Whilst the Malvinas Basin is an exciting and widely recognized underexplored oil and gas-prone basin, traditionally the main target for explorers has been the Early Cretaceous transgressive sandstones of the Springhill Formation – a prolific reservoir in the Austral Basin to the east. However, reprocessed de-ghosted data has now revealed numerous Tertiary plays in the Malvinas Basin offering new and highly prospective play systems still to be explored.

In the reprocessed PSTM line below, a previously unimaged thick syn-rift section with postulated lacustrine source rock has been revealed. At this location, the base of the prograding sequence marks the 35 Ma unconformity associated with rifting of the Scotia Plate to the south. With the source rock modeled to be in the hydrocarbon window and migration pathways ascertained, the identified Tertiary plays are believed to be associated with significant prospectivity.

Offshore Argentina: Tertiary Play Potential in the Malvinas Basin

Figure 1: Searcher’s 2020 broadband reprocessed PSTM line in the Malvinas Basin.

Figure 2: Elevation grid and superimposed magnetically derived chronostratigraphic lines, supporting the timing of opening of the Scotia Plate. Searcher’s 2020 broadband reprocessed PSTM line in the Malvinas Basin, showing the base of the prograding sequence, is dated at 35 Ma and 75,000 km² of 3D post-stack rectified and merged seismic data. The paleo-lithofacies provide a source rock in the prospective area of the Malvinas Basin.
The Malvinas Basin is a large foreland sedimentary basin located entirely offshore on the Argentine Shelf of southern Patagonia. To the west the basin borders the Rio Chico–Strangways High, which separates it from the Magallanes Basin. The northeast boundary in the Tierra del Fuego fold belt, formed by transtensional movement along the Scotia Plate boundary.

Setting the Scene

The Malvinas Basin sedimentary succession can be divided into four stratigraphic units: Jurassic rift deposits; Late-Jurassic to Cretaceous sag deposits; Late Cretaceous to Eocene transitional marine deposits; and the Late Eocene–Palaeocene fore-deposits. As Gondwana was broken up during the Jurassic, rifting commenced across the Malvinas Basin and between Antarctica and South America; an extensional regime was initiated, with subsequent reactivation in the Cretaceous to Eocene. Part of this regime was the formation of the Malvinas Basin, which was characterized by the formation of the Scotia Plate, which developed into the present-day oceanic floor.

Reprocessing of seismic data across the Malvinas Basin has aided in the definition of Tertiary plays, suggesting that Tertiary play systems will underpin successful future exploration in the Malvinas Basin. Identification of shallow gas anomalies using deep water glider technology has helped to reduce the potential for geohazardous scenarios associated with the evolution of the Malvinas Basin and generated additional prospects for exploration. The sources for the hydrocarbon systems charging the Tertiary plays, suggesting that Tertiary play systems will underpin successful future exploration in the Malvinas Basin.