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Title: Tracking Volcanic Aerosols Using CALIPSO and HYSPLIT

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Short Abstract:
Volcanic eruptions with a high stratospheric aerosol loading have a significant impact on the atmosphere. In particular, sulfur dioxide released by eruptions is linked to the destruction of ozone. Using data from the CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations) satellite and the HYSPLIT (Hybrid Single Particle Lagrangian Integrated Trajectory) model, a trajectory is made for stratospheric aerosols from the February 13, 2014 eruption of the Kelud volcano in East Java. Initial points for the trajectory model are found from CALIPSO measurements, and points along the trajectory created by HYSPLIT are then compared with later CALIPSO measurements to find coincidences to help validate the trajectory. CALIPSO passes within 24 hours and 50 km of a trajectory point are labeled as coincidences. Aerosols can be characterized using the depolarization and color ratios from CALIPSO. Other satellite measurements, such as sulfur dioxide measurements from the MLS (Microwave Limb Sounder) instrument on the Aura satellite, are useful in determining the relative impact of the aerosols on the atmosphere. CALIPSO and Aura are both part of the same satellite constellation, and they pass over the same region within fifteen minutes of each other, which makes data from MLS useful for studying the aerosols.

Tracking Volcanic Aerosols Using CALIPSO and HYSPLIT

Sean Leavor, Michael Hill

The Kelud volcano in East Java erupted on February 13, 2014

Large quantities of SO_2 injected into the stratosphere

CALISPO satellite data used to locate an aerosol layer

HYSPLIT trajectory model used to track the aerosol layer

Later CALIPSO overpasses used to validate