EGU24-8922, updated on 14 Oct 2024
https://doi.org/10.5194/egusphere-egu24-8922
EGU General Assembly 2024

Monitoring seismic velocity changes at Campi Flegrei (Naples) using seismic noise interferometry - Do we see precursors of the future volcanic activity?

Marcel van Laaten, Jozef Müller, and Ulrich Wegler
Institute of Geosciences, Friedrich Schiller University Jena, Jena, Germany (marcel.vanlaaten@uni-jena.de)

Campi Flegrei is a volcanic field located in the immediate vicinity of the densely populated area of Naples, Italy. Since 2005, the area has been experiencing a new bradyseismic crisis, i.e., a slow uplift of the subsurface caused by rising fluids in the subsurface. The uplift is accompanied by earthquake activity that has been steadily increasing for years, culminating in the strongest earthquake (ML 4.2) in the last 40 years on September 27, 2023. Such uplift and earthquakes can cause changes in seismic velocity and are often succeeded by a volcanic eruption. In this study, we utilize seismic noise to calculate velocity changes at different levels/frequencies over a 7-year period using passive image interferometry. The observed long-term velocity decrease of 1.39 % near the surface over the period from 2016 to 2023 can be explained by a volume increase of the hydrothermal system at the depth of 3 km. In 2023, the Campi Flegrei underwent several phases of velocity change. After a period of minor velocity changes, there was a gradual 0.7 % increase in velocity starting in May. Following the onset of the earthquake swarm in August, the velocity slowly decreased once again.