

Surface-Wave tomography of Ireland

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We have measured phase velocities of seismic surface waves in order to constrain variations in the crustal and mantle structure beneath Ireland and the Irish Sea. The data are from 5 permanent and 25 temporary broadband seismometers in Ireland and Britain. Phase velocities of the fundamental-mode Rayleigh and Love waves are measured by cross-correlating pairs of vertical or transverse component seismograms, using the two-station approach. Measured inter-station Rayleigh and Love wave phase velocities constrain shear-velocity structure in the depth range from the upper crust to the uppermost mantle. The Rayleigh-wave measurements are inverted for azimuthally anisotropic phase-velocity maps at periods from 10 to 40 s. The tomographic maps display isotropic heterogeneity that indicates substantial lateral variations in the structure of Ireland's lithosphere. Azimuthal anisotropy reveals fabric within the crust and mantle lithosphere that is probably related to flow during the last major deformation episodes. The lithosphere-asthenosphere boundary, lateral variations in uppermost mantle structure; and lithospheric shear zone on which deformation is thus detected.