

Interactive comment on “The Radiative Forcing Model Intercomparison Project (RFMIP): Experimental Protocol for CMIP6” by Robert Pincus et al.

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The CMIP Panel is undertaking a review of the CMIP6 GMD special issue papers to ensure a level of consistency among the invited contributions, also in answering the key questions that were outlined in our request to submit a paper to all co-chairs of CMIP6-Endorsed MIPs. We very much welcome the important contribution from the RFMIP to CMIP6, and below are a few comments:

General comments:

1. The relationship to AerChemMIP is mentioned in passing a couple of times (e.g. P. 7, line 12; P. 9, line 24), but perhaps a bit more can be said of the connections between

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RFMIP and AerChemMIP. For example, will both use the same method for computing radiative forcing? Will there be coordination regarding aerosols?

2. There is the impression in the community that it is too difficult to compute radiative forcing because the traditional definition was for net radiation at top of troposphere with stratospheric adjustment. In RFMIP it is mentioned more than once (e.g. P. 1, line 19; P. 5, line 11; P. 5, line 31) that ERF is now simply the net radiative imbalance at the top of atmosphere (unless we're misinterpreting something). If this is a correct impression, this indeed makes computing ERF much easier, and it may be worth noting this as a significant new aspect of comparing radiative forcing among models. If this is an incorrect impression, it would be worth clarification.

Specific comments:

1. Please update “Eyring, 2015” to “Eyring, 2016” (e.g. p. 2, line 8; p. 4, line 23; p. 9, line 23; p. 11, line 12): Eyring, V., Bony, S., Meehl, G. A., Senior, C. A., Stevens, B., Stouffer, R. J., and Taylor, K. E.: Overview of the Coupled Model Intercomparison Project Phase 6 (CMIP6) experimental design and organization, Geosci. Model Dev., 9, 1937-1958, doi:10.5194/gmd-9-1937-2016, 2016.
2. P. 9, line 27: Readers may be a bit confused by the aerosol protocols. Do the tier 1 aerosol-only experiments allow both prognostic and concentration-driven formulations that may exist in the various models? Understandably the desire for use of a common aerosol concentration data set (MACv2-SP) is spelled out, but what if groups use prognostic aerosols and want to run aerosol-only experiments? Do they not then participate in RFMIP?
3. P. 11, line 2: The warming hole has been shown to have subsided after about 2000, with evidence given to support the idea of remotely-forced atmospheric circulation-driven processes being mostly responsible (Meehl, G.A., J.M. Arblaster, and C.T.Y. Chung, 2015: Disappearance of the southeast U.S. “warming hole” with the late-1990s transition of the Interdecadal Pacific Oscillation. Geophys. Res. Lett., 42, 5564-5570,

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doi:10.1002/2015GL064586.). This could be mentioned to contrast to possible aerosol-driven processes.

4. P. 11, line 4: Another recent paper that could be mentioned here is Smith et al (2016, Role of volcanic and anthropogenic aerosols in the recent global surface warming slowdown. *Nature Clim. Change*, doi:10.1038/NCLIMATE3058) who attempt to provide evidence that the IPO in the Pacific is aerosol-forced (the Pacific analog to Booth et al for the Atlantic).

5. Table 1: the experiment “RFMIP-ERF-LU” has “present-day greenhouse gases” in the description column, but shouldn’t it be “present-day land use”?

With many thanks for your ongoing efforts in the CMIP6 process.

The CMIP Panel

Interactive comment on *Geosci. Model Dev. Discuss.*, doi:10.5194/gmd-2016-88, 2016.