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Dike-like structures control the unrest in Campi Flegrei

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The occurrence of seismicity in active calderas causes great concern as it is one of the main precursors for the volcanic eruptions.

Campi Flegrei is one of the largest known active calderas and its historical unrests are characterized by a high number of low to moderate magnitude earthquakes usually associated with soil uplifts reaching several centimeters or even meters within each cycle.

The last unrest started in 2006 and is currently accompanied by a large sequence of events localized beneath the Soflatara-Piscarelli system, together with the increment of gas emission in Piscarelli and strong variations of several geochemical and geophysical parameters.

Here we show two classes of seismic models generated using passive methods that employed both Earthquakes and Ambient Noise recorded from 2005 till March 2022.

These models enabled us to demonstrate, for the first time, the existence of vertically elongated high P-wave velocity bodies beneath Pisciarelli, Pozzuoli, and a resurgent formation situated offshore. The most evident dike-like structures are positioned at the border of the resurgence dome involved in the uplift, indicating that the peripheral structures regulate the upward fluid migration, contributing to the ongoing unrest.