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.

Anonymous Referee #1

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The paper describes a tool for modellers that may help them to "deal" with various emissions data sets either in an attempt to "paste" the best data for their study together or easily make various versions of the emission data set to do sensitivity and /or model inter-comparisons. As such it may well be a useful product that can save precious research time. This reviewer is not a modeller and with respect to such issues as scientific reproducibility, I simply rely on the fact that the entire Fortran code is available and thus suggests anyone can see it, test it, try it and modify it. However, this may be the too simple view of a non-modeller. It seems to me this is well worth publishing as it is well written and compact AND can be used by others but then they need to be able to find it - such a publication will help as well as providing the necessary reference to

what was being used. That is functional.

I do know more about emissions data and the problems dealing with different sets can bring. This raises a number of issues that are either not really discussed in the paper or possibly not made clear enough. At least to me. I would like to see that amended before the paper is being published. They appear below, not in order of importance.

- 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.

- 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. - 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.

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.

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