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Ray and Wave Tomograms of an Alpine Valley

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In late 2009 we conducted a 3 km long seismic survey across the Salzach Valley near Zell am See. The goal was to image depth and structure of the sedimentary infill down to the basement expected at $\sim$ 300 m below the surface. We used sparse explosive sources to image this contact, and dense drop-weight sources to resolve the sedimentary structures.
Ray tomograms from simultaneous inversion of reflections and refractions for velocity and structure show that the sedimentary infill is $\sim$ 50% thicker than expected, and they resolve a pronounced sedimentary low-velocity-layer in some parts of the profile. However, the resolution of these kinematic images is limited, particularly with respect to the internal structure of the sediments. To further increase the resolution, we apply reflection imaging and acoustic waveform inversion. Relatively strong explosive charges provide a broad signal spectrum from 4-200 Hz, well suited for waveform tomography.