

New exploration results on the northern escarpment zone of the Pre-Caspian Basin, Kazakhstan

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In the northern escarpment zone of the Pre-Caspian Basin, Kazakhstan, in the extensional passive salt diapir zone, 4000 – 5000 m high salt domes separated by narrow and deep mini-basins have been explored by 3D seismic. Because of the high structural complexity of the study area the conventional 3D Kirchhoff post stack time migration (PSTM) processing did not provide reliable results. Seismic image quality below the salt domes was poor, correlation of horizons was uncertain, more over the pull-up effect and the inadequate time-depth map transformation provided unrealistic geologic model.

PSDM/WEPSDM processing resulted realistic seismic structural images under the high salt domes and better horizon correlation.

Based on a joint interpretation of three connected seismic 3D cubes (sum area cc. 1000 km²) reprocessed by PSDM and WEPSDM we got clearer picture about the development of the northern part of Pre-Caspian Basin.

The applied method provides better chance to prepare more detailed structural, stratigraphic and facies maps and to improve the geological model of the escarpment zone.

The updated pre-salt and pos-salt geological model of the escarpment zone resulted new exploration targets. First of all a low angle compactional anticline within the Tournasian carbonates related to the Riphean cored, eroded, transpressional Rozhkovsky anticline. It has been drilled and proved to be hydrocarbon bearing.

There are some other new exploration objects as well:

- unconformity related stratigraphic traps on the flanks of the eroded Devonian Rozhkovsky anticline,
- compaction anticlines and mounds within the platform carbonate series,
- mixed carbonate and clastic slope fans, carbonate build-ups bodies within the Upper Devonian-Lower Permian carbonate mega-sequence.

The most promising new exploration objects shall be drilled and the new elements of the geologic model concept will be verified in the northern escarpment zone of Pre-Caspian Basin.