An international LAPNET array (2007-2009, http://www.oulu.fi/sgo-oty/lapnet) of the POLENET/LAPNET sub-project of the POLENET-IPY consortium related to POLENET seismic and geodetic studies in the Arctic regions, consisted of 37 temporary seismic stations and permanent broadband observatories on the territory of Finland, Sweden, Norway and Russia. Most of the temporary stations were installed north of the Arctic Circle. We analyze P-wave travel time deviations evaluated for a subset of 90 teleseismic events recorded by the LAPNET array and show examples of lateral variations of shear-wave splitting to demonstrate variability of fabrics of the Archean mantle lithosphere. Initial results clearly demonstrate the Archean mantle lithosphere consists of domains with consistent fabric reflecting fossil anisotropic structures. 3D self-consistent anisotropic models with inclined symmetry axes meet the two independent sets of observations. Individual domains are delimited by boundaries (sutures), where the anisotropic parameters change. The results obtained from the LAPNET array fill the gap in structural studies of the upper mantle beneath Fennoscandia (e.g., Sandoval et al., 2004; Pedersen et al., 2006; Plomerova et al., 2006; Vecsey et al., 2007; Eken et al., 2010). We consider possible mechanisms creating anisotropic structure with dipping symmetry axes (domain fabrics) in the very early stages of plate tectonics to explain domain fabrics observed in the mantle lithosphere beneath the Archean cratons. The early lithosphere formed in dynamic conditions, far from simple cooling which would lead to a sub-horizontal layered structure of the lithosphere.