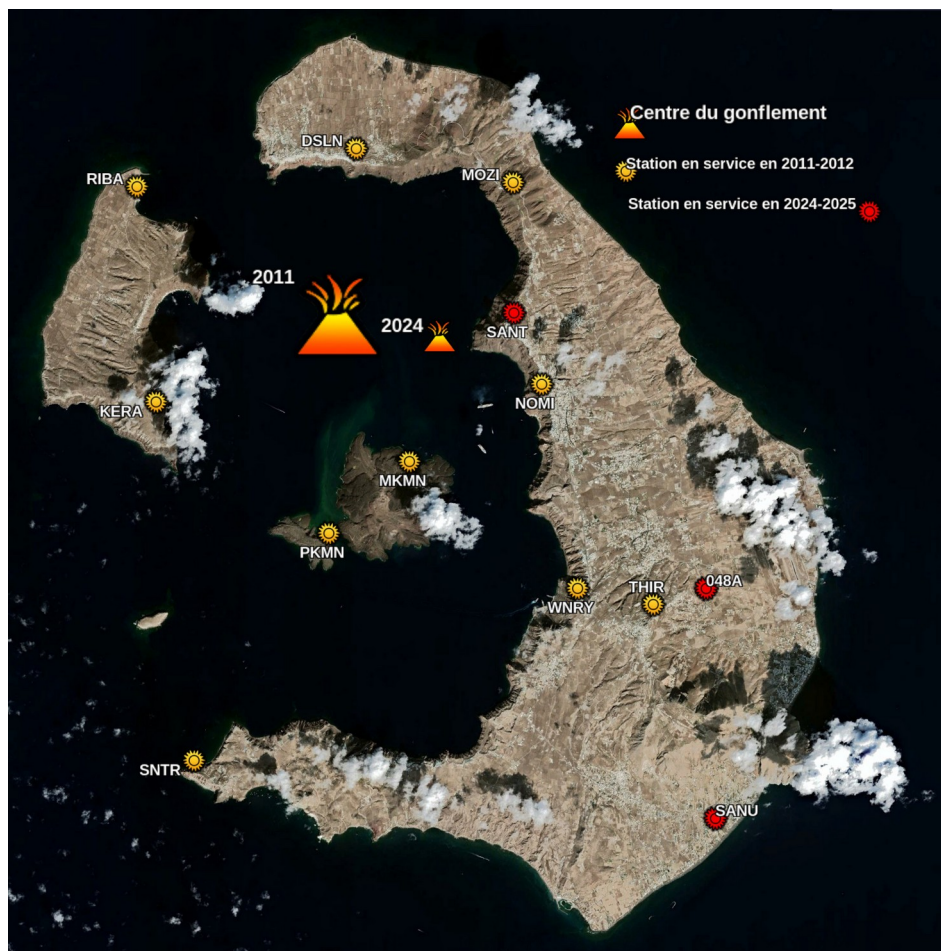


Santorini seismo-volcanic event - Update of the time series of the GNSS stations

P. Briole - CNRS - 9 February 2025

The data used in this note were provided by the Greek geodetic coordination team composed of Athanassios Ganas (NOA), Panagiotis Elias (UPAT) and Vassilis Sakkas (NKUA). The time series were previously submitted to this coordination team for validation.

1. Location of the available stations SANT, 048A and SANU



Station	Long. (°)	Lat. (°)	Elev. (m)	Owner	Name of the network	Data available since
SANT	25.42261	36.43360	392.018	Metrica	HxGN SmartNet ¹	3/2/2011
SANU	25.46603	36.34905	42.797	Tree Company	Uranus ²	28/1/2016
048A	25.46350	36.38769	120.832	Hellenic cadastre	Hepos ³	25/12/2021

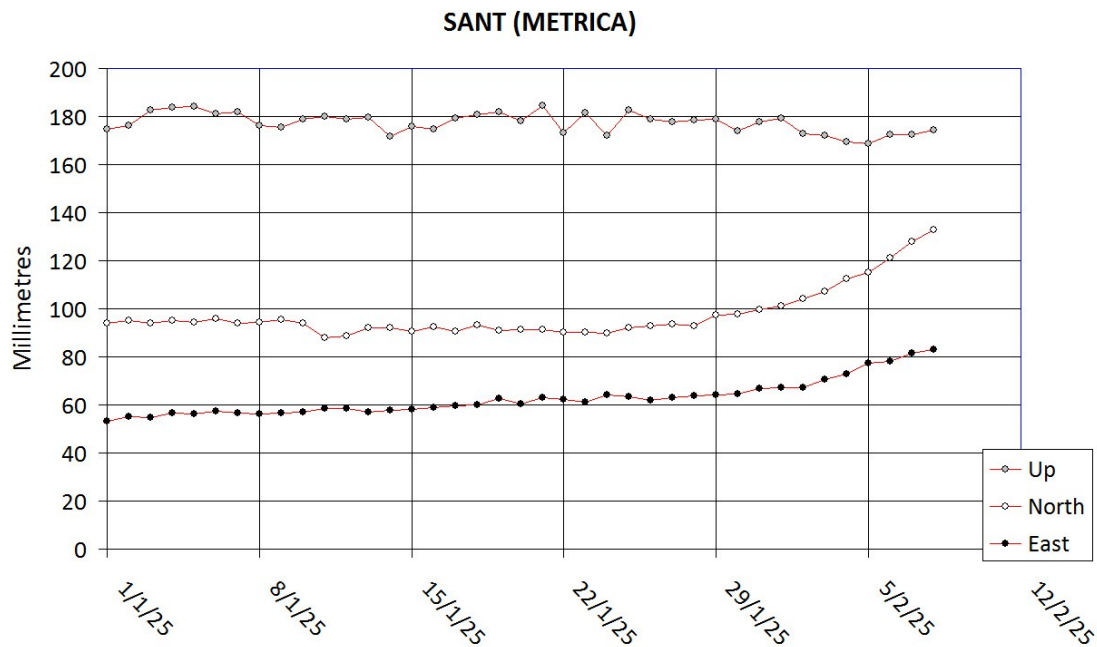
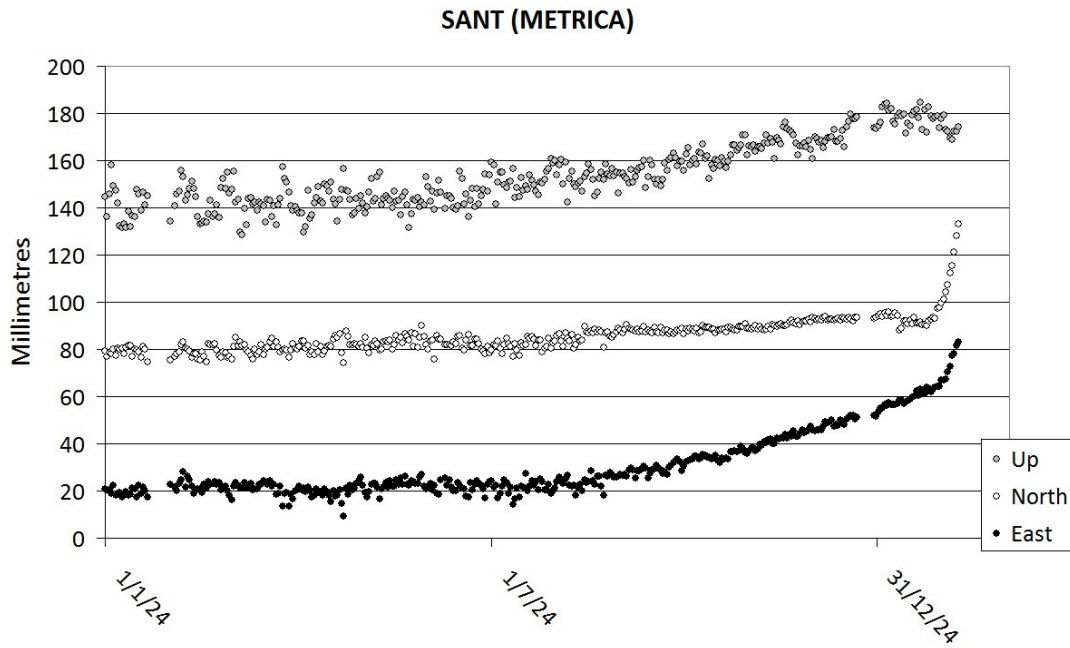
1 <https://info.metrice.gr/index.php/en/smartnet-network-hxgn>

2 <https://www.uranus.gr/>

3 <https://www.hepos.gr/en/home/>

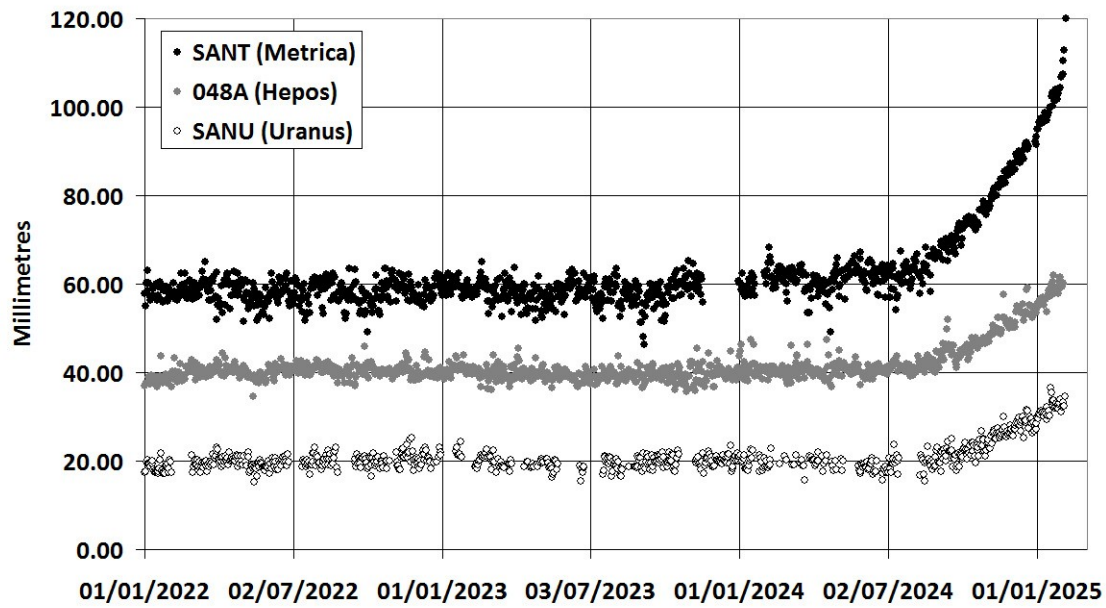
2. Update of the time series of SANT (latest data February 8)

The deflationary trend that began around 20 January seems to be continuing. The fast movement towards the NNE that began on 29 January is continuing.

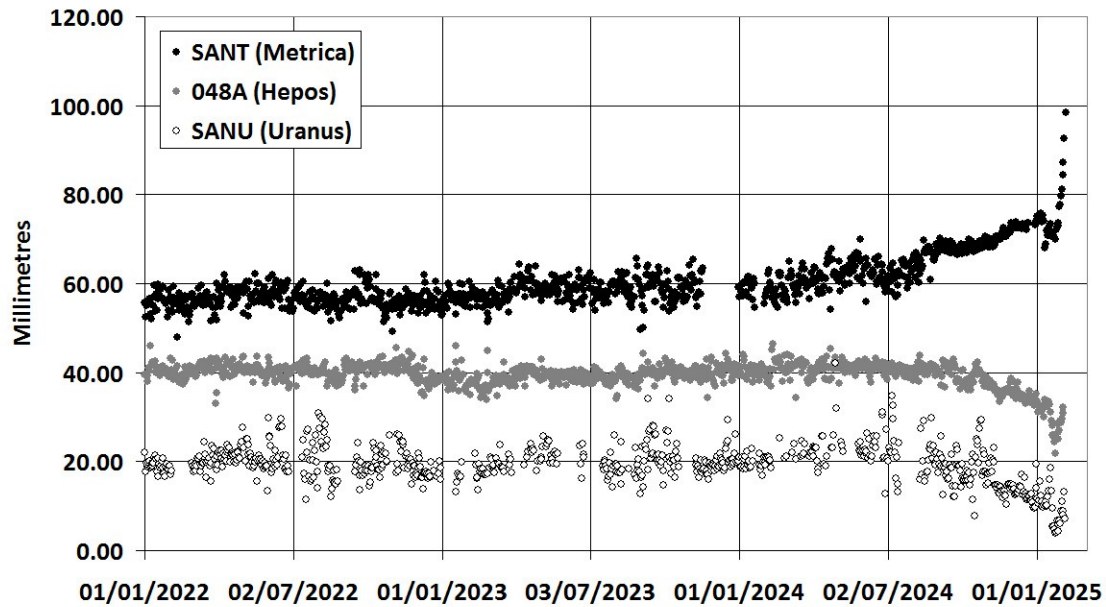


3. Time series 2022-2025 of SANT, 048A and SANU

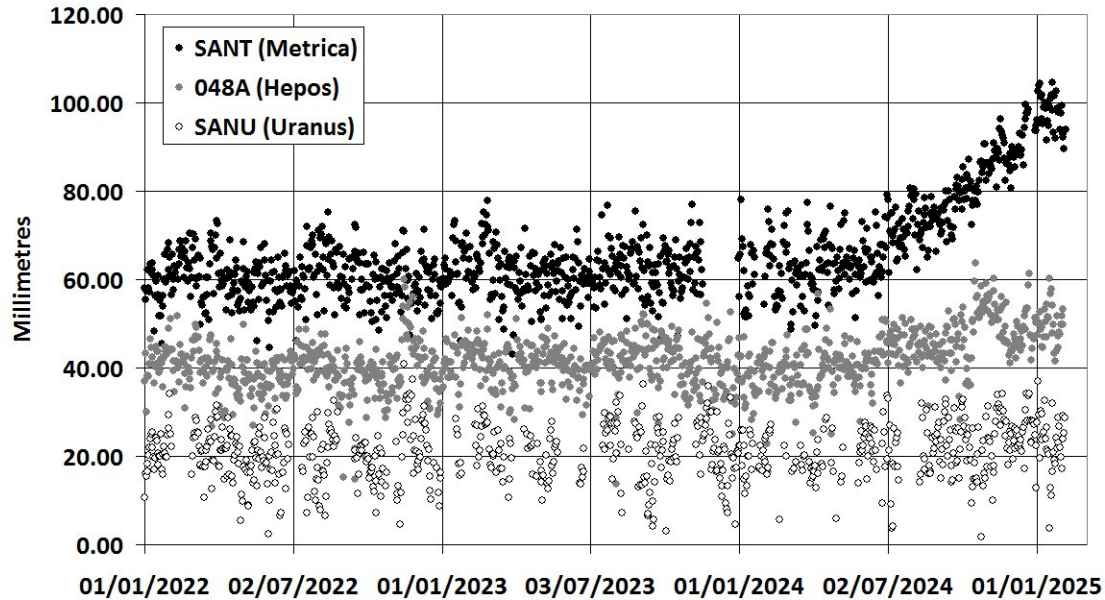
Longitude time series



Latitude time series



Elevation time series



5. Stations velocities before and during the beginning of the unrest (until January 19)

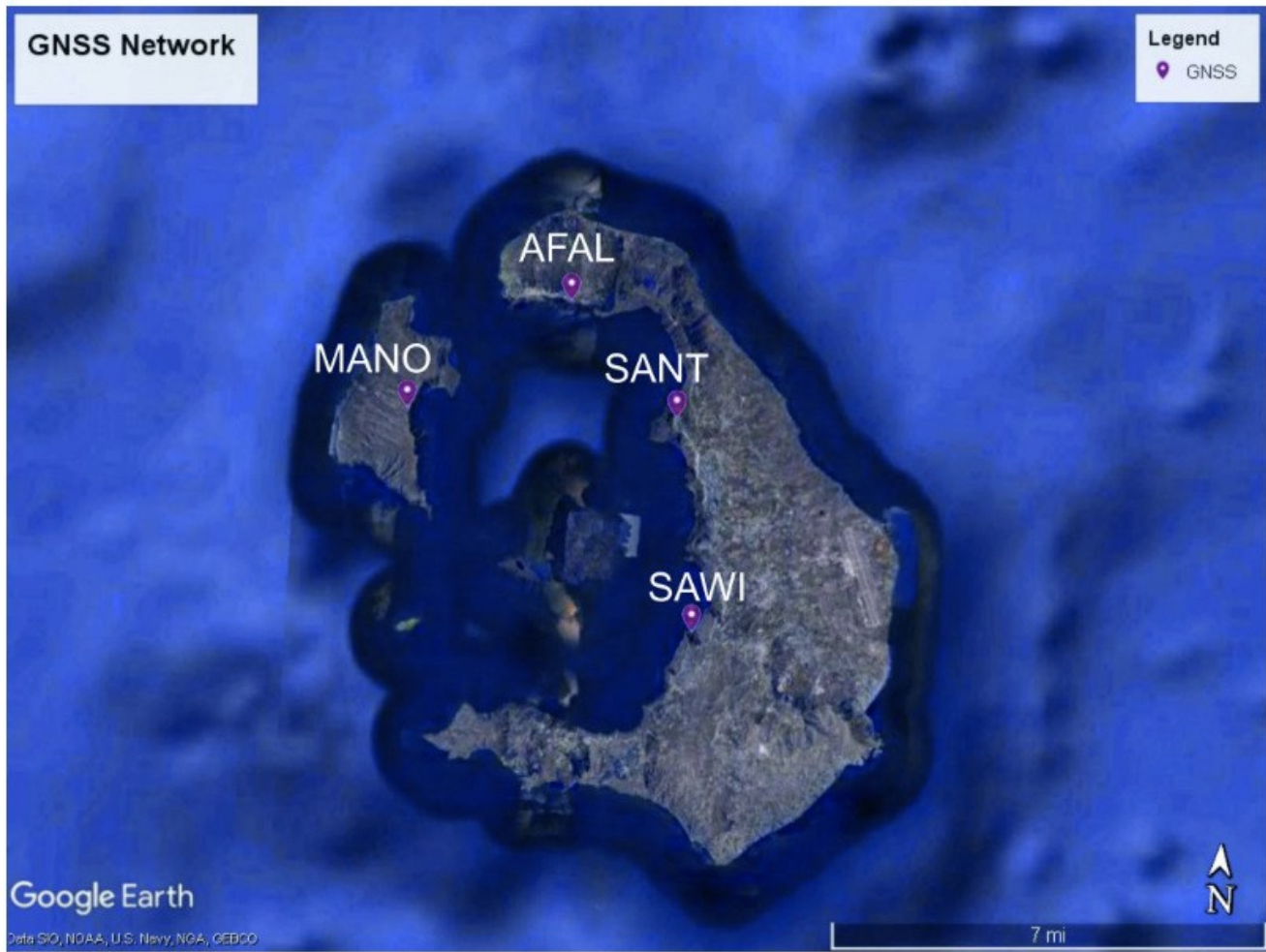
The ITRF 2014 average secular velocity of Santorini recommended by Briole *et al.* (2021) for the analysis of the volcanic activity is 7.4, -15.5 and 0.7 mm yr⁻¹ in east, north and up. They noted also that the average uplift rate of 0.7 mm yr⁻¹ exists and after the unrest of 2011-2012.

The anomalies of velocities reported below correspond to the average anomaly for a period that starts during the summer 2024 and ends on January 19. After this date, there are large changes in the horizontal motions of the stations that are not discussed in this section.

Station	Velocity before 2024 with respect to the average island			Anomaly of velocity with respect to the pre-2024 velocity			Period for which the anomaly is estimated		
	v _E (rel)	v _N (rel)	v _U (rel)	v _E	v _N	v _U	Start	End	Days
	mm yr ⁻¹								
SANT	-2.1	-0.7	-0.1	50.8	24.9	62.3	1/6/2024	17/1/2025	230
SANU	1.2	-1.9	1.1	36.5	-32.0	13.6	18/9/2024	5/2/2025	123
048A	0.6	-2.7	1.0	39.9	-16.1	25.9	15/8/2024	19/1/2025	157

6. Existence of other GNSS stations at Santorini

There is apparently a private institute, called ISMOSAV⁴ that seems to operate geophysical and geochemical networks in Santorini. There is no information on any data produced by this centre.



If the three GNSS stations MANO, AFAL and SAWI really do exist, making the data they produce available to the scientific community that is currently assisting the Greek authorities in charge of managing the crisis appears to be an absolute requirement with which the Hellenic Cadastre and the two private agencies Metrica and TreeComp have complied from the beginning.

The strategy for the deployment, by the intervention teams, of future additional GNSS instruments in the forthcoming days depends on whether or not these stations actually exist and, if they do exist, on the possibility of accessing the data they produce without delay.

4 <https://ismosav.gr/en/home/>