

Interactive comment on “SO₂ emissions from Popocatepetl volcano: emission rates and plume imaging using optical remote sensing techniques” by M. Grutter et al.

Anonymous Referee #1

Received and published: 9 June 2008

General comments This paper describes 4 different methods for estimating SO₂ emissions from a volcano during the MILAGRO campaign. This is an important contribution to the emission inventory for the MCMA as well as to the interpretation of data from MILAGRO. The development of new methods is important for volcano monitoring, and it is important to compare results from these with those from established techniques. The paper is acceptable, subject to the suggestions below.

Specific comments

1. There is a large discrepancy between COSPEC and the fixed DOAS. This is an important point to ensure continuity between the well established COSPEC and

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- the newer DOAS and should be given a more thorough treatment.
2. The section on the plume imaging should be expanded and made a little more rigorous. How much data is available? Could more of it be presented? Is it possible to quantify how intermittent the emissions are? Is there a correlation between SO₂ emissions and visible smoke?
 3. The trajectories do not add much to the analysis. They basically follow the mean flow aloft, and therefore give the same results as using a windrose. The discussion of vertical dispersion is not sufficiently rigorous at this point. I would recommend leaving this out unless you want to substantially expand it. If you do leave it out, the meteorological discussion should be expanded with wind-roses, and with climatological discussions. This could address whether the time period analyzed is representative of the longer record. On this note, I don't think it is necessary to compare NARR and Radiosonde observations - NARR assimilates this data, just refer to the literature. This would leave more space for SO₂ data.
 4. Figures were a little sparse, please show more data.
 5. I was surprised not to see M.A. Matiella Novak et al., *JVGR* 170, 1-2, 76-85 in the literature review. Please include a discussion of the relationship of the present work with this paper. The number of papers on the SO₂ emissions of the Popocatepetl are few enough that you can afford to cite them all.

Technical corrections

1. p8120-19: *but* all trajectories (not and)
2. p8121-11: dormant not repose period
3. p8121-14: ash columns (plural)

4. p8121-29: 6.65 Gg/d (not Gg)
5. p8122-8 : Thus, *the* Popocatepetl volcano (see also line 12)
6. p8125-16: field of view (not regard) (see also p8126-3)
7. p8125-22: run-on sentence, it would be better to split it into 2
8. p8127-5 : Why describe NNRP? If you do, what is the temporal resolution?
9. p8127-12: how were the trajectories calculated? Where convection/terrain effects accounted for?
10. p8128-10: This is meaningless if we do not know how the trajectories were calculated.
11. p8130-12: March. (not March space .)
12. p8130-19: The first reason (not firstly)
13. p8131-12: as discussed above, this should include some climatological / seasonal discussion.
14. p8131-19: This is too vague.
15. p8131-7 : #4 especially seems hypothetical + vague. Please be more specific for both #4 and #5.
16. p8132-15: We are particularly grateful for the assistance of (instead of: A special gratitude)

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8119, 2008.

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