

MT survey in the source region of SSEs in Boso peninsula, Central Japan
- improving noisy data by ICA and three dimensional resistivity modeling -

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We carried out MT surveys in the Boso Peninsula (Chiba, Central Japan) to investigate the resistivity structure in the source region of the slow slip events that have occurred at least five times within 20 years. The MT data contaminated by large artificial noise and DC trains showed near field effect at the frequency band at below 1Hz. To avoid the local noise, in addition to the conventional remote reference method, we attempted to apply the independent component analysis (ICA). ICA is one of the multivariate analysis methods, and complicated mixing data can be separated into all underlying sources without knowing these sources or the way that they are mixed.

We applied the ICA method to improve horizontal magnetic components in MT data. Two components ICA, using both the data observed in Boso area and the noise-free magnetic data observed in Esashi, Sawauchi or Kakioka Magnetic Observatory, was applied for each magnetic component. After the ICA processing, the apparent resistivity and phase were computed by the BIRRP method developed by Chave and Thomson (2004). By this processing, we obtained gentle change and the phases take non-zero values. This result meant that some parts of the noise components such as near field noise were removed.

After obtained the reasonable apparent resistivity and phase, we estimated 3D resistivity structure using ModEM (Egbert and Kelbert, 2012). This area is surrounded by the sea and we especially paid attention to effects of the sea. In addition, conductive sedimentary layers widely cover at the shallow in this area. The resolution of the deeper structure is diminished in this situation. We discussed improving the 3D resistivity structure model under these difficult conditions. Comparing the resistivity structures with geological structure, we discussed the the presence of fluid in the crust.