

Applications of Pseudo Reflection Profiling method to isolated volcanic tremors

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A new application of Pseudo Reflection Profiling will be presented. Isolated volcanic tremor is processed with processed with Pseudo Reflection Profiling method, a sort of correlation seismology. S-wave seismic reflection imaging and detection of source region evolution in conduit region are obtained. Analyses were done with 11 isolated tremors which had been observed in the project ASO98 at the interval times among the shots (Sudo et al., 2002), which were presented as the Hybrid tremors by Mori et al. (2008). Because predominant component of the Hybrid tremors are S wave component (Mori et al., 2008), obtained Pseudo Reflection Profiles correspond to S-wave seismic reflection profiles.

Processing menu has been enhanced with using the grouping processing and clearer sections are obtained than before. Grouping processing among each three stations improves quality of the subsurface image. However, there were ghosts in the obtained profiles which differ among the tremor events. Variation in the incident waves which have non impulsive autocorrelation can cause such appearance. Then evaluation and deconvolution of incident waveform is important but this was difficult. Several approaches have been proposed. The equivalent incident waveform can be obtained by stacking of all pseudo reflection seismograms for a source and contains both source time function and seismic reflection response around the source region (Tsutsui et al., 2008). All ghosts in the Pseudo Reflection Profiles are different for each event then the equivalent incident wave forms vary each other. The difference equivalent incident waveform suggests there should be some difference in source time function and/or seismic reflection response among the sources of isolated tremors. Variation of arrival times around the crater (= source region) supports there may be some changes in source location and/or depth for each event during our observation.

Therefore Pseudo Reflection Profiling method will be a useful tool not only for explorations but for seismic volcanic monitoring.