

CICS-MD Science Meeting
November 12-13, 2014
College Park, MD

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P-14 Producing Quantitative Forecasts of Volcanic Ash Using the HYSPLIT Transport and Dispersion Model Barbara J. B. Stunder, Steven R. Albersheim and Michael J. Pavolonis

The HYSPLIT transport and dispersion model is run operationally by the NOAA National Weather Service (NWS) to provide forecast guidance to the NOAA-operated U.S. Volcanic Ash Advisory Centers (VAACs). The current operational HYSPLIT model output product is a set of maps that show the forecast location of ash. Because one arbitrary unit of mass represents the eruption they do not provide quantitative information on concentration or mass loading of the ash. Quantitative forecasts will be needed in the future because parts of the aviation sector are moving from an ash avoidance approach to a risk-based approach. Inputs to HYSPLIT are meteorological data (provided by a meteorological model) and the source term which consists of the initial positions, amounts, and sizes of ash particles. The initial position of ash particles can be determined since the latitude, longitude and summit height of the volcano are known and an estimate of the plume height is usually available. It is more difficult to determine the amount of ash present in the eruption column and its size distribution. A meaningful quantitative ash concentration forecast cannot be achieved without a reliable quantitative source term. Several approaches to achieving a reliable estimate of the source term are being investigated. Indirect methods look at past relationships between plume height, mass eruption rate and meteorological variables such as wind speed to predict the source term. Direct methods would use satellite retrievals of volcanic ash to estimate the source term. Verification and model output examples are presented for the eruption of Kasatochi (Aleutian Islands) in 2008.