Broad-band MT observations around the Kego Fault, Fukuoka, Japan

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The 2005 west off Fukuoka earthquake (M7) occurred offshore in the northwestern Kego Fault Zone (KFZ). The ruptures did not extend to the southeastern KFZ, where Fukuoka city is located. From 2011 to 2013, various surveys were conducted by a government commissioned project. Trench surveys, borehole surveys, and seismic reflection surveys suggested that KF was active twice in the past (8900 to 7400 years ago, and 4300 to 3400 years ago). Since the 2005 earthquake occurred in the northwestern part of the region, future large earthquakes are concerned at the southeastern part of the KFZ.
In the southeastern KFZ, which is called as Kego fault (KF), a number of seismic reflectors were identified in the subsurface. Dense reflection surveys along E-W trending line across KF imaged a region of poor reflection zone of 1 km width extends down to 17 km depth. This poor reflection zone was interpreted as a fault rupture zone where small-scale inhomogeneities dominate. Furthermore, there were differences in the seismic reflection intensity between the eastern and western sides of the fault, suggesting that KF is located at the region sandwiched by the different lithology.
In this study, we estimate the resistivity structure around the KF by broad-band MT observation. Specifically, we aim to investigate how the resistivity structure is correlated with the seismic structure. Furthermore, we aim to image the resistivity structure at the southeastern end of the KF. Aizawa *et al.* (2021) suggested that the low-resistivity zones at the end of fault zones play a role in the growth and arrest of the earthquake rupture.
As of early February 2022, the MT surveys is in progress. The data have been acquired at 22 sites in a 30 x 30 km area. It is usually difficult to obtain good quality MT response functions in urban areas due to significant artificial noise. However, in the study area, the noise due to the leakage electric current from railways significantly decreases from 0:00 a.m. to 4:00 a.m. We also reduce the artificial noise by applying the remote reference processing (Gamble *et al.*, 1979). In the presentation, we show the features of the obtained data and preliminary resistivity structure.

Keywords: magnetotelluric , resistivity structure, active fault, Kego Fault

