The 1st report of the Network-MT survey in the Western part of Shikoku Island, SW Japan

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In the Bungo channel region at the western margin of the Nankai megathrust rupture zones, the long-term slow slip events (SSE) repeatedly occurred about every 6 or 7 years. They activated deeper episodic tremors and slips (ETS) in the transition zone between locked and steady state slip zones along the sliding zones on the plate interface. The SSE also activated shallow very low frequency earthquakes (VLFE) off the Cape Ashizuri. All of these activities are releasing accumulated stress between the subducting Philippine Sea Plate and the SW Japan without generating a megathrust rapid rupture. Since the last major SSE occurred in 2010, we have not observed the major SSE yet and we will soon have the next one (in 2017 or 2018).

In order to examine mechanism of the SSE and/or concurrent ETS activities, especially to clarify influence of interstitial fluids on occurrence of the events, or to detect movement of the fluids associating with the events, we have started the Network-MT survey in the western part of the Shikoku Island facing the Bungo channel since April, 2016. In the Network-MT method, we use metallic telephone line network of the Nippon Telegraph and Telephone Corp. to measure temporal variation of the electrical potential difference with long baselines of from several kilometers to 10 and several kilometers. We selected 17 areas in the western part of Ehime and Kochi prefectures and installed 3 or 4 electrodes in the respective areas. By using those electrodes and metallic telephone lines, we measure the potential differences in 3 or 4 directions in the respective areas. The electrical potential differences measured in this way are known to be less affected by small scale near-surface lateral resistivity heterogeneities (e.g. Uyeshima, 2007). We also measure geomagnetic field at two stations in the target region. With the aid of the BIRRP code (Chave and Thomson, 2004), we estimated the frequency-domain response functions between each voltage difference and two component horizontal magnetic fields. From these response functions, we can estimate the regional deep resistivity structure. As the first report of this survey, in this presentation, we will show stability of the long-term electric field time series and discuss on the spatial distribution of the Network-MT response functions.

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