Seafloor Electromagnetic Observations in the Sea of Japan and Cooperative EM Observations on Land

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Since 2006, sea floor electromagnetic observations have been made off Tottori and Shimane in the Sea of Japan together with MT measurements in the land region, in order to investigate the resistivity structure in the San-in region; the Tottori-Shimane and the surrounding region in the northern part of the Chugoku district, southwestern Japan, where epicenters of micro earthquakes are remarkably distributing within a line belt with a width of about 4-9 km along the coastal line of the Sea of Japan. The depths of the hypocenters are located up to about 10km depths. In the seismic belt, several large earthquakes of M6.2-7.4 took place in 1943, 1983 and 2000. Moreover, quaternary volcanoes, such as Daisen and Oginosen volcanoes, are also located in the seismic belt.

Wide-band magnetotelluirc (MT) observations have been made along survey profiles of almost N-S direction in the San-in region since 1998, to investigate heterogeneity in the crustal electrical resistivity structure. Through those wide-band MT measurements, we found the low resistive region beneath seismogenic zone of the high seismicity belt on each MT profile line, and that the upper resistive crust corresponds to the seismogenic zone in the Tottori and northern Hyogo region. The low resistive region found along each wide-band MT profile seems to form a conductive zone extending in the almost E-W direction beneath the seismic belt extending in the almost same direction of the conductor. This result strongly suggests the existence of crustal fluid beneath the seismogenic zone in the focal area. The survey lines should be extended toward the Sea of Japan and longer period MT data on the land area should be obtained, in order to investigate deeper resistivity structure and clarify the relationship between subducting the Philippine Sea plate and the deeper resistivity structure beneath the San-in region. Therefore, we have carried out not only sea floor EM measurements but also longer period MT surveys on land since 2006 along two almost N-S profiles passing through two lines of longitudes, 134.3E (Profile SW100) and 133.4E (Profile SW200). It is important to analyze both data sets to obtain high accuracy resistivity structure. In this presentation, we will explain the observations in the sea and on the land and the results of time series analysis obtained so far.