Kelud Volcanic Eruption

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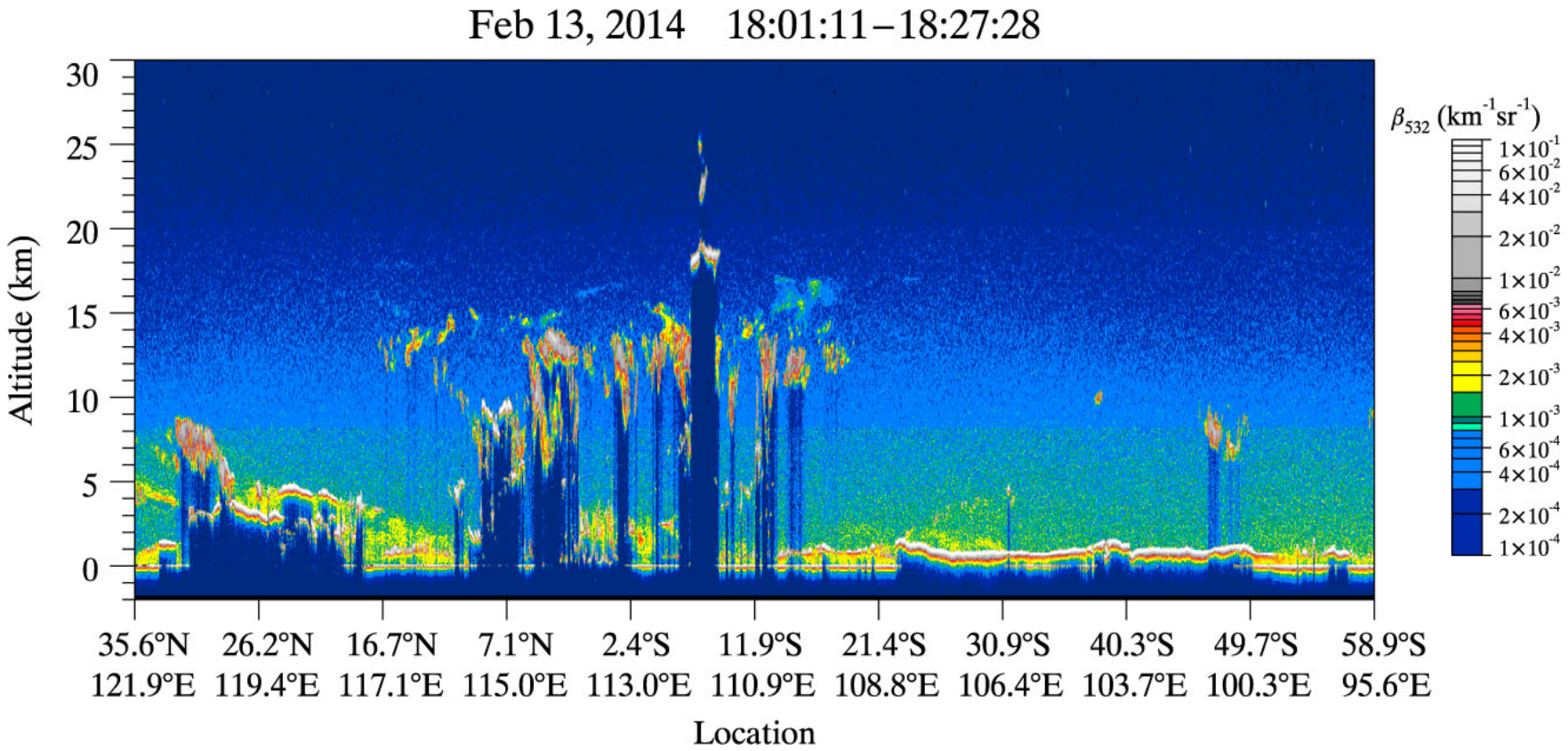
Volcanic Aerosols

- Can have a significant impact on the atmosphere
- Largest impact from conversions of sulfur dioxide (SO_2) to sulfuric acid (H_2SO_4)
- Aerosols can cause surface cooling and stratospheric warming
- Linked to the destruction of ozone

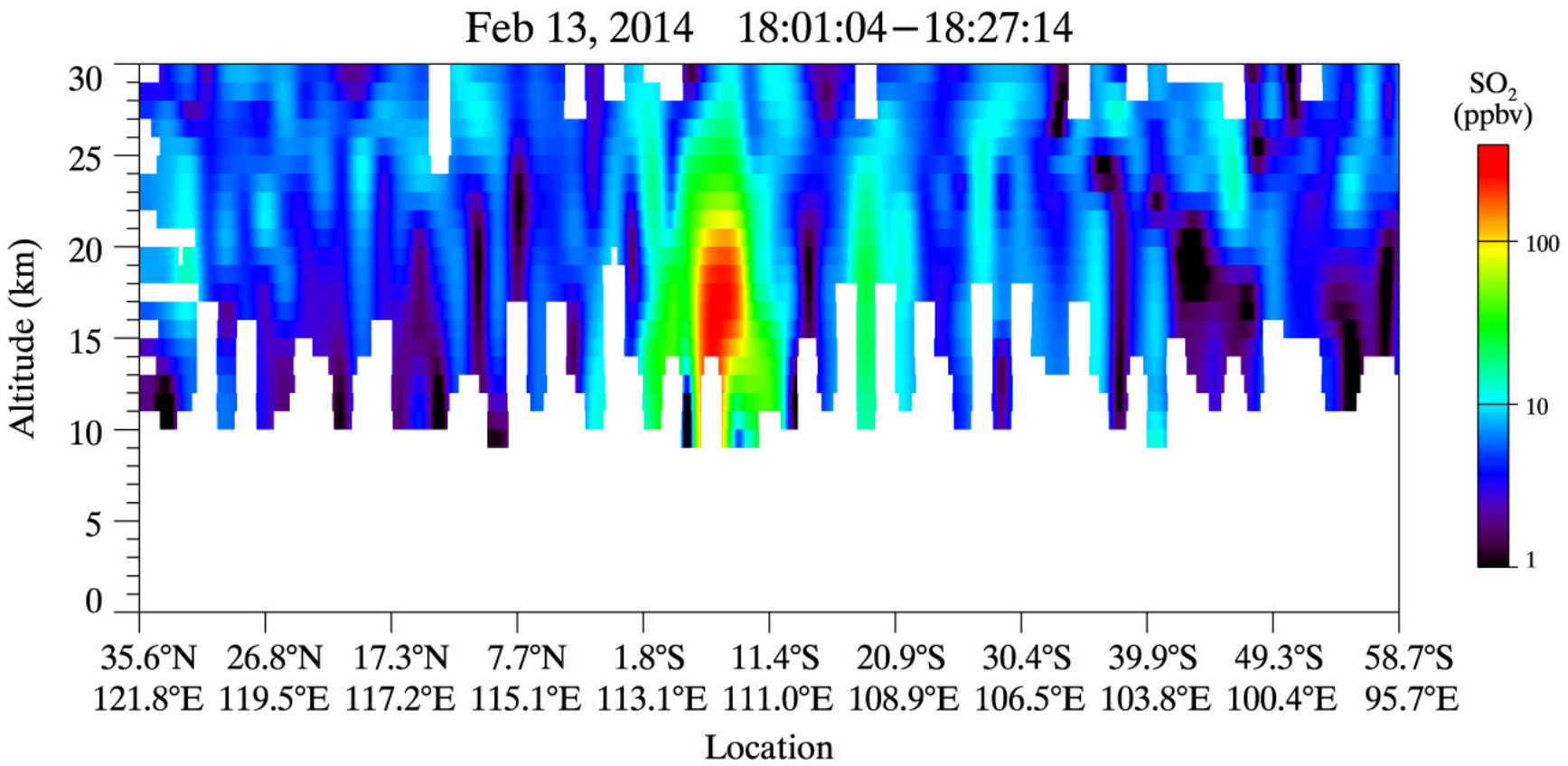
Kelud

- Located in East Java
- Eruption occurred on February 13, 2014 at 15:50 UTC
- Another large explosion followed at 16:30
- Ash plume reached up to 25 km
- Observed by multiple satellites
  - VIIRS at 17:30
  - MODIS at 18:10
  - CALIPSO at 18:13

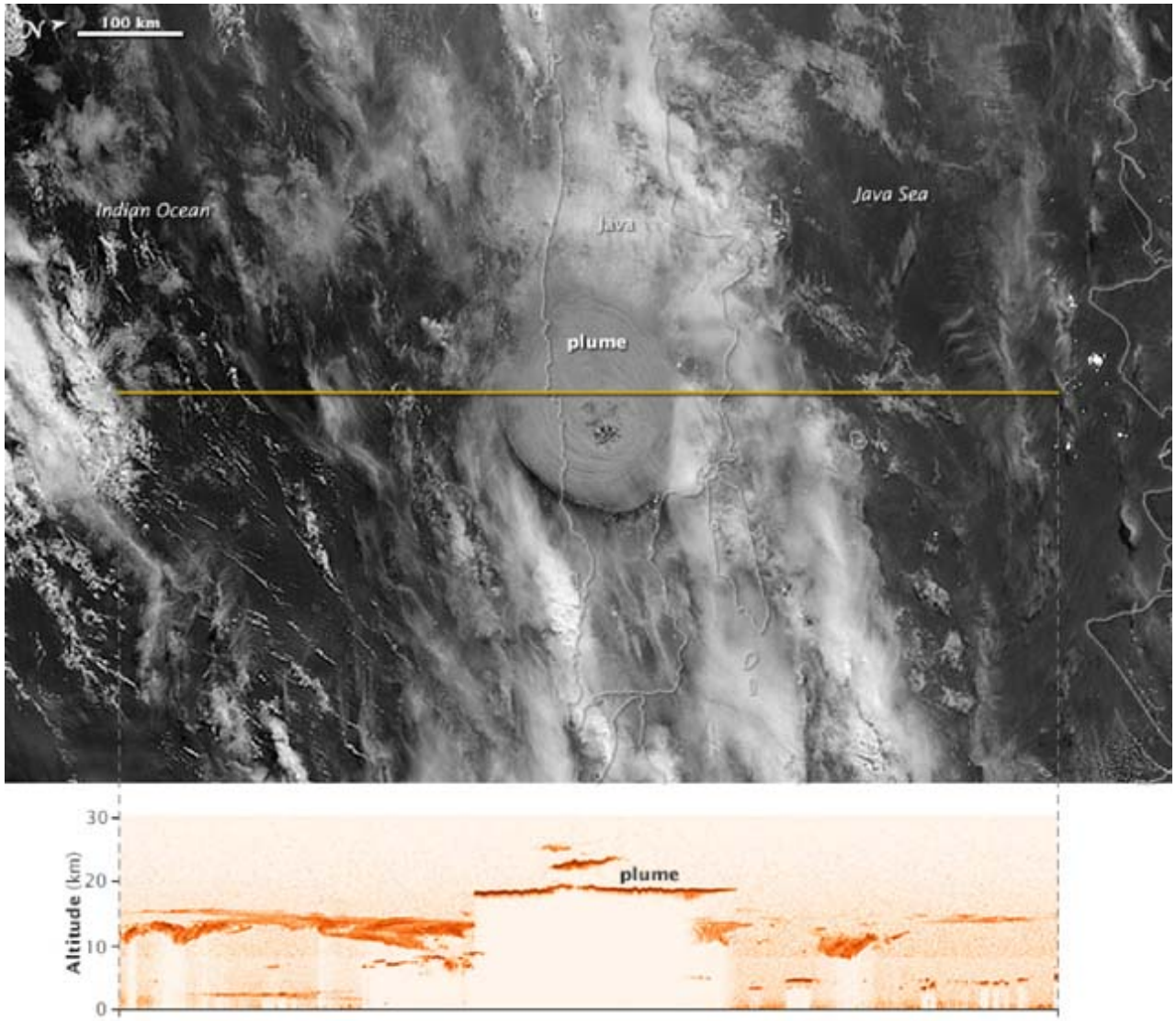
CALIPSO 532 nm Backscatter



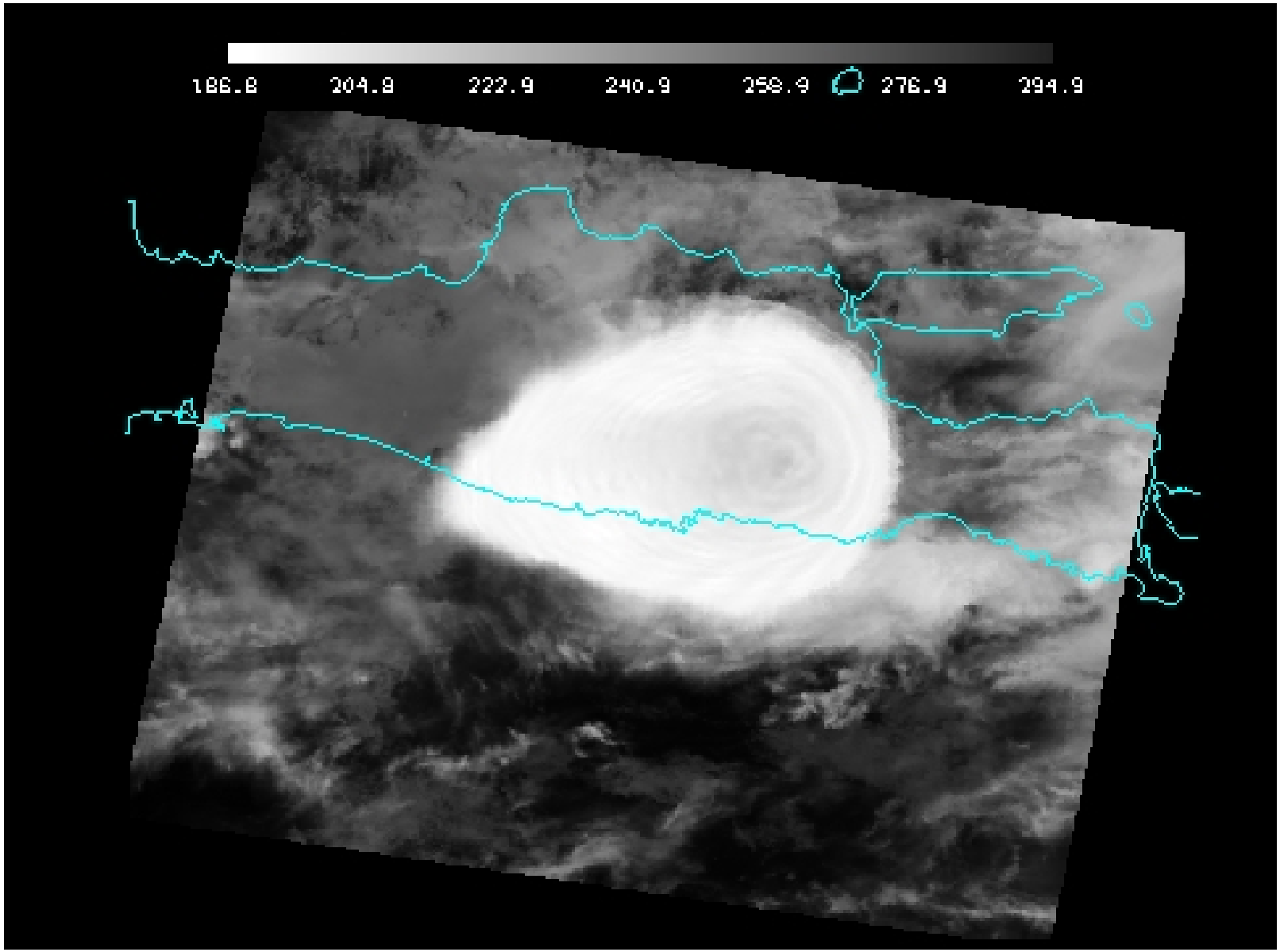
MLS SO_2


Feb 13, 2014 18:01:04−18:27:14
Altitude (km)
30
25
20
15
10
5
0
35.6°N 121.8°E
26.8°N 119.5°E
17.3°N 117.2°E
7.7°N 115.1°E
1.8°S 113.1°E
11.4°S 111.0°E
20.9°S 108.9°E
30.4°S 106.5°E
39.9°S 103.8°E
49.3°S 100.4°E
58.7°S 95.7°E
Location
SO2 (ppbv)
100
10
1

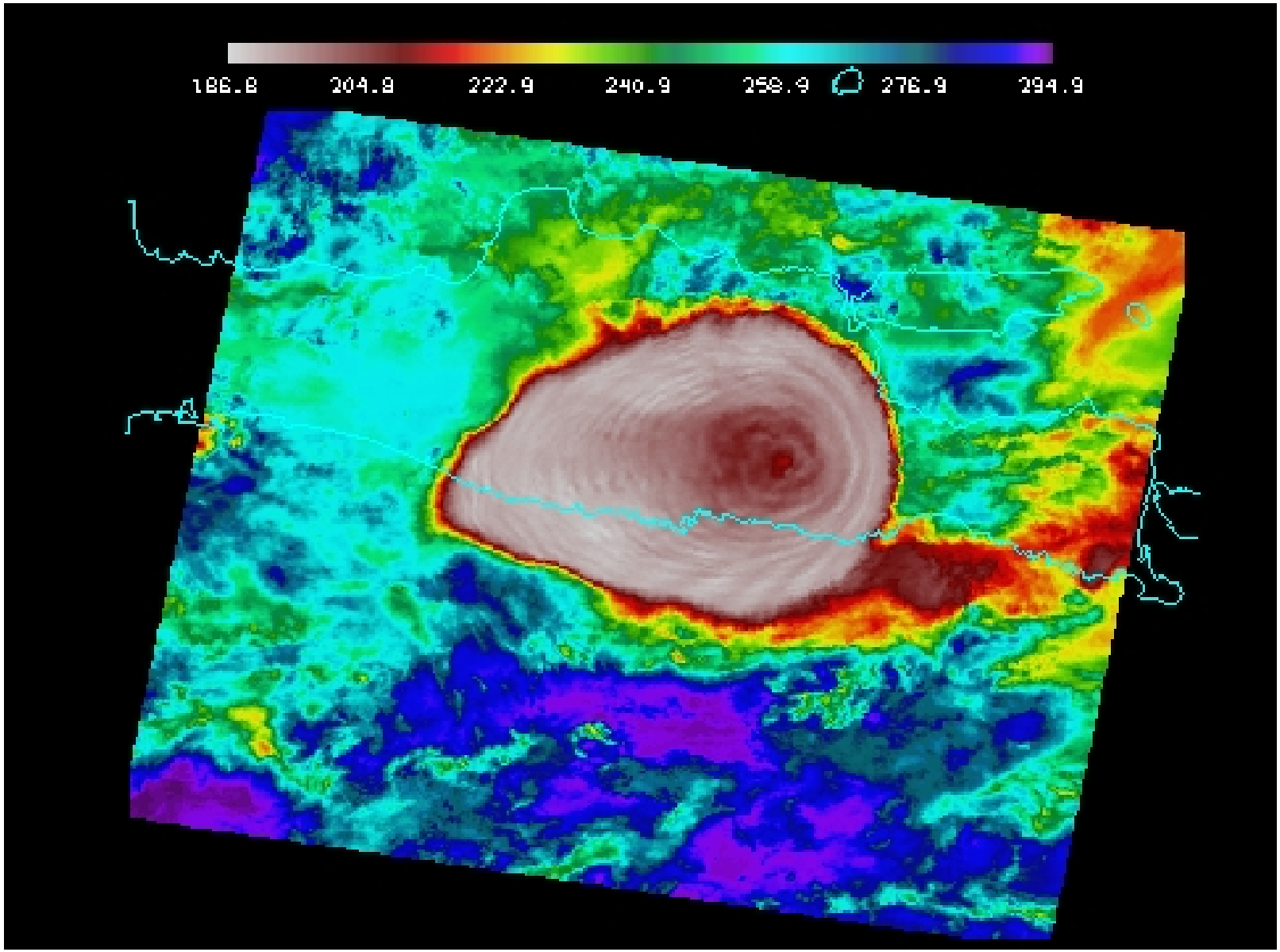
VIIRS


100 km
Indian Ocean
Java
Java Sea
plume
Altitude (km)
30
20
10
0
plume

MODIS B31 (11.0 μm)

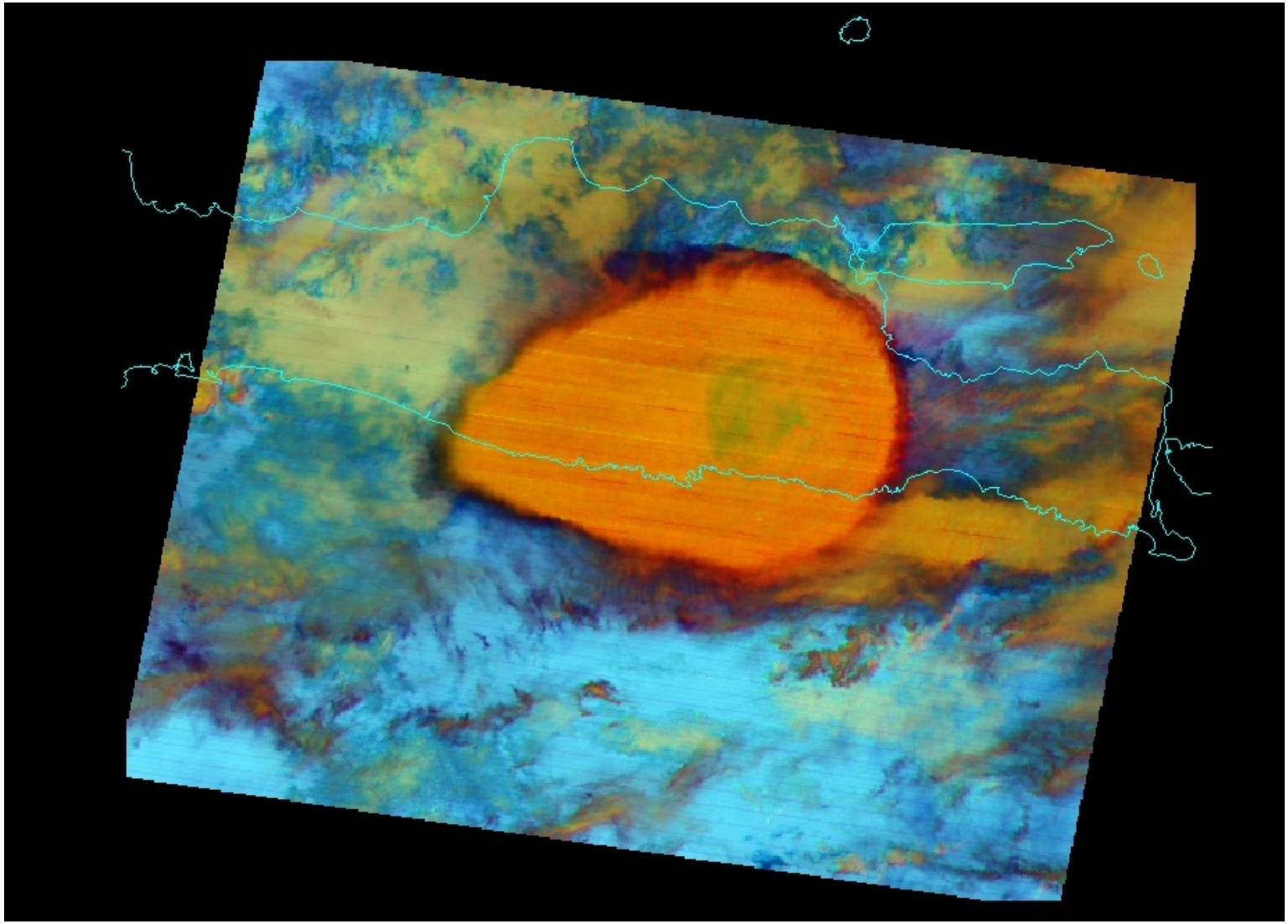


MODIS B31 (11.0 μm)



RGB Composite

R: B33 - B31, G: B31 - B29, B: B31



Summary

- The ash plume from the Kelud eruption reached up to 25 km
- There was a significant increase in SO_2 in the region following the eruption
- MODIS imagery shows a westward movement of the ash plume
- RGB composites created with HYDRA can be used for volcanic ash detection