Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08760, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08760
EGU General Assembly 2008

Gravity controlled Moho depths in the Aegean region

M. Staackmann (1), U. Casten (1), A. Ates (2)

(1) Ruhr-Universität Bochum, 44780 Bochum, Germany, (markus.staackmann@rub.de)
(2) Ankara Universitesi, 06100 Tandogan - Ankara, Turkey

Plate tectonics in the aegean region is dominated by the subduction of the African plate beneath the Eurasian plate and the counterclockwise rotation of the Anatolian and Aegean plate elements. Additionally to this motion, a south-west escape of the southern Aegean part is observed. The motion implicates crustal thinning below the Cretan sea and extension of the Hellenic trench system. Furthermore, geological records show an uplift of Crete. For this complicated situation the Moho depths should be determined. The investigation is done within the Collaborative Research Centre 526 - 'Rheology of the Earth from the Upper Crust to the Subduction Zone' at the Ruhr-Universität Bochum. The results shall be used for numerical modelling of dynamic processes.

Several investigations have been performed. Tirel et al. (2004) inverted data derived from satellite altimetry. The results are a mean depth of $25 \pm 2\,km$, with crustal thinning from West to East and crustal thickening towards Crete from $23\,km$ to $30\,km$. By forward modelling (Casten & Snopek, 2006) Moho depth is $25\,km$ at the Cyclades, $20\,km$ at the Cretan Sea, $35\,km$ beneath Crete and $20\,km$ at the continental edge. Moho depth beneath western Crete still is a matter of discussion (Snopek et al., 2007). Mantle wedge and subduction channel are matters of ongoing forward modelling. Furthermore, several active and passive seismic investigations were performed. The regional analysis of P and S receiver functions gives a Moho depth of $35\,km$ beneath the Peleponnesus, $30\,km$ at west Turkey, $27\,km$ at the north Aegean and $20\,km$ at the Cretan Sea (Sodoudi et al., 2006). Forward modelling of low-pass filtered data from western Turkey resulted in a two layer depth model consisting of crust ($2.8\,g/cm^3$) and mantle ($3.3\,g/cm^3$). In general Moho depths increases from west ($26\,km$) to east

($38\,km$).

Additionally, an isostatic modelling was carried out. The assumed compensation mechanism is of the Vening Meinesz type. Structural parameters are the density of crust ($\rho_C = 2.80\,g/cm^3$), mantle ($\rho_M = 3.20\,g/cm^3$) and water ($\rho_W = 1.03\,g/cm^3$) and the compensation level. The flexural rigidity is variied from $10^{21}\,Nm$ to $10^{23}\,Nm$. In comparison with the mentioned results the isostatic modelling gives similar Moho depths beneath the Peleponessus and west Turkey but greater depths at the Cyclades ($33\,km$).

Casten, U. and Snopek, K. 2006. Gravity modelling of the Hellenic subduction zone - a regional study. Tectonophysics, 417, 183 - 200.

Snopek, K. and Casten, U. Meier, T., Endrun, B., Bohnhoff, M. and Casten, U. 2007. Comparison of gravimetric and seismic constraints on the structure of the Aegean lithosphere in the forearc of the Hellenic subduction zone in the area of Crete. Journal of Geodynamics, 44, 173 - 185.

Sodoudi, F. , Kind R., Hatzfeld, D., Priestly, K., Hanka, W., Wylegalla, K., Stavrakakis, G., Vafidis, A., Harjes, H.-P. and Bohnhoff, M. 2006. Lithospheric structure of the Aegean obtained from P and S receiver functions. J. Geophys. Res., 111, B12307.

Tirel, C., Gueydan, F., Tiberi, C. and Brun, J.P.. 2004. Aegean crustal thickness inferred from gravity inversion. Geodynamical implications. Earth and Planetary Science Letters, 228, 267 - 280.