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Shear Wave Splitting and Anisotropie in Dronning Maud Land, Antarctica

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Temporary seismic stations were deployed in the Wohlthat-Massiv and Kottas-Mountains, Central and Western Dronning Maud Land, Antarctica. These recordings will contribute to improve our knowledge about neo-tectonics and crustal/upper mantle structure of this part of Antarctica. Thus, the data are used for investigations on local seismicity and its origin, receiver function analysis, and upper mantle anisotropy. Since these parts of Antarctica are mainly snow covered and difficult to access, these methods will provide first ideas about geologic structures and tectonic framework. Here, first results on shear wave splitting and mantle anisotropy will be presented.

Analysis of shear wave splitting from tele-seismic core (SKS, SKKS, PKS), and direct S-waves reveals the seismic anisotropy and the strain field of the upper mantle. Seismic anisotropy in the upper earth's mantle is a global observable phenomenon. Anisotropic fabrics originate from deformation induced lattice preferred orientation of crystal structures of intrinsic anisotropic mantle minerals (olivin and orthopyroxen). The formation of these anisotropic structures allows insights into recent as well as fossil geodynamical processes. Thus, from these structures informations about tectonic evolutional processes may be deduced.

In particular, the areas of investigation in Dronning Maud Land are hardly understood in terms of its geological/tectonic evolution and upper mantle anisotropic structure The results will be discussed in terms of ancient deformation processes during Gondwana break-up and former episodes.