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Measurements of the gas emission from Holuhraun volcanic fissure eruption on Iceland, using Scanning DOAS instruments

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On 31 August 2014 a volcanic fissure eruption started at Holuhraun on Iceland. The eruption lasted for 6 months and was by far the strongest source of sulfur dioxide in Europe over the last 230 years, with sustained emission rates exceeding 100 000 ton/day. This gas emission severely affected people within Iceland.

Under the scope of the EU-project FUTUREVOLC, a project with 3.5 years duration, aiming at making Iceland a supersite for volcanological research as a European contribution to GEO, a version of the Scanning DOAS instrument that is adapted to high latitudes with low UV radiation and severe meteorological conditions was developed.

Since the first day of the eruption several of these novel instruments were monitoring the SO_2 emission from the eruption. A lot of work was needed to sustain this operation during the winter at a very remote site and under severe field conditions. At the same time the very high concentrations in the gas plume, in combination with bad meteorological conditions has required the development of novel methods to derive reliable flux estimates. A simple approach to make a first order correction for atmospheric scattering has been applied, as well as filtering of the dataset to remove the data most affected by scattering. Substantial work has also been made to obtain realistic information on plume height and wind speed. The data from these instruments are the only sustained ground-based measurements of this important gas emission event.

In this presentation we will discuss the instrumental issues and evaluation procedures and present the latest version of the emission estimates made from our measurements.