

Topography, tectonics and uplift in the Greater Caucasus: a perspective from Azerbaijan

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The Greater Caucasus (GC) is Europe's highest mountain belt and results from the inversion of the GC backarc-type Mesozoic rift basin due to the collision of Arabia and Eurasia.

The GC is a doubly verging fold-and-thrust belt, with a pro- and a retro wedge actively propagating into the foreland sedimentary basin of the Kura to the S and the Terek to the N, respectively. Based on tectonic geomorphology - active and abandoned thrust fronts - the mountain range can be subdivided into several zones with different uplift amounts and rates with very heterogeneous strain partitioning. The central part of the mountain range – defined by the Main Caucasus Thrust (MCT) to the S and backthrusts to the N – forms a triangular-shape zone showing the highest uplift and fastest rates, and is due to thrusting over a steep tectonic ramp system at depth. The meridional orogenic in front of the Greater Caucasus in Azerbaijan lies at the foothills of the Lesser Caucasus, to the south of the Kura foreland basin.

The orogenic processes that led to the present mountain chain started in early Tertiary, accelerated during the Plio-Pleistocene, and are still active as shown from present GPS studies and earthquake distribution. Total uplift since Sarmatian is in excess of 3700 m as documented in the Eastern GC in Azerbaijan. Uplift rates in excess of 10-12 mm/a in the central part of the mountain range need to be confirmed especially when confronted with data showing more moderate uplift rates of 0.33 to 1.00 mm/a over the last 10 Ma. Overall convergence is converted into a 6-14 mm/a horizontal deformation across the Lesser Caucasus and the GC. An important drop in velocities across the Main MCT in the GC, indicates that there is no horizontal displacement, but dominantly uplift N of the MCT! The MCT is a main boundary north of which we observe the development of triangular zone of uplift related to an important tectonic ramp system at depth.

New field evidence on thrust geometry, tectonic geomorphology, and tectonics combined with literature data on Tertiary tectonics in Azerbaijan led us to investigate the relationship between tectonics, topography and uplift in the eastern GC and correlate and expand our findings along strike to the whole GC. Clear links between geomorphology, uplift, seismicity and tectonics can be observed.