



Lower-crustal seismicity in the Dead Sea region

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We studied the local seismicity of the Dead Sea basin for the period 1984-1997. Sixty percent of well-constrained microearthquakes ($0.3 \leq M_L \leq 3.2$) nucleated at depths of 20-32 km and more than 40 percent occurred below the depth of peak seismicity situated near 20 km. With the Moho at 32 km, the upper mantle appeared to be aseismic during the 14-year data period.

A relocation procedure involving the simultaneous use of three one-dimensional velocity models reveals that the distribution of focal depths in the Dead Sea basin is stable. The lower-crustal seismicity is not an artifact created by strong lateral velocity variations or data-related problems.

A lithospheric strength profile has been calculated from the relatively low surface heat flow of 40 mWm^{-2} . Based on a quartz-depleted lower crust, a narrow brittle-to-ductile transition might occur in the crust around 380°C at a depth of 31 km. For the upper mantle, the brittle-to-ductile transition occurs in the model at 490°C and at 44 km depth. The absence of micro-seismicity in the upper mantle remains an open question.