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Uncertaintines in the inverse modelling of sulphur dioxide eruption profiles

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We have developed a methodology for retrieving vertical profiles of the source term in volcanic eruption columns, based on satellite column data obtained during the following hours and days on one hand and transport and dispersion calculations with FLEXPART on the other. These two pieces of information are used as input for an analytical inversion algorithm. So far, the method was applied for sulphur dioxide emissions at Jebel at Tair (Eckhardt et al., 2008) and Kasatochi (Kristiansen et al., 2010). GOME, OMI, SEVIRI, and AIRS data have been used in different combinations.

The inversion uses as input an a priori profile together with its uncertainty, usually a very simple shape, and the column values from the satellite retrieval, also with uncertainties. The uncertainties are only rough estimates. The impact of assuming different uncertainties on the final profiles and their a posteriori uncertainty is studied. This includes the general magnitude of the uncertainty as well as more specific patterns representing, for example, the degradation of the retrieveals by the presence of clouds. First results show that even if the magnitude of the satellite data's uncertainty is increased by a factor of three compared to our standard value, the main features of the reconstructed emission profiles remain and turn out to be clearly significant.

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References

Eckhard, S., Prata, A.J., Seibert, P., Stebel, K., and Stohl, A. (2008): Estimation of the vertical profile of sulfur dioxide injection into the atmosphere by a volcanic eruption using satellite column measurements and inverse transport modeling. Atmos. Chem. Phys., 8, 3881-3897, http://www.atmos-chem-phys.net/8/3881/2008/acp-8-3881-2008.html

Kristiansen, A. Stohl, A. J. Prata, A. Richter, S. Eckhardt, P.Seibert, A. Hoffmann, C. Ritter, L. Bitar, T. Duck, K.Stebel (2010): Remote sensing and inverse transport modeling of the Kasatochi eruption sulfur dioxide cloud. J. Geophys. Res., submitted.