The robust aspects of global seismic tomography

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ABSTRACT

This paper reviews results from the past twenty years of global seismic tomography in terms of the robustness of features derived in such studies. It is argued that the large-scale features should be the easiest to detect because of the integrative nature of the data used in tomography as well as the red character of the power spectrum of terrestrial lateral heterogeneity. Particular attention is given to the possibility that the 650 km discontinuity is associated with an abrupt change in the heterogeneity spectrum and that there is evidence for impeded penetration of subducted material into the lower mantle. However, the high-velocity anomalies in the lowermost mantle bear similarity to the distribution of the principal subduction zones at the surface, and there is good correlation of the distribution of hotspots and the low-velocity anomalies near the core-mantle boundary. Thus some communication between the upper and lower mantle seems to be required.