

***Interactive comment on “Technical Note:
Anthropogenic and natural offline emissions and
the online Emissions and dry DEPosition
submodel EMDEP of the Modular Earth Submodel
system (MESSy)” by L. N. Ganzeveld et al.***

Anonymous Referee #2

Received and published: 3 August 2006

General comment:

The authors introduce a MESSy subroutine EMDEP, which calculates/organises emissions and deposition of chemical species and present results from 1-year integration. In general I do appreciate a detailed documentation of model systems. However in this case I have the feeling that a duplication of work is performed. The two papers by Kerckweg et al. (same special issue) describe in more detail the routines OFFLEM, ONLEM, and DRYDEP and are basically the same as in EMDEP. And unless I missed important differences between these routines, I would recommend not to publish the methodol-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

ogy (= Sec. 3) twice. On the other hand the description of the implemented emission data set is not given in Kerkweg et al. so that I would recommend that Ganzeveld et al. concentrate on this point in combination with an analysis of the impact of emission heights and an analysis of calculated budgets. However, the analysis performed so far is quite hand-waving and lacks a detailed investigation. Therefore, I think the paper can be a valuable contribution only after major revisions, which include a change in the focus.

Major comments:

1. Difference EMDEP <-> (EMDEP and OFFLEM, ONLEM) unclear. As far as I understand from the text EMDEP is a routine including various processes. In a further step processes were separated/extracted from EMDEP and OFFLEM, ONLEM DRYDEP routines developed. The following question should be answered to better understand the relations:
 - (a) Is EMDEP obsolete, because it can be substituted by the updated subroutines OFFLEM, ONLEM and DRYDEP? In that case I would not recommend the publication!
 - (b) Is the methodology different in the approaches EMDEP vs. (OFFLEM, ONLEM DRYDEP)? If not, the methodology should only be published once either in a paper on EMDEP or in OFFLEM, ONLEM DRYDEP papers.
2. OFFLEM: Emissions: Original work in emissions unclear. As far as I understand from the text from 5460/10 to 5461/8 is a reference of existing work. 5461/9-5461/17 describes how the speciation is done, based on previous work. The rest of this section is a summary, which datasets were put together.
 - (a) It should be made clearer what is new, i.e. what part is not 'simply' copied from other emission datasets.

- (b) It should be emphasised how the authors decide which data set they take. Is there some sort of philosophy behind? EDGAR covers only anthropogenic emissions? That should be made clear to avoid the impression that emission data were picked arbitrarily.
 - (c) A lot of detailed information is given on the datasets. A table would be helpful which includes source types, species, methods applied (if), and references.
 - (d) Kerkweg et al. gave information on how the input data in OFFLEM are processed in more detail. Is EMDEP working the same way?
3. ONLEM: The discussion of the treating of online emissions is identical to Kerkweg et al., except that Ganzeveld et al. present it more verbally, without describing the algorithms but simply referring to previous papers, and Kerkweg actually present the formulas, an approach which I support and which I think is the right way for a Technical Note. I suggest to remove this part and refer to Kerkweg et al. with clear indications whenever the method deviates.
4. DRYDEP: Same as above. Here we have a verbal description of what Kerkweg et al. (p 6856) describes in a more technical way. Both refer to the same basic papers by Ganzeveld and Lelieveld (1995) and Ganzeveld et al., (1998). So why duplicating it?
5. The design of the numerical experimental lacks information. Is ECHAM run in a nudged mode or not? If nudged how is it done, which impact does it have on the boundary layer?
6. The discussion of the results, especially concerning the resolution leaves a lot of question open. Especially the analysis of the impact of the resolution on the emissions is not accurately performed.

Minor comments:

5459 / 10: I do not understand the phrasing 'testing model' what exactly will be tested? And how can one decide, which subroutine is giving the correct answer to allow testing?

5467/18: Is 1 year integration and climatologically integration not a antagonism?

5467/27: Why is it a consequence?

5468/3: use reduced instead of corrected.

5468/4: Where is the increase in the 'simulated fraction \check{E} ' coming from? How do the authors know that there is compensation? Did they run extra simulations? Does it directly follow from some equations? This has to be explained in more detail.

5468/8: Is the agreement also good in terms of seasonal cycle / horizontal patterns?

5468/13 Why? Is the T dependence that linear?

5468/17-19 + 26 So what is the result in ECHAM5? Applying the larger isoprene emissions of 607 TgC/yr, are the concentrations also exceeding the measurements?

5469/1 The caption of table 3 states that the budget is only an estimate. Then the whole discussion is somehow artificial. What is the uncertainty range? In the case of a strong diurnal cycle, which I assume, the monthly mean value may be dominated by only a couple of instantaneous values. Why hasn't the emitted mass not been accumulated, which would give the exact value? On top of that there is an interannual variability in the emission strength, which has to be included in the discussion, since results from different years are compared.

5470/7-17(28) As far as I understood an explicit year has been simulated. Does this imply that the meteorology is nudged? Is it done in the same way as in Jöckel et al.? I.e. are the near surface layer not nudged? Since this information is missing it is hard to assess the significance of the results concerning the different resolution. How different are the near surface temperature and wind fields? If those would be the same, will the emission be the same even in a finer resolution, I guess not? Are the

chosen resolutions, some sort of standard resolutions, recommended for the use of ECHAM5.MESSy? There are a number of open questions concerning the impact of resolution on the emission strength which should be clarified.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 5457, 2006.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper