



Vertical profile and aerosol size distribution measurements in Iceland (LOAC)

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Cold climate and high latitudes regions contain important dust sources where dust is frequently emitted, foremost from glacially-derived sediments of riverbeds or ice-proximal areas (Arnalds, 2010; Bullard, 2013). Iceland is probably the most active dust source in the arctic/sub-arctic region (Dagsson-Waldhauserova, 2013). The frequency of days with suspended dust exceeds 34 dust days annually. Icelandic dust is of volcanic origin; it is very dark in colour and contains sharp-tipped shards with bubbles. Such properties allow even large particles to be easily transported long distances. Thus, there is a need to better understand the spatial and temporal variability of these dusts.

Two launch campaigns of the Light Optical Aerosols Counter (LOAC) were conducted in Iceland with meteorological balloons. LOAC use a new optical design that allows to retrieve the size concentrations in 19 size classes between 0.2 and 100 microm, and to provide an estimate of the main nature of aerosols. Vertical stratification and aerosol composition of the subarctic atmosphere was studied in detail. The July 2011 launch represented clean non-dusty season with low winds while the November 2013 launch was conducted during the high winds after dusty period. For the winter flight (performed from Reykjavik), the nature of aerosols strongly changed with altitude. In particular, a thin layer of volcanic dust was observed at an altitude of 1 km.

Further LOAC measurements are needed to understand the implication of Icelandic dust to the Arctic warming and climate change. A new campaign of LAOC launches is planned for May 2014.

Reference:

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