# Hikurangi沈み込み帯における海底電磁気観測 (序報)

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# A preliminary result of ocean bottom EM observations in the Hikurangi subduction margin (the HOBITSS experiment)

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The Hikurangi subduction margin, where the Pacific plate subducted beneath the Australian plate around the eastern coast of New Zealand's North Island, is an important research field for study of interplate coupling. Geodetic studies found the significant difference of interplate coupling rate between northeast and southwest sides of the margin (e.g. Wallace and Beavan, 2010; Wallace et al., 2012). In the northeast side, small plate coupling coefficient (i.e. weakly coupled plate interface) is estimated. Slow slip events (SSEs) frequently occur in this area. Because most portion of moment release in the plate interface is attributed to the SSEs (Wallace and Beavan, 2010) understanding of the SSE events are also important. On the other hand, high coupling coefficient (i.e. mostly locked plate interface) is estimated in the southwest side. Heise et al. (2013) found the low resistivity zone and high resistivity zone in the weakly coupled northeastern side and the strongly coupled southwestern side, respectively, based on land magnetotelluric (MT) observations. They imply that the low resistivity zone reflects fluid or clay mineral rich interface, which decreases interplate coupling. However, plate coupling, SSEs and physical properties in the interface is not well understood under the off-coast area. In particular, SSEs mostly occur in the off-shore in the northeastern side. In order to study SSEs in this area, the HOBITSS (Hikurangi Ocean Bottom Investigation of Tremor and Slow Slip) experiment by the international research team deployed 15 ocean bottom seismometers (OBS), 24 absolute pressure gauges (APG) and 3 ocean bottom electromagnetometers (OBEM). RV Tangaroa (operated by NIWA, New Zealand) in May 2014. The instruments were recovered by RV Roger Revelle (operated by SCRIPPCS, US) in June 2015.

In this presentation, we will report preliminary result of the OBEM experiment. We used the single glass-sphere OBEMs developed by Tierra Tecnica and JAMSTEC (JM100 series) (Kasaya and Goto 2009). The data were recorded in the following locations: the intermediate point between coast and Hikurangi Trench (site OBEM-1) close to the IODP drilling target point, the point at 20 km landward from the trench (site OBEM-2), and the point at 10 km seaward from the trench (site OBEM-3). Although one OBEM settled at the site OBEM-2 was not recovered, the other two OBEM recorded high quality MT data. We preliminarily estimated MT impedances at the two MT sites based on the BIRRP program (Chave and Thomson, 2004). The horizontal magnetic field data of the other site were used for remote reference. The amplitude of estimated MT impedances in the diagonal components are comparable level with these of off-diagonal components at any rotation angles. It indicates strong 3-D effect due to bathymetry and/or underground resistivity distribution. They also show out of quadrant phase in the TE-mode. Because the phenomenon is observed when the resistivity in the underground is high (greater than 100 ohm-m in the case of Tohoku-oki area; Key and Constable, 2011), resistivity around the plate interface is possibly high in the slow slip area.

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