

Seismic refraction and wide-angle reflection experiment in southern Kyushu, Japan: (3) the 2018 exploration report

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[1] Primary Objective

Southern Kyushu is a typical island arc region: subduction of Philippine Sea plate under Kyushu off Hyuganada with high seismic activity, the Aira caldera with active volcanic activity, the extending Okinawa trough, and the East China Sea. Our project is aimed at clarifying the detailed velocity structure of the crust beneath southern Kyushu and recognizing interactions with crustal activities in these regions. It is also concerned about the occurrence of large-scale eruptions at the Aira caldera larger than the 1914 Taisho eruption in Sakurajima volcano. Accordingly, we also intend to reveal the caldera structure of the Aira caldera in order to deepen the understanding of the present magma supply system beneath the Aira caldera.

This reports an outline of the second seismic exploration carried out in November 2018.

[2] Report of Seismic Exploration in 2018

For our purpose mentioned above, we carried out the first seismic exploration in November 2017, which consists of 9 shot points with charges of about 200 kg dynamite in the land area and 906 temporary seismic stations including 42 OBSs along about 165 km long profile running transversely across the Osumi Peninsula, the central part of the Aira caldera, the Satsuma Peninsula, the Koshiki Strait and the Koshiki Islands.

The second seismic exploration was carried out in November 2018. In this 2018 exploration, 872 temporary seismic stations were deployed along the 2017 seismic main profile. The equipment at each station is same as that in 2017. In addition, we widely deployed 49 seismic temporary stations with a 4.5 Hz three components seismometer and a portable data logger "GSX" in Sakurajima volcano in order to estimate the 3-D velocity structure beneath the volcano.

In the 2018 exploration, artificial explosions by the seismic air-gun blasting system (6000 cubic inches) were applied at 50m or 100m intervals along the sea profiles (Profile-B, Profile-D, Profile-F, Profile-H). We successfully observed the seismic refraction and reflection signals generated from the air-gun in a distance range of more than 20 km. We also introduced 4 big vibrator vehicles in the land area, which vibrates continuously during about 4 hours at the fixed locations. In addition, we carried out the seismic reflection profiling with 5 km long profile in the northeastern area in Sakurajima volcano.

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