Crustal Anisotropy beneath Northern Iran calculated by harmonic decomposition of Receiver Functions.

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This study concerns crustal anisotropy at 16 permanent seismic stations to investigate preferentially aligned cracks or structures and their relation to the stress-state in the South Central Alborz (northern Iran). We consider plunging anisotropy and dipping interfaces of multiple layers using harmonic functions to correct the arrival time variations of $P_s$ phases from different backazimuths.

The dominant fast orientation of integrated crustal anisotropy strikes NE, almost parallel to the stress direction in the upper crust. The magnitude of crustal anisotropy is found to be in range of 0.1 s to 0.5 s. In some stations, intracrustal interface is observed, for which we analyzed harmonic decomposition of receiver functions to consider anisotropy in the upper crust. Upper crustal anisotropy strikes NE, close to the principal stress direction, indicating that stress in the upper crust plays a major role in producing anisotropy and deformation. In a few stations, crustal anisotropy display different directions rather than NE, which maybe controlled by cracks and fractures of dominant faults.

Keywords: Anisotropy, Receiver function, harmonic decomposition, Northern Iran.