



Overview of the NAME model and its role as a VAAC atmospheric dispersion model during the Eyjafjallajökull Eruption April 2010

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The UK Met Office, in its role as one of nine Volcanic Ash Advisory Centres (VAACs) around the world, is responsible for advising international aviation authorities in all impacted countries of the location and movement of clouds of volcanic ash which originate from the London VAAC domain. VAACs only provide advice on extent of ash to the aviation regulators and it is the regulator's decision on whether to restrict air space. The Met Office delivers this capability through a world-leading atmospheric dispersion model, NAME. In addition to its role as an emergency response guidance tool the model is used for routine air quality forecasting and meteorological research activities.

NAME is a Lagrangian particle model which calculates the dispersion of pollutants by tracking 'particles' through a modelled atmosphere. Each model particle has its own characteristics, for example, particles can represent different chemical species and can represent real particulate sizes. NAME has the flexibility to specify sources at any location in the atmosphere. Once emitted, particles move in a manner determined by the meteorology obtained from the Met Office operational numerical weather prediction model, the Unified Model. Particles are advected according to three-dimensional winds with a random component used to represent the effects of atmospheric turbulence and can be removed from the model atmosphere by various processes.

For modelling the dispersion of volcanic ash during the Eyjafjallajökull eruption, NAME is configured in the following manner. Material is released between the volcano summit and the plume rise height as estimated from observations taken by the Icelandic Met Office and measurements from radar and satellites. The particles are emitted following a prescribed size distribution with a density of 2300 kg/m³. The material is subjected to gravitational settling, and is deposited due to dry and wet deposition processes. There is no attempt in NAME to model volcano dynamics or the dynamics of the rising plume. This approach is consistent with that used by the other international VAACs.

A series of maps demonstrating the areas hazardous to flight are produced by NAME as required by the UK Civil Aviation Authority. At the time of writing (Apr 2010), NAME produced area-at-risk maps based on the standard Volcanic Ash Forecast Transport and Dispersion (VAFTAD) threshold system developed by the US National Oceanic & Atmospheric Administration (NOAA). The VAFTAD system relates the height of the plume at the release to the threshold of risk given a prescribed emission rate. During this event the height of the plume has varied considerably and this evolving situation has been fed into the modelling in a manner consistent with the VAFTAD system.