

## **North Argentina Basin (CAN): A New Frontier Offshore Basin Arising in the South Atlantic Margin**

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### **Extended abstract**

In the Argentine continental margin, it can be recognized two almost independent realms associated with shallow and deep waters basins. The first one corresponds to depocenters on the shelf and the upper slope from South of Brazil, Uruguay, and Argentina. These are Pelotas, Punta del Este, Salado, Colorado, Valdés-Rawson, Golfo San Jorge, San Julián, Malvinas Norte, Austral, Malvinas and Malvinas Oriental basins. They share an almost identical origin from Lower Mesozoic (155 Ma) up to the Miocene and have a common evolution with the conjugate counterparts in Africa (Orange Basin).

The deep waters realm corresponds to the Argentina Basin (CA) with three main depocenters: Northern (CAN), Central (CAC) and Southern (CAS). The basin is developed in the lower slope where the seabed has water depths in between 2,000 to 3,000 m and the continental rise region. The basin has 1,300 km long, 250 km wide, with a NE-SW striking, and covers 290,000 sq km. The sedimentary fill is greater than 5,000 m thick and can be correlated among the depocenters. The CAN offshore blocks are located within the Northern depocenter.

The volcanic transition continental crust (TC) segment was affected by the crustal stretching that promoted a series of fractures along the deep margin. Consequently, a series of rift basins were formed scrolling in a chained succession from North to South, being controlled by normal fractures parallel to the continental margin strike that coincides with the 2,500 isobaths. Local magmatism chimneys, volcanic cones and lava flows in a subaquatic and subaerial environment can be recognized through stacked basic lava wedges and seaward dipping reflectors (SDRs). Overlying this volcanoclastic complex a break-up unconformity (BU=AR1) of Hauterivian age (125 My) can be recognized. Afterwards, sedimentary sequences limited by seismic horizons can be determined representing the most relevant intervals comprising deposits from Upper Aptian to the Eocene-Oligocene limit ages. A coastal to shallow marine basal clastic sequence (BCS) overlying the BU and represents the end of the volcanoclastic process. Sequence AR2 corresponds to anoxic facies and sapropelic muds that lasted over 40 My and represents the proto-South Atlantic region. AR2 correlates with Sequence A II in the conjugate Namibia Basin dated as Tithonian to late Aptian (120 My). The base of sequence AR3 comprise subparallel reflectors interpreted as coastal to shallow deposits assigned to the beginning of the sag cycle and representing the aggradational sag sequence of the Lower Cenozoic correlated with Pedro Luro Formation (Colorado Basin). This sequence extends on the rise and continental slope, invading the sea and indicating the first regional marine invasion. The top of AR3 suffered erosional processes with isolated valleys filled with the Neogene clastic sediments of sequence AR4. This sequence represents a marine dynamic controlled by submarine currents.

From a petroleum system viewpoint, the source rock (Barremian to Aptian age), clastic fluvial and litoral reservoirs (Turonian age), regional seals, overburden rocks, and traps are present, and the Africa analogy has a strong influence in the geologic model. Recent success in

Namibia's Orange Basin with the discovery of more than 6 billion barrels of oil equivalent (boe) of recoverable resources has promoted Equinor, Shell and YPF to drill in 2024 the ultra-deep well Argerich.x-1 with potential resources estimated at 1,100 million boe.



