# 地震波干渉法によるニュージランド・アルパイン断層近傍における表層付近のS波異方性の推定
# Shear wave anisotropy in shallow subsurface around the Alpine fault, New Zealand, estimated by seismic interferometry

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Deep Fault Drilling Project (DFDP) aims to provide new geophysical and geological insight for the central Alpine fault system. After the drillings in two phases (DFDP-1 and DFDP-2), seismometers have been deployed at the depth of 81 and 400 m within the DFDP-1 and DFDP-2 boreholes, respectively, to detect micro earthquakes around the Alpine fault. Additionally, we newly installed two surface seismometers above the DFDP boreholes. Using the borehole and surface seismometers, we examined shear wave anisotropy in shallow subsurface close to the Alpine fault. We applied seismic interferometry to regional earthquake waveforms observed at the bottom and surface sensors to estimate shear wave anisotropy between the two sensors. First, we corrected instrument responses and orientations of sensors and upsampled waveforms. Then, we computed cross-correlation functions of coda waves of 25 and 16 regional earthquakes for DFDP-1 and DFDP-2 sites, respectively. The cross-correlation functions show clear wave packets in the frequency range of 3-6 Hz. The peak times indicate average shear velocity of 880 and 550 m/s in DFDP-1 and DFDP-2 site, respectively. We estimated shear wave polarization anisotropy from peak time variations of cross-correlation functions of rotated horizontal waveforms. We obtained similar shear wave anisotropy in both boreholes with fast shear wave directions parallel to the Alpine fault. The fault parallel fast direction is consistent with orientation of foliation in hanging wall mylonite, suggesting structural anisotropy is predominant. Compering anisotropy in two other boreholes in the footwall sides may provide deeper understanding of shallow subsurface anisotropy and information about structural evolution and stress state around the Alpine fault.

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