

Drilling Dynamics Knowledge Contributes to Reservoir Navigation Decisions in the Peregrino Field, Offshore Brazil

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ABSTRACT

Realizing the full potential of the Peregrino oilfield requires an increasing number of high-angle and horizontal wells (HAHZ). These complex wells are more challenging than previous vertical wells and are correspondingly more expensive. Mitigating technical and economic risks requires innovative techniques.

The basis of successful drilling and optimization of reservoir production from Peregrino field HAHZ wells is geological understanding and correlation. Geological complexity is common, with potential for close offset wells to be markedly different due the heterogeneity of the sandstone reservoir deposited from gravity flow and a high rate of lateral variation. These factors mean that even a well-constructed reservoir navigation model does not guarantee good geological correlation and understanding.

This presentation illustrates an efficient method for prompt identification of geological targets, bed boundaries, and lithological changes, based on a combination of highly specialized drilling dynamics measurements and reservoir navigation services supported by extra-deep azimuthal resistivity. With local knowledge, the drilling measurement is sophisticated enough to support not only the identification of change in drilling dynamics but also characterization, enabling an enhanced geological interpretation. The method and examples presented show the balancing of forward (at-bit) warning of lateral formation changes with the geospatial mapping capability of the extra-deep azimuthal resistivity measurements, providing early update of the geological model and a reduction in geological uncertainty.