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The interior of Mars constrained by Love and Rayleigh wave joint inversion scheme

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The upper part of the Mars' interior (comprising crust and upper mantle) can be described by classical well-known elastic isotropic parameters (V_P, V_S, and ρ) and further by inferring additional anisotropic parameters carried by seismic waveforms. In the view of providing a mean 1D reference model for at least the first 300 km of the Mars' interior, surface waves are well-suited since they are travelling guided by the planet's surface. At first order, the dispersive property of these waves reflects radial heterogeneities of the sampled medium, integrated along the travel path. In the event of a marsquake, the surface waves are propagating along minor- and major arcs then providing informations on different media. Although Rayleigh waves are widely used to infer the isotropic seismic structure, Love waves can be used to constrain anisotropy. Since azimuthal dependence of seismic waves cannot be resolved with a single station as InSight, only the polarization anisotropy can be retrieve. In the framework of the Mars Structure Service blind test, providing a single event dataset, we present results and show that vertical polarization of S-waves significantly differs from horizontal only within the first 20 km depth. The transverse anisotropy measured by η seems to be inexistent in the input model.