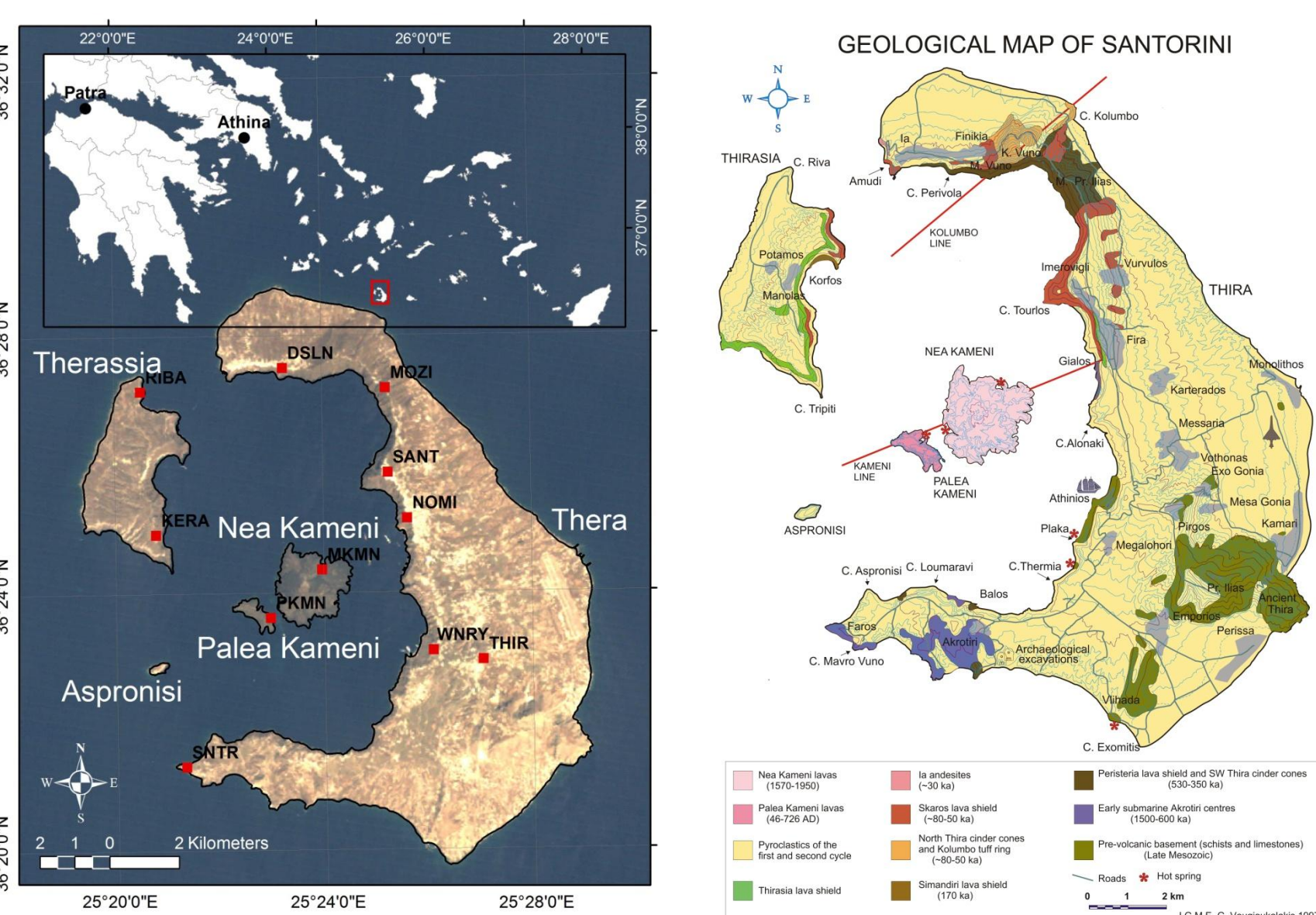


Background

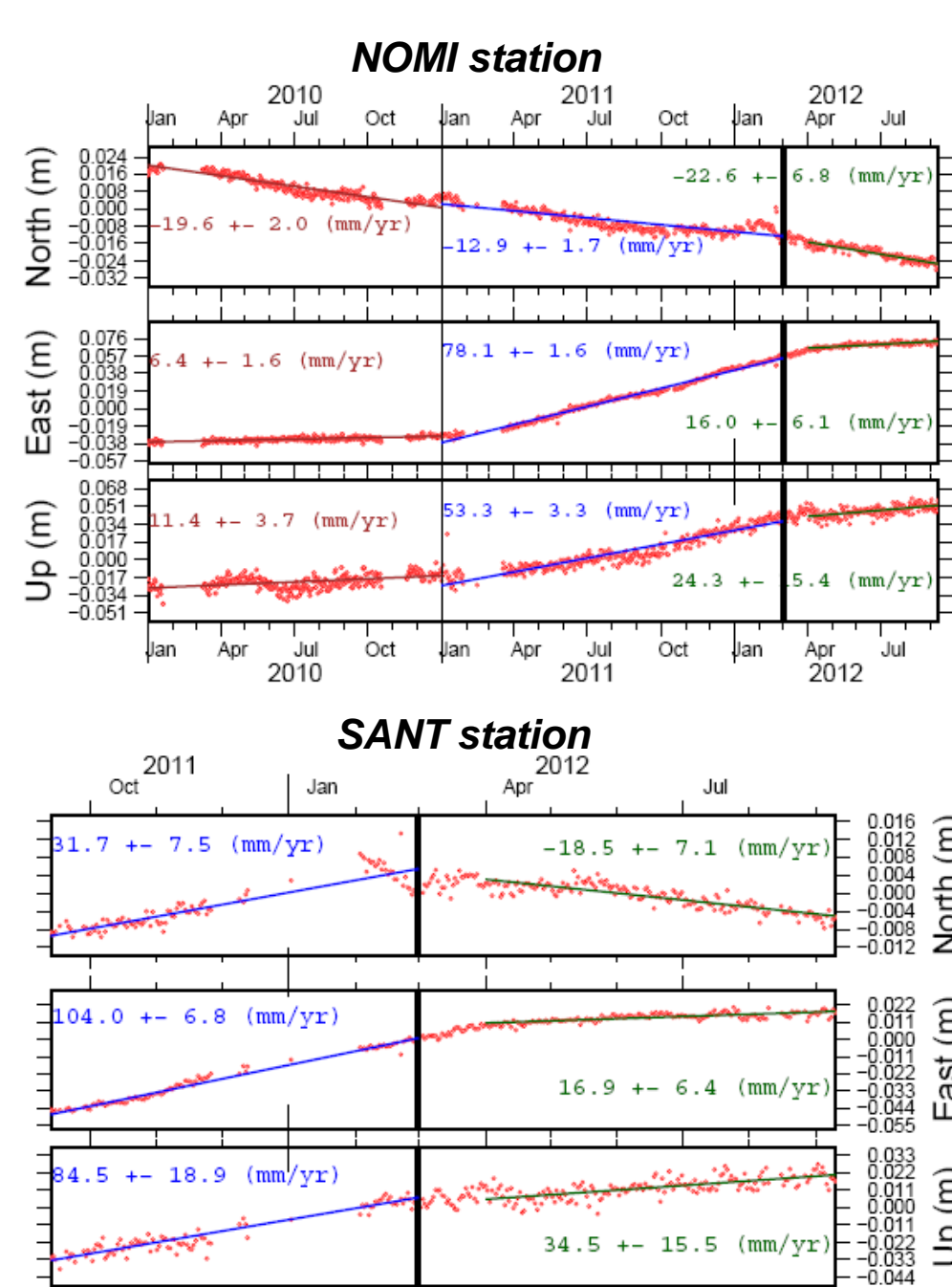
- ✓ The Santorini volcanic complex is comprised of four islands: Therasia and Thera islands form the caldera rim; Palea Kameni and Nea Kameni have built up in the central caldera
- ✓ Santorini Volcanic Complex is the most active part of the South Aegean (Hellenic) Volcanic Arc.
- ✓ Several eruptions led to the present form of the Kameni islands
- ✓ Most recent seismic sequence ended in 1950
- ✓ Since then, Santorini volcano has been in a 'quite' phase,



(left) Landsat 5 TM scene depicting Santorini and the locations of the installed cGPS (right) Simplified geological map of Santorini (Vougioukalakis, 1997)

Input data and methodology

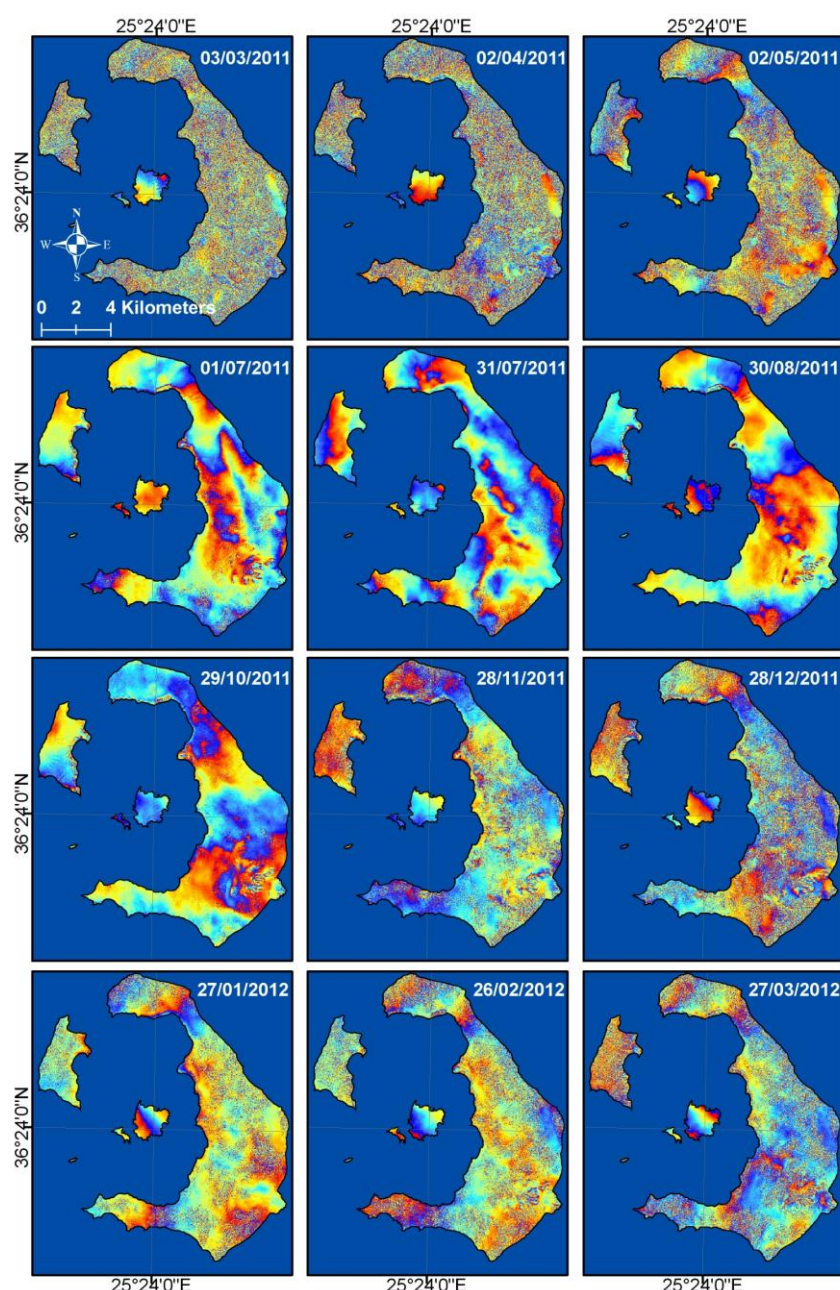
GPS



Raw GPS time series for selected stations

- ✓ 13 ASAR Envisat descending mode
- ✓ Last orbit before the end of the mission in April 2012
- ✓ Short spatial & temporal baselines
- ✓ Swath I6, leading to increased sensitivity to the E-W horizontal components
- ✓ S/W: Gamma, StaMPS (Hooper et al., JGR, 2007)
- ✓ PSI challenging due to the limited number of scenes

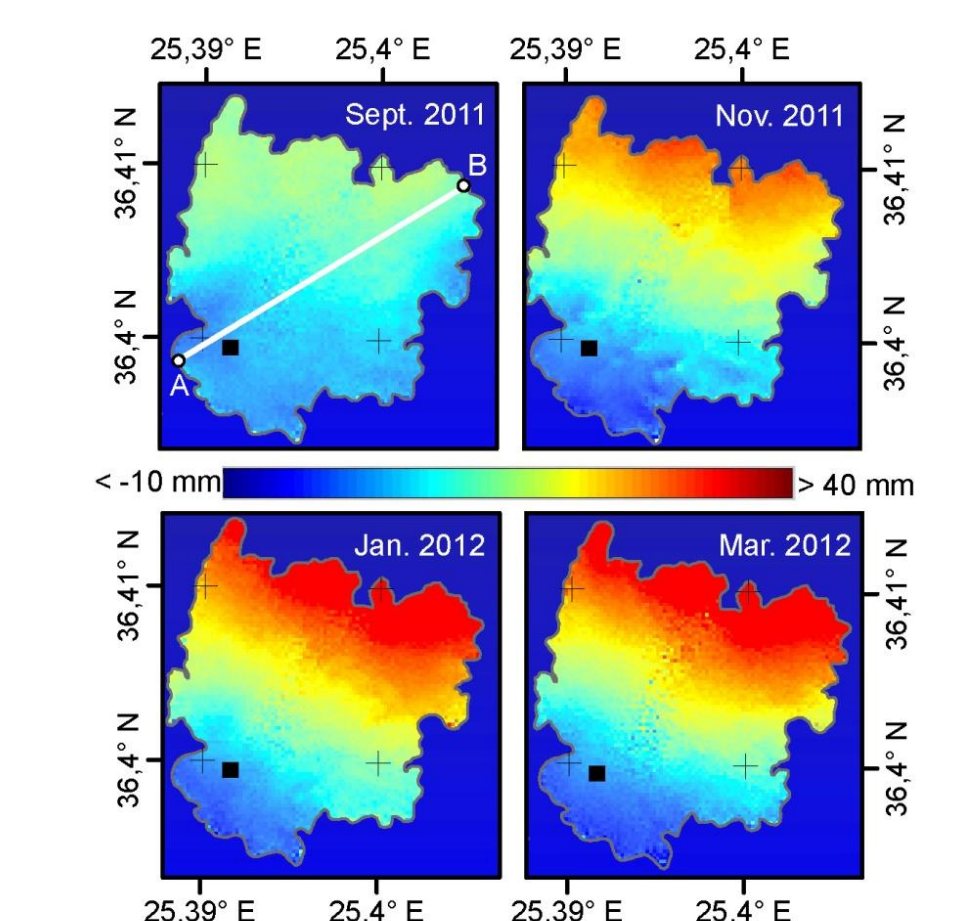
DInSAR



Wrapped Envisat interferograms with respect to the September 2011 acquisition

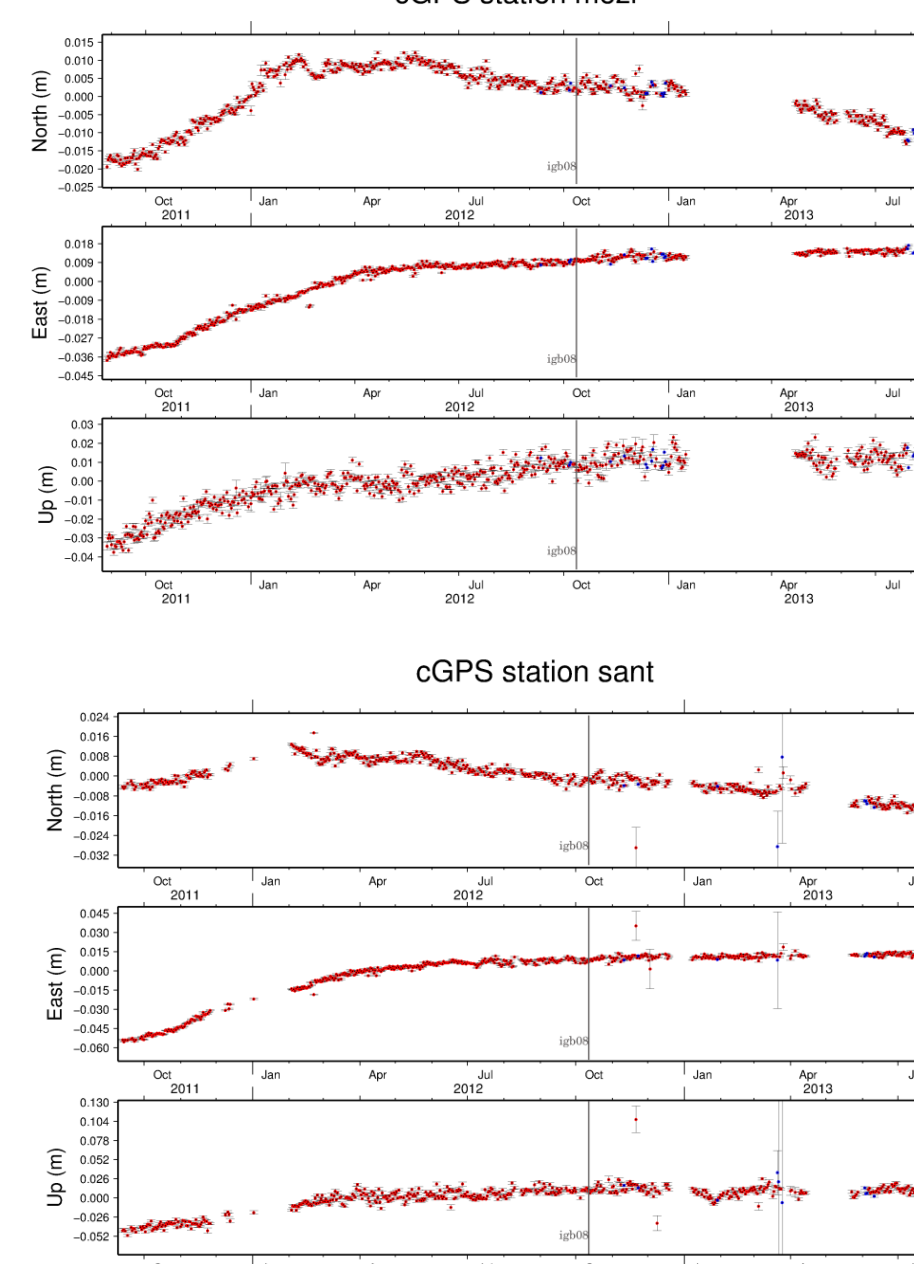
The end of the episode: February/March 2012

DInSAR



Unwrapped differential interferograms in Nea Kameni. While the magnitude of uplift clearly increases for the first three interferograms, in March 2012 the deformation is similar to the one observed in January 2012

GPS



Raw GPS time series up until August 2013 for selected GPS stations

The change in motion around February/March 2012 can be seen

Conclusions

- ✓ Maximum inflation of 150 mm/yr LOS
- ✓ Mogi model seems to be suitable with a source depth of 3.3–6.3 km (in agreement with Newman et al., Parks et al.)
- ✓ Unless a very deep hydrothermal fluid reservoir exists beneath the caldera, this episode was likely to be one of magmatic inflation of the shallow chamber
- ✓ Inflation has diminished since the end of February 2012
- ✓ New phase of relative stability, reduced probability for an imminent volcanic eruption

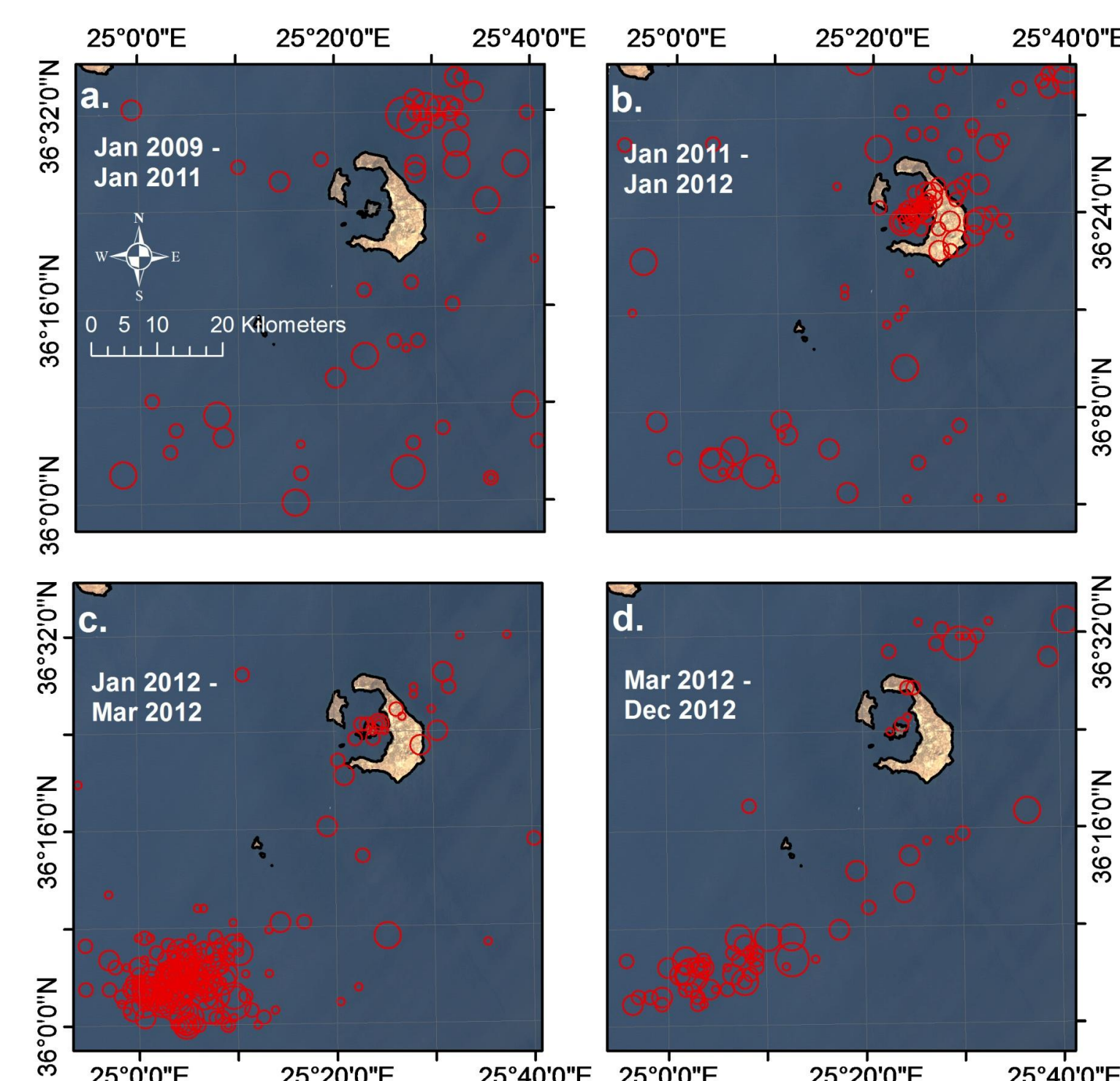
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 Hooper et al. (2007), Persistent Scatterer InSAR for Crustal Deformation Analysis, with Application to Volcán Alcedo, Galápagos, *J. Geophys. Res.*, 112, B07407

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Seismicity

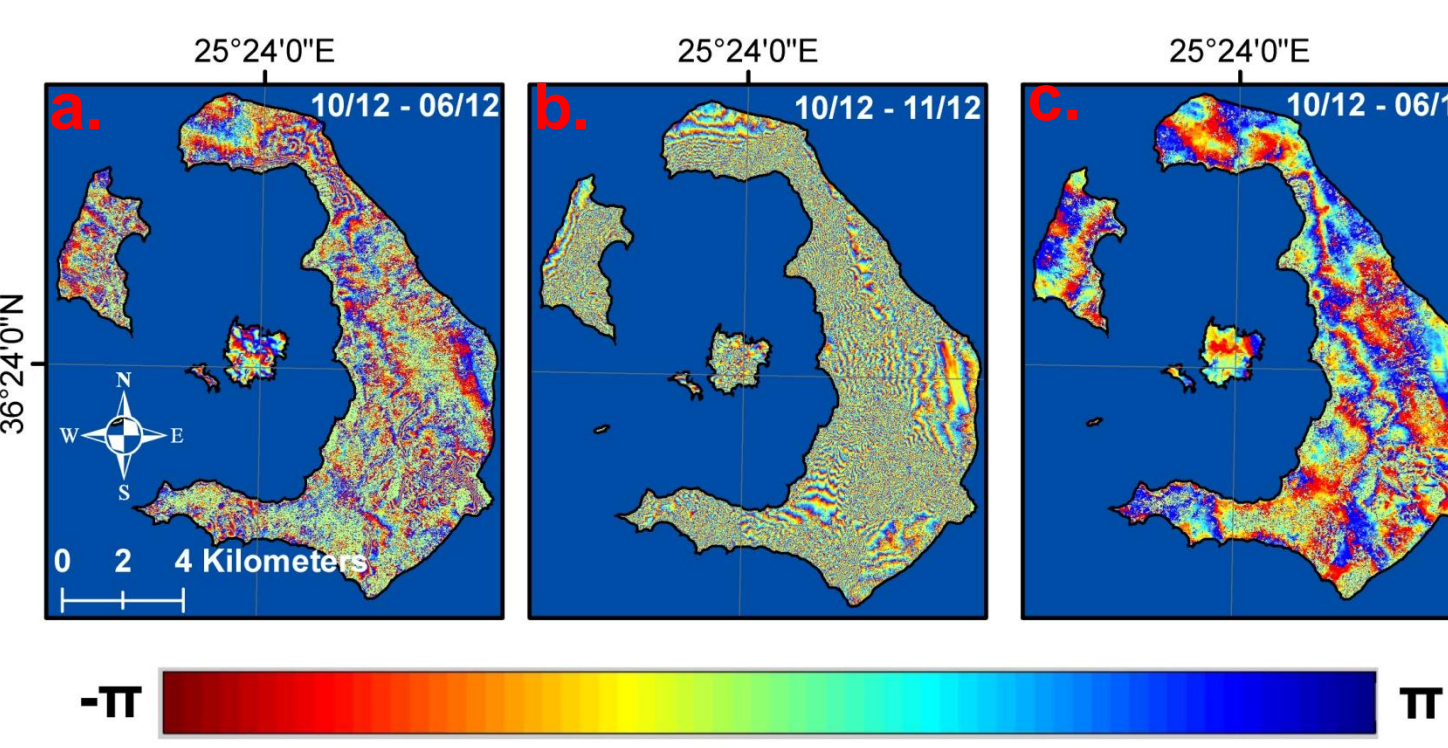


Regional seismicity for selected time spans

Continuous monitoring of Santorini

COSMO-SkyMed

- a. Short perpendicular & long temporal baseline interferogram => deformation
- b. Long perpendicular & short temporal baseline interferogram => DEM
- c. Differential interferogram from 3-pass interferometry



GPS online

Daily GPS solutions for Santorini:
<http://dionysos.survey.ntua.gr/>

BEYOND center of excellence

BEYOND

- ✓ Centre of Excellence for Earth Observation based monitoring of Natural Disasters in south-east Europe
- ✓ <http://www.beyond-eocenter.eu/>
- ✓ June 2013 – 2016, €2.3M EU contribution
- ✓ Beneficiary is the National Observatory of Athens