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The Eyjafjallajökull ash plume over Leipzig, Germany

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After the eruption of the Eyjafjöll volcano in Iceland on April 14, 2010 we observed the evolution of the emitted plume over Leipzig since April 15, 2010 with a multiwavelength Raman lidar and with an AERONET sun photometer. With the lidar we obtain vertical profiles of the particle backscatter coefficient at 355, 532, and 1064 nm, of the particle extinction coefficient at 355 and 532 nm and profiles of the particle depolarization ratio at 532 nm. The volcanic plume arrived over Leipzig on April 16 around noon in about 6km height. The optical depth of this plume was about 0.7 at 500nm. The height of this thick layer rapidly decreased to 3km before the layer vanished at about 18 UT. During the following days we observed ash layer in the free troposphere up to 8 km height with an optical depth at 500nm of about 0.06. On April 19, 2010, The DLR research aircraft Falcon flew over Leipzig. We estimated the particle mass concentration in the volcanic layer to $50 \mu g/m^3$ from our measured extinction profiles and an extinction-to-mass conversion factor for Saharan dust from the OPAC database. This value is in good agreement with the in-situ observations aboard the Falcon. On April 19-20, 2010, the volcanic particles were mixed into the planetary boundary layer. DOAS measurements at ground level show a decrease in the Angström exponent and an increase in the particle extinction coefficient at the same time. Effective radii were of the order of 0.6 μm. We observed the formation of ice clouds within the volcanic layer at unexpectedly high temperatures of -10 to -15°C.