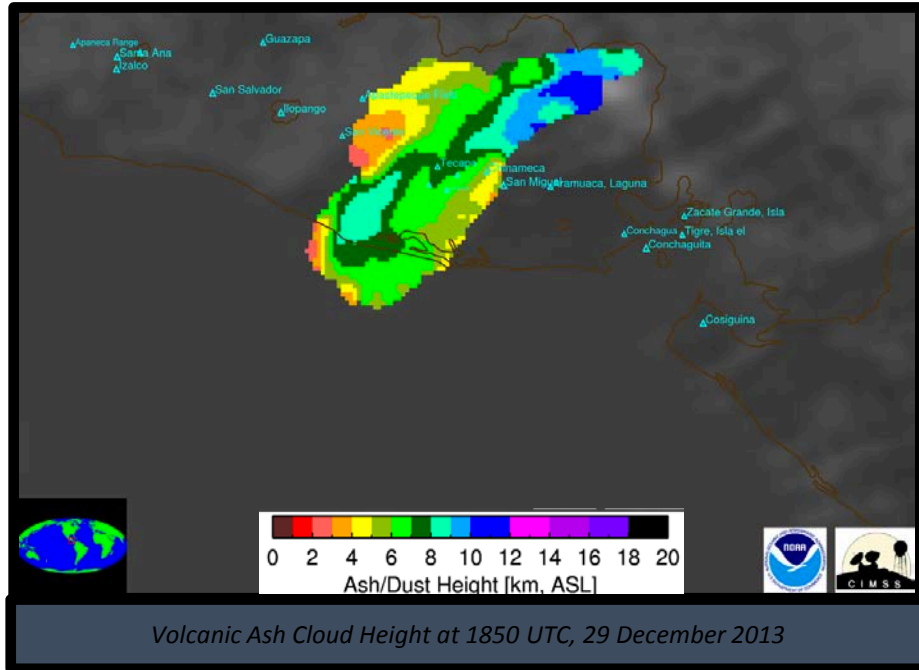


### Why is Volcanic Ash Detection Important?

Volcanic ash is hazardous to aviation, air quality and public health. The Volcanic Ash algorithm determines the location, height and mass loading properties for satellite pixels potentially containing volcanic ash. These products help forecasters identify potentially hazardous areas and issue more accurate aviation and public health warnings. Volcanic ash products are also useful for enhancing ash dispersion and trajectory prediction models.



### How is Volcanic Ash detected and cloud height/mass determined?

VIIRS Channels	Wavelength	Channel Usage
M14	8.55 $\mu\text{m}$	Ash detection using absorption optical depth ratios
M15	10.763 $\mu\text{m}$	Ash detection using absorption optical depth ratios; ash height and mass loading using optimal estimation technique
M16	12.013 $\mu\text{m}$	Ash height and mass loading using optimal estimation technique

### Impact on Operations

**Volcanic Ash Detection:** Day/night detection of volcanic ash clouds is performed using spectral and spatial testing over a full granule and has global coverage every 12 hours.

**Volcanic Ash Cloud Height:** For satellite pixels determined to possibly contain volcanic ash, an ash cloud top height is determined.

**Volcanic Ash Cloud Mass Loading:** For satellite pixels determined to possibly contain volcanic ash, column integrated ash mass loading calculation is performed.

**Dispersion Modeling Aid:** The volcanic ash algorithm products can also be used for initialization and validation of volcanic ash dispersion models.

### Limitations

**Imagery/Instrument Sensitivities:** Any artifacts or noise within the imagery or instrument and/or unknown spectral shifts in the instrument channels will degrade the algorithm performance.

**Ancillary Data Availability:** No ancillary data (NWP, land/sea/snow mask, radiative transfer model [RTM], etc.) can be missing.

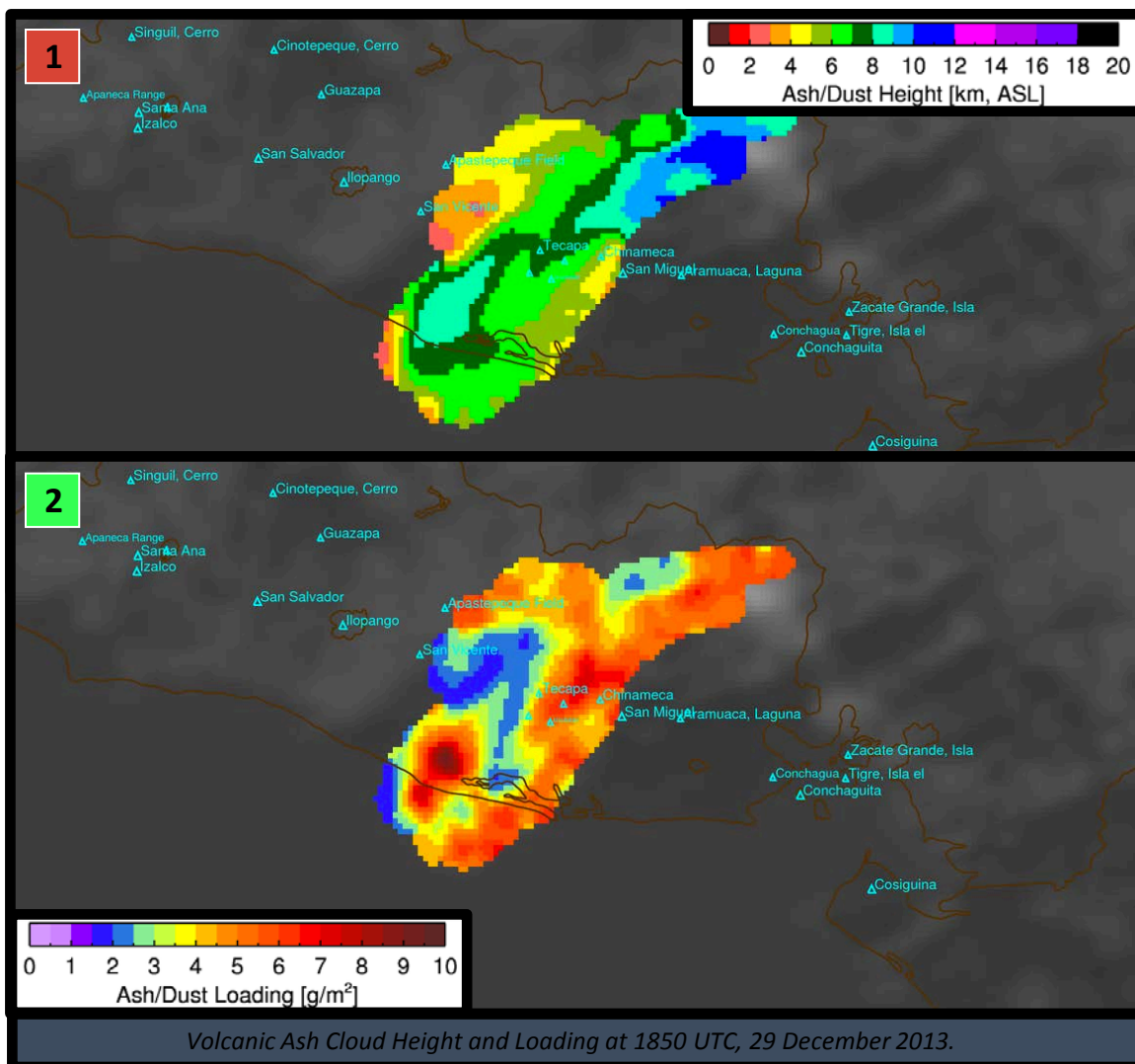
**RTM Clear-sky Radiance Errors:** Calculation errors and algorithm inconsistencies can occur near distinct physical boundaries (coastlines, mountains, snow/ice field edges, atmospheric frontal zones, etc.) due to less accurate NWP profiles in these regions, especially where optically thin clouds are present.

### Interpretation

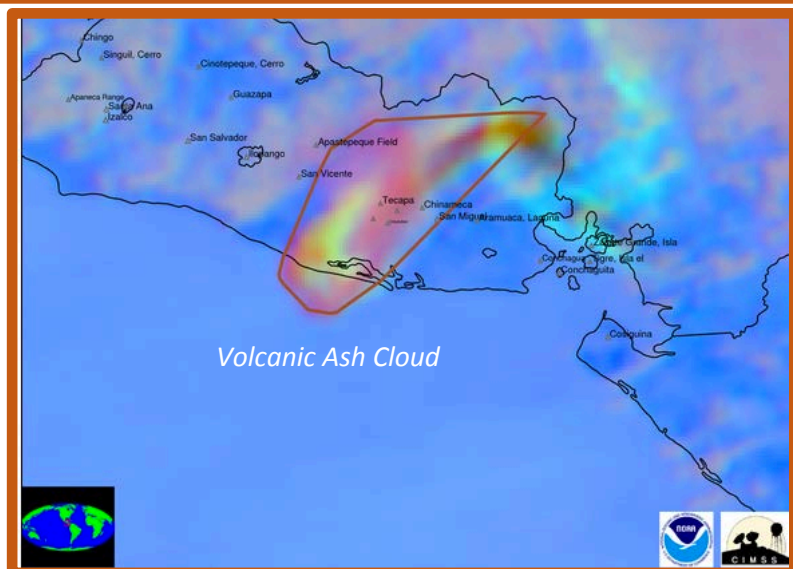
**1** **Volcanic Ash Cloud Height** – Helps define the upper extent of a possible ash cloud within a given satellite pixel (units are km; image is showing range of 1-10 km)

**2** **Volcanic Ash Mass Loading** – Provides the column integrated ash mass within a satellite pixel (units are  $g/m^2$ ; image is showing range of 1.5-8.5  $g/m^2$ )

*Mass and height retrievals are from an optimal estimation technique. Please reference Pavolonis, et al. (2013), if interested, for more details on the retrieval technique. Data is not corrected for parallax as this is variable on satellite view angle and cloud height estimations.*



**Volcanic Ash Products enhance the basic location information that can be taken from Ash RGB imagery (below)**



### Resources

[Volcanic Ash NOAA Data Catalog](#)  
[Volcanic Ash Detection and Height](#)

[JPS Program](#)  
[Mission Information](#)

[Volcanic Ash/Mass Retrieval Technique](#)  
[Pavolonis et al., 2013, Journal of Geophysical Research](#)

**Hyperlinks will not work in AWIPS, but will work in VLab**