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Characterization of the Eyjafjallajökull volcanic ash cloud over the Netherlands from remote sensing observations

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On 16 April 2010 a dense ash cloud from the Icelandic Eyjafjallajökull volcanic eruption drifted over the Netherlands. This unique event was observed visually and with ground-based remote sensing instruments. In the following weeks additional, but less dense ash layers were observed over the Netherlands. To provide advice to aviation security authorities in the Netherlands, quantitative information was needed about presence, height and mass concentration of the ash cloud. This information was derived from several instruments in Cabauw, namely a UV lidar including depolarization capability, a Raman lidar for quantitative retrieval of extinction profiles, and sunphotometers. The operational ceilometer network was upgraded to quickly provide ash layer information over the entire country. In De Bilt, ozone profile measurements were performed to study the effects of the ash. Satellite data was used to monitor the horizontal extent and transport of the ash cloud away from the source. In particular, the high temporal resolution 15-minute images of the Meteosat SEVIRI dust index were used. Daily maps of Absorbing Aerosol Index and SO2 provided by OMI and GOME-2 were also used. These UV-visible instruments on polar orbiting satellites make measurements over Europe between 10-15 UTC every day. The KNMI meteorologist was able to verify and enhance the VAAC model contours of ash concentration by combining the satellite and lidar data. It appeared that the mass concentration of the ash layer over the Netherlands on 16 April was 0.4-0.8 mg/m3, whereas the thin ash layers still visible in Meteosat imagery had a mass concentration of about 0.1 mg/m3. This information contributed to the advice that led to reopening of airspace in the Netherlands. In this presentation we will review the observational data obtained over the Netherlands in the period of April-May 2010, to characterize the ash clouds which caused so much disruptance to air traffic.