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Claudia Borbolla[1], Fernando Fernandez Seveso[2], Hector Bouso[1], Daniel Dellapé[1], Steven Bahret[3] (1) Chevron San Jorge, Buenos Aires, Argentina (2) Jason Geosystems, Buenos Aires, Argentina (3) Jason Geosystems, Houston, TX

Gas-Charged Reservoir Delineation, From Seismic to Simultaneous Inversion, Austral Basin, Argentina

AVO analysis, Trace Inversion and Simultaneous Angle Dependant Inversion (SADI) provided encouraging results for prospect evaluation in the onshore of Austral Basin, Argentina.

The Austral Basin, located in the southern most extreme of South America, developed as a tectonic depression in the Jurassic and evolved to a foreland basin during Late Cretaceous. The Springhill Sandstone is the main hydrocarbon productive unit and represents the retrogradational basal section of the Cretaceous marine flooding. The transgression expanded on the syn-rift topography and evolved to a thick section of shales, which constitutes the most important source rock and seal.

Initial bright spots detection guided two exploration wells, which resulted in one highly productive gas discovery and one non-commercial well due to low permeability reservoir.

Springhill gas reservoir is an AVO Class II anomaly. Pre-stack data organized by the angle of incidence and shear velocity information recorded in wells, are essential for accurate gas-charged reservoir characterization.

Because acoustic impedance (AI) volume interpretation reveals clean sandstones distribution but does not discriminate fluid content, additional information provided by SADI methodology was used to diminish the uncertainty associated with delineation of gas-prone reservoir. This methodology provides P-Impedance, S-Impedance, MuRho, LambdaRho, Vp/Vs and Poisson ratio, which are related to density, shear and compressional wave velocities; increasing the capability of fluid and lithology identification.

Multivolume interpretation and geobody capture techniques provided a superior layer model to recognize gas charged sandstones, providing confidence in the new prospect evaluation.