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A global crustal Model constrained by fundamental Mode Surface Waves

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We present the first global crustal model with corresponding uncertainties constrained by surface wave data. We use a neural network approach to invert fundamental mode Love and Rayleigh phase and group velocity maps. For each inversion, performed on a $2^\circ \times 2^\circ$ grid globally, we obtain the a posteriori probability distribution of crustal thickness and independently of average crustal shear-wave velocity. Compressional-wave velocities and densities are linearly scaled to shear-wave velocities within the crust. We find that using surface wave data in the period range considered ($T > 35$ s for phase velocities and $T > 18$ s for group velocities), average shear-wave velocity of oceanic crust is not resolvable and is therefore constrained a priori. The resulting model is valuable in itself, since it independently illustrates the subsurface expression of various large scale tectonic provinces over continents. In addition we demonstrate that such a model offers for the first time a consistent means of computing independent crustal corrections for tomography using surface wave data with periods $T > 50$ s.