

1,256 meters inside the earth - observations of seismic activity in the Dead Sea basin using borehole seismometer

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Seismological measurements, conducted at great depths of several hundred of meters or even a few km, can provide useful information that one cannot get while conducting the measurements on the surface. We take advantage of Masada Deep borehole, an abandoned oil well, for the installation of a seismometer at a large depth of 1,256 m. Seismological observations since 1983, using permanent and portable stations, revealed earthquake activity along the Dead Sea fault and its proximity, which is in good agreement with geological observations of young faulting age (>30 KY). The operation of such station enriches the seismological database with high quality data. The study has a few goals: 1) improving the detection capabilities of small earthquakes in the Dead Sea basin; 2) improving characterization of seismic activity in the Dead Sea basin; 3) better identification of seismic activity on the Dead Sea fault and observe earthquake nucleation and rupture processes in the near field; 4) extending the frequency-magnitude relationship of earthquakes into smaller magnitudes below the threshold of the Israel Seismic Network catalog. The borehole seismometer was installed in Dec. 2012. We present seismic observations of small events conducted at a depth of 1516 m, many of them were not recorded by the Israel Seismic Network.