



## **Retrieval of mass concentrations in the volcanic ash plume from the Eyjafjöll eruption using airborne, ground-based lidars and in-situ measurements.**

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An Ultra-Violet Rayleigh-Mie lidar was deployed aboard the Falcon-20 (F20) French research aircraft during the Eyjafjöll volcano crisis in order to monitor the ash plume. This compact and light system was developed by the Commissariat à l'Energie Atomique (CEA) and is now commercialized under a CEA-CNRS license by the LEOSPHERE company. The F20 was equipped by the SAFIRE unit (Météo-France-INSU-CNES). Four operational flights were carried out on 21 April, 12 16 and 17 May, 2010, inside the French, Spanish and British air spaces. For the 12 May, 2010, the flight was coordinated with a second French research aircraft, the ATR42 operated by SAFIRE and equipped with an in-situ sampling inlet connected to onboard instrumentation. This instrumentation measured the aerosol size distribution and the chemical composition inside the ash plume allowing the retrieval of microphysical properties of volcanic ashes like specific extinction cross-section and complex refractive index at 355 nm. Mass concentrations in the ash plume have thus been assessed from airborne lidar extinction coefficient profiles using Raman-N<sub>2</sub> ground-based observations. This operational survey has been a powerful tool for decision makers and enabled to confirm air traffic reopening.

We will present here the first 3 flights (21 April, 12 and 16 May) and describe the method used and the results obtained in term of mass concentration in the ash plume retrieved from Rayleigh-Mie airborne lidar measurements.