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Seismic anisotropy of the upper crust near East European Craton margin in SE Poland?

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Several deep seismic profiles from CELEBRATION'2000 experiment cross each other in the area of Malopolska block (MB) and Lysogory block (LB) near EEC marging in SE Poland. Recorded data provide dense three-dimensional network of seismic data and allow for detailed investigations of the properties of the crust in this area, including azimuthal variations of Vp velocities in the crust. This work is based on interpretation of in-line and fan recordings from main profiles CEL 1, CEL 2, CEL 4, CEL 5, CEL 14 and other, shorter profiles recorded in this area. The comparison of 2-D models for these profiles in the MB area revealed large differences in upper crustal velocity in the depth range 3-15 km at the crossing points of profiles extending in NW-SE and SW-NE directions. This suggests azimuthal variation of the Vp velocity, unlikely to be explained by a common model with a local velocity anomaly. The axis of the fast velocity, trending roughly NW-SE, is consistent with the strike of the main tectonic lineaments in MB and LB. A possible explanation may be seismic anisotropy of the upper crustal material in the MB area. The azimuthal dependence of the traveltimes of the Pg phase was analysed in order to prove this hypothesis. Assuming TI approximation, an inversion of available traveltimes was performed in order to determine the amount of anisotropy. Obtained results indicate that the anisitropy of the Vp velocity amounts to about 10%, with fast axis trending at azimuth of approx.110°. Such explanation is consistent with the knowledge about the geology of the area, where tightly folded (dip 40°-80°) metapelites of Neoproterozoic age are were reported at depths of few km and deeper.