Westfälische
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GEOPHYSIK
WWU MÜNSTER

Institut für Geophysik

Geophysikalisches Kolloquium
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Crustal and uppermost mantle S-wave velocity Structure of the Middle East by ambient-noise tomography

We have constructed a 3-D shear-wave velocity model for the crust and upper most mantle beneath the Middle-East by analysis of Rayleigh wave records obtained from ambient-noise correlation and regional earthquakes. We combined one decade of data collected from more than 866 permanent and temporary broadband stations in the region in order to calculate group velocity dispersion curves. We have in total ›60000 ray paths giving reliable group velocity measurements for periods between 5 and 100 seconds.
The group velocities calculated at different periods along individual ray paths were inverted for 2-D group-velocity maps. Due to the heterogeneous ray coverage, we pursue an adaptive parametrization for the group velocity tomography inversion.
We then inverted the dispersion curves extracted at cells of the 2-D group-velocity maps for 1-D shear-wave velocity profiles beneath each cell. The S-wave velocity model shows regions of low-velocities at shallow depths (5-10 km) beneath the Mesopotamian foredeep, south Caspian basin, eastern Mediterranean and Black Sea. These low velocity regions coincide with the thick sedimentary basins. Shallow high-velocity anomalies are observed in the regions with magmatic outcrops such as the Arabian Shield and NW Iran.
In the upper crustal depth range (10-20 km), we clearly observe a band of high-velocity anomalies (› 4.0 km/s) along the Red Sea, indicating the presence of the upper mantle rocks in this depth range. Low velocity regions are observed beneath the Mesopotamian foredeep and Zagros implying the effect of thick sedimentary rocks comprising the upper crust.
Our 3-D velocity model exhibits high velocities in the depth range 25-40 km beneath the western Arabia, south Caspian basin, eastern Mediterranean and Black Sea indicating a relatively thin crust beneath these regions, whereas the Zagros, NW Iran, the easternmost Anatolian plateau and Lesser Caucasus are characterized by low velocities at these depths. At least some of these anomalies may be related to thick crustal roots that support the high topography of these regions.
In the upper mantle depth range, high-velocity anomalies are obtained beneath the Arabian Platform, southern Zagros and eastern Mediterranean and low velocities beneath Red Sea, Arabian Shield, Afar depression, Central Iran and eastern Turkey.

Das Kolloquium findet um **16 Uhr c. t.** im **Seminarraum GEO 315**, Corrensstr. 24, 48149 Münster statt.
Alle an dem Thema Interessierten sind hierzu herzlich eingeladen.

Die Dozenten des Instituts für Geophysik