Magneto-telluric monitoring for probing changes in crustal resistivity associated with slow earthquakes

*Futoshi Yamashita[1], Yoshimori Honkura[1]

1.National Research Institute for Earth Science and Disaster Prevention

In southwest Japan, various slow earthquakes such as deep low-frequency tremor, deep very-low-frequency earthquake, and short-term slow slip events occur at the subducting plate interface (e.g. Obara, 2002, Scinence; Ito *et al*., 2007, Science; Hirose and Obara, 2005, EPS). To understand their mechanisms by probing the associated structural changes around the plate interface, we have been carrying out continuous magneto-telluric (MT) observations in western Shikoku, Japan since 2008. MT survey along the dip direction of subducting Philippine Sea plate revealed an existence of low-resistivity structure in the lower crust in this region (Yamashita and Obara, 2009, AGU). Two observational sites KBN and SGW were installed on the survey line. The observation at SGW terminated and representative observation at IKT, which is about 10 km away from the survey line, has started in 2010. Qualities of the data recorded at these sites are relatively fine. However, to further improve the quality, we are applying a data processing method same as Honkura *et al*. (2013, Nat. commun.); we use only data whose coherency between electric and magnetic field is higher than a threshold. Using the high-quality data, we estimate daily MT parameters, apparent resistivities and phases at nine frequencies from 0.00055Hz to 0.141Hz. As a result of the careful data analysis, we found some temporal changes in MT parameters. They should not be originated from a noise but the structural change in crust, because amounts of the changes in apparent resistivity and phase over nine frequencies are consistent with the theoretical relation in MT method. In addition, those temporal changes are common among two observational sites. We further found that the changes in the MT parameters looked correlated with the activity of the deep low-frequency tremor beneath the observational sites. Based on the surveyed resistivity structure, we will further investigate amount and location of the resistivity changes.

Keywords: Slow earthquake, Crustal resistivity, Magneto-telluric monitoring

