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Geoscientific Model Development Discussions

Interactive comment on "HEMCO v1.0: A versatile, ESMF-compliant component for calculating emissions in atmospheric models" *by* C. A. Keller et al.

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Response to Reviewer 1

We thank reviewer 1 for the comments. The manuscript has been revised as suggested:

- One of the capabilities of HEMCO listed is the option to regrid. This can be rather confusing. I don't see how HEMCO is able to regrid emissions data that are in different projections. Countries often have their own projection system and

this is not necessary lon-lat. If that is correct than the paper should explain that all conversion of other non-lon-lat projections need to be done in GIS outside of HEMCO as a necessary preparations step. Especially this step can be quite laborious and frustrating because nothing ever fits exactly.

More details on the regridding capabilities - both within an ESMF environment and when running HEMCO stand-alone - are now provided in sections 2.2. and 2.5.

- The compactness of the paper is appreciated but "2.6 Extensions for on-line scale factors" is too compact for my liking. Examples are named but not really given. I would like to see this a bit more elaborated. Just take one example like dust and then show how the parameterization is taken up in the extension, where do the climate data come from? what is needed if you apply this elsewhere? Does it reproduce what was presented in the original paper for this sources? Right now the figures (Fig.3) are pretty much black boxes called "emissions + dust" but how it got there is not really described. And in th case of dust - as what is it added; PM with size fractions? or TSP? Is the parameterization applicable everywhere or only in certain environments or climate conditions, is that restriction than build in? Or are these the kind of things a user should do him/herself? That would be perfectly understandable but it would good to have this pointed out then.

We updated section 2.6 and Figure 3 to provide more details on the HEMCO extensions as well as the exchangeability amongst different model environments. The dust size bins used by the dust extensions are now given in Table 1, as are the accumulation and coarse mode size of the sea salt aerosols.

- An issue when combining emission inventories is often different source sector

definitions - How is this handled? Are there conversion tables? or is it handled by simply summing everything for a pollutant - or does every gridcel keep the source sectors of its original inventory? Some explanation on this would be welcome. It is obvious that HEMCO cannot solve all such issues but it would be good to also make clear that some problems must be solved elsewhere.

HEMCO gives the user complete freedom in the definitions of the emission sectors (through the category attribute in the configuration file), i.e. it is the responsibility of the user to ensure that emission sectors from different inventories are added or overlaid in a meaningful manner. This is now addressed in more detail in section 2.1.

- A final remark is more of a philosophical nature. When many origin al sources are being combined, plotted on different girds, multiplied with new scale factors etc. what is the proper reference to the data? This is not a HEMCO problem but if the authors have a clear vison on this it might be worth spending a few lines on this.

This is an excellent question! In the GEOS-Chem community, this is typically addressed by referencing the original base inventory (e.g., EDGAR) as well as the journal article describing additional updates or modifications (e.g., scaling factors, regional masks). Since other authors may have a different philosophy, we leave this issue to the discretion of individual authors.

Interactive comment on Geosci. Model Dev. Discuss., 7, 1115, 2014.