Deep earth structure and dynamics revealed by seismic tomography

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We determined a new model of whole mantle tomography with a grid parameterization, 3-D ray tracing, and considering the topography of the Moho, 410 and 660 km discontinuities [Zhao, 2001]. This model provides the following information on the structure and dynamics of the Earth's interior: (1) a low-velocity ring around the Pacific Ocean basin in the depth range of 0-400 km, (2) high-velocity anomalies associated with subducting slabs most prominent in the mantle transition zone, suggesting the existence of stagnant slabs in the transition zone,(3) Prominent slow anomalies (superplumes) in the whole mantle under South Pacific and East Africa, (4) Low-velocity mantle plumes show deflected images under hotspots, and (5) The Hawaiian plume is not a part of the Pacific superplume but an independent one.