

PREDICTING FLUVIAL RESERVOIR FACIES DISTRIBUTION BY APPLYING ADVANCED SEISMIC RESERVOIR CHARACTERIZATION TOOLS TO UZBEKNEFTEGAZ ASSETS

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The goal of the current work is to describe the results of seismic reservoir characterization done for Uzbekneftegaz (UNG) assets in Ustyurt basin as a part of exploration and field development planning project.

UNG assets are located in the area of Berdakh high and Sudochi depression. Ustyurt is a Jurassic intracontinental rift basin containing continental Jurassic sediments, continental to shallow marine and marine Cretaceous and Paleogene sediments overlying Paleozoic rocks.

Detailed study of the reservoir structure, stratigraphy and properties of the fields developed since 2002, where there are more than 60 wells, is urged by the low success rate of drilling and development of productive horizons.

This issue has plagued geologists and developers, who understood the lenticular structure of reservoirs, but did not have the technological ability to track these lenses in the lateral direction for many years. Until today, the approach to drilling exploration and production wells was based on the concept of a lithologically consistent layered reservoirs, that changed dramatically as a result of the reinterpretation of 3D seismic data.

Previous studies in Ustyurt were lacking holistic approach to seismogeological analysis, applied in this work and required to get the full understanding of the geological concept, reservoir properties and their distribution.

In the current work we would like to focus on the seismic reservoir characterization tools, which, despite the limitations of data quality, allowed to get valuable outputs.

Chromatic extraction in color domain as well as spectral decomposition were two strong tools that enabled to perform stratigraphic analysis of seismic data. Chromatic extraction in RMS mode increased the lateral precision and added additional details to the areas with moderate seismic quality. Post-stack inversion was applied to the data to get closer to quantitative estimates. Tools such as Automatic Well Tie (AWT) helped to extract proper wavelet shapes and TDRs in optimal timeframes.

As a result of the successful implementation of the mentioned tools the reservoirs of Ustyurt basin, represented by alluvial and fluvial deposits were traced and predicted in inter-well space. This information was a valuable input to geological and dynamic models. Delineation of paleochannels, formed more than 145 million years ago has explained why the same two fields were not identically productive.

Eventually, consideration of the seismic reservoir characterization results has changed the location of planned exploration and production wells dramatically and led to drilling successful wells with commercial production rates.