Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SCG67-P06 会場:コンベンションホール 時間:5 月 22 日 18:15-19:30

フィリピン海プレート周辺の海底下の 3 次元電気伝導度構造
The three-dimensional conductivity structure beneath the Philippine Sea and the western Pacific Ocean

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The electrical conductivity of the upper mantle beneath the Philippine Sea and the western edge of the Pacific Ocean was imaged in three-dimension (3-D) for the first time from marine magnetotelluric (MT) data.

We performed 3-D inversion analysis for the MT responses at 25 sites, which were obtained by a previous study (Baba et al., 2010) as a part of the Stagnant Slab Project (Shiobara et al., 2009). 21 sites of all sites were located on the Philippine Sea plate, while 4 sites were on the Pacific plate. The inversion scheme that we applied in this study was newly developed for this study to treat the effect for both regional large-scale and local small-scale topographic changes on MT responses (Tata et al., 2012; Baba et al., submitted) because the bathymetry and land/ocean distribution are known to significantly affect seafloor MT responses because of high contrast in the conductivity between seawater and crustal rocks..

The area imaged in this study is more than 3,000 x 3,000 square kilometers. The resolution of the electrical conductivity structure is at least 500 km x 500 km. This is small enough to discuss differences or similarities among basins in the Philippine Sea plate. And also we can discuss differences/similarities between the Philippine Sea mantle and the Pacific mantle from the electrical conductivity structure.

The best electrical conductivity model shows four features. (1) The conductivity of the Philippine Sea mantle is higher than that of Pacific mantle for the depths shallower than 200 km, and become almost equal to that of Pacific mantle in deeper parts, suggesting thinner young Philippine Sea Plate and thicker old Pacific Plate. (2) A conductive anomaly is located below 125 km depth beneath the Sikoku and Parece-Vera Basins. (3) A resistive anomaly is located at shallower than 40 km depth beneath the Daito and Oki Daito ridges. It might reflect complex tectonic history such as paleo Daito Ridge island arc-trench system (Tokuyama, 1995). (4) A resistive anomaly is located at shallower than 240 km at the northern part of the Shikoku Basin, which indicates the subducted Pacific Plate.

The next step will combine our result with other parameters such as seismic velocity structures in order to understand an evolution of the Philippine Sea plate in detail.

キーワード: 3 次元電気伝導度構造, フィリピン海, 海底 MT 法, インバージョン
Keywords: 3-D conductivity structure, Philippine Sea, Marine MT method, Inversion