

Study on crack size in anisotropic media in Hakone volcano

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We have studied properties of anisotropic media in Hakone volcano, such as depth dependence of anisotropic intensity and/or its time variations. In this study, we consider the characteristic size of the crack system in the anisotropic media in Hakone volcano. To do so, we examined the confidence band in the frequency domain of the parameters obtained in the S-wave splitting analysis based on the method proposed by Mizuno et al (2001).

Mizuno et al (2001) proposed a quantitative manner to estimate errors in phase differences between two quasi-S waves obtained by a splitting analysis. The phase differences should be constant (confidence band) under the assumption that a considered wavelength is much longer than the size of the cracks. As a frequency becomes higher, the phase differences become frequency-dependent. Therefore, we can estimate the lower limit of the wavelength, that is, the upper limit of crack size from a confidence band of phase differences.

We estimated the upper limit of crack size as 200 ~ 300m in the assumed velocity structure. However, lower limits of wavelength obtained for some observation sites (e.g., KIN and OWD) are longer than those for the other sites. Yukutake et al (2013) reported that there is a low b-value zone beneath the fumarolic area (Owakudani). The low b-value zone is expected to include relatively large cracks. The spacial variations of estimated crack size may be caused by rays passing through the low b-value zone.

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