R003-06
Zoom meeting A ：11/2 PM2 (15:45-18:15)
17:20〜17:35

Introduction of a pilot Network-MT survey in the north island of New Zealand

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Beneath the east coast of the North Island of New Zealand, westward subduction of the Pacific plate takes place. On the northern part plate interface, the slow slip earthquakes (or events, SSE) frequently occur. One candidate reason to explain the SSE (and not high-speed normal earthquake) occurrence is existence of interstitial fluids on the plate interface.

Electrical resistivity is a physical quantity which is sensitive to existence of interstitial water and, especially, to its connectivity. Therefore, if we can confirm temporal resistivity variation, where resistivity value reduces with enhanced connectivity on SSE occurrence, we will reinforce the hypothesis that the fluids cause the SSE occurrence.

Aiming at confirming such temporal structural variation associating with the SSE activities, we decided to perform the Network-MT survey in the northeastern coastal area of the North Island. In the target area, subduction angle is low, and the plate interface is located at depths of from 12 km to 20 km. Especially in the northern part of the east coast, SSE more frequently occur with recurrent interval of about 2 years. Thus, the target area is one of the best research fields to investigate temporal variation of the electrical resistivity structure with SSE occurrence in the world.

In the Network-MT surveys, copper telephone line network is used to measure the electrical potential difference between the electrodes. This enables us to measure the electrical potential differences using dipoles from several kilometers to 10s of kilometers length. The magnitudes of natural electric disturbances are much increased and integrated electric field data of high S/N ratio can be obtained. Very high S/N ratio measurements are needed to detect any temporal variation of the electrical resistivity associating with fluid transport near the plate interface.

In this presentation, we will describe our pilot Network-MT trial that commenced in December, 2019 at Tolaga Bay, about 40 km northeast of Gisborne. The survey was planned to evaluate feasibility of the Network-MT survey in the New Zealand. We will show observation configuration and discuss on quality and stability of the Network-MT response functions in the frequency domain between the electrical potential difference and the magnetic field.