

Vector energy transfer of seismic waves and lithospheric heterogeneities beneath the US

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Stochastic analysis of seismic waves can provide a different vision of the structures in the lithosphere, complementing the deterministic pictures provided by seismic tomography models. To infer the stochastic properties of the lithosphere beneath US we analyzed the vector transfer of energy using 3 component seismograms recorded at USarray seismic network. The application of theoretical scattering model based on the Markov approximation permits to interpret the vector energy ratio and derive statistical information about the heterogeneity distribution in the analyzed medium. By using high frequency seismic waves a continental vision of the scattering properties of the US lithosphere is obtained by the regionalization of our observations. The derived map of the lithospheric scattering reveals strong correlation of the scattering property with well-known geological features of the US lithosphere. High scattering is observed in tectonically active east US and highly deformed central regions, while low scattering is characteristic of old cratonic regions in the eastern US.

Keywords: Scattering, Stochastic imaging, Wave propagation in complex media