

Cretaceous Napo U and Napo T Sandstone Channels Accommodation Space Created by Tectonism and Erosion; Exploration and Development Implications on Western Ecuadorian Oriente Basin

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Abstract

A regional evaluation of Cretaceous Napo U and Napo T Sandstones channels, in the central and western Ecuadorian Oriente Basin, based on sequence stratigraphy has been performed by integrating well logs, core descriptions and seismic data analysis. This evaluation has allowed the identification of main mechanisms that created accommodation spaces of Napo U Sandstone and Napo T Sandstone channels across the western and central Oriente Basin. Detail sequence stratigraphic analysis, depositional setting evaluations and facies analysis of different oilfields like Coca Payamino, Paraiso, Huachito, Inchi, MDC, Sacha, Shushufindi, Auca, Cononaco, etc., has helped to identify and explain that accommodation spaces were created by tectonic and erosive mechanisms working on the depositional timing over different areas on the western and central Ecuadorian Oriente Basin. Erosional surfaces and basal lag facies have been described on core data from different wells (Payamino, Oso, Auca, MDC). Erosion and tectonic events can be identified on oilfield scales well log correlations represented by thickening or thinning of Napo U and Napo T Sandstones and Napo Shale intervals. Southwards of present-day Napo River, erosion was the main mechanism working to create the required accommodation spaces to preserve the Napo U and Napo T Sandstone channels. As oppose to that event, to the north of Napo River, an extensional tectonic event was the main mechanism to develop the accommodation spaces for Napo U

Sandstone channels. The geological models of different oilfields are compared against published models highlighting hard data that supports interpretations and conclusions. The regional evaluation and geological modelling of Napo U and Napo T Sandstone reservoirs depositional setting is a key tool on both exploration and development projects. Understanding the geological evolution and patterns that created accommodation spaces for sandy channels helped to develop indirect mapping technique of reservoir areal distributions, since those reservoirs cannot be reliable image from seismic data due to limited thickness and seismic resolution. That indirect mapping technic approach has been successfully applied to both exploration and development projects, including secondary recovery by water flooding for some oilfields in the western Ecuadorian Oriente Basin.