Impact of the Eyjafjallajökull’s eruption on surface air quality in France


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Remote Sensing

The task of monitoring volcanic plumes using space-borne imagery is a solution reexamined 20 km out of 80 including this mission that was operated 24/7 across the whole April plume plume period.

- The cloud and aerosol (DAE) lidar operates between 0.3 km and 15 km. Two lidars operated in pairs (a 0.3 km and 1.6 km) while acquiring images every 15 minutes of the cloud at 1.6 km (cross-Doppler, 1.6 km, and 367 nm) and from the aerosol (DAE) lidar.
- A commercial operational (DAE) lidar operating at 3 km between the surface and the tropopause (cross-Doppler) along with the lidar of the satellite of the French national observatory.

Modelling the April 2010 nitrate pollution episode

PM10 forecasts with the ProxAir system ("now") accounting for the Eyjafjallajökull’s emissions.

A PM10 pollution event was forecasted to occur on 18-19 April in Northern France as a result of a combination between an adverse meteorological context and spreading of nitrate-rich agricultural fertilizers leading to the formation of ammonium nitrate particulate matter.

An unusual bias was found between the forecast and optimum interpolation of real-time observations in Northern France on the 18th and 19th of April as a result of injection of the boundary layer of volcanic material that was not included in the forecast - neither in the boundary conditions nor in the emission inventory.

Fast Facts

- 2/47 24/7 lidars showed the continuous advection of a thin layer of volcanic material over altitude in the Paris area until its ultimate injection in the stratosphere.

- Surface measurements showed a significant impact of the volcanic plume on particulate matter concentration in some Northern French regions and allowed to discriminate the respective contribution of local pollution and Eyjafjallajökull’s emissions.

Perspectives

- In-depth analysis of collected samples may provide insight into the chemical processes taking place in the plume.

- Improvements of the deposition in the models will allow a more realistic representation of the decay.

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Surface Data

Fast Facts: Impact of Eyjafjallajökull volcanic ash plume on surface air quality in France