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## Eyjafjallajökull Volcanic Eruption: Ice Nuclei and Particle Characterization

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### ABSTRACT

The Eyjafjallajökull 2010 eruption was an extraordinary event in that it led to widespread and unprecedented disruption to air travel over Europe – a region generally considered to be free from the hazards associated with volcanic eruptions, excluding the extreme south influenced by Mt. Etna. In situ measurements were performed at the research centre of the National Research Council (CNR) area of Bologna (44°31' N; 11°20' E), an urban background site, in order to contribute to knowledge concerning the impact of the volcanic emission. Aerosol size distributions measured with a Differential Mobility Particle Sizer (DMPS) and an Optical Particle Counter (OPC) show an increase in concentration of the accumulation and coarse fraction during the transit of the ash cloud, with respect to the subsequent period of the event, while particles smaller than 0.3 µm seem not to be affected by volcanic ash. Ice nuclei measured in the sampled air during and after the ash cloud transit, show a higher concentration during the ash cloud transit, with a ratio of about 1:110 with respect to the aerosol number concentration measured with the OPC. The elemental composition of aerosol particles, performed with SEM-EDX, gives about 30% of the inorganic coarse particles (geometric diameter larger than 1 µm) of volcanic origin on the 20 April. Si and Al concentrations result prevalently much higher than Ca and Fe ones. A large number of particles contained sulphur, indicating secondary processes of sulphate/sulphuric acid formation due to sulphur dioxide oxidation during transport in the volcanic plume.

### KEYWORDS

Ice Nuclei, Nucleation, Supersaturation, Volcanic Ash

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