Abstract: Petroleum Systems Charged by the Vaca Muerta (Tithonian) Formation: Neuquen Basin, Argentina

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Tithonian (Upper Jurassic) source rock sequences are responsible for a significant volume of petroleum reserves on a global basis. This research defines the petroleum systems within the Neuquen basin that are charged from the Tithonian Vaca Muerta Formation, a unit deposited in a low angle ramp setting that is characterized in seismic and geochemical terms to contain three distinct organic facies. The oil types that correlate to the different organic facies are used to define effective migration pathways. The results indicate that the *distal condensed sections* are volumetrically significant but physical constraints related to hydrocarbon expulsion and migration contribute to decreased system efficiency. In contrast, the hydrocarbon potential of the *shelfal condensed sections* have less volumetric significance but exhibit higher efficiency due to the shorter distance required for fracture propagation (i.e., related to the expulsion event) and the effective juxtaposition of migration conduits and/or potential reservoirs. Organic facies are also identified within the Picun Leufu subbasin (South Embayment) that generate a hydrocarbon charge at relatively low levels of thermal stress. The sequence of events required for effective hydrocarbon entrapment is demonstrated by time-slice analysis for the Vaca Muerta-Lajas (!), Vaca Muerta-Sierras Blancas/Tordillo/Catriel/Qda. del Sapo (!), and Vaca Muerta-Quintuco/Mulichinco/Loma Montosa (!) Petroleum Systems.

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