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Simulations of the Holuhraun eruption 2014 with WRF-Chem and evaluation with satellite and ground based SO_2 measurements

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Volcanic eruptions, with gas or/and particle emissions, directly influence our environment, with special significance when they either occur near inhabited regions or are transported towards them. In addition to the well-known affectation of air traffic, with large economic impacts, the ground touching plumes can lead directly to an influence of soil, water and even to a decrease of air quality.
The eruption of Holuhraun in August 2014 in central Iceland is the country's largest lava and gas eruption since the Lakagígar eruption in 1783. Nevertheless, very little volcanic ash was produced. The main atmospheric threat from this event was the SO_2 pollution that frequently violated the Icelandic National Air Quality Standards in many population centers. However, the SO_2 affectation was not limited to Iceland but extended to mainland Europe.
The on-line coupled model WRF-Chem is used to simulate the dispersion of SO_2 for this event that affected the central European regions. The volcanic emissions are considered in addition to the anthropogenic and biogenic ground sources at European scale. A modified version of WRF-Chem version 4.1 is used in order to use time depending injection heights and mass fluxes which were obtained from in situ observations. WRF-Chem uses complex gas- (RADM2) and aerosol- (MADE-SORGAM) chemistry and is operated on a European domain (12 km resolution), and a nested grid covering the Alpine region (4 km resolution).
The study is showing the evaluation of the model simulations with satellite and ground based measurement data of SO_2. The analysis is conducted on a data management platform, which is currently developed in the frame of the ESA-funded project TAMP "Technology and Atmospheric Mission Platform": it provides comprehensive functionalities to visualize and numerically compare data from different sources (model, satellite and ground-measurements).