

Shallow velocity structure in and around Sakurajima Volcano deduced from a refraction seismic experiment - Part 1 -

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Refraction and reflection seismic experiments were carried out in and around Sakurajima Volcano in November, 2008. Seismic waves radiated from 8 large shots and 7 small shots were observed by 678 temporary seismic stations including 32 ocean bottom seismometers. The details are referred to Iguchi et al. (2009). In this study, we aim to estimate basement structure in and around Sakurajima Volcano by travel time analysis.

We analyzed along 9 profiles by combination among the shots. In order to construct an initial velocity model along each profile, we applied the method of difference and the time term method to the travel time data. Next, we utilized the ray tracing program "rayinvr" (Zelt and Smith, 1992) and obtained rough velocity model along each profile by trial and error approach.

The features of the velocity structure are as follows: A velocity of the thin 1st layer is about 1.3 - 1.7 km/s, which corresponds to the lava layer or the sedimentary layer. The 2nd layer is the sediment with a velocity of 2.3 - 2.8 km/s and thickness less than 1km. The 3rd layer is found to have local variation in velocity and thickness: the velocity in the Sakurajima volcano ranges from 3.0 to 4.0 km/s, and that outside the volcano is about 4.3 - 4.8 km/s and its thickness is about 2 km. The 4th layer has a velocity more than 5.2 km/s.

The obtained velocity model shows that the basement with a velocity more than 5 km/s is distributed at about 3 km depth beneath Aira Caldera. On the other hand, outside the Caldera, the basement is located at 1km depth. We can not reveal the depth configuration of the basement beneath Sakurajima Volcano, due to the short-range profile. However, our model suggests that the basement beneath the volcano and the Caldera is deep, compared with that beneath the surrounding area.

Keywords: Sakurajima, velocity structure