SOME GEODYNAMIC IMPLICATIONS FROM THE TOMOGRAPHIC INVERSION OF P-WAVE TRAVEL TIME RESIDUALS IN THE AEGEAN REGION

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P-wave travel time residuals, obtained by the Athens Observatory network for both local and teleseismic events, are used for the study of the velocity structure in the Aegean region. Tomographic inversion of the residuals is applied to further illuminate the structure of the crust and upper mantle. The best quality of the results is obtained at lithospheric depths in mainland Greece and the Aegean Sea. Anomalies are better resolved at these depths due to the orthogonality of local (near-horizontal) and teleseismic (near-vertical) raypaths.

A heterogeneous velocity structure is revealed in the upper mantle correlating very well with a thermal model of subduction and other independent geophysical fields. The most significent features of the inferred velocity structure are an erea of low-velocity anomaly in the back-arc region, an area of higher velocities in the sea of Crete and a high-velocity zone, following the shape of the volcanic arc, dipping to the NE away from the Hellenic trench. The combined study of the tomographic results and the temperature and gravity data is used to asses the validity of the tomogrephic model and to put further constraints on the geodynamic processes in the area and particularly, the coupled subduction-spreading process observed in the Aegean.

The area of present-day active extension and seismicity in the central and northern Aegean, behind the volcenic arc, is associated with regionally raised isotherms (low seismic velocities). The area known as the sea of Crete, where the strongest Bouguer and Free-air anomalies occur, is an area of quiscent seismicity this century and is associated with a zone of relatively lowered isotherms (higher velocities).

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