

From Nanopore to Seismic Scale - the Role of Organic Matter in Vaca Muerta Shale Oil Productivity and Sweet Spot Prediction in Rincón de Aranda block

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ABSTRACT

An increasing number of studies demonstrate the key role of organic matter in the productivity of shale plays. Integrated results from the first shale oil well in Rincón de Aranda (RDA) block confirm this strong relationship, but current understanding of hydrocarbon storage and flow in the matrix and fractures of shales is still insufficient to predict recovery.

In order to understand the specific role of organic matter for porosity and oil saturation in a shale oil reservoir, we image shale pore networks at micro- to nanoscale and quantify relative petrophysical properties using an integrated workflow of CT/FIBSEM 3D imaging of core subsamples.

From well logs and laboratory data, we observed a strong correlation between TOC and Sonic measurements for a large collection of shale oil wells and calculated a TOC-DT function. Using neuronal network and multiattribute workflow, we applied this function to the Transit Time cube calculated from a trace inversion of the 3D seismic data available for the RDA block and obtained a calibrated TOC cube.

If the search for the sweetspot(s) in an area should be multicomponent (TOC, reservoir thickness, overpressure, etc.), the TOC cube should be considered as a key element for productivity prediction not only in Rincón de Aranda but also all over the Vaca Muerta oil window.