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Evaluation of various inversions of P-wave teleseismic tomography in Scandinavia

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From August 1996 to July 1997 an array of 149 seismographs were placed in a rectangular array, 900 km long and 100 km wide across the northwestern part of the Trans-European Suture Zone (TESZ) that lies between Denmark and Sweden. The aim of this TOR-1 project was to study the lithosphere-asthenosphere system of the significant geological boundary between the Baltic Shield and the younger European lithosphere in this region.

Inversions of the data set have been made with a variety of methods at several European institutions. The general position is that the sharp transition in the upper mantle below the crust is dipping towards North-East, but a dipping towards South-West is also found by others.

We attempt to narrow and describe the inversion differences. For the inversions we use the ACH method and compare the results from inversions of several different starting models. Here the results (P-velocity perturbations) all have the same overall structure. But for the transition zone the direction of the dip is not uniform in the comparison. In some of the models a second transition North-East of the first one is seen faintly. And from calculation of the horizontal P-velocity gradient the two transitions are both seen clearly.

The weighting of the phase picks plays an important role. The dip of the transition can change from dipping considerable towards South-West towards being almost vertical.