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Dispersion Modelling at the London VAAC 10 Years after the Eyjafjallajökull Ash Cloud

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It has been 10 years since the ash cloud from the eruption of Eyjafjallajökull caused chaos to air traffic across Europe. Although disruptive, the longevity of the event afforded the scientific community the opportunity to observe and extensively study the transport and dispersion of a volcanic ash cloud. Here we present the development of the NAME atmospheric dispersion model and modifications to its application in the London VAAC forecasting system since 2010, based on the lessons learned.

Our ability to represent both the vertical and horizontal transport of ash in the atmosphere and its removal have been improved through the introduction of new schemes to represent the sedimentation and wet deposition of volcanic ash, and updated schemes to represent deep atmospheric convection and parameterizations for plume spread due to unresolved mesoscale motions. A good simulation of the transport and dispersion of a volcanic ash cloud requires an accurate representation of the source and we have introduced more sophisticated approaches to representing the eruption source parameters, and their uncertainties, used to initialize NAME. Further, atmospheric dispersion models are driven by 3-dimensional meteorological data from Numerical Weather Prediction (NWP) models and the Met Office's upper air wind field data is now more accurate than it was in 2010. These developments have resulted in a more robust modelling system at the London VAAC, ready to provide forecasts and guidance during the next volcanic ash event affecting their region.