

Locating volcano-seismic events using high-frequency amplitudes for volcano monitoring

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Long-period (LP) events and tremor are useful to monitor volcanic activity. However, these events are generally difficult or impossible to estimate their locations using arrival time methods. Battaglia and Aki (2003) proposed that seismic amplitudes are useful to locate LP events and tremor. We tested this method to an explosion event and tremor originated from lahars at Tungurahua, Ecuador, of which source locations were known. We used data from four seismic stations at this volcano. Our results indicated that two important improvements for this method. First, the site amplification factors estimated from coda waves are not appropriate, and the factors estimated from teleseismic S waves provide better estimates. Second, Q for medium attenuation affects locations of the event and tremor, and the Q value at the minimum residual among different Q values provides good locations. Although the depth resolution is not good, we can use high-frequency amplitudes to locate LP events and tremor using a small number of stations, suggesting that this approach is highly useful to volcano monitoring.