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Seismic, Geodesic and Atmospheric monitoring of the recent Seismo-volcanic activity in São Jorge Island – Azores (Portugal)

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Abstract. On March 19, 2022, at 5:11 pm, Portuguese Institute for Sea and Atmosphere (IPMA) network recorded the first earthquake, on São Jorge Island (Azores, Portugal), of what would turn out to be a seismic crisis of the type "swarm" with a maximum of 700 events/hour (maximum magnitude = 4.0 ML). The epicenters are distributed in a direction close to the alignment of the Island, in a strip between Velas and Pico da Esperança and a depth between 7 and 13 km (source: IPMA). This occurrence generated great alarm among the population. In the days following the beginning of the crisis, the Institute of Earth Sciences – University of Évora (ICT-UÉ) and IPMA proceeded with the installation of a set of broadband stations and an accelerometer (some of them connected via 4G to IPMA and ICT-EVORA), to reinforce the existing seismological network. Using Sentinel-1 InSAR data (acquired between March 9 and April 14, 2022) it is observed that there is a deformation between 5.6 and 8.4 cm affecting a vast region comprised between the islands of São Jorge, Pico and Faial. Considering this result and the high risk of volcanic eruption, or earthquake of greater intensity than those already felt, the ICT-UÉ and IPMA installed 30 BB stations disposed in four small-aperture sub-arrays centered on the islands of S. Jorge and Pico to reinforce the ability to detect low magnitude events and through these to improve the understanding of the earthquake-volcanic processes associated with the observed deformation. A spectrometer, an aerosol particle sizer and a meteorological station were also installed at São Jorge Island aiming at monitoring trace gases, aerosol size distribution and concentrations, as well as meteorological variables during the seismic emergency. In this work we present the recent results of seismicity and seismic source of this crisis, and atmospheric measurements.
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