

## ***Interactive comment on “Pan-spectral observing system simulation experiments of shortwave reflectance and longwave radiance for climate model evaluation” by D. R. Feldman and W. D. Collins***

**D. R. Feldman**

drfeldman@lbl.gov

Received and published: 25 July 2014

Below are short responses to the reviewer's comments:

1. The issue that the reviewer raises of simulations based on monthly mean values is extremely well-taken, because the integration of the equation of radiative transfer is generally non-linear. There are several challenges here, however: (1) the fields necessary in the CMIP5 archive to perform competent radiative transfer are archived at monthly resolution and (2) As the reviewer rightly notes, it is extremely computation-

C1236

ally expensive to calculate. Currently, the OSSE radiometric validation performed with CCSM3 was based on offline calculations to the CAM radiation code and to MODTRAN. Validation against online radiation calculations has not been performed. In order to address the reviewer's comment, limited numbers of CFMIP calculations may be necessary to ensure that the radiometric validation against online results are not biased. This may satisfy the reviewer's suggestion to perform instantaneous radiation calculation comparisons.

2. The simulation configuration is generally flexible, allowing for different, and even arbitrary, cloud-overlap approximations based on a subroutine that performs sub-column generation and uses multiple calls to MODTRAN based on the results of this generator to great a grid-box averaged spectrum. With respect to cloud optics, it is straightforward to implement different cloud optics and the gray approximation can easily be relaxed, though the exercise in model excavation necessary to determine the cloud optics parameterizations for each model may be non-trivial. The reviewer's point regarding benchmark computation times can certainly be included in a revised manuscript.

3. The presence and meaning of dipole features in the SW+LW response would resolve broadband signal degeneracy and would be very scientifically interesting to explore in a revised manuscript.

---

Interactive comment on Geosci. Model Dev. Discuss., 7, 3647, 2014.

C1237