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Electrical resistivity distributions of the 2011 Tohoku-oki earthquake based on marine electromagnetic data

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Huge fault slip over 80 m in the shallowest part of the plate interface associated with the 2011 Tohoku-oki earthquake (M9.0) (e.g. Iinuma et al., 2012). The extreme slip distribution changed general understandings of fault ruptures because the area within ∼50 km arc-ward of the trench axis and the deeper area were believed as aseismic and seismic areas, respectively. Because pore fluids control fault behavior, understanding of the distribution of pore fluid around fault rupture zone is important to clarify the above questions. In order to discuss fluid distribution around the rupture zone, we acquired marine magnetotelluric data based on ocean bottom electro-magnetometers (OBEM) at 18 sites along two parallel survey lines; one line crosses the center of fault ruptured zone including the shallowest huge slip area and (line C, along latitude 38N); the other line crosses the north end of ruptured zone where tsunami origin was estimated (Ichihara et al., 2013) despite the significant fault slip is not estimated (line B, along latitude 39N). We estimated resistivity distribution beneath the line C using the 2-D inversion code based on Ogawa and Uchida (1996). The estimated resistivity profile shows a low resistivity zone in the shallowest part of plate interface. On the other hand, resistivity is relatively high in the deeper plate interface. They indicate that the huge fault slip occurred in the pore fluid rich area whereas the fault slip is small in the dehydrated area. In the presentation, resistivity distribution beneath the line B will be also discussed.