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What in Earth?! Deciphering solid earth structure and processes 1 to 10,000 seismic stations at a time

Abstract

Converted teleseismic waves are a building block for imaging and characterizing structure in the Earth's crust and upper mantle. Isolated in their simplest form, as receiver functions, they can be mapped beneath individual stations or arrays of stations to generate 1-D and 2-D images of sub-horizontal interfaces. Converted waves also form the basis for higher-resolution imaging techniques that invert the scattered wavefields for 2-D and 3-D structure. In this talk, I present results from converted wave imaging approaches that have been implemented for individual stations, dense arrays of stations, and global networks of stations. For individual stations, I show how converted waves can be employed to study the Lithosphere-Asthenosphere Boundary. At dense arrays of stations, I show how high-resolution seismic images can be interpreted in conjunction with petrological and geodynamic models to pinpoint the locus of metamorphic reactions in subducted slabs. Lastly, I present preliminary results from an ongoing project that aims to compute and provide the tools to interpret receiver functions at all available seismic stations globally.