

Exploration of a Frontier Area Using Numerical Stratigraphical Modeling, Application to the Offshore Colorado Basin of Argentina

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In the Argentine Continental Margin, the Colorado Basin (160,000 km²) records 12,000 m. of continental and marine sediments. With the 3000 km of 2D seismic shot in 1999, began the commercial exploration of the deep water areas (1000-3500 m). Currently, a few wells located on the basin borders investigated only the upper-third (Upper Cretaceous to Quaternary) of the sedimentary column. In order to optimize and validate the geological model, a numerical stratigraphical approach (Dionisos) was used to simulate a 3D model of the stratigraphic architecture detailing sequences and facies distribution of the eastern part of the basin. The software simulates erosion, transport and deposition of the sediments using macro-scale physical laws and geological input (accommodation maps).

The Colorado Basin initiated by a Lower Mesozoic rifting-period was followed by a Cretaceous to Miocene sag period that ultimately reached the present day passive margin configuration. The simulation has quantified the geological parameters and evaluated the facies distribution, including the non-drilled areas (Lower Cretaceous, Jurassic, the eastern part of the basin). Matching with the seismic information, the simulation indicates a drastic change from continental to restricted and the open marine environments around the Atlantic spreading period corresponding to the beginning of the sag phase.

Focusing on the methodology, this study shows the different stages of the stratigraphic modeling from the interpretation of the dataset (seismic lines, cuttings, wireline logs and paleontological data) to the model validation. This study clearly illustrates the interest in stratigraphic modeling techniques for basin exploration with relatively few data.