

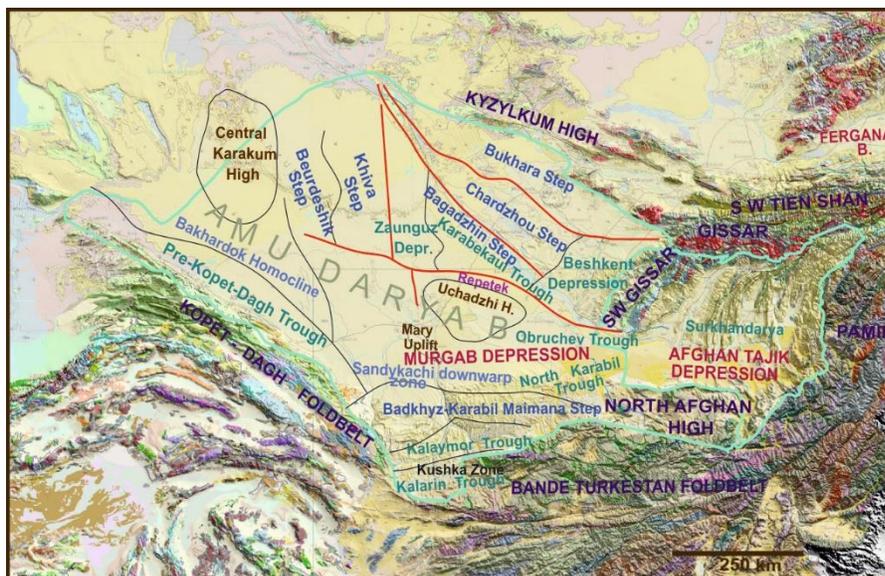
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Evolution of the Amu Darya Basin: interplay between tectonics and inherited structures

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The Amu Darya Basin (ADB) is a rich petroleum province of Central Asia, extending to the east in the Afghan Tajik Basin. ADB is settled on the southeast of the Turan platform, between the sutures of the Turkestan ocean to the north and the Palaeo-Tethys ocean (PT) to the south, closed respectively during the Late Palaeozoic and Early Mesozoic. Blocks/microcontinents, terranes, island arcs accreted during the Palaeozoic to the northern active margin of the PT are composing a poorly defined heterogeneous basement underlying the ADB. They played an important role in shaping its composite structure into a series of variously oriented steps, troughs and highs (Fig. 1). Georeferenced maps of faults, magnetic and gravimetric anomalies, isohypses, isopachs were considered to unravel the location, origin and tectonic calendar of the main structural elements.



North and NW trends are inherited from the Palaeozoic collage; west trend is parallel to the PT margin and SW Tien Shan, some faults being reactivated in strike-slip. NE trending faults, already active during the Jurassic in shaping the area of subsidence and facies, were reactivated during the Cenozoic as in SW Gissar, dividing the ADB and Afghan Tajik Basin.

Figure 1: Main structural elements of the Amu Darya and Afghan Tajik basins. Light green outlines the two petroleum provinces.

A set of cross sections, modified from Soviet publications (few new data were published at the basin scale), was studied to characterize the subsidence evolution of the mains parts of the ADB. Three of these sections were backstripped in 2D, and some 1D subsidence curves were analysed in more detail. The west oriented Murgab depression is the thickest sub-basin of the ADB with possibly around 15 km of sediments deposited since the Late Palaeozoic. The main tectonic events leading to the ADB formation and evolution took place: (1) in the Late Palaeozoic-Early Triassic (back-arc extension/strike slip); (2)

from Mid-Triassic to Triassic-Jurassic boundary (Eocimmerian collision of continental blocks, derived from Gondwana, with the southern margin of Pangea and closure of the PT); (3) during Early to Mid-Jurassic (post collision extensional event). The last part of the evolution reflects the shortening and flexure due to Cenozoic collisions. Structures are either newly formed or reactivated. These events are then related to the geodynamics of the Tethyan domain through some palaeotectonic maps [1] of the Darius Programme, which was the frame of this study.

[1] Barrier E. and Vrielynck B., 2016. Palaeotectonic maps of Middle East and Western Central Asia from the Middle Permian to the Pliocene. Scale 1:17 000 000, 20 sheets. CGMW. ISBN: 9782917310304

