



Eyjafjallajökull Ash Plume - Observations by DWD Ceilometers, Ozone Sondes and in-situ Instruments

Harald Flentje, Anja Werner, Hans Claude, Stefan Gilge, Christian Plass-Dülmer, Wolfgang Steinbrecht, Werner Thomas, and Wolfgang Fricke

Hohenpeissenberg Meteorological Observatory, DWD, Hohenpeissenberg, Germany

The volcanic ash plume of Eyjafjalla was detected over Germany by ground-based in-situ measurements, ozone sondes, and ceilometers, all operated by the German Meteorological Service (DWD). The network of new ceilometers (Jenoptik CHM15K) at currently 30 meteorological stations in Germany was especially important for recording the arrival and subsequent temporal evolution of the ash plume over Germany. These instruments are sensitive to atmospheric aerosols. With the help of independent aerosol optical depth data, they allow the retrieval of aerosol backscatter profiles, from which extinction coefficients, and particle mass concentrations can be roughly estimated. At the Global Atmosphere Watch (GAW) station Zugspitze-Hohenpeissenberg, the ceilometer data were augmented by in-situ measurements of sulphur dioxide, particulate matter, sulphuric acid, SO₂ vertical column densities, and ozone sonde profiles. According to all observations, the ash plume reached northern Germany between 2 and 7 km altitude on the evening of April 15, then subsided and moved southwards on April 16 and 17. By noon of April 17 it was entrained into the planetary boundary layer. At that point, the surface concentrations of SO₂ and large particles rose to high levels. Ozone profiles indicated layers impacted by volcanic ash and SO₂. The ash cloud prevailed until the 19th, and diminished thereafter. A maximum particle mass concentration of 300-500 $\mu\text{g}/\text{m}^3$ at 2 km above ground was estimated for Hohenpeissenberg on April 17, 08:41 UTC, with an uncertainty of about a factor of 2. This estimate is based on the ceilometer backscatter profile and concurrent nephelometer and particle mass concentration measurements at ground. It should be understood as a first guess.