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Wave Velocity Structure Beneath the San Miguel Volcano, El Salvador, Estimated from Seismic Ambient Noise

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The San Miguel volcano is considered one of the most active volcanoes in El Salvador due to its multiple eruptions; however, its structural properties are not fully understood. Four broadband seismometers were deployed by the Ministry of Environment of El Salvador from February 2014 to April 2014. We analysed ambient noise data using the spatial autocorrelation (SPAC) method and seismic interferometry technique. The SPAC method enabled us to calculate the phase velocity of the surface waves from 0.2 to 1.0 Hz. We derived the SPAC coefficients for each sensor-to-sensor pair (1.5–5.5 km). We directly converted the derived SPAC coefficients to Rayleigh wave phase velocities between 0.2 and 0.4 Hz and inferred phase velocities above 0.4 Hz using the zero-crossing frequencies. We also calculated Rayleigh wave group velocities with seismic interferometry, for each sensor-to-sensor pair. The combined use of the two methods offered ways to gain information about the subsurface seismic velocity structure from the same dataset. Considering the fundamental mode phase and group velocities, the resultant dispersion curve was obtained in a frequency band of 0.2-1.3 Hz. Our results made it possible to perform a joint inversion of phase and group velocities to obtain the S wave velocity structure of the volcano.

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Promotional text

Transforming noise into signal to understand the San Miguel volcano

Oral preference format

in-person

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