

Seismic activity along the Dead Sea Transform and the Dead Sea basin

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We analyzed the catalog of instrumental recordings of seismic activity from 1900 to 2010 along the Dead Sea Transform. The seismicity pattern reveals significant activity confined to 5 main sections of the transform. In all the sections of the transform there is a significant amount of seismic activity at depths of 9-10 km (lower part of the upper crust). The seismic activity extends to large depths of 20 km and more, where about 30% of the seismic activity occurs in the lower crust, especially in the Dead Sea basin and the Arava Valley. The deep seismicity is correlative with previous low heat flow measurements along the transform, and thus suggesting a relatively cold crust. We analyzed more than 4,300 S-wave spectra of earthquakes in the magnitude range is $0.8 < M_d < 6.2$, with M_0 values ranging from 3.1×10^{11} N·m to 5.4×10^{18} N·m, and Brune stress drop estimates, between 0.1 MPa and 15 MPa. The total seismic moment release in the years 1900-2010 in the Dead Sea Transform due to all the earthquakes, including the earthquake in 1927, is only a fraction of the expected seismic moment release.