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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Inverting for volcanic SO_2 flux at high temporal resolution using spaceborne plume imagery and chemistry-transport modelling: the 2010 Eyjafjallajökull eruption case-study" *by* M. Boichu et al.

Anonymous Referee #1

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The authors present a method to reconstruct the SO_2 flux history of the Eyjafjallajökull eruption from IASI satellite observations, using and inverse modeling approach with the chemistry-transport Eulerian model CHIMERE. The method here presented can be applied to other eruptions and other satellite observations.

This is a good work, suitable for publication in ACP. I have only few comments. The manuscript provides details about the method here developed and an evaluation of the results. However, I have found the presentation of the material is partly

confused. It is difficult to separate the calculation of the results (*i.e.* the SO_2 flux) from the evaluation and from the application to forecast models.

General comments

- Are the authors comparing to IASI observations? Is comparing to IASI correct, considering that the same observations are the starting point of your procedure? Shouldn't the authors use independent observation to evaluate their method?
- How exactly would this method be applicable to other eruptions? The authors make some assumptions, for instance, on the injection height. Do they expect that major changes should be done for other eruptions? Which assumptions should be changed?

Specific comments

- 6556 L15: parenthesis missing before Highwood.
- 6561 L1: in page 6559 the authors state that they do not include SO_2 oxidation. Does *g* include anyhow chemical processes?
- 6561 L4: if *g* includes chemical processes, shouldn't they be included in this line?
- 6562 L19: Reason number 3 should underestimate the observed plume, too, correct?
- 6564 L21: Did the plume from Eyjafjallajökull contain much water? Is it a problem for using your method in this case?

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 6553, 2013.