**Atmospheric
Chemistry
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Discussions**

Interactive comment on "The shortwave radiative forcing bias of liquid and ice clouds from MODIS observations" *by* L. Oreopoulos et al.

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Received and published: 3 August 2009

We would like to thank the referee for his/her comments. They are identified below by "**" that precedes them.

**In section 2, page 10342, line 7, you mention coefficients for each "SW infrared and near infrared spectral regions". I'm missing something here. What is meant by SW infrared? There seems to be an error here somewhere or I have missed something.

By "infrared radiation" we commonly refer to radiation beyond red wavelengths, i.e., greater than 0.7 μm. We clearly refer here to the so-called "solar infrared" (the term we now use), i.e., the wavelength range $\sim$ 0.7-5. μm (see the AMS glossary). Although, the division of solar infrared depends on the application, we commonly refer

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to "Shortwave Infrared" or SWIR as the portion of the solar spectrum between $\sim$1.4 and 3 μm, while "Near Infrared" or NIR refers to solar radiation between $\sim$0.7 and 1.4 μm (see also MWIR which stands for "mid-wave infrared" refers to solar wavelength $\sim$3-5μm). Not directly related to our use in the paper, but the same terminology is frequently used to identify the region of the spectrum for MODIS bands, for example band 2 (0.841-0.876 μm) is considered a NIR band, band 7 (2.105-2.155 μm) a SWIR band and band 20 (3.660-3.840 μm) a MWIR band.

**In the second to last paragraph in section 3.1, you comment that the ice cloud delta-SWCRF is more spatially variable that that of liquid clouds and there is a slight but distinct tendency of greater dispersion for the vernal and autumnal months compared to the winter and summer months. Well – I see the spatial variability part – but I do not see what you mean by greater dispersion. Are you referring to the range of values exhibited by the three types of averaging?

The reviewer is justifiably confused because we didn't define "dispersion". It is simply the ratio of global mean to standard deviation for which we provide values. So greater dispersion means greater spatial variability. We have now fixed this.

**In section 3.3, I found the discussion of the various statistical options (CF/no FO etc) to be somewhat confusing. For example, I believe, but am not certain that the default choice for the paper was "no CF/FO". It may not seem that this has to be explicitly stated (the default choice is described but not named) but it would help given the various permutations. It might also help to have a table with a concise description of each to go along with Figure 3.

We have modified the text to clarify this. Since we are not talking about different flavors of SWCRF bias before this section we thought that our default calculation (the one that already appeared in the prior sections) was obvious, i.e., CF/FO, the only one that did not need to be defined anew in section 3.3. The other reason we thought it was clear what the default calculation is the fact that the CF/FO (white) bars in Fig. 3

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reproduce the white bars in Fig. 1, something we actually mention in p. 10348, where we wrote "The white bars correspond to the same overpass values shown in Fig. 1". Nevertheless, we don't minding stating this now even more explicitly to eliminate any chance of confusion.

**Section 3.5. You state in the first paragraph that liquid cloud biases are either near zero or are of opposite sign (January and October). In Figure 7, I see the opposite sign for January – but not for October.

The black bars in Fig. 7 (default "CF/FO" calculations) corresponding to January liquid and October liquid indicate values of opposite sign.

**Section 3.5 again. In the second paragraph, you describe the comparison of Terra and Aqua in Figure 8. The authors note that the two distributions are nearly identical for low biases. Is this because these represent relatively homogeneous clouds with little diurnal cycle?

Well, the distribution of biases track each other for more than just low biases (up to about 20 Wm-2). But Figure 7 suggests that there may be more than diurnal in-omogeneity in play, with cloud fraction and frequency of occurrence changes between morning and afternoon acting to reduce/cancel out the effect of inhomogeneity alone.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 10337, 2009.