

## **Seismo-Stratigraphic Analysis and Characterization of Hydrocarbon Leakage Indicators in the Malvinas Basin, Offshore Argentine Continental Margin**

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First results of the interpretation of 650 2D seismic-reflection profiles in the Malvinas Basin are presented. The available dataset covers an area of approximately 81,000 km<sup>2</sup> and 25 wells were used as control points. The goals of the study are the mapping of the main seismo-stratigraphic units and the interpretation of the abundance and distribution of hydrocarbon migration/leakage indicators present in the basin. As the Malvinas Basin is located south on the wide offshore Argentine continental margin, the signature of sea level fluctuations is expected to be well preserved. Additionally, evidences of an active petroleum system have been reported in the neighbouring North Malvinas Basin (Richards et al., 2006, *JPG*, v. 29(3), p. 199-214).

Five major seismo-stratigraphic units, informally named U1 to U5, were identified and correlated with the main tectonic phases of the margin. U1 (Pre-168 Ma) represents the seismic basement and deepens gradually southwards and is affected by several E-W and NW-SE normal faults rooted in the basement. U2 (168-150.5 Ma, syn rift phase) thickens and deepens southwards. It fills regional depressions, onlaps the basement and is locally affected by basement faulting. U3 (150.5-68 Ma, sag phase) is an aggradational unit identified over the entire basin. It is predominantly affected by normal faults to the south. U4 (68-42.5 Ma, transtensional foredeep phase) overlies unconformably U3 and thickens to the south. The unit only has a few normal faults and some reactivated reversed faults in the south. Finally, U5 (42.5~0 Ma, transpressional foreland phase) represents an interesting stratigraphic switch from aggradation to progradation. While on the west of the basin there are clinofolds prograding eastwards and downlapping the basal section, a northward onlapping wedge is identified in the deeper southern part of the basin.

Several seismic features interpreted as gas chimneys were mapped. All of them seem to be sealed within units U4 and U5. As, they are found mostly above the basement normal faults, their origin is probably structurally controlled and the source of gas may be located within the deepest units. So far, no seismic chimney has been found reaching the seafloor. Future work includes a more detailed mapping of the gas-leakage indicators and the 3D reconstruction of these features using petroleum system and fluid flow modelling.