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BOOK OF ABSTRACTS

ANELASTIC PROPERTIES OF THE AEGEAN UPPER MANTLE INFERRED FROM RAYLEIGH WAVE ATTENUATION

I. KASSARAS, F. LOUIS, K. MAKROPOULOS, G. KAVIRIS, A. MAGGANAS

University of Athens, Greece

Anelasticity of the Earth crucially affects the propagation of seismic waves especially, in the long period range. However, even though the elastic properties of the Aegean deep lithosphere and upper mantle have been thoroughly investigated, their quantitative anelastic properties that influence the long period wavefield are still largely unknown. This work is towards contributing to the better knowledge of the deep structure of the Aegean by introducing experimental anelastic parameters via the study of the attenuation of long period Rayleigh waves.
For this scope, fundamental mode attenuation coefficients (aR) have been obtained for different two-station great-circle paths across the Aegean. The data used were provided by a broadband array installed in the area for 6 months in 1997. More than 1100 seismograms were analyzed in the 20-100 s range to obtain 16 sets of path average aR(T) functions. The attenuation coefficients are in the range 2.2×10^{-3} - 0.15×10^{-3} km^{-1} and correlate sufficiently with both experimental measurements in active tectonic regions elsewhere and synthetics generated with the use of an a priori attenuation reference model inferred from other sources. By applying a stochastic inversion method an average Qa^{-1} model of the area was obtained, which implies for strong absorption of seismic energy over the whole lithosphere and upper mantle. Furthermore, path average aR(T) functions were combined in a continuous regionalization tomographic scheme to obtain local aR and tomograms were constructed in the range 20-80 s. The most prominent feature in the tomograms is a high attenuation region in central and north Aegean, located south of the North Anatolian Trough. This high attenuation zone correlates well with a low shear velocity zone observed in a previous study. Moreover, it is compatible with surface observed high extensional rates, recent volcanism, high heat flow and mantle olivine anisotropy.

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