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# 片状組織を有するアンチゴライト蛇紋岩の強度
# Strength of foliated antigorite serpentinite

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The trench parallel seismic anisotropy is demonstrated by recent seismological data. This phenomenon is tried to be explained by lattice preferred orientation (LPO) of plastically deformed antigorite serpentinite potentially existed in the mantle wedge and along the subducting oceanic plate. The rocks with LPO have generally well-developed foliation and lineation. In fact, naturally deformed antigorite serpentinites normally have such structure with LPO. The foliated rocks show a great amount of anisotropy of mechanical behavior. In this research, the anisotropic strength behavior of foliated antigorite serpentinite is studied through deformation experiment. In addition we observe the microstructures of recovered samples to clarify the plasticity of antigorite serpentinite.

We have conducted constant strain rate experiments on foliated antigorite serpentinite, collected from Happo ultramafic complex. This foliated antigorite serpentinite has a LPO characterized by [010] and (001) density maximum subparallel to lineation and foliation, respectively. The starting samples were cylinder with ca. 5 mm in diameter and ca. 8 mm in length. They were grouped in three types, as that the foliations were oriented at 0, 30 and 90 degrees with respect to the axial stress. The angle between the axial stress direction and foliation is named as orientation angles, B. The direction of lineation in the cylinders of B = 0 and 30 degrees was oriented parallel to maximum shear stress. Experimental conditions were 500 C of temperature and 1 GPa of confining pressure with a constant strain rate of ca. 1.7 x $10^{-5}$ /s.

Our mechanical data demonstrate that the strength of foliated antigorite serpentinite exhibits significant anisotropic behavior. Based on the microstructural observations of the recovered samples, the plastic deformation of antigorite serpentinite is proceeded probably by (001)[010] slip. We do not now get any evidence of the other slip systems rather than (001)[010]. This fact suggests that the deformation of antigorite serpentinite can not satisfy the von Mises criterion for creep. If this is true, the antigorite serpentinite can not be deformed to large strain by dislocation creep, which means that LPO does not develop during deformation. Therefore the idea of antigorite serpentinite with LPO existed in the mantle wedge and along the subducting oceanic plate can not be explained by deformation origin.

Keywords: foliated serpentinite, antigorite, anisotropy, plasticity