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Characterization of Fluvial Reservoirs in Environments Highly Influenced by Pyroclastic Supply, Golfo San Jorge Basin, Argentina

The Castillo Formation is the second oil bearing unit in the Golfo San Jorge Basin. At the western flank of the basin, the productive reservoirs are composed of conglomerates and sandstones corresponding to point bars and channel fill deposits with an average thickness of 4 meters. Those bodies are commonly associated with ingnimbrite-type pyroclastic flow deposits within the same thickness range. The most compacted components of those pyroclastic flow deposits are difficult to identify in conventional wire-line log data because they have a very similar response to those of clastic reservoirs.

Outcrop observations combined with well cuttings allowed the validation of a method for differentiating reservoirs based on the combination of density and sonic logs. From both of these well logs it was possible to obtain a hybrid curve that shows the volume of pyroclastic material present in the drilled section. This curve was used to subtract the pyroclastic component from lithologic logs such as spontaneous potential or gamma ray. In addition, these curves were correlated between wells to differentiate intervals showing pulses of different volcanic activity.

With 3D postack seismic visualizations it was possible to distinguish patterns similar to meandering channels that correspond to the reservoirs. The best facies within these bodies were identified by prestack attributes which in there empirical ratios enhance the velocity of P and S waves, parameters that are important for lithological differentiation.

This methodology allowed the identification of the facies with best reservoir conditions favoring exploration and development of the area.