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# Detecting seismic anisotropy across the 410 km discontinuity through polarity and amplitude variations of the underside reflections

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We investigate the effect of various types of deformation mechanisms on the reflection coefficients of P and S waves underside reflections off the 410 km discontinuity, to find a diagnostic tool to detect the style of deformation at boundary layers. We calculate the reflection coefficient for P and SH underside reflections depending on the variation in velocity perturbations across the 410 km discontinuity for two deformation scenarios, compression and shear for different azimuths and angles of incidence at the interface. The results show that in the case of an anisotropic olivine layer above an isotropic wadsleyite layer, the P wave reflection coefficient amplitudes are only slightly influenced by the joint effect of angle of incidence and the strength of imposed deformation, without any polarity reversal and for all deformation styles. For the SH wave underside reflections a more complicated behaviour is visible: In compressional deformation, a polarity reversal occurs at distances depending on the incidence angle and the intensity of applied deformation without any azimuthal dependency. However, for shear geometry the azimuth to the direction of deformation appears as an important factor which strongly affects the incidence angle at which the polarity reversal of the reflected S wave occurs. These differences in amplitude and polarity patterns of reflection coefficients of different deformation geometries, especially for S wave at shorter distances allow to detect the style of deformation mechanisms at a boundary layer.