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Investigations on crustal resistivity structures in the middle-western part of Tottori and the eatern part of Hiroshima

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The purpose of this study is to estimate electrical resistivity structure sections across and along the southwest Japan arc in order to clarify the relationship between the deep crustal conductive region and seismic activities. In this report, the general description of the resistivity structure investigation in 2012 by using a wide band MT method (the measurement line of the middle-western part in Tottori pref. and the east part in Hiroshima pref.) is given.

Ozaki et al(2011) showed that the crust has generally a resistive, as a feature of the resistivity model estimated from the south-north crossing measurement line in the earthquake occurrence region in the middle-west part of Tottori pref. (2002, Mj5.3). This observation fact conflicts with the model advocated by the group including authors that have studied electrical resistivity in Sanin region: A conductive area exists in the deep crustal part where inland earthquakes occur. And characteristic seismic activities including hypocenters of big earthquakes are found in the border between a conductive area and the above resistive area or on a resistive area side. That is, there is a possibility that the deep conductive area less than 10ohm-m beneath the Sanin region pointed by the existing study in the adjacent area in the east-west direction is not found and a deep crustal area in Sanin region does not exist in series. Assuming that inland earthquakes occur because of local stress concentration caused by inhomogeneous structure beneath a seismic activity band (Iio, 2009), the reliability of this information should be confirmed. To clear a continuity of a deep conductive structure clarified in the existing study is important to find the mechanism of the zonal seismic activity in this area.

Under the background mentioned above, after the autumn in 2012, a supplemental MT observation of resistivity structure was done in the middle-west part of Tottori pref. The investigation points are 6 places including that of the supplemental observation. As the result, both data obtained from the supplemental observation on the two points (Shitsu and Oka) close to the Tottori middle-west part earthquake occurrence area shows the same feature that apparent resistivity curve decreases for the frequency range below 1 Hz. This is a new feature that was not found in the former observation data. There is a difference in the configuration of the investigation curve between the points very close each other with several Km distance. This difference should be clarified by a structure analysis and a more detailed surfacial structure data should be completed hereafter.

On the other hand, as for the investigation research crossing the southwest Japan arc, the first 2-dimensional resistivity structure sections of the eastern part of Shikoku and Chugoku region obtained and the detailed earthquake reflection wave section found by Sato et al. (2005) and Ito et al.(2009) were compared and examined. However, for making the second island arc crossing structure section from the southwest Japan arc, an additional investigation in the unmeasured area, the eastern part of Hiroshima as the main area, is required to clear the northern edge of subducting Philippines plate. The MT investigation in the eastern part of Hiroshima has just started to make the second island arc crossing structure section. At the writing time of this report, the five points are being investigated.

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Keywords: Chugoku region, electrical resistivity, heterogeniety