Tracking the evolution of the Merapi volcano crater area by high resolution satellite imagery

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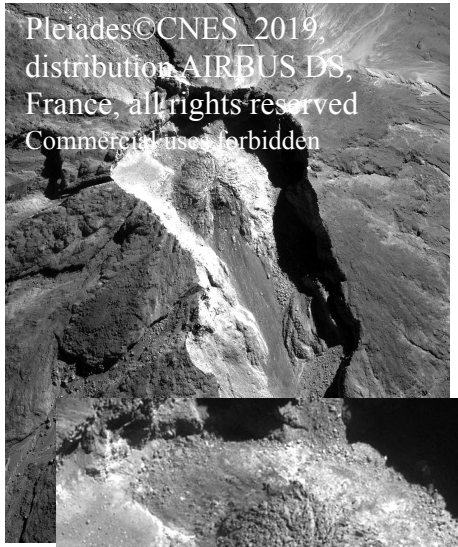
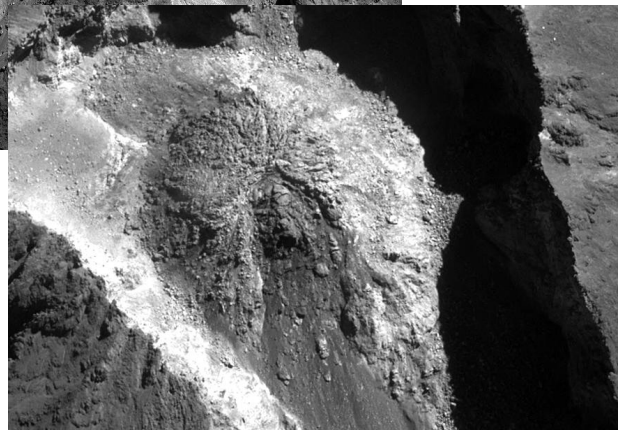
Method



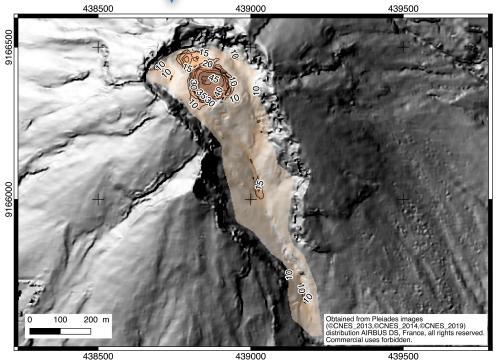


Pleiades panchromatic images (tri-stereo)
(0.7m resolution)

AMES Stereo Pipeline

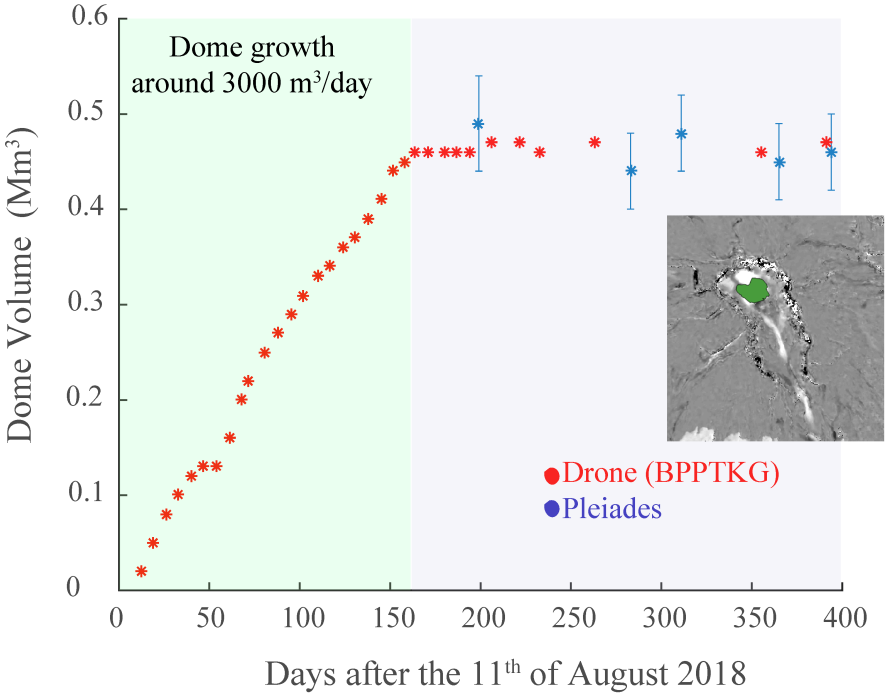
DEM (3m resolution, 1m precision)

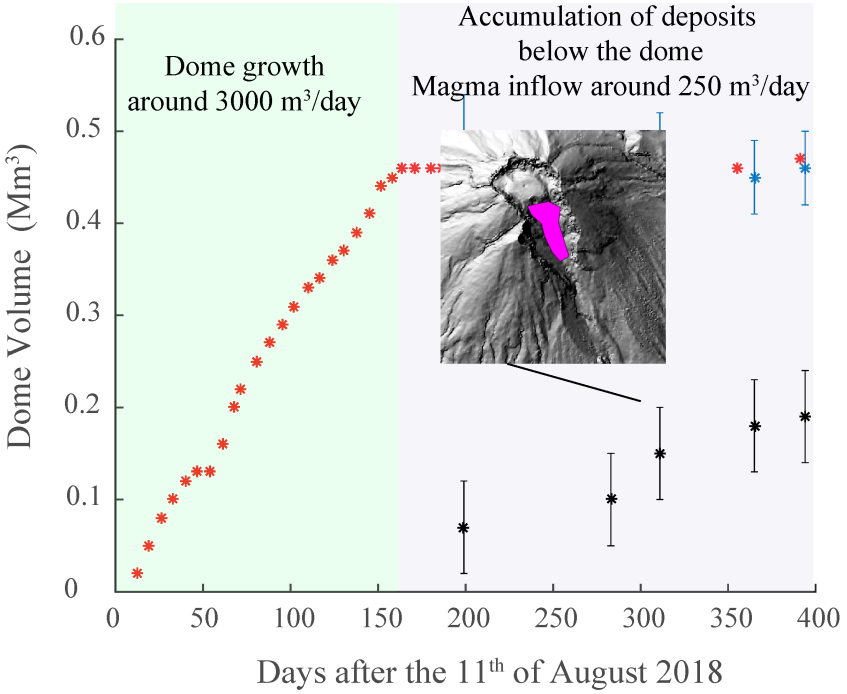
Coregistration
Difference



Elevation difference in the summit area of Merapi volcano between the 26th of February 2019 and 2014.
Estimated volume of eruptive deposits=0.82 Mm3

Results


Dome growth
around 3000 m³/day
Dome Volume (Mm³)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
300
350
400
Days after the 11th of August 2018
Drone (BPPTKG)
Pleiades


Dome growth
around 3000 m³/day
Accumulation of deposits
below the dome
Magma inflow around 250 m³/day
Dome Volume (Mm³)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
50
100
150
200
250
300
350
400
Days after the 11th of August 2018

Conclusions

General:
Validation of the use of tri-stereo Pleiades images for dome growth quantification by comparison with drone measurements

Merapi Volcano:
No significant growth of the dome from January 2019 to September 2019
but accumulation of deposits by dome destabilization a few hundreds of meters below the dome (outside the area surveyed by drone)
→Magma inflow is still going on at a rate of 250 m^3/day