

山形県北西部ひずみ集中帯の比抵抗構造

Resistivity structure across the tectonic zone of the northwestern region of Yamagata prefecture

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In the tectonic zone, dehydrated fluid from a subducted oceanic plate is estimated to be localized in the crust and the upper mantle. It is considered that identifying the localized fluid is the critical key to clarify the mechanism of tectonic zone. Therefore, measuring of electrical resistivity structure which is highly sensitive to fluid, is thought to be contributing to clarify the mechanism of the tectonic zone.

We started wideband magnetotelluric (MT) measurements in the northeastern margin of Japan sea tectonic zone since 2008. Two MT measurement lines, across Chokai volcano and Sakata to Sinjo cities from east to west, were performed in 2008. We estimated an eastward dipping low resistivity zone probably along the eastern Shonai plane active fault from 2D analysis. However, the whole feature of the low resistivity zone was not clear in the measurements.

To elucidate the spatial extent of the low resistivity zone, additional three lines of MT measurements over 50 km long (total measurement sites were 33) were performed in the northwestern part of Yamagata prefecture from 14 September to 18 November in 2009. The measurements have been continued about 20 days at each site by using 15 measurement devices (8 of ADU07 manufactured by Metronix Messgeraete and Elektronik GmbH, and 7 of MTU-5 manufactured by Phoenix Geophysics Co.). The impedance responses of each site are estimated by using BIRRP code (Chave and Thomson, 2003, 2004). The source of electromagnetic induction was very weak during the period because of the very weak solar activity. However, we are able to obtain enough quality impedance responses because of using the advanced robust code of BIRRP for the impedance response and done the long period measurements. In this presentation, we will discuss the whole feature of the low resistivity zone and also the mechanism in the tectonic zone from estimated 2D resistivity structures of all measurement lines.

キーワード: MT法, ひずみ集中帯, 山形, 庄内平野東縁断層

Keywords: Magnetotelluric method, tectonic zone, Yamagata prefecture, eastern Shonai plane active fault