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Attenuation structure and crustal evolution of the western United States from Lg coda waves

Baqer, Saadia A. Saint Louis University, ProQuest, UMI Dissertations Publishing, 1996. 9638847.

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Abstract (summary)

The lateral variations in the western United States of Lg coda Q and its frequency dependence are investigated. Lg coda time series from digital seismic stations within the western United States are selected for analysis. The stacked spectral ratio method was used to obtain stable estimates of $Q\sb{o}$ (Q at 1 Hz) and its frequency dependence $\eta.$ These estimates were inverted using a back-projection method to construct images of the lateral variations of Lg coda Q and its frequency dependence. The standard errors and resolution of the tomographic image were investigated. Better resolution and smaller error occur in the western part of the studied area where better path coverage and low Q values are observed.

The analysis reveals that the spatial Lg coda Q variations correlate with changes in surface tectonics that are related to the crustal evolution of the region. Q increases from west to east between Pacific coast and the Rocky Mountains. Q is lowest (250-300) for the coastal region and Basin and Range province, highest (400-550) for the Rocky Mountains, and intermediate in regions such as the Colorado (300-500) and Columbia Plateau (300-400). Lg coda Q patterns are compared to geologic and geophysical parameters of the western United States, Lg coda Q patterns are found to correlate well with reduced heat-flow, which itself maps the tectonothermal regime of the area.

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