

DARIUS across the central Greater Caucasus : tectonics between Georgia and Russia

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The Greater Caucasus is Europe’s highest and youngest mountain range with Mt. Elbrus culminating at 5642m, and rock uplift of more than 8,000 m in the last 2 Myr. The intramontane basin is one of the world’s earliest sites of human society with 1.8 Ma old humanoid remains of Dmanisi (Georgia)

In the frame of the DARIUS project we investigate the tectonics and geodynamics of the Central Greater Caucasus along an N-S oriented section between Georgia and Russia. Located at the northern tip of the former Persian empire of king DARIUS our endeavor is to cross the past and present political borders and present a modern tectonic analysis from the foreland fold-and-thrust belt of the southern foothills of the GC in Georgia across the main range and the orogenic core into the northern foreland in Russia.

The project proposes to investigate the tectonic processes (including syndepositional tectonics) and their timing during the Mesozoic to Recent along a broad transect in the central Greater Caucasus in Georgia and Russia. We shall characterize the major tectonic events in terms of age (paleo-, neo- and recent tectonics), paleostress regimes (based on field observations of faults and striations), and their interactions and consequences on sedimentary basin evolution and orogenic evolution.

Following along the same trail as did some of the pioneering geologists of the Caucasus such as Frederic Dubois de Montpéreux in the 1830ies - who probably drew the first geological map of the Caucasus - followed by Hermann Abich in the 1840ies and later by Ernest Favre in 1875 and Albert Heim in 1898 (during the VII Inter. Geol. Congress in Russia) we will present work in progress.

A first exploration expedition was carried out along the military road in Georgia. Whereas the axial zone comprises Jurassic sedimentary rocks (Azerbaijan), a pre-Mesozoic basement (Georgia, Russia), and Pliocene intrusions, both external fold-and-thrust belts consist mainly of Cretaceous sedimentary rocks. We also investigated the subsurface structure of the meridional foreland fold and thrust belt developed mainly in the sediments of Tertiary age. Recent plate tectonic models and GPS based convergence rates suggest that the Caucasus is a very active, complex plate boundary with vertical and horizontal strain partitioning, influencing the evolution of the Caucasus topography.