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Quantifying the mass loading of particles in an ash cloud remobilised from tephra deposits on Iceland

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We use satellite based measurements in combination with radiative transfer and dispersion modelling to quantify the total mass of ash resuspended during a significant remobilisation event in southern Iceland during the 16-17 September 2013. The resulting resuspended ash cloud was transported to the south-east over the North Atlantic Ocean and, due to clear skies at the time, was exceptionally well observed in satellite imagery. The timing and location of the ash cloud identified from measurements made by VIIRS on-board the SUOMI satellite agree well with model predictions using the dispersion model NAME. Total column mass loadings are determined from the VIIRS data using an optimal estimation technique which accounts for the low altitude of the resuspended ash cloud and are used to calibrate the source strength in the resuspended ash scheme in NAME. Considering the tephra deposits from the recent eruptions of Eyjafjallajökull and Grímsvötn we estimate that ~ 0.2 Tg of ash was remobilised during this event.