

Deep Earth dynamics revealed by whole mantle tomography

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Whole mantle P-wave tomography is determined with a grid parameterization, 3-D ray tracing, and the topography of the Moho, 410 and 660 km discontinuities. This new model contains the following features: (1) a low-velocity ring around the Pacific Ocean basin in the depth range 35-400 km, (2) high-velocity anomalies associated with subducting slabs most prominent in the mantle transition zone, (3) Prominent slow anomalies (superplumes) in the whole mantle under South Pacific and East Africa, and (4) Low-velocity mantle plumes show deflected images under hotspots. In general, final travel time residuals become smaller for the tomographic models including the topography of the discontinuities.