

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

**Robert Pincus et al.**

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Dear Dr. Michou -

Thank you for providing these helpful comments.

## **More important comments**

*it would be of benefit to the entire RFMIP/CMIP6 community to have an explicit, complete list of variables to provide for RFMIP in this RFMIP description paper. This list should be further divided into Tier 1 and other tier variables if need be.*

The full description of the requested data fields is intimately tied up with the formal

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CMIP data request. We hesitate to provide so much detail when the information is available elsewhere, in a form we can update as needed. It also seems imprudent to allow for conflicting requests in the manuscript and the database. We looked at some of the other manuscripts in this special collection and adopted similar language, namely:

“We provide brief summaries of requested output but the definitive and detailed specification is documented in the CMIP6 data request available at <https://earthsystemcog.org/projects/wip/CMIP6DataRequest>.”

We also amplified the data request for the ERF integrations:

“The main diagnostics are the top of atmosphere energy budget terms required to estimate ERF. Diagnostics of atmospheric state, including temperature, water vapor, cloud and aerosol information, are requested to allow for detailed diagnosis of rapid adjustments. A few daily variables related to temperature and precipitation are requested in conjunction with DAMIP to help distinguish direct effects of external forcing and air-sea interaction effects on historical changes in extreme indices (e.g., extreme precipitation).”

*as already mentioned by J. Quaas, and to emphasize further on the first above comment, do RFMIP require on-line diagnostics of the components of the forcing? and if yes, what are the recommendations for these diagnostics?*

We have clarified that on-line diagnostics are not part of the protocol but may be provided:

“We are also interested in comparing IRP and cloud adjustments estimated from the kernel method with those that have been explicitly calculated in models that employ the triple radiation call approach of Ghan (2013) to diagnose instantaneous forcings and cloud adjustments. As this method is time-consuming and not implemented by all models we do not include this request as part of the protocol but models implementing triple radiation calls are encouraged to contact us. ”

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*it is somehow disturbing to have a detailed description of simulations under 4.1, while this is not the case for the other two aspects/questions of RFMIP.*

As part of other revisions we expanded the description of the IRF calculations in section 3, after which we read the manuscript with this point in mind. Our sense is that this imbalance reflects the different levels of maturity of the ERF calculations described in section 2 and the specified-aerosol simulations in section 4. At this stage it seems important to express the latter in detail but needlessly long to add information to the former (indeed, there's already quite a lot of motivating detail about the use of fixed-SST runs and the use of climatology).

We are open to further input if this point seems especially important.

### **Other comments**

*p9 : l 23 : There is no reference to MACv2-SP in the Eyring et al, 2015 GMD paper*

We have changed the reference to the MACv2-SP description to the now-available Stevens et al., 2016.

We have omitted the ERF simulations for aerosols.

We have clarified in section 2 that the treatment of vegetation is to follow each model's normal use, i.e.

“Land-surface models including interactive vegetation, if available, should be applied as in normal integrations.”

We have harmonized the experiment titles and experiment\_ids to be self-consistent. Aerosols and ozone are prescribed together and denoted AerO3. Experiments seeking to diagnose radiative forcing have titles beginning “RFMIP-ERF” and experiment\_ids denoting the protocol (“piClim”). We have also been careful to use the same descriptions throughout the manuscript.

Thanks again for your careful review.

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

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