2011 年東北地方太平洋沖地震（M9.0）震源域における海底電磁気観測

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Ocean bottom electromagnetic observations around the focal zone of the 2011 off the Pacific coast of Tohoku earthquake (M9.0)

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Imaging of fluid distribution around the rupture zone of the 2011 Tohoku earthquake (M 9.0) gives us fundamental information to clarify mechanism of the earthquake because pore fluid controls viscosity, shear strength, and solidus temperature of rocks. Electrical conductivity is known as a good indicator for the pore fluid in the crust and the upper most mantle and thus it is useful for imaging the fluid distribution. In this study, we report marine magnetotelluric (MT) surveys with ocean bottom electromagnetometers (OBEMs) conducted around the source area of the earthquake and discuss resistivity distribution. We deployed 13 OBEMs on lines across the Japan Trench by the research cruses named KR09-16, KR10-12, NT11-08, NT11-13, and YK11-E06 between 2009 and 2011, and totally obtained good quality electric and magnetic data. MT impedances of these OBEM data were estimated based on the BIRRP program (Chave and Thomson, 2004). Presuming that the structure is approximately two-dimensional (2-D) with the strike parallel to the trench axis, the phases in TE mode were not determined in the ordinal quadrant in some sites. Because Key and Constable (2011) explained the out-of quadrant phases by coastal effect due to strong distortion in the magnetic field, we calculated MT impedances of simple 2-D models based on 10, 100 and 1000 ohm-m half space models beneath the seafloor that includes 2-D seawater distribution (0.3 ohm-m) across the Japan Trench. Although the 10 ohm-m model does not explain the out-of-quadrant phases, higher background resistivity models (100 and 1000 ohm-m) explain them. The other features of the impedances, however, are not explained enough by these simple models. They indicate that the resistivity distribution around the Japan Trench is more complex than the simple model we assumed. Therefore, we will discuss more detail resistivity distribution based on 2-D forward and/or inversion approaches in this presentation.