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## Ambient Noise Cross-Correlations along Distributed Acoustic Sensing (DAS) for Imaging the Subsurface at Stromboli Volcano

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The deployment of dense seismic arrays on volcanoes has increased significantly over the past decades, enabling more precise monitoring of volcanic activity. While short-period sensors are commonly used, Distributed Acoustic Sensing (DAS) represents a promising complementary technology, providing high spatial resolution and remote location of the interrogator. Accurate monitoring requires a robust understanding of seismic wave propagation, particularly within the shallow subsurface beneath the sensors. On volcanic edifices, the distribution of eruptive deposits along the flanks can be highly heterogeneous, leading to strong lateral variations in physical properties that can significantly affect seismic records.

In this study, we use ambient noise cross-correlation to characterize the subsurface velocity structure beneath a 3 km long DAS cable deployed on Stromboli volcano, Italy. We analyse two months of continuous strain rate data acquired on this persistently active volcano, which allows the application of a passive approach. Empirical Green's Functions (EGFs) are retrieved using Phase Cross-Correlation and times-scale Phase Weighted Stack methods. They are validated through comparison with EGFs obtained from collocated short-period seismic sensors. Local phase and group velocities are then computed along the optical fiber and inverted to determine the 2D S-wave velocity profile. We clearly identify 2 distinct regions along the profile which are correlated with changes of local topography, eruptive activity and deposits.

### Speaker information

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