



Stratigraphic correlations of the Vaca Muerta formation in the southern Neuquén basin, Argentina

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The petroleum Neuquén basin, south west Argentina, contains a continuous late Triassic to Cenozoic succession including continental and marine sediments, deposited under a variety of tectonic regimes.

The Vaca Muerta formation is one of the major source rocks of the Neuquén basin and was deposited during the Andic cycle. This formation consists of organic-rich dark brown to black shales and mudstones deposited during a major transgression, in euxinic conditions on a shelf and slope during the Tithonian.

Over most of the basin, the Vaca Muerta formation overlies the continental deposits of the Tordillo formation. The contact between the two formations is isochronous throughout the basin and marks the Tithonian transgression (Leanza, 1981). After this transgression, prograding bodies were deposited and the Vaca Muerta corresponds to the distal part of this latest. It includes stages from Middle Tithonian in the south to Valanginian in the north (Leanza & Hugo, 1977).

The Vaca Muerta formation is well exposed in the southern part of the Neuquén basin, from the Picun Leufu Anticline to the north of the town of Las Lajas. It corresponds in these two areas to a succession of dark to brown shales and carbonate beds. In details, we can divide it into two parts: the Lower Vaca Muerta and the Upper Vaca Muerta. Above, the Picun Leufu formation overlies the Vaca Muerta formation and consists of carbonaceous and siliciclastics progradational bodies. This unit is absent in the "North Zapala Zone" and its lateral equivalent is less carbonaceous.

In this poster, we propose eight detailed sedimentological logs, which are correlated along 120 km north-south trend (from the Picun Leufu Anticline to the south west to the Agrio thrust Belt (ATB) to the north). This correlation will be used to assess the vertical and lateral variability of the Vaca Muerta deposits and to define the palaeogeographic evolution of that region.

This allowed us to identify two major prograding sequences during this period. The sedimentary response in the distal (central?) part of the basin (ATB) is characterized by an undifferentiated deposits of organic-rich dark brown to black shales and mudstones (Vaca Muerta facies), while in the proximal part we can identified two prograding sequences, the first one mainly siliciclastic and the second one mainly carbonated. The transition between these two sequences is characterized by a relief inversion of the southern part of the Neuquen basin related to the uplift of the Huincul Ridge (close to Zapala city). This tectonic movement involves the establishment on the southern edge of the basin of a blue marls deposits (lower part of Picun Leufu formation) which corresponds laterally to a carbonate platform (member Los Catutos of Vaca Muerta) on the structural high.