LATERAL FACIES VARIABILITY AND THICKNESS CHANGES IN A BASINAL SETTING

Ralf Weger and the Vaca Muerta Team

OBJECTIVES

- Measure a new section of the Vaca Muerta Formation approximately 5 km north of the existing Puerta Curaco reference section to assess the lateral variability in the basin center.
- Refine the Puerta Curaco (PC) reference section measurements and fill-in missing parts.
- Measure a new section in Yesera del Tromen to achieve a better tie to existing published age data.

RATIONALE AND BACKGROUND

In the last two years we have measured several sections in the Puerta Curaco area to produce a reference section without any gaps in coverage. The CSL has assembled a complete section through the Vaca Muerta Formation at Puerta Curaco by splicing together the best-exposed segments of the formation. This composite section provides a formidable framework for a comprehensive assessment of the sedimentological, stratigraphic, petrophysical and geochemical evolution of the Vaca Muerta Formation in this basinal position.

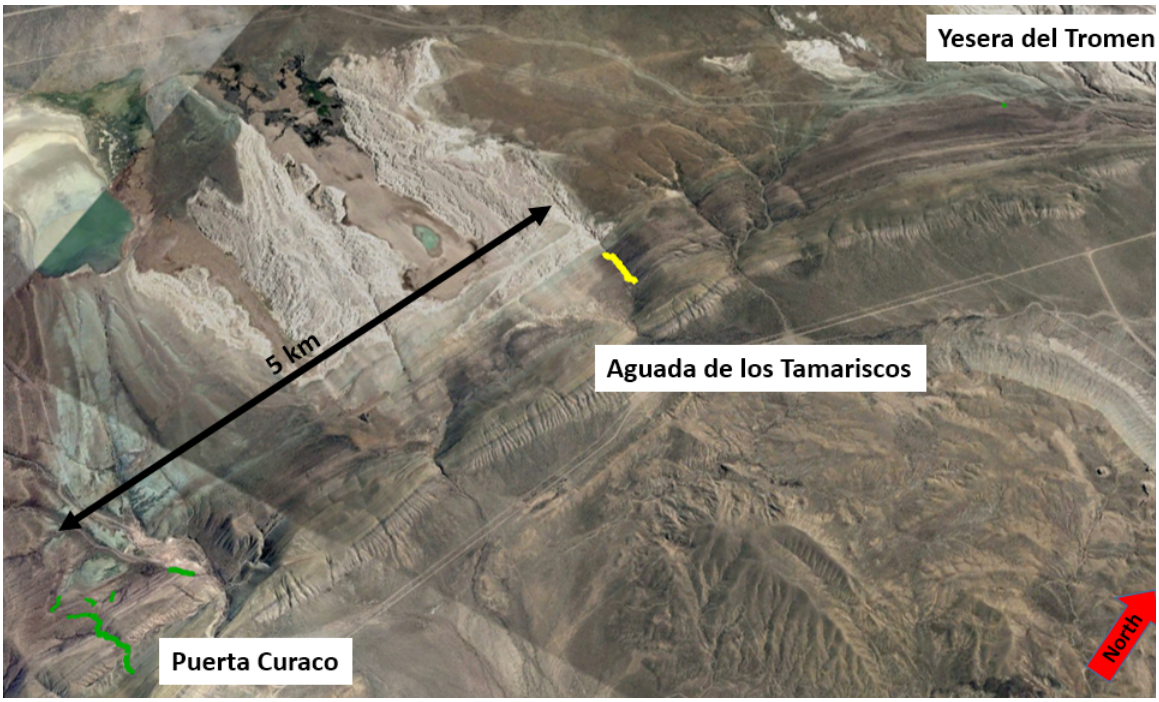

Figure 1. Regional overview and location of sections in Puerta Curaco, Yesera del Tromen, and the new section at Aguada de los Tamariscos.

In each segment the lithologic log is complemented with a gamma ray measurement and samples for chemical analysis at 1 m intervals to build a detailed 1-D record of the strata. This sedimentological, geochemical and petrophysical data set can be compared to cores and logs in the subsurface.

The individual segments of the reference section at Puerta Curaco are a couple of hundred meters apart and thus allow for an assessment of the small-scale lateral variability. To capture the variability on a larger scale, we plan to measure a complete section further away from the reference section. This offset section will provide valuable information about the distribution of TOC and strata in this basinal setting.

SCOPE OF WORK AND EXPECTED RESULTS

The new, offset section is approximately 5 km north of Puerta Curaco. This new section will provide meter-scale gamma ray measurements and samples for geochemical analyses. In addition, this new section will allow thickness comparisons between the existing PC reference section and another nearby basinal position.

This comparison will allow us to evaluate lateral facies variations, changes in bed and interval thicknesses, and any variability in total organic carbon (TOC) and carbonate content. Although the distance between the two sections is relatively short, the variation resulting from a 5 km northward movement within this basinal setting may allow us to discriminate a relatively more proximal position from a relatively more basinal setting.

Additional plans for the upcoming field season are to measure a section at Yesera del Tromen that has been dated with ammonites by Aguiire Urreta et al. (2014). This duplication of her section and the exact positioning of her ammonite zones into our section will strengthen the biostratigraphic dating of the reference section that is only a few kilometers away. In addition, it will serve as another anchor point for assessing the lateral variability in the basin.

To improve the splice at the reference section and to be able to better characterize the facies, we will measure short segments with better exposure in the Puerta Curaco area. Another drilling campaign to obtain more 1 m cores from key locations is planned for the spring.

SIGNIFICANCE

The lithology of the various outcrop sections, together with the petrophysical and geochemical properties measured, will provide an array of data points in the basin center that will capture the small and large-scale heterogeneity of the strata.

REFERENCES

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