



Volcanic ash modelling for aviation

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Volcanic ash produced when a volcano erupts provides a significant hazard to aircraft by reducing visibility and causing both temporary engine failure and permanent engine damage. Therefore the presence of ash can disrupt air traffic and as a result incur large financial losses for the aviation industry. Numerical models are an important tool for predicting volcanic ash transport and dispersion. In the event of an eruption the Volcanic Ash Advisory Centres (VAACs) issue hazard maps of instantaneous horizontal ash coverage in three vertically integrated layers of the atmosphere at 6 hourly-intervals. The boundaries of the ash show the maximum expected extent of the plume. The accuracy of these maps is limited, for example, by the real-time information available describing the volcanic eruption source parameters (e.g. plume height, mass eruption rate and the size distribution of particles). Currently forecasts are deterministic and do not represent the uncertainties present in the predictions. As part of the RACER (Robust Assessment and Communication of Environmental Risk) project we are quantifying for the first time, the source, parameter and structural uncertainty present in the forecasts for different types of volcanic eruption. This extra information will allow decision makers to make a more informed judgment of the risks involved.