

### **3D Reconstruction of a Shale-Cored Anticline in the Western South Caspian Sea**

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The South Caspian Sea is a Mesozoic back-arc basin located in central Eurasia and generated during the Alpine orogeny. The basin lies on a probable oceanic crust and contains large sedimentary depocenters of more than 20 km depth. Oldest sediments are presumably Jurassic and ~10 km were deposited from Late Miocene-to-Recent. The Productive Series (5.9 Ma to ~3.4-3.1 Ma) represent a thick fluvio-deltaic sequence of ~6 km and they are overlaid by the youngest formations of Akchagyl, Apsheron, and Gelasian, which are here referred as the post-Productive Series (~3.4-3.1 Ma-to-Recent). Numerous folds deform both Productive Series and post-Productive Series since Pliocene times. They are commonly intruded by shale structures and overpressured mud comes from the Maykop Unit (Oligocene-to-Miocene).

This study is focused on the geometrical reconstruction of the KAD anticline, in offshore Azerbaijan. We use a post-stack 3D seismic cube migrated in depth tied with data from two exploration wells. KAD structure is a SE-NW fold with a sigmoidal trace composed by two culminations. The analysis of fold profiles shows a variable geometry along strike and anticline changes from symmetrical box-like structures to asymmetric folds with variable vergence. Mud diapirs pierce the culmination domains and usually sketches teardrop shapes fed by vertical welds. Mud volcanoes are also recognized in the southern culmination.

Folding was originated presumably due to the development of a detachment level within the Maykop Unit located at more than 9 km depth. Mud diapirism occurred simultaneously to folding. A detailed analysis of the geometry of fold flanks evidences important differences with the classic examples of detachment folds that suggest a tilting of the basin to the east during folding. Numerous collapse faults usually displace the youngest formations on both culmination regions and show a radial pattern. The deepest horizons are crosscut by reverse faults oppositely oriented.