



Evidence for a change in the global shear velocity pattern ~ 1,000 km depth

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In this study, we show evidence for a change in the shear velocity spectrum around 1,000 km depth based on a new shear velocity tomographic model of the Earth's mantle, SEISGLOB2. SEISGLOB2 is based on Rayleigh surface wave phase velocities, self- and cross-coupling structure coefficients of spheroidal normal modes and body wave travel times which are, for the first time, combined in a tomographic inversion. SEISGLOB2 is developed up to spherical harmonic degree 40 and in 21 spline functions. The spectrum of SEISGLOB2 shows it is the flattest around 1,000 km depth and this flattening occurs between 800 and 1,500 km depth. The presence of such a transition in the spectrum suggests an accumulation of shorter scale heterogeneities at around 1,000 km depth. This change in the spectrum is also observed when looking at the model, where some behaviour changes of slabs, hotspots and LLSVPs occur around 1,000 km depth. The existence of such a velocity change in the mid-mantle can have great impacts on our understanding of the mantle dynamics and should thus be taken into account in future modeling.