R003-06
D 会場 ：11/25　PM1 （13:15-14:45）
14:30〜14:45

男鹿半島申川断層の電気探査と磁気探査による断層傾斜角の推定

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An estimation of the dip angle of the Sarukawa fault at Oga peninsula by use of electric sounding and magnetic survey

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Several damaged earthquakes have taken place around the area of Oga peninsula in Akita prefecture, northeast of Japan. In 1810, a damaged earthquake called Ugo earthquake or Bunka-Oga earthquake estimated magnitude M6.5 occurred in Oga peninsula. In 1939, successive earthquakes of magnitudes M6.8, M6.7 and M6.5 took place around the peninsula. Off the Oga peninsula in Japan Sea, the earthquake off Oga of 1964 (M6.9) and the central Japan Sea earthquake in 1983 (M7.7) are known as well.

The earthquake fault in associated with above earthquakes inland of Oga peninsula is not clearly known although several researchers have proposed the candidates. The lineament in the topography mainly bending low cliffs can be seen along the eastern edge of Iriai lowland in Oga peninsula. The lineament is called the Sarukawa fault and it is one of the candidates of past damaged earthquakes.

We cannot see the fault outcrops at Sarukawa fault and excavated researchers have not carried out so far. The dislocated fault angle buried under the ground surface is not so clear. In the regional stress state of the tectonic background in recent geological stage, compressional stress in the direction of east-west. Reverse fault planes are expected under the Sarukawa fault based on the consideration of surface topography and stress state in the region.

The low dip angle of the reverse faults in Akita area are known e.g., in the Senya fault with Rikuu earthquake in 1896, at parts of shallow zone of Kita-Yuri thrust faults

We conducted ERT (Electric Resistivity Tomography), GPR (Ground Penetrating Radar), the seismic refraction survey and magnetic survey at the Sarukawa fault. With the reference to the result of the resistivity structure model and the magnetic survey in total intensity across the Sarukawa fault, we try to estimate the dip angle of the Sarukawa fault, especially focusing it is high angle or low angle.

In this study, ERT survey lines were installed and collected data on September 16, September 26, October 25, and December 7, 2022. Four 235 m long straight survey lines were set up along a farm road in the Iriai-Chuishi area, on the eastern boundary of Iriai lowland. The Dipole-Dipole and Wenner were used for the electrode array, with 48 electrodes and 5 m electrode spacing. GNSS positioning was also used for detailed topographic analysis. RES2DINV was used as the analysis software to create a resistivity model of the subsurface within the exploration area.

We referred the resulted models of the resistivity section across the Sarukawa fault by ERT. General speaking of estimating the location of the dislocation fault surface, we align the thin layer of low resistivity or seek the sharp boundary of resistivity values. Based on the resistivity model, we have two candidates of the buried fault surface of the Sarukawa fault. One is low angle model and the other is high angle model. It is easier to take the low angle model in the subsurface image of surficial soil like as the soften alluvial fan or sand dune deposit in the background of regional stress in the direction of east-west in the northeast of Japan. At present we can refer the 20 m boring result at the site. In the assumption of the low angel fault, the dislocation has to recognized in the boring core, but we cannot see such kind of rupture in the sand dune in the sample of the core.

So far we tentatively concluded the dislocation angle to the ground surface of the Sarukawa fault would be high. But we feel the further investigation is necessary in consideration of detailed topography, rheology and elasticity of the geology, stress and strain of this region etc.