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Active tectonics of central-western Caucasus, Georgia

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Abstract

This work contributes to a better knowledge of potentially seismogenic faults of the Georgia Greater and Lesser Caucasus by evaluating the distribution of earthquake foci, active tectonic stress field, kinematics and geometry of main fault planes. We consider all the information coming from field structural geology, geomorphology, seismological data from historical and instrumental catalogues, seismic reflection sections, as well as new focal mechanism solutions. These data enable recognizing some active ENE-WSW reverse faults in the core of the Greater Caucasus that are parallel to the mountain range. At the southernmost front of the Greater Caucasus, a series of main thrusts dipping towards NNE are active, with up to hundreds-km-long segments; along this thrust zone, a potentially locked segment is present, about 90 km long. The studied section of the Lesser Caucasus has active structures along the northern front given by south-dipping thrusts, as well as in the central core where strike-slip and oblique faults coexist. The Transcaucasian depression between the two mountain ranges shows an ongoing inversion tectonics of the central part of the Rioni Basin where active N- to NE-dipping reverse faults are present, accompanied by clear evidence of uplift of a wide area. The data are coherent with a N-S to NNE-SSW contraction of the central-western Greater Caucasus and Lesser Caucasus. Although in general the seismicity decreases westward in terms of number of earthquakes and magnitude, seismological and geological structural data in the Rioni Basin indicate here a Quaternary propagation of deformation towards the west.

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