

## Thick sedimentary layers above the seismic basement in the Chuetsu area, Central Japan, inferred from MT and AMT surveys

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We conducted MT and AMT electromagnetic surveys in the Chuetsu area, Central Japan, where Neogene sedimentary layers were thickly deposited and the serious damage caused by long-period earthquake ground motion happens frequently. For the Niigata sedimentary basin including this area, the 3-D subsurface structure models were constructed using mainly geological data and seismic data. The purpose of the electromagnetic surveys is to investigate the deep resistivity structure from the surface to the seismic basement in this area and to verify the subsurface structure models with different approach from the conventional method. The MT and AMT data were collected at 34 and 91 sites, respectively, which were located along a NW-SE profile traversing the regional geologic strike. Since the cultural noise levels are considerably high in this area, it is difficult to acquire the high quality MT data. Using the far remote reference method, we performed long-term measurements at many sites simultaneously with a maximum of 16 pieces of equipment so that MT data could be acquired when strong natural signals occurred. In data processing, we selected the periods with the strong signals and edited the data of the high S/N ratio in them to raise the quality of data. As a result, MT parameters which can be used for quantitative analysis of resistivity structure were obtained. Two-dimensional analysis was applied along the profile. The precise resistivity section up to a depth of about 1.5 km was obtained from the AMT data and the deep resistivity section up to a depth of about 15 km from the MT data. We interpreted the resistivity sections using geological data and well data, and compared them with the past subsurface structure model. The resistivity structures from MT and AMT data are consistent with the resistivity log of nearby a 3100 m-deep well. The high-resistivity basement is good agreement with the seismic basement obtained from the seismic survey. Very conductive layers correspond to the Neogene sedimentary layers of Nishiyama, Shiiya, Upper Teradomari and Lower Teradomari formations. They are shallow and thin at anticlines, and deep and thick at synclines. The zone of lowest resistivity corresponds to the Upper or Lower Teradomari layer. Resistive layers at or near surface correspond to the volcanic rocks or the Uonuma formations of mainly Pleistocene age, which are not altered. From the detailed resistivity section, the location and scale of anticline and syncline structures can be estimated.

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