Geosci. Model Dev. Discuss.,
doi:10.5194/gmd-2016-69-SC3, 2016

Geoscientific Model Development Discussions

Interactive comment on "Overview of the Global Monsoons Model Inter-comparison Project (GMMIP)" *by* Tianjun Zhou et al.

A. Cherchi

annalisa.cherchi@ingv.it

Received and published: 24 May 2016

The manuscript deals with the description of the GMMIP experiments in the framework of the next CMIP6 effort. The Introduction is a nice overview of the main issues of monsoon variability and simulation, including still unsolved shortcoming in monsoon modelling that should benefit from the experiments and the comparison proposed. Overall the manuscript is well structured, however I have few general comments and some technical corrections as listed below.

General comments:

1 - Why the term "global monsoons" is plural? The global monsoon represents the global hydrological cycle and it is very important/interesting to have metrics to consider it as a single phenomenon. Nevertheless it is composed by the regional monsoons. I

think it is important to stress on the manuscript the need to have both, as this would help merging the contribution from the different communities dedicated to the regional monsoons (actually this is done in some parts, I would check it to be consistent in the whole manuscript)

2 - In the Introduction the issue of the recent observed decrease in precipitation over India and the tendency of the coupled models to have increased precipitation when the atmospheric CO2 increases should be discussed (i.e. issues of thermodynamical versus dynamical changes in precipitation as discussed in Cherchi et al., 2011 and in Endo and Kitoh, 2014 for the different monsoon regions) - see references: Cherchi et al. (2011) Clim Dyn 37 83-101 doi:10.1007/s00382-010-0801-7; Endo and Kitoh (2014) GRL 41 1704-1710 doi:10.1002/2013GL059158.

3 - Table 1: a useful information that should be added in this table and that should be mentioned in paragraphs 4.2 4.3 4.4 and 4.5 is the models involved in GMMIP that will be also involved in the other respective MIPs. This would help to know how many models (i.e. how large will be the sample) could be included in the comparison

4 - You should specify if you have specific requirements for the variables (and respective time-frequency) that should be saved as output from the GMMIP experiments (they should be listed in the manuscript)

5 - You should specify what specific criterion should be used for the TIP-NSH experiment (tier-3) to cut off the sensible heating from the selected regions

Some technical corrections:

Page 1, line 20: change "during" with "in"

Page 1, line 23: remove the comma after the word "DECK"

Page 1, line 27: I would use "benefit monsoons prediction .." instead of "benefit monsoon prediction .."

Page 2, lines 15-18: I think that in the Introduction the issue of internal feedback should be separated from that of external driven processes, and discussed in more detail

Page 6, sections 3.2 and 3.3: what are the initial conditions for these experiments? how long are these experiments? I would suggest including these information also in the text not only in the table

Page 6, line 15: I would insert "coupled" between "historical" and "climate"

Page 6, lines 23-24: I think it is better to consider the tier-3 as a perturbation of the Tier-1 rather to the DECK (it is the same, it is just a matter of flow of the description)

Page 7, line 5: what do you mean by "standard CMIP6 horizontal and vertical resolutions"

Page 7, section 4.1: the chain of comparisons between different experiments is a bit confusing. Consider rewriting the paragraph. More for the comparison of Tier-2 experiments with pre-industrial and historical simulations, please consider that in the former (tier-2 experiments) you have prescribed SST in selected regions but you have also the contribution of anthropogenic GHG and aerosols

Page 7, lines 28-29: not clear, please rewrite. Why high resolution in the mid-latitudes?

Page 7-8, section 4.3: It should be mentioned in the manuscript that in HighResMIP the SST used to build the AMIP experiments will be used as daily mean, differently from the other AMIP protocol. This should be considered also for the kind of comparison that would result. Also in HighResMIP the aerosols would be sort of prescribed (mandatory use of MPI simple plume module for anthropogenic aerosols). This should also be mentioned and discussed in terms of possible comparisons with GMMIP experiments

Page 8, lines 24-26: this could also be a hard comparison because of the specificity of the HighResMIP experiments as mentioned in the comment just above. You should mention what kind of specific metrics/analysis could be used/you have in mind for this comparison?

Page 9, line 7: "ACGM" should be "AGCM"

Page 9, lines 7-9: both 20CR and ERA20C are global atmospheric reanalyses that assimilate only the surface pressure (and the SST are prescribed)

Page 9, line 7-8: you should include references for 20CR and ERA20C

Page 9, line 15: "global monsoon" instead of "global monsoons"

Page 11: "Data availability" should be an appendix, I guess (see also general comment above for specific requirements on variables and related time frequency)

Page 11, line 25: insert "coupled" between "historical" and "simulation"

Interactive comment on Geosci. Model Dev. Discuss., doi:10.5194/gmd-2016-69, 2016.