# Numerical and Experimental Investigation on Seismic Anisotropy of Finero Peridotite, Ivrea-Verbano Zone, Northern Italy

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The Ivrea-Verbano Zone (South-Alpine basement, NW Italy) offers a unique opportunity to study lower crust/upper mantle rocks unaffected by serpentinization or intense weathering. Peridotites from Finero (northeast Ivrea-Verbano Zone) have been collected to investigate the physical influence of hydrous minerals (hornblende and phlogopite) which have been formed as a consequence of metasomatism. The methods involve experimental tests using Geneva Rig (hydrostatic pressure vessel confined with oil medium), electron backscatter diffraction (EBSD), optical microscope, scanning electron microscope (SEM) together with open software simulation (MTEX) to investigate the crystallographic preferred orientation and its influence on seismic anisotropy. The seismic anisotropy of compressional wave range from 2% to 8.7% (averaged around 6%) under room temperature and meanwhile shows decreasing trend as confining pressure increases (from 20 to 250 MPa).

Crystallographic preferred orientation has been analyzed by large area EBSD scans for major minerals including olivine, orthopyroxene and clinopyroxene, but also for metasomatic hornblende and phlogopite. The influence of a preferred alignment of these hydrous minerals on the seismic anisotropy is discussed. Numerical investigations of bulk average elastic properties are compared to the high-pressure measurements. Finite element simulations of elastic wave propagation are presented as a complementary tool to separate the effects of bulk texture versus microstructural features like grain shape anisotropy and cracks.