

Attenuation Structure around Unzen Volcano

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Unzen volcano is in Unzen graben cut by faults crossing Shimabara peninsula east and west. Volcano activity has continued intermittently for five hundred thousand years. It is an important clue to seek for seismic attenuation structure to elucidate the construction of a volcano body.

Pulse width data are used to invert for attenuation structure to 4km in depth in the Unzen volcano area. The dataset consists of pulse width measurements of small seismic events ($M_{0.5-2.5}$) recorded between 1990 and 2001. A linear relationship between pulse width broadening and travel time is upheld from observation and theory. The proportion coefficient of pulse width is C/Q for travel time. And the constant C is approximately 0.5 from past experiments. This time I suppose ($C=0.5$).

Pulse width data of an event are recorded at several stations. And an average Q in the local area is calculated from the ratio of pulse width for travel time. Furthermore, the average Q of Shimabara peninsula is estimated from all events. And then five local average Q around Mt. Fugen are estimated by selecting the stations near an epicenter. Low Q regions are located near the mountain and at the east side. High Q regions are located at the west side and the south side. Pulse width dependence on stations is estimated by averaging pulse width residuals of each station for all events. Finally I compare them with the inversion result.