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Three-dimensional resistivity imaging beneath the fold-and-thrust belt, Ishikari-teichi-toen fault zone, Hokkaido

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A magnetotteluric (MT) survey was performed in the Ishikari lowland region in order to clarify the distribution of fluids beneath the Ishikari-Teichi-Toen active fault zone (ITFZ), which is regarded as the most hazardous inland fault zone in northern Japan. Four components of impedance tensor and two components of magnetic transfer function at 16 frequencies between 40 and 0.00012 Hz at 50 measurement stations were inverted to a 3-D resistivity structure with the aid of the WSINV3DMT code. The inverted structure showed at the shallower part that the conductive layer ($<$10 ohm-m) corresponding to sediments beneath the lowland lies from the surface down to 7 km deep. The resistivity below 7 km shows a regional boundary between the western-northern and southwestern parts. The conductor is found along the ITFZ beneath this boundary in the middle crust. We interpreted this conductor to be a fluid rich zone, acting as a dynamically weakened zone. The conductive body is also found beneath the Shikotsu caldera, implying magmatic fluids ascending from the mantle or a region of partial melt.

Keywords: magnetotellurics, 3-D inversion, active fault, fold and thrust, active volcano