Satellite remote sensing data provides one instant in time of the ash cloud’s location and concentration, Volcanic Ash Dispersion and Transport models provide a forecast of the ash cloud movement, providing critical information for hazard assessment and mitigation. Comparisons of these two complimentary datasets are required to reduce the potential volcanic ash cloud hazard and to provide forecasted volcanic ash cloud concentrations.

With the Weather Research and Forecast Model coupled with Chemistry (WRF-Chem), we analyse recent volcanic eruptions within the Pacific Rim including Sarychev Peak 2008, Redoubt 2009 and Kizimen 2010/2011 as well as the Eyjafjallajoekull eruption of 2010 to calculate concentrations and altitudes of airborne volcanic ash. Comparison of the WRF-Chem simulations to satellite ash retrievals and traditional remote sensing techniques yields the uncertainties associated with the methods and how best to use them in parallel.

Preliminary results from the Eyjafjallajoekull eruption show a close match between WRF-Chem model and satellite data under cloud-free conditions of 1.8 and 1.7 tons km\(^{-2}\) of ash above the Faroe Islands on 15 April 2010 at 12:00 UTC, respectively. We will additionally show how WRF-Chem can be used for the Sarychev Peak, Redoubt and Kizimen events. In addition to the volcanic ash mass and altitude estimates, this data will provide valuable information of the behaviour of volcanic eruptions which, if applied to ongoing eruptions, will lead to an improved estimate of location and concentration of the ash clouds, critical information for the aviation community and in performing hazard assessment.