[PS]Expanding the Limits of the Vaca Muerta Play in Areas of High Exploratory Risk*

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Abstract

The study area is located in the northern part Neuquén province, within the platform area of the Neuquén Basin. This part of the basin has the reservoirs considered the largest producer of conventional oil such as Mb. Troncoso Inferior, Mb. Chorreado and Mb. Avilé, which are currently in an advanced state of maturity and depletion. The western part of this sector remains unexplored due to its complex topography, lack of seismic information and presence of volcanic material in the stratigraphic column. The launch of the remaining exploratory plan of Vaca Muerta Formation, the first unconventional shale gas/oil development in Argentina, has the objective of re-evaluating this block as an opportunity to expand the limits of the Vaca Muerta play to the northern end of the province. Here, unconvencional exploration was very scarce to null, representing an opportunity to add value to this asset. In this sector of the basin Vaca Muerta Formation is in the oil generation window, having several levels with TOC values of 4 to 6% and good geomechanical properties, with potential to be navigated with horizontal wells. In the area there was an important volcanic activity associated with the formation of the Cerro Bayo laccolith, intruded into the lower Miocene; which produced the intrusion of dikes and sills along the entire stratigraphic column. These features act as mechanical barriers that may complicate hydraulic fracturing efficiency and the correct evaluation of the unconventional play, so special attention should be paid to their spatial distribution through detailed subsurface mapping. By the endo of 2017 a new 3D seismic survey was carried out on this topographically complex area. Over this new cube, emphasis was placed on the identification of seismic amplitude anomalies associated with the presence of sills in order to delimit an area with remaining unconventional exploratory potential. Using different seismic attributes followed by the detailed mapping and delineation of high amplitude geoforms, it was possible to delineate an area with lower risk of igneous activity and adequate geochemical properties. This work will be useful to derisk locations for vertical and horizontal wells in this highly complex area to collect data for a future unconventional development in this underexplored area of the Neuquén Basin.

Expanding the limits of the Vaca Muerta Play in areas of high exploration risk.

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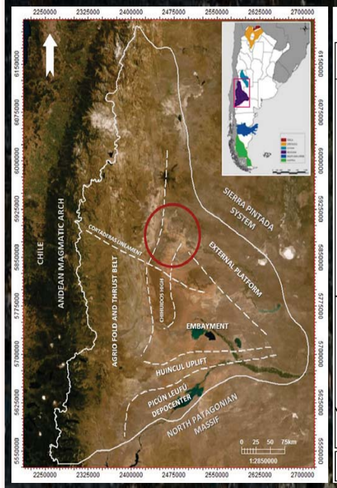
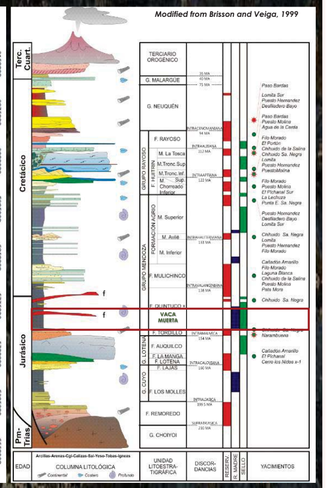
INTRODUCTION

The study area is located in the northern part Neuquén province, within the platform area of the Neuquén Basin. This part of the basin has the reservoirs considered the largest producer of conventional oil such as Mb. Troncoso Inferior, Mb. Chorreado and Mb. Avilé, which are currently in an advanced state of maturity and depletion. The western part of this sector remains unexplored due to its complex topography, lack of seismic information and presence of volcanic material in the stratigraphic column.





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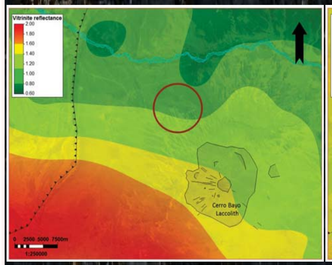
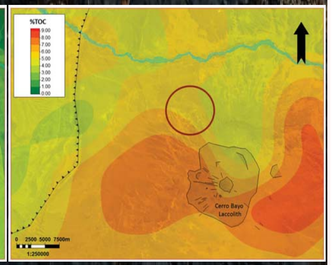
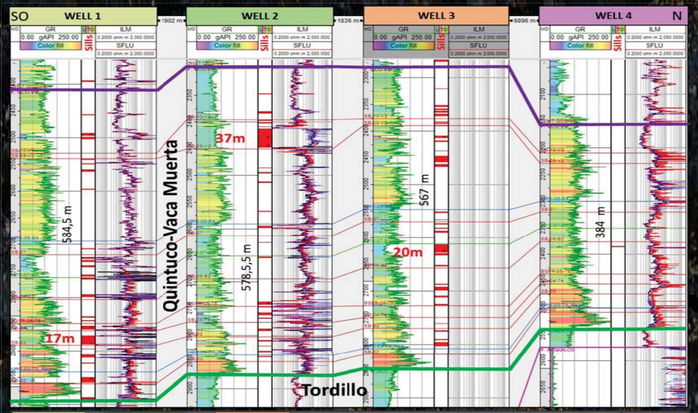
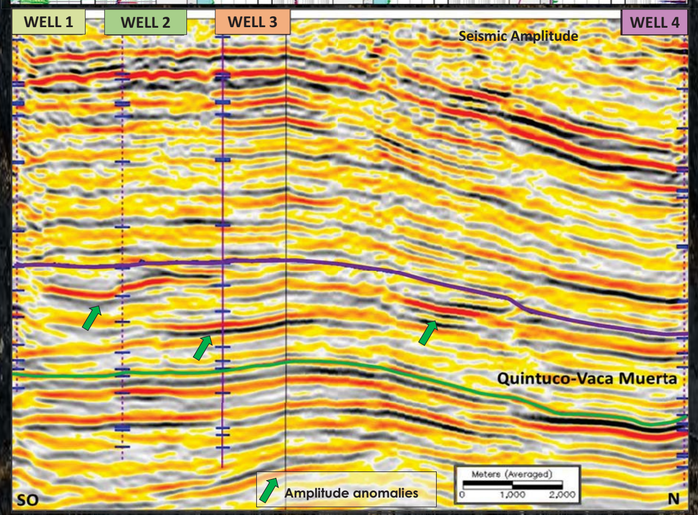




DATA, METHODOLOGY AND RESULTS

In the area there was an important volcanic activity associated with the formation of the Cerro Bayo laccolith, intruded during the lower Miocene; which produced the intrusion of dikes and sills along the entire stratigraphic column. These features act as mechanical barriers that may complicate hydraulic fracturing efficiency and the correct evaluation of the unconventional play, so special attention should be paid to their spatial distribution through detailed subsurface mapping.





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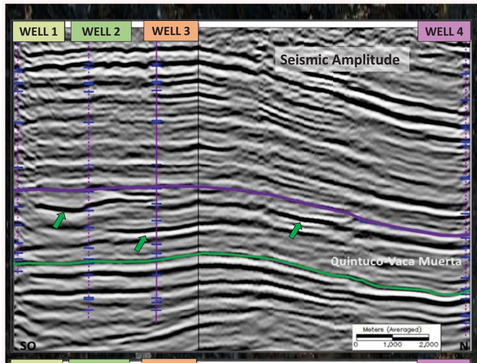

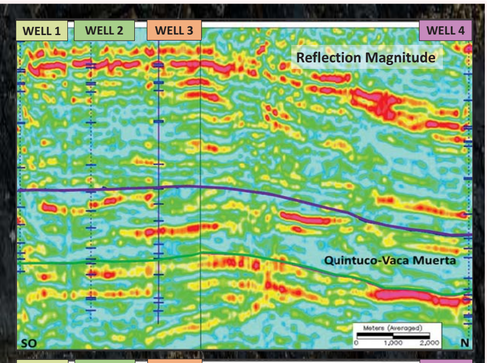

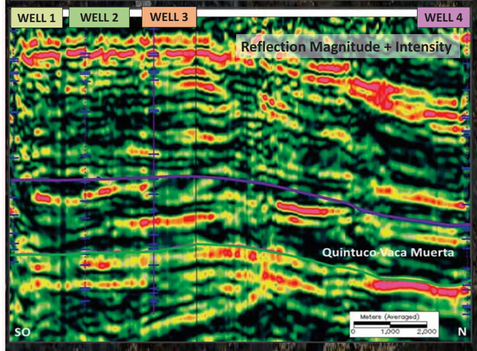

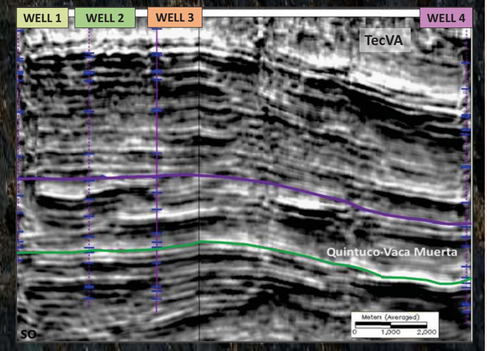

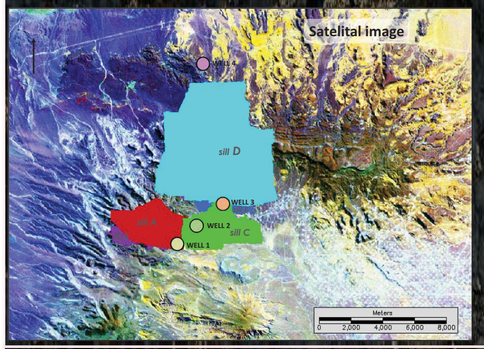

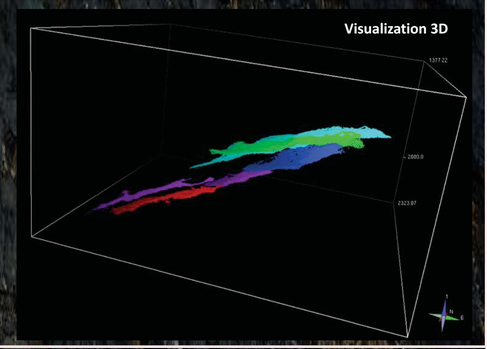

CONCLUSION

Having mapped, reinterpreted and discarded the main anomalies linked to dikes and sills in the Vaca Muerta Formation, visible to the seismic resolution of the 3D cube, was possible identified an area without sills and dikes. This workflow will be useful to derisk locations for vertical and horizontal wells in this highly complex area to collect data for a future unconventional development in this underexplored area of the Neuquén Basin.