

Interactive
Comment

***Interactive comment on “Technical Note:
Implementation of prescribed (OFFLEM),
calculated (ONLEM), and pseudo-emissions
(TNUDGE) of chemical species in the Modular
Earth Submodel System (MESSy)” by A. Kerkweg
et al.***

Anonymous Referee #1

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Kerkweg et al. acpd-2006-0094 describes the implementation of three new sub-models for simulating emissions of gases and aerosols in the Modular Earth Submodel System (MESSy). OFFLEM imports prescribed emission fields such as anthropogenic emissions from the EDGAR inventory, ONLEM provides a framework for calculating emission fields such as biogenic emissions during the model runtime using simulated parameters from other submodels and sometimes using additional exter-

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nal data, TNUDGE prescribes the tracer mixing ratios either at the ground surface or at the tropopause and above (useful especially if the emission is highly uncertain or if the tracer has a long photochemical lifetime). In addition, the supplementary tool EDGAR2NC is capable of converting the ASCII-format EDGAR database into the NetCDF format, which is required by OFFLEM. The whole package is available to the atmospheric modeling community and comes with a detailed user manual as an electronic supplement.

This paper is a well-written summary of the emission implementation useful not only for the users of the submodels but also for general readers. I think that the paper should be published in ACP with minor modification. I suggest that the authors should also address the following points.

1) Emission of sea-salt aerosols

The particle size of sea-salt aerosols changes with relative humidity via deliquescence. Therefore the authors should state whether or not Eqs. (7)-(10) are formulated for dry sea-salt mass flux and size. If that is not the case, applicable relative humidity should be stated along with equation(s) correcting the effect of relative humidity. Or, this issue does not matter at all for the aerosol model M7 for which the present ONLEM submodel is providing the sea-salt aerosol emissions?

2) Stratospheric tracer mixing ratios for TNUDGE

TNUDGE is capable of simulating the tracer fluxes across the tropopause by specifying the tracer mixing ratios at and above the tropopause. I wonder if the stratospheric mixing ratios for ozone etc. as a function of latitude, height, and season, are already pre-compiled by the authors and ready to use for TNUDGE. If that is the case, the authors should state which species are pre-compiled and available to users.

3) DMS emission from the ocean

Regarding the DMS seawater concentration climatology and the piston velocity formu-

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lation for calculating the sea-to-air DMS flux, I think that some users might want other choices than Kettle and Andreae (2000) and Liss and Merlivat (1986), respectively (e.g., Chin et al., 1998; Boucher et al., 2003). The authors may leave the implementation of those alternative choices to the users, but the built-in "TYPE" label may need to be more specific such as "DMS_lm1986_ka2000" for users' convenience.

[References]

Boucher, O., C. Moulin, S. Belviso, O. Aumont, L. Bopp, E. Cosme, R. von Kuhlmann, M. G. Lawrence, M. Pham, M. S. Reddy, J. Sciare, and C. Venkataraman, DMS atmospheric concentrations and sulphate aerosol indirect radiative forcing: a sensitivity study to the DMS source representation and oxidation, *Atmos. Chem. Phys.*, 3, 49-65, 2003.

Chin, M., R. B. Rood, D. J. Allen, M. O. Andreae, A. M. Thompson, S.-J. Lin, R. M. Atlas, J. V. Ardizzone, Processes controlling dimethylsulfide over the ocean: Case studies using a 3-D model driven by assimilated meteorological fields, *J. Geophys. Res.*, 103(D7), 8341-8354, 1998.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 6, 5485, 2006.

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