MODES OF LITHOSPHERIC INTERACTIONS IN THE AGEAN AREA

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Summary

Geophysical properties of the southern Aegean area are attributed to a lithospheric slab dipping from the Mediterranean to the Aegean and a back-arc expanding lithosphere associated with the southern Aegean volcanic arc. Evidence exists that the tectonic process in the northern Aegean is still affected by a former subduction which is now in a dying phase.

Résumé

Les qualités géophysique des régions suds de l'Aigée sont attribuées a une plaque lithosphérique qui descend de la Mediterranée vers la mer Aigée et á une lithosphére marginale qui s'étend et qui est associée au bassin de Créte et l'arc volcanique de l'Aigée du Sud. Il y a une évidence que la procedure tectonique á la région de l'Aigée du nord est encore effectuée par une immersion anterieure qui est maintenant á une phase de developement diminant.

The most important features of the deep tectonic structure of the southern Aegean area are a lithospheric slab, dipping from the Mediterranean to the Aegean, and a back-arc expanding lithosphere associated with the Cretan trough and the southern Aegean volcanic arc. Heat generated on the top slip surface of this Mediterranean slab or hydrodynamic forces produced by the sinking of the slab may cause upwards migration of hot magma in the Aegean asthenosphere above the slab. The inefficient transmission of the short period body waves in the concaves part of the Hellenic arc and travel time residuals are attributed to this hot material. Due to convective currents in the mantle above this slab or to volume increase of this mantle caused by the upwards migration of ther-

mal diapir, the back-arc lithosphere is forced to expand to the Hellenic trench. This leads to intrusion of mantle material into the crust, to volcanic activity, high heat flow, magnetic anomalies, modification of crustal structure, subsidence of crustal blocks, generation of shallow earthquakes by tensional mechanism in the inner Aegean area and occurrence of earthquakes by compressional mechanism in the convex side of the Hellenic arc.

Convective cells in the mantle above the Mediterranean slab may also drag the central and northern Aegean lithosphere to the north and force it to expand. This can explain the magnetic anomalies, the high heat flow, the volcanism, the tensional focal mechanism of the shallow earthquakes in the broader central and northern Aegean area and the compressional mechanism of the shallow earthquakes in the northernmost part of the area. The generation, however, of small intermediate earthquakes in the northern Aegean area and tertiary magmatism in the broader northern Aegean area lead to the hypothesis that the remnants of a former lithospheric slab, which dip slowly from the central to the northern Aegean area, still affects the tectonics of the northern Aegean area.