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## Abstract

While carbonate reservoirs are holding more than 60% of undiscovered reserves, exploration results over the last decade have dampened such expectations and confirm that uncertainties around, for example, identification from seismic have not come down. In addition, development and characterization of carbonate reservoirs is still more expensive and challenging than sandstone reservoirs. Consider, for example, the lower recovery factors, net to gross, matrix permeability and porosity in carbonates.

To improve our knowledge base and optimize pre-drill assessment for carbonates, TotalEnergies developed three new and innovative products: 1) GIS-based improved paleo digital elevation models with probabilistic carbonate presence, 2) browser-based relational database covering core – to well - to reservoir scale reservoir quality and geological attributes and, 3) browser-based relational database of seismic imagery, geological attributes, and diagnostic criteria.

A dedicated semi-automated workflow was developed for state-of-the-art paleo-DEM products which show radical differences compared with current academic and industry products. For example, the location of basins, shallow-water acreage and major seaways are, in many cases, radically different. The paleo-DEM products form the basis for paleoclimate modeling and result in probabilistic products for GDE and thickness for Ypresian, Rupelian and Burdigalian time slices. The browser-based reservoir quality application provides estimations of typical reservoir quality ranges for exploration projects but also allows reviewing – and quantifying - the link between geology and multiscale reservoir quality in existing reservoirs and basins/regions, K multipliers, saturation, and many other questions. Lastly, the browser-based seismic application provides fast access to diagnostic criteria for a range of carbonate settings as well as volcanic for contrast-comparison and unbiased and semi-quantitative analysis of the target object.

This presentation will explain and illustrate the value of these novel tools in bridging and simplifying carbonate exploration and effectively democratizing knowledge by putting those directly in the hands of the explorers.

Democratized digital GIS-based probabilistic carbonate presence and thickness and browser-based reservoir quality and seismic diagnostic criteria for carbonate prospects.