



Alpine tectonics of the Greater Caucasus : a review

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The Greater Caucasus is Europe's highest mountain belt at the cross-road with Asia, with numerous summits in excess of 5000m, such as Mount Elbrus with its 5642m. The Greater Caucasus (GC) extends from the Black Sea in the W to the South Caspian Basin to the E and results from the rotational convergence of the Arabian and Eurasian (Scythian) plates. This Tertiary age orogen developed from the inversion of a former intracontinental, possibly hyperextended, rift-basin. The GC forms a doubly vergent orogenic belt with a dominant thrust direction top-to-the south. Both, to the N and the S, we observe active foreland-fold-and-thrust belts that propagate into their detrital flexural foreland basins. Unlike in the GC, extension in the Black Sea and South Caspian basins went beyond rifting to develop new ocean lithosphere, though at different more recent periods. The alpine orogen developed obliquely across the original rift basin/northern rift shoulder setting. Different structural domains thus reflect different former paleogeographic and synsedimentary settings of the southern, central, and northern GC Basin. The main present-day tectonic boundaries (thrusts, strike-slip faults) associated with the plate convergence and the mountain building processes develop along inherited structures.

Foreland directed fold-and-thrust-belts can be observed to the N and S of the Main Range such as in Georgia and Azerbaijan (to the South) and in Dagestan (to the North). The central and W segment of the northern slopes are characterized by steep S-dipping thrusts. The transition to the north towards the Stavropol High is via a broad regional monoclinical slope formed in the sedimentary series of the Scythian platform that may possibly be related to basement inversion along reverse thrust that reach far into the foreland. The S-slopes to the S of the core of the orogeny, are formed by a succession of tectonic domains separated by major thrusts and showing fault-related folding. The dominant thrust is the Main Caucasus Thrust (MCT) separating the core of the GC from the southern slopes. It also forms the boundary with the Paleozoic basement in the central and western part of the GC.

Igneous and effusive magmatism have accompanied the GC Basin, and subsequently GC alpine orogenic evolution. Pliensbachian series in the core of the orogen and to the south of the former rift shoulder are heavily intruded with diabase dikes reflecting important synrift stretching. Pillow lavas of early Mesozoic age are common in the central parts of the main range, however, no remnants of Mesozoic oceanic crust are known. Young Tertiary intrusives and volcanism led to development of the Caucasus' highest summits such as Mount Kazbek and Mount Elbrus.

The tectonic evolution and the different structural domains will be briefly presented and discussed in the light of new 2D palinspastic reconstructions, new tectonic profiles across the whole mountain range, as well as detailed examples specific geological and structural features, regional tectonic settings, and seismicity.