

Interactive comment on “The vertical distribution of volcanic SO₂ plumes measured by IASI” by E. Carboni et al.

Anonymous Referee #2

Received and published: 9 October 2015

In their manuscript “The vertical distribution of volcanic SO₂ plumes measured by IASI”, Carboni et al. present results from retrievals of volcanic plume SO₂ content and vertical distribution performed on IASI data. They present a large data set covering several volcanic eruptions, provide some validation of SO₂ layer height with CALIPSO measurements and of SO₂ columns with ground-based Brewer observations and describe in detail results for a set of large volcanic eruptions.

The paper is well written but in some places, minor English corrections needed. It is clearly structured and reports on an impressive and relevant data set which is of interest to the community and fits well into the scope of ACP. I therefore recommend this manuscript for publication in ACP after taking into account the comments and suggestions given below.

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General comments

1. My only real concern with the manuscript is that this is by no means the first IASI SO₂ product and for data users, it would be relevant to know how this product compares with other published IASI SO₂ products, at least in terms of SO₂ columns. There is some brief discussion of comparisons in the text but ideally, Fig. 7 or parts of it should contain data points from other IASI retrievals as well. It would be good if some direct comparison could be added here or in another figure.
2. I'm also not fully convinced that the lengthy description of the individual events in section 6 is needed but on the other hand it does provide quick information for people interested in a specific eruption.
3. As this is an interesting data set it would be good to indicate how it can be accessed.
4. The result that most of the eruptions inject SO₂ into the tropopause region is interesting and somewhat surprising. Can you give any possible explanation for this finding? Is it in line with other observations of the height of volcanic emissions? Do you think there is a risk that this result is biased by your SO₂ plume height retrieval?
5. The validation of SO₂ column amount with Brewer observations is useful but the good correlation really hinges on one single point (Valentia).

Technical comments

- p 24645, l 7: amounts => amount
- p 24654, l 23: then => than

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- p 24655, l 9 and following: I do not understand your explanation for the overestimation of low amounts – please clarify
- p 24655, l 12: then => than
- p 24655, l 21: something is wrong with this sentence, please check
- p 24655, l 22: into a 0.125 => into 0.125
- p 24658, l 25: release => released
- p 24660, l 17: to Kasatochi => as Kasatochi
- p 24661, l 11: and implicate => and implicated
- Figure 5: to a different Brewer ground station => to different Brewer ground stations
- Figure 8: Add explanation of tropopause lines in caption
- Figure 10: Etna plots shows => Etna plots show

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 24643, 2015.

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