

## ***Interactive comment on “Modeling and computation of effective emissions: a position paper” by R. Paoli et al.***

**Anonymous Referee #1**

Received and published: 16 March 2011

General comments:

A review of techniques to incorporate parameterizations of plume processes into global models is a much needed and welcomed initiative. It has been difficult for modelers to keep overview of the different methods. This manuscript fit very well within the scope of this journal and provides an important contribution to modeling science. I recommend publication after some minor revisions.

In my view there is one major omission from making this a complete review. In the discussion of the results of studies implementing the parameterizations it is not verified whether the model results are improved or not. That global models likely overestimate concentrations and that the plume parameterizations improve the physical representation changing the model concentrations by given amounts is well documented. What

C63

is missing is a discussion whether the calculated concentration changes are realistic if one compares to measurements. For those plume parameterization studies in literature that have made comparisons to observations the outcome should be referred to. Though it is hard to be conclusive on these issues (due to for instance other model errors, limited amount of existing measurements and uncertainty in other sector's emissions) this review should provide a discussion. The authors could possibly also point out how better evaluations can be made (what kind of measurements etc). For non-experts this manuscript is in general probably a bit technical and the article could reach a broader audience with some more explanations and clearer definitions. Some suggestions are made under specific comments.

Specific comments:

Typos/grammar: There are some errors (not many). I have mentioned a few below. The manuscript should be read through carefully to eliminate the remaining.

Page 138, lines 5-8: Long sentence, language could be improved.

Page 143: It would be much easier to discern methods and motivating, especially for non-experts, if some more fundamental explanation of the effective emission and effective reaction rates are provided at an early stage. I suggest a few lines and this could very well be something similar to the text in the Conclusion section ( page 164) which nicely describes the differences between the EEI, ECF/PTI and ERR.

Page 145, equation 14: Perhaps mention that the last term represents dilution.

Section 4.2: Maybe some rephrasing of the 10 first lines could make the approach easier to understand. For instance “attempts to determine the local conversions of the emitted species on the same plume, rather than. . .” is a long sentence where it is easy to fall off. Should it be “mass” instead of “emissions” in line 6, page 154 ?

Page 158: The abbreviation “LES” should be written out/explained.

Page 160, lines 14-18: The text could be clearer and the explanation is difficult to

C64

understand. The words “produces additional ozone emissions” is a bit confusing as ozone is a secondary component and not emitted.

---

Interactive comment on Geosci. Model Dev. Discuss., 4, 137, 2011.