

Unknown later arrivals in cross-line shooting seismograms of the repeating seismic experiments in Sakurajima Volcano

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Clear unknown later arrivals will be presented, which are detected through reconsideration on cross-line shooting seismograms in Sakurajima Volcano. The later arrivals are interpreted as PP reflections or PS conversions beneath eastern flank of Kitadake.

The repeating seismic experiments in Sakurajima Volcano has been conducted on every December since 2009 through 2014 (Tsutsui et al. 2010; 2011; 2012; 2013; 2014). The experiment includes two seismic profiles in the northern and the eastern Sakurajima, and fourteen or fifteen chemical shots have been recorded at over 250 temporary stations on each experiment. The active reflector "Alpha" at 5.8km below sea level has been reported as a result of the experiments, which is located in the northeastern part of Sakurajima. However, only a portion of the active reflector has been presented in the paper under processing, which locates just beneath the seismic line.

On the other hand, the cross-line shooting seismograms have been waiting for analysis. We have obtained sets of the cross-line shooting seismograms due to continuous recording over the shootings. We detected and interpreted some clear later arrivals in the cross-line shooting seismograms as followings;

A clear later arrival appears on 2.9 through 3 seconds in the eastern stations for northern shots and also in their reversed configuration, in the source distance range of 4.0 to 4.8 km. The arrival only appears in the seismograms corresponding to path passing through 2 km ENE of Kitadake summit. The arrival is interpreted as PP reflections because they appear high apparent velocity and also been found in reversed geometry of the station and the shot. A PP reflector at 4.7 to 4.8km below sea level gives well explanation on the arrival time. It is of interest that the modeled reflector is located in the south of the reflector "Alpha", and is shallower than "Alpha".

Moreover, other clear later arrival appears in seismograms in northern Sakurajima for the eastern shot, which appears about 5.2 s in the range 4.5 through 5.5 km. The arrival has high apparent velocity, disappears in the seismograms at the reversed geometry, and shows larger amplitude than that expected in PP arrival time. The arrival is interpreted to be PS conversion because of those above feature in seismograms. Assuming V_p/V_s is 1.73, the conversion at 5.8 km below sea level in NE of Kitadake can explain its travel time. It is significant that the converting points locate just at the same depth of the active reflector "Alpha", and locate between previous reflector and the reflection "Alpha". Moreover, amplitude of the conversion has been changing through the seismic rounds.

Later arrivals have been detected in cross-line shooting seismograms on 2014 of which an association with the latest intrusion event on August 2015 is of interest.

Those seismic horizons beneath eastern to northeastern flank of Kitadake will be reported and their association with the intrusion event on August 2015 will be discussed.

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