LATERAL VARIABILITY OF THE VACA MUERTA FORMATION

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PROJECT OBJECTIVES

- Assess the degree of lateral variability between different sections only separated by a few kilometers.
- Use sedimentological, stratigraphic, petrophysical and geochemical changes between these sections to demonstrate the presence of current dominated deep basin processes.

PROJECT RATIONALE

Over the last several years, the Vaca Muerta Formation has proven its unconventional resource potential. The CSL has assembled a complete reference section at Puerta Curaco (PC) by splicing together the best-exposed segments of the formation. In 2017, we measured a new section to assess the lateral variability between PC and Aguada de los Tamariscos (AT), approximately 5 km north of Puerta Curaco. Last year, we measured an additional section at Pampa Trill (PT), another 15 km further north east.

We presented the differences between the measured sections in Puerta Curaco (PC) and Aguada de los Tamariscos (AT) in 2017, illustrating subtle indications of current driven depositional differences and an overall increase in carbonate content over the just 5km distance between PC and AT. Additional data from a presumably more proximal setting 15 km further NE will provide insight into the basin evolution on the far north-eastern end of the Neuquén Basin.

APPROACH

In the areas of Puerta Curaco, Aguada de los Tamariscos, and Yesera del Tromen we measured 12 different sections with a total length of 1850 meters. In addition to the lithologic spectral log, gamma ray was measured every meter and a sample for geochemical analysis was collected at each gamma ray location. Geochemical analyses included total organic content (TOC), carbonate content and isotopic analysis of the organic and



Figure 1: Location of the compared sections at Puerta Curaco, Aguada de los Tamariscos, and Pampa Trill

inorganic carbon. In the Puerta Curaco area, nine individual sections were spliced into a composite reference section that covers the stratigraphic column from Tordillo up to the Mulichinco Formation. The section in Puerta Curaro was correlated (lithologic and gamma ray) to the section at Aguada de los Tamariscos and ammonite zonation from Aguirre Urreta et al. (2014) provided clear age constraints for the first 120 m, and the younger parts of the sections were age correlated to wells in the El Trapial Block (Chevron) via spectral gamma ray. A more detailed explanation can be found in Rodríguez Blanco (2016). Now we have measured an additional section 570 m in length, collecting gamma ray and samples for geochemical analysis every meter.

SIGNIFICANCE

The lithologic sections display many similarities, but are different with regards to thickness, carbonate content, presence of calcite 'beef', and TOC. All three sequences are correlated based on lithological characteristics and gamma ray signature. Substantially higher carbonate content, and noticeably less horizontal, stratigraphically aligned calcite veins (beef) and volcanic intercalations have been observed in PT.

These observed variations between the sections can be explained with a proximal – distal trend but more importantly by the presence of currents that dominate the deep basin processes. Indications of current driven depositional differences are the thickness variations and the strong increase in carbonate content over a distance of just a few kilometers between PC, AT, and PT. The chemical data (carbonate content, TOC, isotopes) suggest a more proximal depositional setting at PT, only 15 km NE of PC.

REFERENCES

- Aguirre-Urreta, M., Vennari, V., Lescano, M., Naipauer, M., Concheyro, A., and Ramos, V. A., Bioestratigrafía y Geocronología de Alta Resolución de la Formación Vaca Muerta, Cuenca Neuquina, in Proceedings IX Congreso de Exploración y Desarrollo de Hidrocarburos, Mendoza, Mendoza, Argentina, 2014, Volume 2, IAPG, p. 245-268.
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