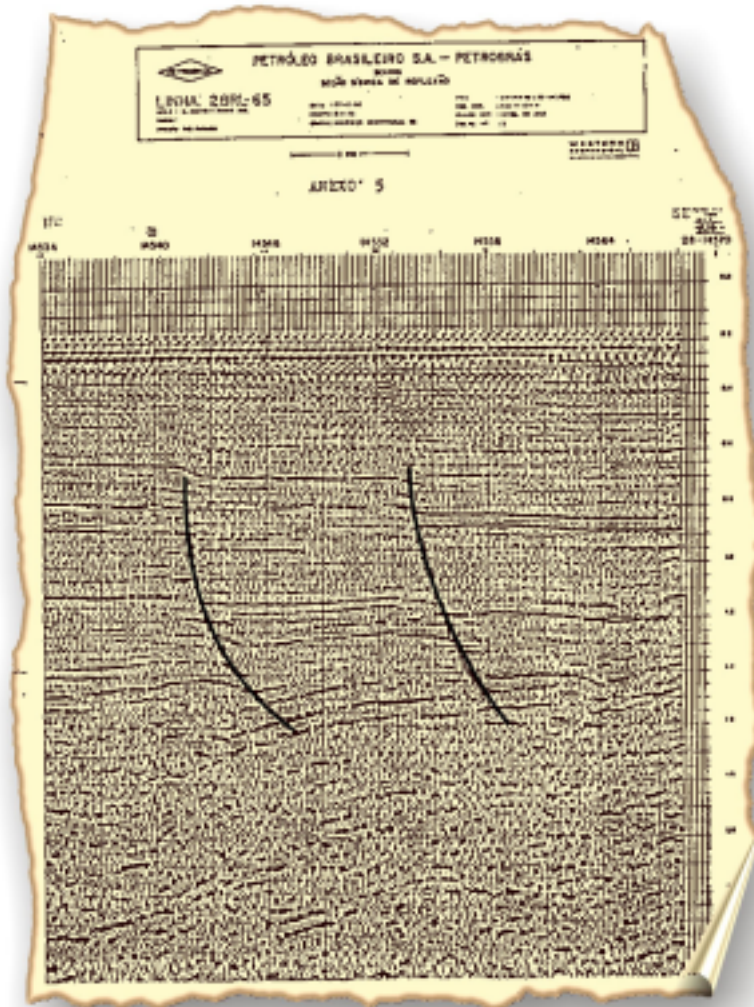


Figure 1 – example of seismic section of the first acquisition phase in the Campos Basin

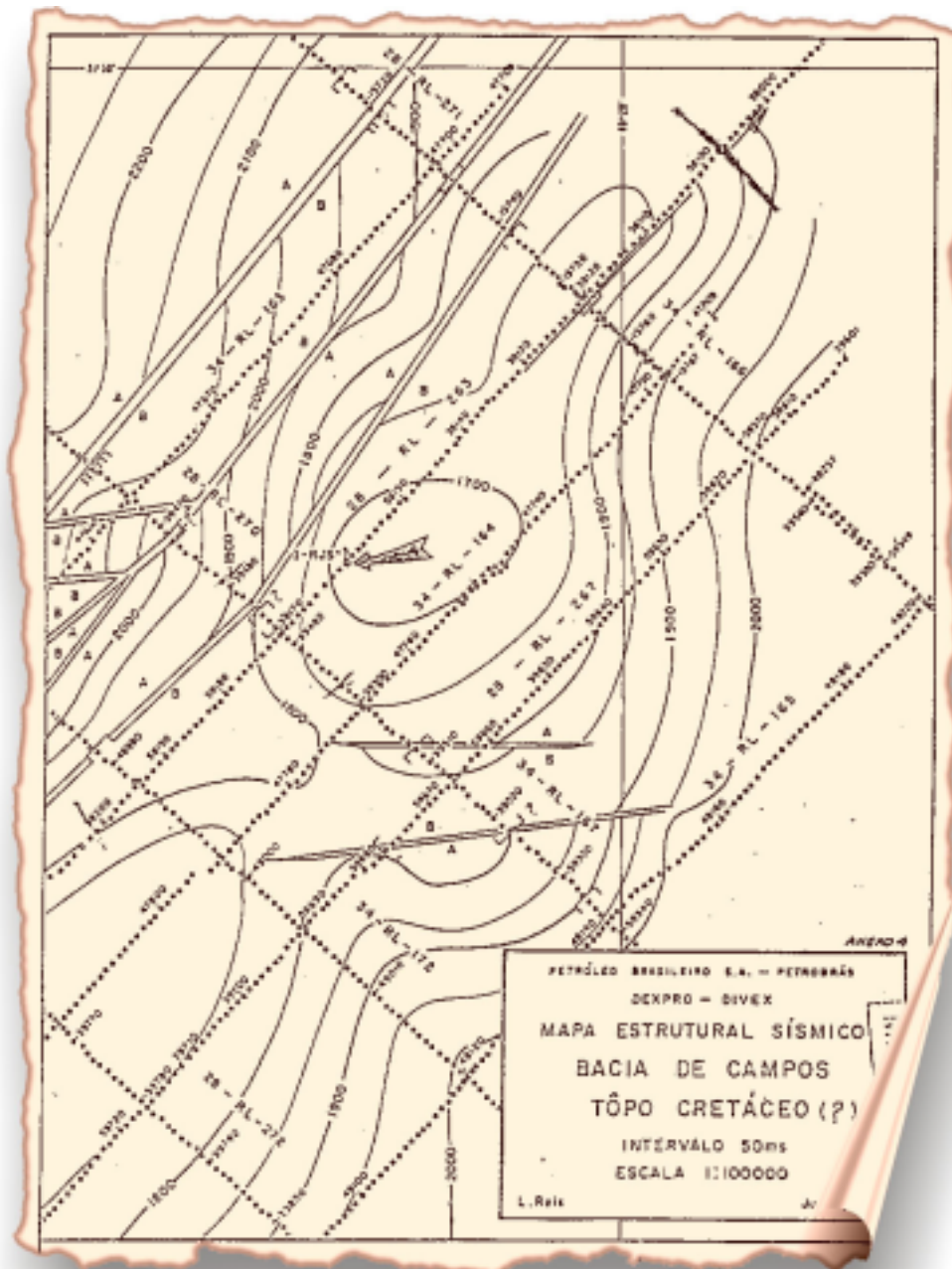


Figure 2 – structural seismic map (top of Cretaceous) of the first well drilled in the Campos Basin.