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Global multiple-frequency SH-wave tomography: refining seismic imaging of the Earth's mantle

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We present a globally distributed dataset of 400,000 frequency-dependent SH-wave travel times. An automated technique is used to measure tele-seismic S, ScS and SS travel times at several periods ranging from 10 to 51 s. After correction for physical dispersion due to intrinsic an-elastic processes, we still observe a residual travel time dispersion on the order of 1-2 s in the period range of analysis.
Our observations suggest that a residual "structural" (i.e. related to 3-D seismic heterogeneities present in the deep Earth) dispersion is explicitly contained in our data. We incorporate this new observable in a global multiple-frequency SH-wave tomography, in order to refine the seismic imaging of the Earth's mantle, and present our first tomographic model.
We show that taking into account the dispersion of body wave travel times, over a large period range of analysis, may provide additional constraints on the 3-D elastic structure of the mantle.