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Analysis of Stress State of Caucasus (Azerbaijan) Based on the Maximum Horizontal Stress Orientations and "World Stress Map" Technique

Caucasus is prone to stress-related geohazards because of its tectonic setting and the high overpressures. Here we analyze and model the effect of local topography anomaly on the stress-strain formation of the Caucasus lithosphere (Azerbaijan). Technique is based on numerical analysis with finite element modeling. The model results show that the stress orientations are influenced by the combination of topography and crust thickness distribution even at very large depth. Western Caucasus shows a N-S to NNE-SSW stress orientation. The results also suggest that the Lesser Caucasus and Kur depression are rotating coherently, with little or no internal deformation in a counter-clockwise rotation located near the north-eastern corner of the Black Sea. The comparative analysis of the stress orientations was performed with the focal mechanism solution map of the earthquakes occurred in Azerbaijan during 1998-2016 period using the CASMO technique ("World stress map"). Orientation of stress axes well consistent with earthquake focal mechanisms revealed that within Upper and Lower Crusts earthquakes are predominantly thrust-faulting with a number of normal-faulting and a few of strike-slip faulting.

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