ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

OMI SO_2 and UVAI observations of Eyjafjallajökull volcanic eruption

J. Hakkarainen, M. Sofiev, J. Tamminen, J. Vira, and M. Prank
Finnish Meteorological Institute (FMI), Earth Observation, Helsinki, Finland.

Abstract

Eyjafjallajökull volcanic eruption took place on March 14th 2010 in Iceland. On the next day vulcanic ash was dispersed in Northern Europe and the air space was closed in many European countries. In this work we show SO_2 and Ultraviolet Aerosol Index (UVAI) observations derived from the Ozone Measurement instrument (OMI). OMI observations provided useful information to scientists and decision makers all over the world. For example at the Finnish Meteorological Institute (FMI) the OMI data was used to calibrate SILAM dispersion model.

OMI data

The Dutch-Finnish Ozone Monitoring Instrument (OMI) on board the NASA EOS Aura space-craft (on flight from 14 July 2004), is a nadir viewing spectrometer that measures solar reflected and backscattered light in the spectral range from 270 nm to 500 nm. The width of the instrument's viewing swath is 2600 km and it is large enough to provide global daily coverage with a spatial resolution at nadir of 13×24 km.

In this study the Middle tropospheric sulfur dioxide (SO_2) column and Ultraviolet Aerosol Index (UVAI) were used and the data was carefully screened from the effects of the row anomaly. The OMI SO2-TRM product is optimized for typical volcanic degassing.

Monitoring Eyjafjallajökull volcanic eruption

Eyjafjallajökull volcanic eruption took place on March 14th 2010 in Iceland. On the next day volcanic ash was dispersed in Northern Europe and the air space was closed in many European countries. The whole period lasted until the end of May 2010.

Volcanic ash and SO_2 were monitored by various space borne instruments. OMI sensed increase of aerosols and/or SO_2 between March 15th (Fig. 1) and May 23rd. OMI data set provided good information about the temporal evolution of SO_2 (Fig. 2). At the FMI the OMI data was used to calibrate SILAM dispersion model (Fig. 3).

Conclusions

In this work observations of SO_2 and UVAI from OMI was shown. These observations provided useful information about the Eyjafjallajökull volcanic eruption.

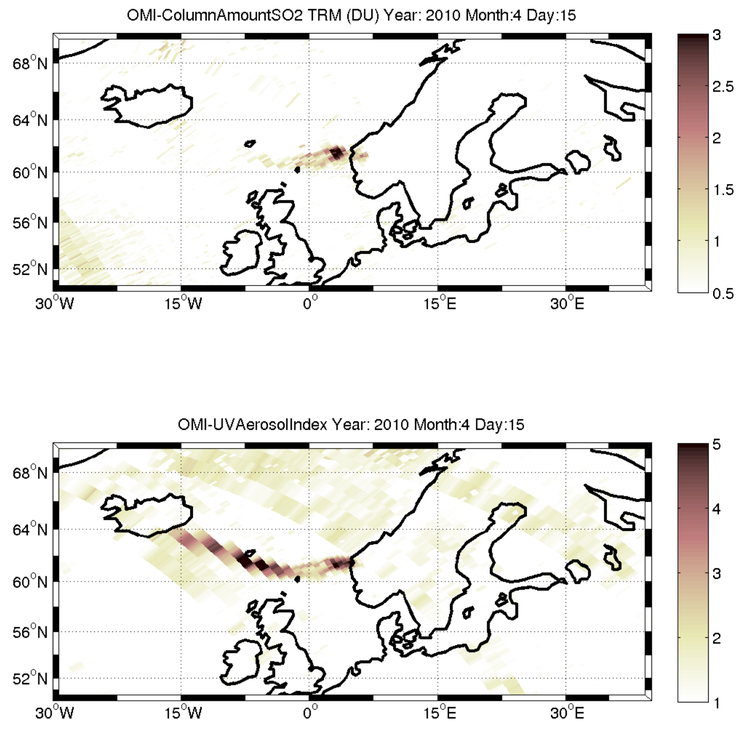

Figure 1. First OMI SO_2 and UVAI observations the day after Ejafjallajökull volcanic eruption from March 15th 2010.

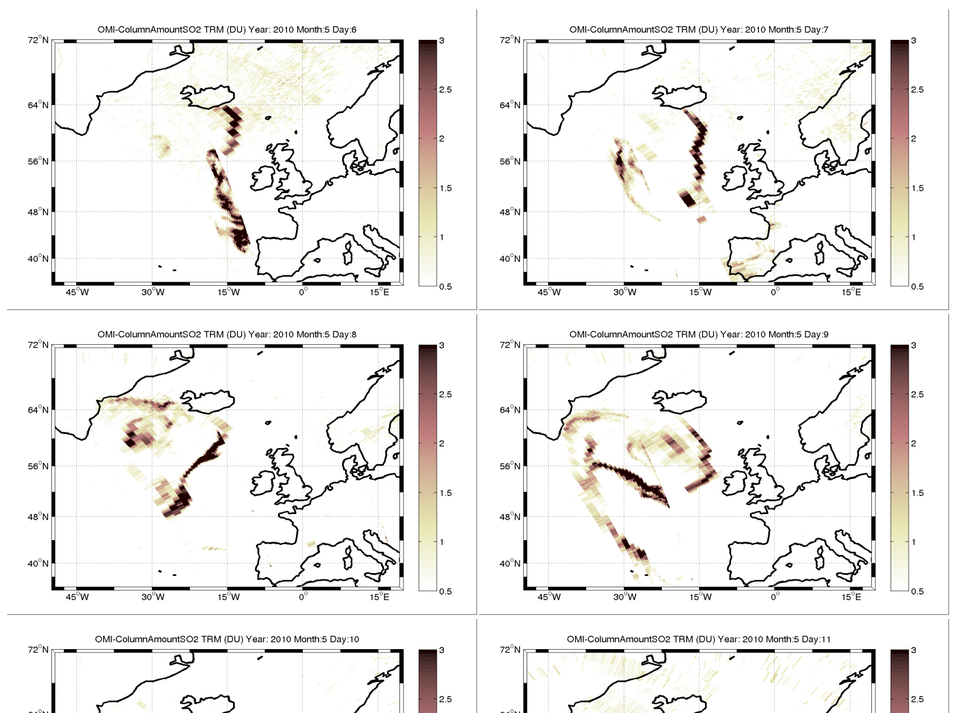

Figure 2. A movie of OMI SO_2 observations from May 6th 2010 to May 15th 2010.

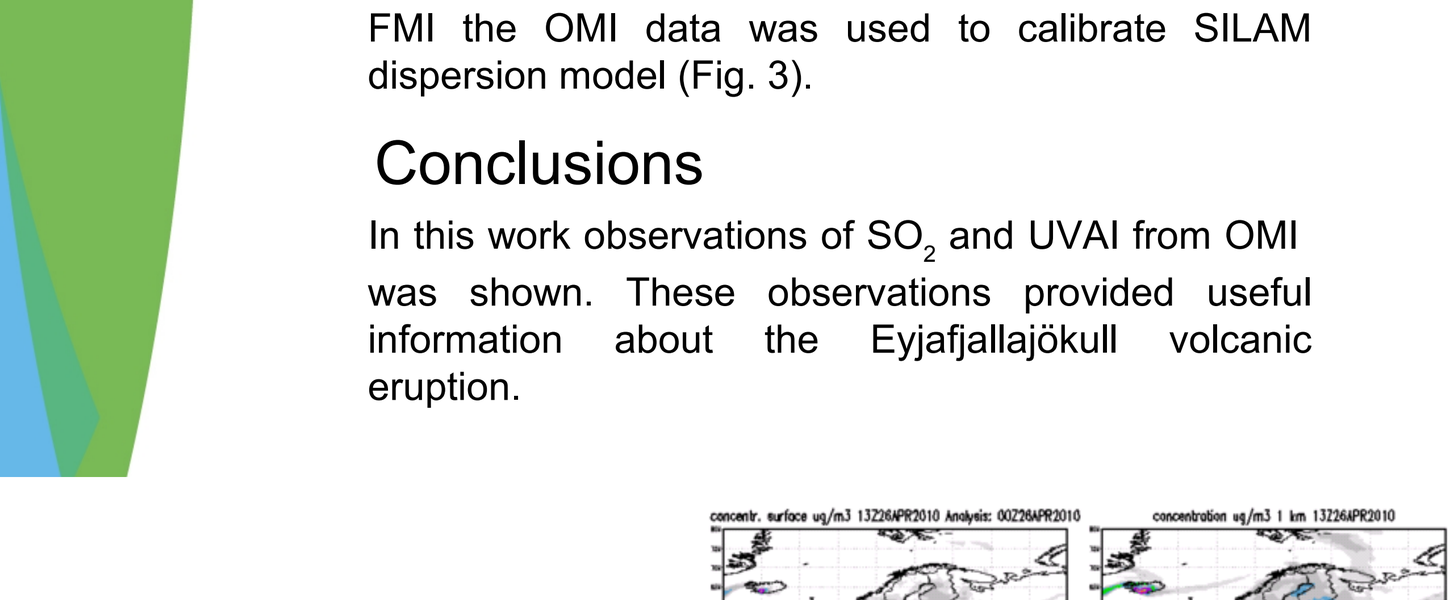

Figure 3. OMI SO_2 total column and FMI's SILAM dispersion model ash simulations for March 26th 2010 in different layers.