

Prestack Classification Applied to Siliciclastic and Carbonate Deepwater Reservoirs

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ABSTRACT

This recent publication, written with colleagues from Petrobras, is brief overview about the use of prestack data in classification workflow applied to Albian carbonates and to an Oligocene siliciclastic reservoir. This classification workflow makes more with already acquired prestack data. The results of this technology show us that prestack attributes could add more information to reservoir characterization and modeling in terms of facies variation and also of structural features, highlighting faults and detecting fractures zones. That could improve our reservoir characterization and could lead to better production forecast.

The characteristics of a seismic reflector or a set of reflectors might be associated with changes in the strata geometry or lithology. Many existing methods are used to recognize these geology patterns from seismic data. This article presents a workflow for prestack seismic amplitude versus offset (AVO) classification that was applied to an actual dataset in the continental shelf of the Campos basin.

In addition to the classical correlation polygon AVO classification, another parameter, “intensity,” was introduced to further characterize the variations within an individual polygon. Rather than a constant value per polygon, each data point within the polygon is scaled gradationally by its distance to the background trend reference line defined by the interpreter.

This method enables gradational classification values to be assigned, which captures the “uncertainty” or “intensity” of the classification results and helps to reveal subtle stratigraphic and structural features in the target reservoirs.

Finally, the classified seismic volume is submitted to a volume segmentation algorithm to extract geobodies, which can identify the most useful seismic class variations for mapping purposes. This workflow was applied to both the Albian carbonates and Oligo-Miocene reservoirs.