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High Resolution Reservoir Characterization. The Effectiveness of Multi-Disciplinary Technologies in the Cerro Bayo Field, San Jorge Basin, Argentina

The Golfo San Jorge Basin, the oldest hydrocarbon producing basin in Argentina, is an intracratonic extensional basin located in the central part of Patagonia Terrane. Bajo Barreal Formation of the Upper Cretaceous age has been the main producing unit with reservoirs that have an average thickness that is between 2 and 10 meters. These intervals have high pyroclastic content that decrease the reservoir quality. This study involves a thorough petrophysical, sedimentological and stratigraphic analysis utilizing wireline logs, core or sample data and seismic information in order to allow lateral and vertical delineation of productive reservoirs. Well data provide sufficient vertical resolution but leave a large space between the wells. The use of standard seismic attributes was not effective for the recognition of thin-reservoir continuity due to the effect of wavelet superposition. The most effective way to establish a relation between well petrophysics and the seismic response is to remove the wavelet effect imprinted in the seismic data, for this purpose we used 3D trace-based inversion. After the seismic traces were transformed to pseudo logs of acoustic impedances we established the direct relation between this volume and the petrophysical reservoir properties such as porosity and shale content. The low-pass filtered logs were further analyzed via cross-plots, they permit to identify different lithologies and stratigraphic surfaces response. The acoustic impedance derived from the inversion process are sensitive to the presence of several stacked sandstone units and hence can be used to map lateral variations. Following this methodology we proposed several wells with better production performance than the existing in the study area.