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Inversion of receiver functions and P-wave polarisation across the North Anatolian Fault Zone

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The North Anatolian Fault Zone (NAFZ) is a major plate boundary that separates the Eurasian plate to the north from the Anatolian plate to the south and is associated with powerful damaging earthquakes. Despite numerous studies of the crust and upper mantle across the NAFZ, our understanding of the exact mechanisms and distribution of deformation with depth is still vague. Accurate models of the crustal velocity structure may help interpreting earthquake sources and seismic hazard. Here, we address this problem by analysing broadband teleseismic waveform data from the central part of the NAFZ. We use a novel approach that simultaneously inverts receiver function waveforms and P-wave polarisations to recover S-wave velocity structure from surface to the upper mantle, as well as the depth to basement and Moho topography. The results of our inverse modelling reveal clear structural-tectonic relationships in the crust, for example high and low velocity regions seem to directly correlate with major fault zones and suture zones. Our ultimate aim is to provide seismological constraints (e.g., Vs, Vp/Vs etc) which can help us identify possible zones of weakness in the crust and upper mantle, and to link them to seismic activity along the NAFZ.