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西南日本三波川帯の前弧マントルウェッジにおける Antigorite CPO パターン
Subduction related Antigorite CPO patterns from forearc mantle in the Sanbagawa belt, southwest Japan

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Antigorite (Atg) is stable throughout large parts of the wedge mantle of most subduction zones. Atg shows very strong acoustic anisotropy, and recent studies have emphasized that the crystallographic preferred orientation (CPO) of Atg should be considered as a possible cause of seismic anisotropy in convergent margins.

Only a few Atg CPO patterns have been published (Bezacier et al., 2010; Hirauchi et al., 2010; Moortele at al., 2010; Soda & Takagi, 2010). From these limited data, two main types of Atg CPO pattern can be defined: one with an a-axis parallel to the stretching direction (A-type) and the other with the b-axis parallel to the stretching direction (B-type). In this study, we report antigorite CPO patterns from the Higashiakaishi (HA) body?a sliver of forearc mantle preserved in the Sanbagawa belt of southwest Japan. These CPO patterns are a further example of the B-type antigorite patterns.

Because Atg has a low plastic yield strength, it is possible that original orientations of the Atg crystals may be affected by mechanical damage caused by production of the thin sections used for measurement. However, statistical analysis using the eigen vector method of Atg CPO in two thin sections from two distinct directions in the same sample (YZ-section perpendicular to foliation and lineation and XZ-section perpendicular to foliation and parallel to lineation) shows no significant differences. Atg CPO developed during the same phase of deformation was also stronger in the sample with a greater proportion of Atg: the opposite to that expected if Atg CPO is disturbed by sample preparation. We conclude that sample preparation by standard polishing techniques has no significant affect on the resulting CPO.

Seismic anisotropy associated with the Atg-bearing HA peridotite calculated using the combined Olivine and Atg CPO patterns requires thicknesses of 1.47?4.6 km for a time delay of 0.1 s and 5.31?11.56 km for a time delay of 1 s. The large range of possible thicknesses represents the difference between Reuss and Voigt averages.

[References] Bezacier, L. et al. 2010, EPSL; Hirauchi, K. et al. 2010, EPSL 299. 196-206; Moortele, B. et al. 2010, J. Microscopy 239, 245-248; Soda, Y. and Takagi, H. 2010, J. Structural Geology 32, 792-802.

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