Ancient depositional environments of the Eastern Black Sea

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The study aims to detail the main features of the ancient depositional environments as they evolved from the Late Jurassic to the Present time.

A 2D seismic survey offshore and geological data onshore are contributing to understanding of the depositional paleo-environments of the Eastern Black Sea**.**

In the Late Jurassic time the relatively deep water Western Caucasus basin was connected with the Eastern Crimea basin and was surrounded by shelfal zone. The limestones located on the Upper Jurassic shelf consist of reefs with associated deposits. These upper Jurassic carbonate deposits have been considered as favorable formational areas for oil and gas pools as is shown on the Shatsky Ridge in the Eastern Black Sea.

The relatively deep water depositional area of the Western Caucasus had been developing until the Middle Eocene, however during this time the size of the basin had been diminishing. Presumably, beginning from the Middle Eocene, the Tuapse Trough, a new deep-water basin, began to form during the same time as the post-rift subsidence of the Eastern Black Sea basin. The Tuapse Trough and Eastern Black Sea basin are separated by the Shatsky ridge, and both basins consist of onlap fill successions. The Middle Eocene – Early Oligocene sediments in both of these basins provide a possible oil and gas source rocks.

The Late Mesozoic and the Early Paleogene shallow-water carbonate sedimentation was changed by predominant terrigenous deposits in the relatively deep-water basins. The Late Sarmatian time (beginning of the Late Miocene) is characterized by a strong regression. Subaerial exposure on the eastern periphery of the sea at that time is confirmed by a buried paleo-river valley stretching 230 km from Gudauta uplift along north slope of the Shatsky Ridge. This fluvial incision has a depth of 200-300 meters. Late Miocene rivers were sediment transport pathways into the Eastern Black Sea basin. After the Sarmatian, the Shatsky ridge began to subside due to thermal relaxation as well as the increasing sediment load into the basin. The average rate of subsidence is estimated to be 0.4 km/my for the last 10 million years. Non–anticlinal hydrocarbon traps can be located within the buried valley.

Late Pliocene-Quaternary subsidence of the Black Sea Basin was thought to be the fastest due to the rate and amount of sediment found within that time period. Both the Shatsky Ridge and Tuapse Trough were involved in this basin subsidence and seem to act as a unit rather than independent features indicating that these two features are now reacting to the basin subsidence as dependent units rather than separate ones.