

Using Subsurface and Outcrop Analogues to Improve Reservoir Modeling in a Low Price Environment – The Petrobras Experience

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ABSTRACT

Petrobras has built a database named Phoenix to support the classification of the most important Brazilian petroleum reservoirs on the basis of static (geological) and dynamic (fluid) criteria. These reservoir classes have been used as analog oilfields to support reservoir static and fluid flow modeling and also reserves estimation and certification. Multidisciplinary reservoir data from over 300 oil and gas fields producing from over 3,000 production zones have been incorporated into the Phoenix system, recording information from important sedimentary basins, including the Pre- and Post-Salt sections of the very prolific Santos and Campos basins.

The team characterized the current stage of oil recovery in all production zones, aiming to recognize the most important controlling factors of their recovery factor, and defined an “ultimate recovery factor reference” for each reservoir class in the Phoenix system.

Petrobras has also built a database named SAGA that contains information related to reservoir geometry, facies characterization and spacial distribution, and petropysical properties, which have been described and measured in tens of outcrops located in many different countries such as Brazil, Argentina, USA, France, Australia, South Africa, and Namibia. These outcropping reservoirs, mostly of siliciclastic turbidites and lacustrine and marine carbonates, are analogues to many Brazilian reservoirs, particularly to those of the Pre- and Post-Salt sections of the Santos and Campos basins.

Large database systems such as Phoenix and SAGA have been used to support and improve the reservoir modeling of many areas operated by Petrobras, particularly in areas at the early stages of exploration and production development, allowing significant cost reduction in data acquisition, something very critical in the current scenario of low oil prices faced by the oil industry.