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3D Visualization of Alluvial and Lacustrine-Palustrine Sedimentary Systems: the Examples in the Strike-slip As Pontes Basin (Northwest Spain)

In reservoir modeling is fundamental to understand the geometry of the facies and sedimentary bodies, their 3D detailed distribution and their relationships. All these characteristics can only be known in exceptional conditions like well-exposed and oriented outcrops, good 3D-seismic data, or extensively drilled fields and basins. We take profit of the data obtained from these kind of reservoirs in order to develop, test and improve facies stochastic simulation algorithms useful for predictions of the characteristics of similar productive reservoirs.

The As Pontes basin is a potential analog for alluvial and lacustrine to marsh-swamp systems. Intensive coal mining has resulted in the drilling of 1256 wells with continuous core recovery (in total more than 170.000 meters). Wells are placed forming a nearly regular grid spaced at about 105 m. Moreover, some spatial features and relationships between sedimentary bodies can be extracted from some outcrops. The lithofacies found in the wells have been described, correlated and grouped by sequences. From these data, 3D stratigraphic grids are built, constrained by isochronous surfaces, and are populated using a deterministic approach. As a first step these results would serve to compare different algorithms for populating grids. Also, these models provide new insights on the evolution and distribution of the alluvial fans and the related lacustrine-palustrine deposits of the basin. The 3D grid model could be visualized using several cross-sections or bounding isosurfaces to help in a better comprehension of the architecture of the alluvial fan reservoir analogs and of the associated lacustrine and marsh-swamp facies.