



Three dimensional crustal structure beneath the Gulf of Aqaba region from regional earthquake tomography

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Abstract

Gulf of Aqaba is tectonically and seismically active according to up to date earthquake activity recorded by the National seismic network of Egypt and ISC. Aqaba Gulf is located at the southern part of the Dead Sea Rift at the Northern Red Sea Rift as a major component of the Sinai triple junction where the plate boundaries play an important role in the tectonic activity of this region. In this work we apply the regional earthquake tomography technique of Koulakov (2009) to the P and S waves arrival times. Checkerboard resolution test has been performed to estimate the resolution of the data used in the inversion. The synthetic tests revealed reasonable resolving for the main geologic structures. The results revealed three dimensional seismic structures of P and S waves beneath the Gulf of Aqaba region for the first time. Consistent seismic velocity pattern is obtained for P and S seismic phases. Strong anomalies of high-velocity with abrupt change are observed coinciding with the northern Red sea coast lines. This new results indicate new perspective suggesting oceanic nature of the crust in the northern part of the Red Sea disagreeing with the Hypothesis of gradual stretching of the continental crust.

Key words: Regional Seismic tomography, Gulf of Aqaba, Dead Sea Transform Fault, Northern Red Sea