



## Investigation of volcanic emissions in Antikythera PANGEA station using near-real-time alerts

**Anna Kampouri**<sup>1,2</sup>, Vassilis Amiridis<sup>1</sup>, Stavros Solomos<sup>1,3</sup>, Anna Gialitaki<sup>1,4</sup>, Eleni Marinou<sup>1,4</sup>, Christos Spyrou<sup>1</sup>, Aristeidis K. Georgoulas<sup>2</sup>, Dimitris Akritidis<sup>2</sup>, Nikolaos Papagiannopoulos<sup>5</sup>, Lucia Mona<sup>5</sup>, Simona Scollo<sup>6</sup>, Ioannis Pytharoulis<sup>2</sup>, Theodore Karacostas<sup>2</sup>, and Prodromos Zanis<sup>2</sup>

<sup>1</sup>National Observatory of Athens / IAASARS, Athens, Greece, Athens, Greece (akampouri@noa.gr), (vamoir@noa.gr), (ssolomos@academyofathens.gr), (togialitaki@noa.gr), (elmarinou@noa.gr), (cspyrou@noa.gr)

<sup>2</sup>Department of Meteorology and Climatology, School of Geology, Aristotle University of Thessaloniki, Greece (akampouri@noa.gr), (ageor@auth.gr), (dakritid@geo.auth.gr), (pyth@geo.auth.gr), (karac@geo.auth.gr), (zanis@geo.auth.gr)

<sup>3</sup>Research Centre for Atmospheric Physics and Climatology, Academy of Athens, Athens, Greece (ssolomos@academyofathens.gr)

<sup>4</sup>Laboratory of Atmospheric Physics, Physics Department, Aristotle University of Thessaloniki, Greece (togialitaki@noa.gr), (elmarinou@noa.gr)

<sup>5</sup>Consiglio Nazionale delle Ricerche, Istituto di Metodologie per l'Analisi Ambientale (CNR-IMAA), Italy (nikolaos.papagiannopoulos@imaa.cnr.it), (lucia.mona@imaa.cnr.it)

<sup>6</sup>Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Catania, Italy (simona.scollo@ingv.it)

In the last years, several Etna eruption events are documented, forming lava flows and explosive activity. The Pilot EO4D\_ash – Earth observation data for detection, discrimination & distribution (4D) of volcanic ash of the e-shape project provides the PANhellenic GEophysical observatory of Antikythera (PANGEA) of the National Observatory of Athens (NOA), in Greece with near-real-time alerts from Etna volcano eruptions. These alerts are used in the PANGEA station to monitor and reveal the presence of volcanic particles above the area the days following an eruption, also the station is supported by a volcanic particle monitoring and forecasting warning system. In this work, we investigate the volcano eruption between 30 May and 6 June 2019 which affected the southern parts of Greece and reaching the Antikythera station. Due to the prevailing meteorological conditions, volcanic particles and gases followed an easterly direction and were dispersed towards Greece. FLEXPART dispersion model simulations confirm the volcanic plume transport from Etna towards PANGEA, mixing also with co-existing desert dust particles. Model simulations are evaluated with Polly<sup>XT</sup> lidar measurements performed at PANGEA and satellite-based SO<sub>2</sub> observations from the TROPOspheric Monitoring Instrument onboard the Sentinel-5 Precursor (TROPOMI/S5P). This is the first time that Etna volcanic products are monitored at the Antikythera station, in Greece with implications for the investigation of their role in the Mediterranean weather and climate.

**Acknowledgments:** We acknowledge the support by EU H2020 E-shape project (Grant Agreement n. 820852). Also, this research was supported by data and services obtained from the PANhellenic Geophysical Observatory of Antikythera (PANGEA) of the National Observatory of Athens (NOA),

Greece, and by the project "PANhellenic infrastructure for Atmospheric Composition and climate change" (MIS 5021516) which is implemented under the Action "Reinforcement of the Research and Innovation Infrastructure", funded by the Operational Programme "Competitiveness, Entrepreneurship and Innovation" (NSRF 2014-2020) and co-financed by Greece and the European Union (European Regional Development Fund). NOA team acknowledges the support of the Stavros Niarchos Foundation (SNF).