HIGH-RESOLUTION CHARACTERIZATION OF CYCLES OF THE VACA MUERTA FORMATION, NEUQUÉN BASIN, ARGENTINA

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ABSTRACT

The early Tithonian-Valanginian Vaca Muerta (VM) Formation contains the fore – and bottom set of a mixed carbonate-siliciclastic prograding system in which fine-grained clastics dominate. However, variable amounts of carbonates and total organic carbon (TOC) are admixed, forming cycles with different motifs throughout the basin. The main goal of this project is to conduct a high-resolution characterization of the cycles using outcrop logs and short cores (~1m) from different stratigraphic levels and positions within the prograding clinoforms. This characterization will be completed using geochemical approaches that include TOC, isotopic δ13C and δ15N analysis, and carbonate content. Additionally, detail mineral identification will be performed using thin sections, X-ray diffraction (XRD), Near-Infrared Spectroscopy (NIR), and Hyperspectral Core Imaging (HCI) techniques. Element composition in short cores will be established using X-ray fluorescence (XRF) technique to retrieve ultra-high resolution (5mm) variability. The high-resolution study using geochemical approaches will help to investigate environmental conditions during deposition, provenance and diagenesis of sediments that together with lithological analysis will help decipher the processes forming and/or disturbing the cycles. A detailed study of the cycles forming the VM Fm is required to quantify lateral variations and to correlate them to log data. The lithological and geochemical signals when placed into the stratigraphic framework of the Neuquén Basin will provide the basis to predict cycles in sectors of the basin with logs but without sediment cores. This study will contribute to a better understanding of the processes producing unconventional reservoirs and distal mixed systems.

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