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# The Eastern Greater Caucasus - Uplift, topography and tectonics

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With Mount El'brus culminating at 5642 m.a.s.l. the Greater Caucasus is Europe's highest mountain range at the cross-road of Europe, Asia and Arabia. Its eastern termination, in Azerbaijan, plunges into the South Caspian Sea, one of the world's major oil provinces. The sediments hosting the oil reservoirs are deposited in the very deep basin formed by the South Caspian ( $>$ 20km). The western termination borders the Black Sea, another important oil exploration region. The provenance/source of the sediments is the Greater Caucasus where they are eroded and subsequently carried by large rivers such as the Volga, the Samur and the Kura.

The overall geodynamic setting of the Greater Caucasus corresponds to a continental collision. The tectonic features of the Eastern Greater Caucasus are those of a doubly verging mountain-belt with two external fold-and-thrust belts. The generally admitted model is that the Great Caucasus mountain range has been forming since the Neogene. The main event giving rise to the present topography started in Miocene and lasts into the Present. The continued convergence (since Tertiary) makes the Greater Caucasus a unique mountain belt where *tectonic activity is expressed in the morphology.* The changes in topography reflect the distribution and arrangement of the major structural features such as the Alazani Basin, the Main Range, etc..

Results from GPS measurements indicate an average deformation of 14mm/y across the eastern part of the mountain range. Compression is oriented N-S. This is in agreement with studies on paleostress of the recent brittle faults cutting the whole range and developing prominent morphological features such as deep gorges.

Active and relic mountain fronts shape the topography along the southern edge of the

mountains. They allow establishing a chronology of the major tectonic events. The active thrust front can be seen in the Karamarian anticline; a large anticline developed in Quaternary sediments to the S of the mountain range in the Kura Basin. This structure is linked to a blind thrust hidden in subsurface and is indicative of ongoing deformation. It has been incised by large valleys to form wind- and watergaps making it possible to determine lateral growth of the anticline.

Uplift of the highest summits in the central and northern parts is highlighted by Plio-Pleistocene marine sediments now found at elevations in excess of 2500 m.a.s.l.. In the Northern part of the mountain belt the erosional deposits of the Samur river are deeply (>400m) incised by the present tributaries of the river. The rivers entrench and cannibalize their own deposits, starting in early Tertiary, and are mirroring the active tectonic growth and dynamic evolution of topography.

The Greater Caucasus is a *unique natural laboratory to investigate the link between lithospheric and surface processes.*