Geosci. Model Dev. Discuss.,
doi:10.5194/gmd-2016-139-SC2, 2016

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "AerChemMIP: Quantifying the effects of chemistry and aerosols in CMIP6" *by* William J. Collins et al.

M. Michou

martine.michou@meteo.fr

Received and published: 1 September 2016

1 More important remarks/questions

- p.14 para 5.1 The authors indicate that there are 'considerable synergies between AerChemMIP and RFMIP'. However the experiments to diagnose transient ERFs are diffently designed, eventhough authors note that "the impact of different approaches ...have been estimated to be small". Given the amount of work involved in managing these CMIP6 simulations, could not the protocol for these specific simulations under 'prescribed SST experiments' be the same?

  A similar comment applies to paragraph 5.2 : what is the justification for asking for two different protocols in AerChemMIP and DAMIP in some coupled model

Printer-friendly version

Discussion paper

experiments with regards to species fixed at PI levels or historically evolving?

- p.12 l.8 : the DynVarMIP project is mentioned here: simulations that are of interest to several MIPs are of special interest to the modelling community at large. The AerChemMIP paper should detail both the simulations and the diagnostics that are behind these simulations. I understand this is an additional burden to the authors of the article, but this would benefit to the entire community. If not done in the paper, then each individual modelling team will have this burden, which in the end will result in a much larger community burden. The same comment applies to other parts of the article when other MIPs are mentioned.

- Another issue in the data request is the vertical coordinate: in the excel files of the aerocom wiki page, it is mentioned that 3D data should be provided on model levels. In our case, our model has 91 model levels with about half of the model levels in the troposphere. What is the scientific justification to provide tropospheric aerosol information on stratospheric levels?

- in the article a distinction is made between models without and with interactive gas-phase chemistry. It would be clearer to distinguish between four types of models (1) without interactive chemistry (2) with interactive tropospheric chemistry only (3) with interactive stratospheric chemistry only (4) with both tropospheric and stratospheric chemistry.

  Our model includes interactive aerosols and stratospheric chemistry with the chemistry calculated down to the mid-troposphere (560hPa). So for us, so-called NTCF simulations and Aer simulations are the same. But we will rather name our simulations xxxNTCF that are Tier1 simulations. Thank you for any comment you may have on this choice.

- the names of the experiments in the paper and in the official data request web page

(https://www.earthsystemcog.org/projects/wip/CMIP6DataRequest) are not the same, and a few experiments appear in the paper and not in the data request web page or vice-versa.

In our case at CNRM, we have chosen to use the data request to build as automatically possible experiment designs (names, list of variables, ...). In the case here, what are the official experiments IDs? We need this information in the coming couple of weeks as for a number of constraints our CMIP6 simulations will start on 1 November.

- a comment similar to the previous one concerns the diagnostics: p.11 l.30: it is mentioned that the diagnostics are assembled in two excel files (https://wiki.met.no/aerocom/aerchemmip/diagnostics), and that the definite request will be found in the CMIP6 Data request web page. At this stage there is no obvious link between the two lists. For instance in the CMIP6 Data request web page the data are not presented in 6 sheets as specified in the article p11 l35. A second example, is that there does not seem to be any request for 2D zonal monthly mean data in the CMIP6 Data request web page while there is the excel files of wiki.met.no.

  We can hope that the CMIP6 Data request web page will coincide at some point with the wiki excel files but when will that be?

  In the mean time, I would suggest to add as an appendix to the paper the final list of variables with all their characteristics (CMOR names, units, method of calculation if required, etc...) to which the CMIP6 data request will comply. Some MIP papers do not include this list, but others such as the OMIP or the C4MIP papers do, and in the end the entire community, both the one that puts together the MIP simulations, and then the one that will analyse the simulation outputs will benefit from that.

- what is the recommendation for the aerdaily data: average from 6hourly data, or

instantaneous data once per day, or?

- p.12 l.19: please detail here which specific CMIP6 variables will come out of this additional call to the radiation call. Please indicate the name, and the method of calculation (equation xx from Ghan 2012 for instance) if appropriate. Such details are presented in other CMIP6 MIP description papers, such as the OMIP paper, and in the end it ensures common grounds for these variables which were not part of CMIP5. Such details should appear at least for all non CMIP5 variables.
- For the forcing, how are such fields as the swtoaasaer (that appears in the CMIP6 Data request) generated in the course of the simulation? The same question applies to diagnostics such as the swtoaasdust.
- For the CMIP5 variables, there could/should be some coordination between AerChemMIP and other MIPs such as DAMIP or RFMIP to ensure that variables are not requested twice under two different names. For instance, ozone is requested as the tro3 and as the o3 CMOR variable, and it is not clear what the justification is for providing the same variable under different names.
- p.9 l.31: Could you explain why AerChemMIP future simulations should end in 2055 ? I admit it would have an additional cost to continue them until 2100, but it could be considered at least for a few simulations.
- p.13 l.6: 'Speciated AOT diagnostics are suggested': I could repeat here my previous comment. Thank you for listing diagnostics explicitly, describing how to obtain these diagnostics (additional calls to the radiative code, specific simulations...)
- p.13 l.19: same comment with regards to "with additional radiation calls": thank you for listing diagnostics explicitly

- p.13 l.23: same comment as above with regards to “Fluxes for this repeated call have to be stored separately” : what are the names of fluxes?
- p.13 p.24: please list explicitly the aerosol-oriented ERF experiments
- p.14 para4.6 : again here, it would be very useful to have a clear list of the diagnostics concerned.

2 Additional remarks/questions

- abstract l.32: please indicate that a number of additional simulations, and not only specific diagnostics, are part of AerChemMIP
- p.2 l.16: please indicate a reference for the ERF here
- p.3 l.10: the contributions listed appear rather different from the ones in the abstract. Why is it so?
- p.3 l.21: “Finally, additional...” : the sentence does not appear to be logical with the rest of the paragraph. A reformulation would certainly facilitate the reading.
- p.3 l.36: "the model setups for CMIP5 and ACCMIP tended to be different". Could you give more details on these differences ?
- p.6 l.18: I may be wrong, but I have not seen in this paper any simulation with an increase of 10%. Please include here simulation names for the sake of clarity.
- p.6 l.24: As far as volcanic SO2 emissions are concerned, is there any work on these emissions considered in AerChemMIP ? Or at least any dataset provided ?

- p.8 l.41: could you precise if there is any specific spin-up period for the simulations beginning in 1950 ?
- p.10 para 3.2.2: the experiment concerning CH4 should be mentioned in this subsection, as it appears in Table 4
- p.11 l.20: the article indicates that “the data request is structured according to overarching analysis subjects”: please indicate that these categories are presented later in the paper.
- p.11 l.36: as of today, there is no reference to the 6 sheets listed in the article in the CMIP6 Data request web page.
- p.12 l.6 : in which document can we find these tables? The tables in the CMIP6 Data request web page are different (Amon, AmonAdj, Lmon, OMon, aerannual, aerdaily, aerfixed, aerhourly, aermonthly, cfDay, cfMon, cfSites, day)
- It seems to me that almost all specific AerChemMIP variables are given in Priority 1. Is there any possibility to share out these variables between the three priorities ? Or at least in terms of temporal frequency or number of vertical levels ?
- in tables 5 and 6, it is said “using pre-industrial climatological average SSTs”: what is the time length recommended for the average?

M. Michou and P. Nabat

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-139, 2016.

Printer-friendly version

Discussion paper