CERES SSF Aqua Edition3A Incorrect ADM Usage over Polar Regions

The CERES Aqua Editon3A SSF were inadvertently processed using the CERES Terra Ed3 Shortwave Polar ADM set. This has resulted in differences between the fluxes retrieved by the Edition3A Aqua dataset compared to the fluxes retrieved if the Aqua Ed2 Shortwave Polar ADM dataset was applied to the Aqua Edition3A data. The effect of this was investigated using six months (Jan, Feb, Jun, Jul, Aug, Dec) of data from 2007. With the exception of December, the mean all sky difference (F_{ed3_adm}-F_{ed2_adm}) is between -0.14Wm^{-2} and 0.22Wm^{-2}. The mean clear sky difference ranges from 0.55Wm^{-2} to -0.73Wm^{-2}. For December the mean all sky difference is 1.94Wm-2 and the mean clear sky difference is 3.88Wm^{-2}. This is mainly due to large differences over permanent snow scenes at lower solar zenith angles (between 44° and 50°). There are also notable differences (of up to 35Wm^{-2}) for the thick overcast scenes over permanent snow for solar zenith angles between 74° and 84°. Large differences are seen for all fresh snow scene type flux retrievals, where the mean difference can vary between -75Wm^{-2} to 35Wm^{-2} depending on the solar zenith angle and the ADM used for the inversion. The sea ice ADMs showed differences between the Ed3 and Ed2 flux retrievals of between ±0.2Wm^{-2}, however most of the differences for sea ice ADM types were between ±0.1Wm^{-2}. Additionally to these differences, there are cases in which the Ed3 ADMs were unable to retrieve a flux, yet the Ed2 ADMs were. These situations occurred mainly for the highest solar zenith angle bin (86°-88°) and are likely to be the result of differences in the sampling at these solar zenith angles between CERES Terra and CERES Aqua when the ADMs were created.

Figures 1-6: Regional all sky and clear sky flux differences for each month between retrieved fluxes from Aqua Ed3A SSF data using Ed3 Terra SW Polar ADMs and Ed2 Aqua SW Polar ADMs. Difference is defined as F_{ed3_adm}-F_{ed2_adm}.

Figures 7-12: Flux differences by solar zenith angle bin and ADM type for each month between retrieved fluxes from Aqua Ed3A SSF data using Ed3 Terra SW Polar ADMs and Ed2 Aqua SW Polar ADMs. Difference is defined as F_{ed3_adm}-F_{ed2_adm}. Add 200 to ADM type to get the actual ADM type (see CERES/Terra Shortwave ADM Types for definitions) and solar zenith angle bins are in increments of 2°.

Figures 1-6: Regional all sky and clear sky flux differences

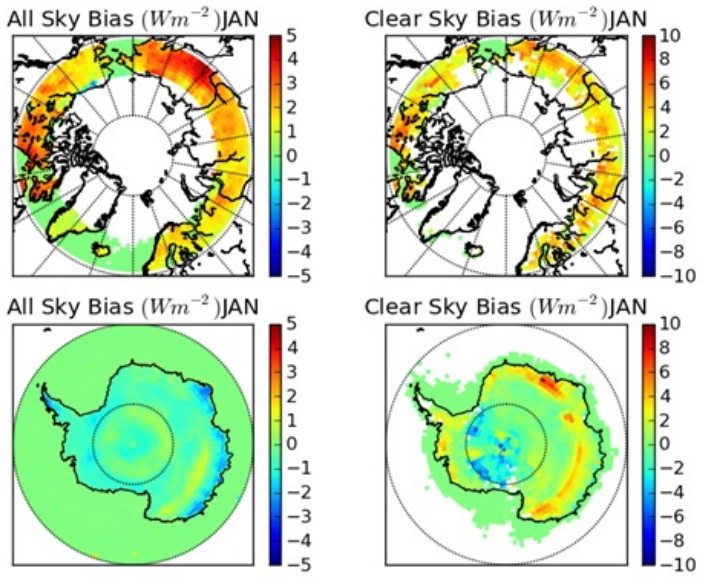

Figure 1 - January 2007

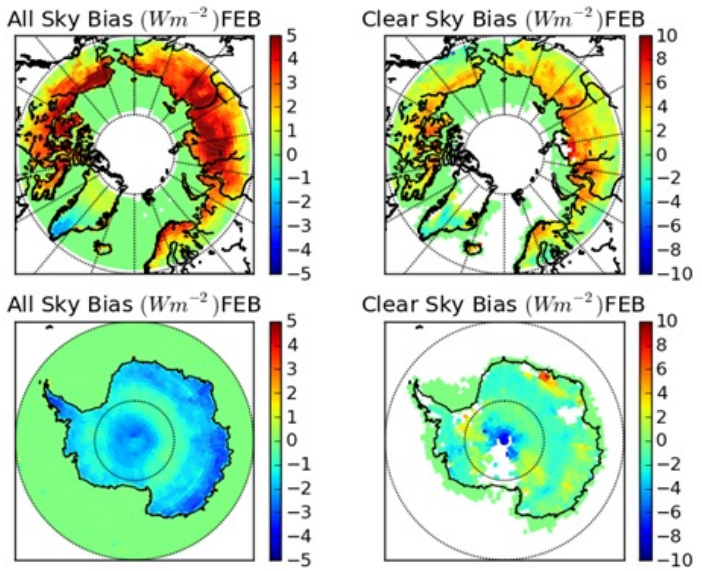

Figure 2 - February 2007

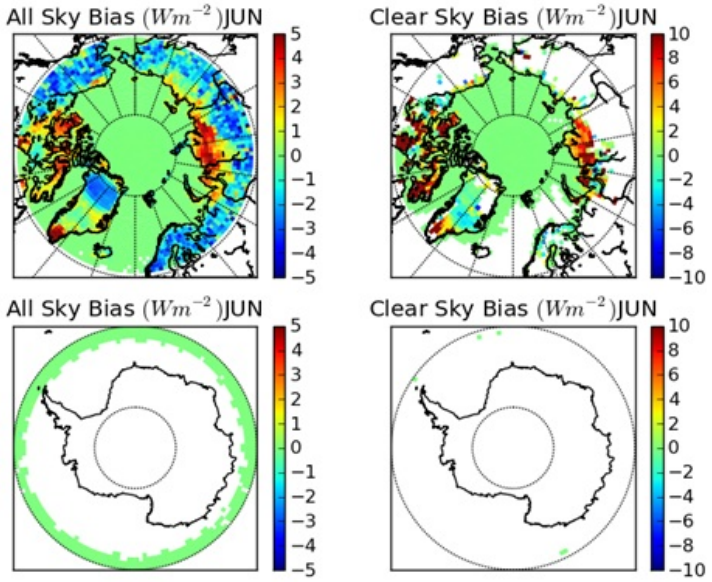

Figure 3 - June 2007

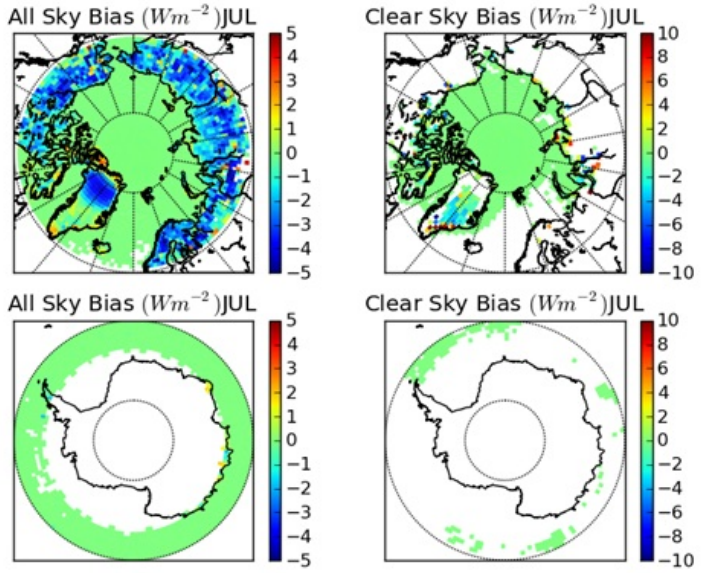

Figure 4 - July 2007

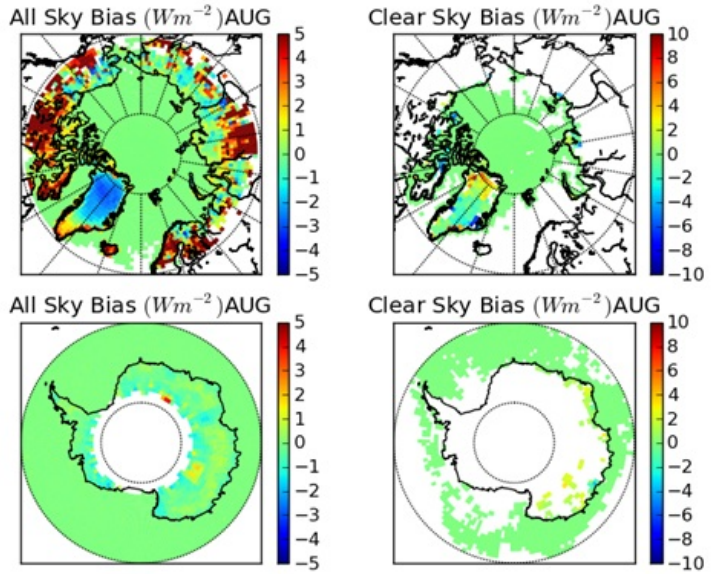

Figure 5 - August 2007

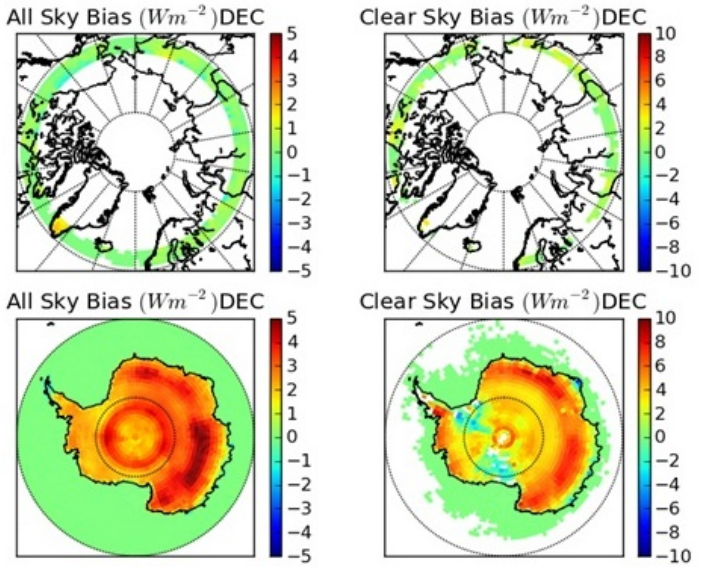

Figure 6 - December 2007

Figures 7-12: Flux differences by solar zenith angle bin and ADM type

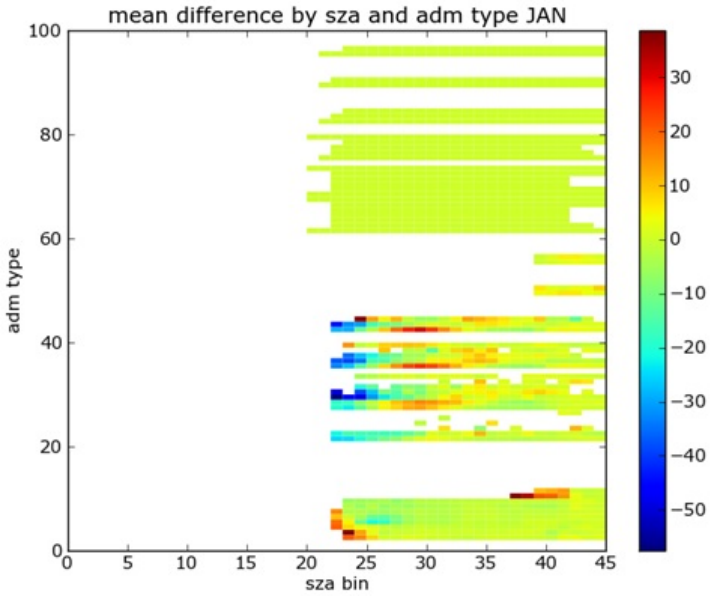

Figure 7 - January 2007

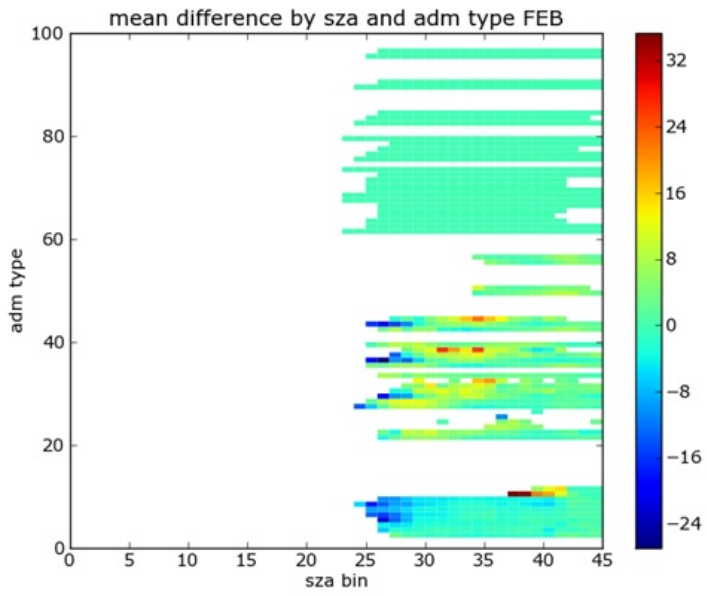

Figure 8 - February 2007

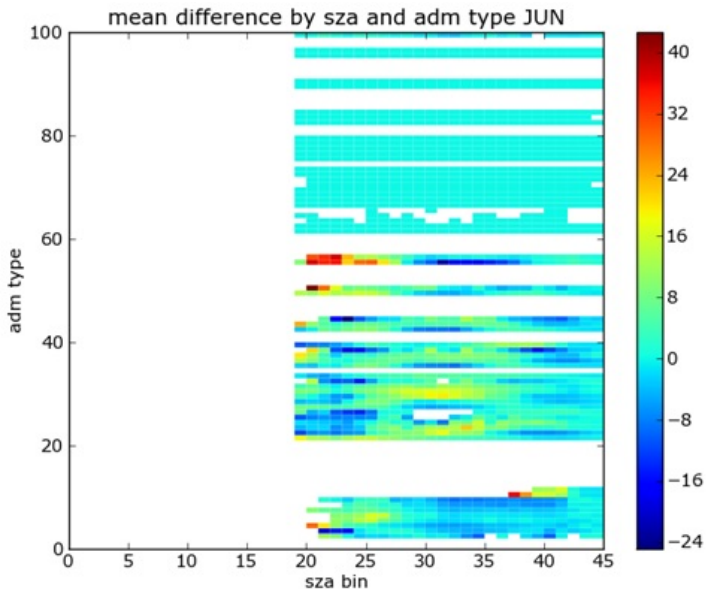

Figure 9 - June 2007

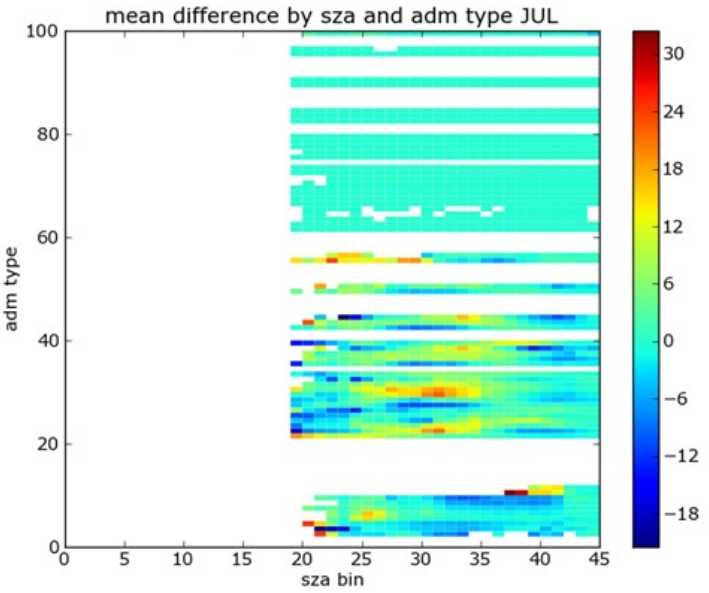

Figure 10 - July 2007

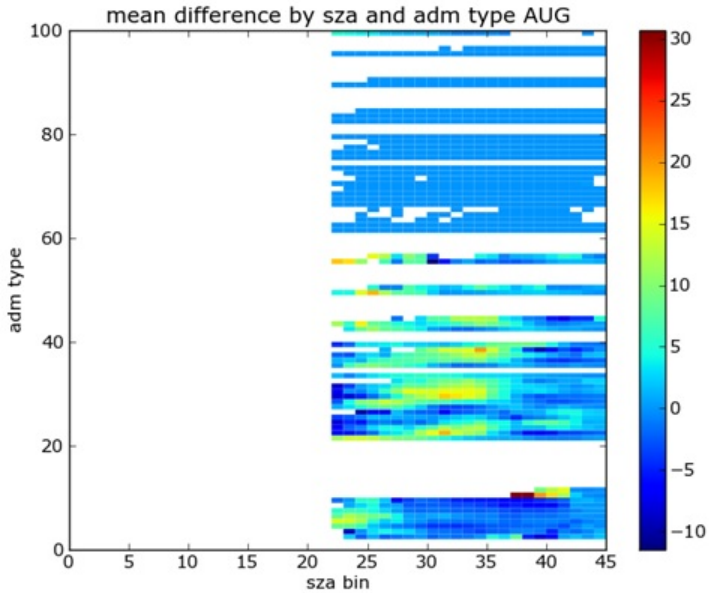

Figure 11 - August 2007

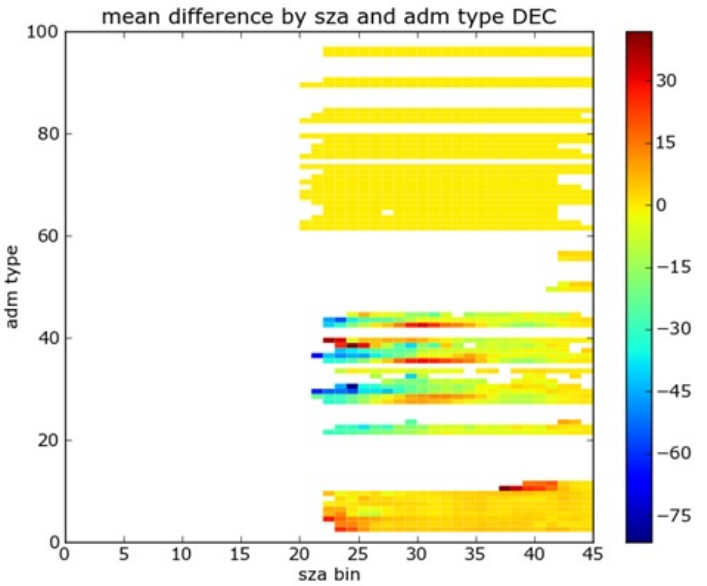

Figure 12 - December 2007