西フィリピン海盆の上部マントル電気伝導度異方性（序報）

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Preliminary report on anisotropic electrical conductivity of the upper mantle beneath the Western Philippine Basin

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Since anisotropy in electrical conductivity of oceanic upper mantle was imaged directly from by seafloor magnetotelluric (MT) observation in the East Pacific Rise (Evans et al., 2005; Baba et al., 2006), issue on oceanic asthenosphere has been revisited by from both geophysical and experimental studies (e.g., Yoshino et al., 2006; Seama et al., 2007). The key is hydrous mantle materials that are highly conductive and easier to be partially molten compared with dry ones. The anisotropy may be manifested through lattice preferred orientation of the minerals and/or directional connection of partial melt. To conclude this problem through geophysical studies, further examples in seafloor of variable age are required. However, global distribution of the electrical anisotropy is poorly revealed.

A small array of seafloor MT using three ocean bottom electromagnetometers (OBEMs) was deployed in 2006-2007 to investigate the electrical anisotropy of the upper mantle beneath the West Philippine Basin (WPB). Paleomagnetic studies revealed that the WPB was formed during 55 Ma to 35 Ma and the fossil spreading direction in the MT array area was about N30E which is perpendicular to current absolute plate motion (e.g. Hilde and Lee, 1984). This tectonic setting is feasible to separate the lithospheric frozen anisotropy and asthenospheric anisotropy because the high conductive axes, if they exist, are expected to be orthogonal. The MT sites are named T04, T04a, and T04b. T04 and T04a align along the current plate motion direction, while T04 and T04b align to the fossil spreading direction. The site intervals are about 80 km.

The time-series of electromagnetic field obtained by the OBEMs were processed and MT responses were estimated for each site. The responses in the periods from 320 to 7680 seconds are used for the following analysis. The responses at the three sites are fairly uniform suggesting lateral heterogeneity in conductivity in the area is less significant. The effect for the land-ocean distribution and bathymetry on the observed MT responses is first corrected assuming isotropic 1-D mantle conductivity. Against the anticipation, the principal axis of the corrected MT responses direct to about N70E, which is not parallel to either the fossil spreading direction or the current plate motion direction. Anisotropic 1-D forward modeling is now being attempted for the corrected MT responses. The result will be reported on the poster.