



## **Effects of Pre-Salt Relief on Salt Tectonics on the São Paulo Plateau and Implications for the Albian Gap, Santos Basin, Brazil**

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Pre-salt relief has been recently shown to significantly influence salt flow, producing three-dimensionally complex strain distribution and multiphase deformation within the evaporite sequence and overburden. The São Paulo Plateau, Santos Basin, Brazil is a prolific hydrocarbon province situated downdip of the Albian Gap, characterized by > 2 km thick, mechanically layered Aptian salt, prominent basal relief and a complex framework of supra-salt structures. This study uses 3D seismic data combined with physical and kinematic models to demonstrate how gravity-driven translation above thick salt with complex basal relief generated this framework. A series of ramp-syncline basins occur above and downdip of the main pre-salt highs indicating c. 30 km of translation in the area. As the system translated downdip, salt flux variations caused by significant base-salt relief resulted in non-uniform motion of the cover with simultaneous development of extensional and contractional structures and multiphase reactivation during the Late Cretaceous-Paleocene. Contraction occurred preferentially above landward-dipping ramps at base of salt and downdip of basinward-dipping ramps where motion decelerated. Extension occurred at the top of basinward-dipping ramps and base-salt plateaus, where flow accelerated. Where base-salt was broadly flat, structures evolved primarily by density-driven subsidence and diapirism. At the edge of or around smaller base-salt highs, salt structures were affected by plan-view rotation, shearing and radial flow. To the north, where earlier Albian growth occurred, deformation is marked by a polygonal plan-view framework that is also a consequence of oblique flow driven by the concave shape of the margin. The observed translation and deformation style in the area afford an improved kinematic model for the enigmatic Albian Gap located updip combining simultaneous extension and salt expulsion. These observations contribute to the long-lived debate regarding the mechanisms of salt tectonics in the Santos Basin, ultimately improving the general understanding of the effects of base-salt relief and regionally complex salt tectonics.