Histograms for instruments supported by RTTOV MFASIS

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So far RTTOV MFASIS supports 9 channels on 3 different instruments. Different channels pose different challenges and the fit between MFASIS and DOM varies significantly between different channels. To obtain a rough idea what kind of performance one may expect for the respective channels, I have gathered some "MFASIS-DOM" statistics taken from about 32000 FOV's. These correspond to one scene with the DWD ICON model and the DEFF scheme ($clw = 2$). The Dom data were computed with 16 streams as it was used for producing the MFASIS look up tables.

If MFASIS finds any issues it adds a nonzero value to the RTTOV quality flag. Below, some of the statistics (red and blue curves) are restricted to cases where the quality flag is zero. As MFASIS has large relative errors for very weak clouds, it was decided to plot also statistics for scenes where reflectances smaller than 0.2 (as computed with the DOM scheme) were excluded (green and blue curves).

To illustrate different aspects of the distributions, all histograms are plotted twice with different scaling of the y-axis (top linear, bottom logarithmic). Figs. 1, 2 and 3 show statistics on relative differences, i.e., the reflectance difference "MFASIS-DOM" was scaled by the the reflectance mean "(MFASIS+DOM)/2". Figs. 4, 5 and 6 are for the coresponding unscaled difference "MFASIS-DOM".

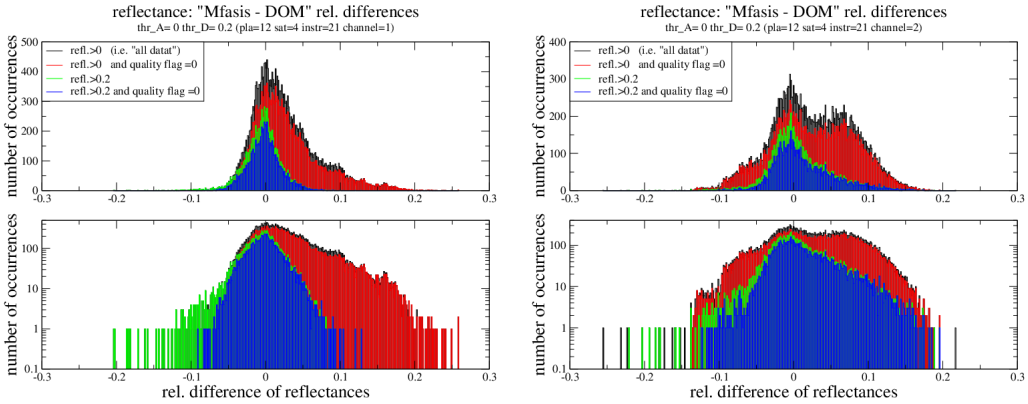

Figure 1: SEVIRI channels 1and 2 (relative differences)

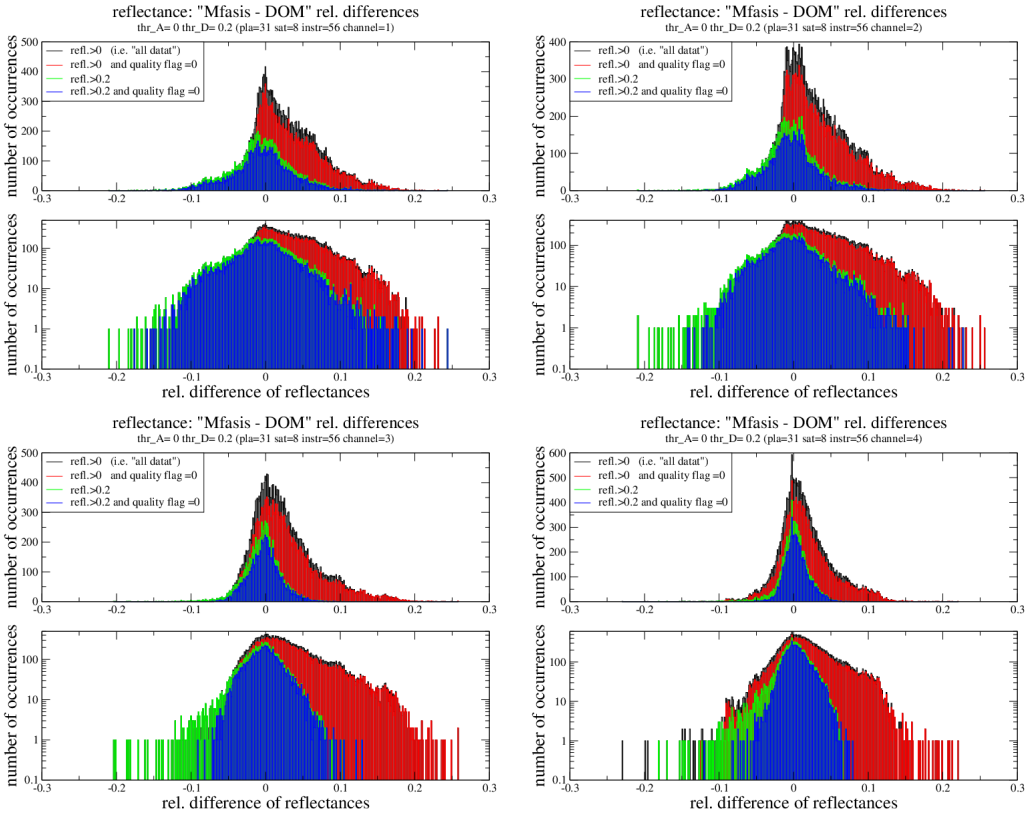

Figure 2: HIMAWARI AHI channels 1-4 (1: 0.47μm, 2: 0.51μm, 3: 0.64μm, 4:0.86μm) (relative differences)

1

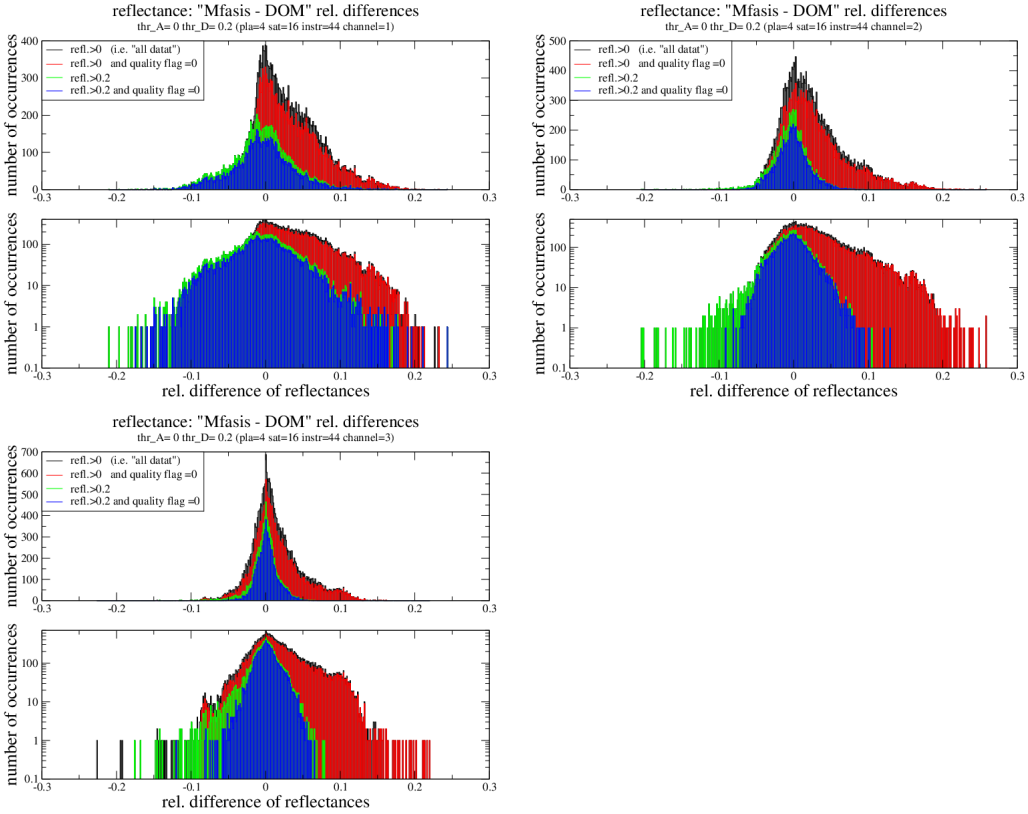

Figure 3: GOES ABI channels 1-3(1: 0.47μm, 2: 0.64μm, 3:0.86μm) (relative differences)

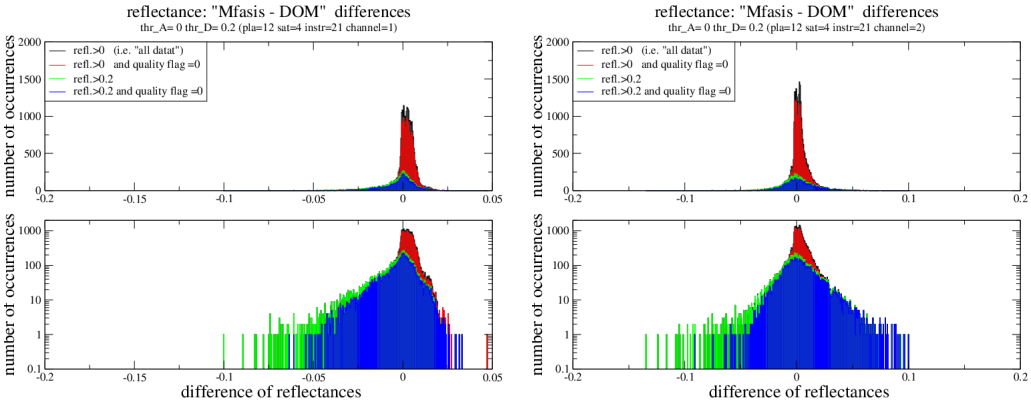

Figure 4: SEVIRI channels 1and 2

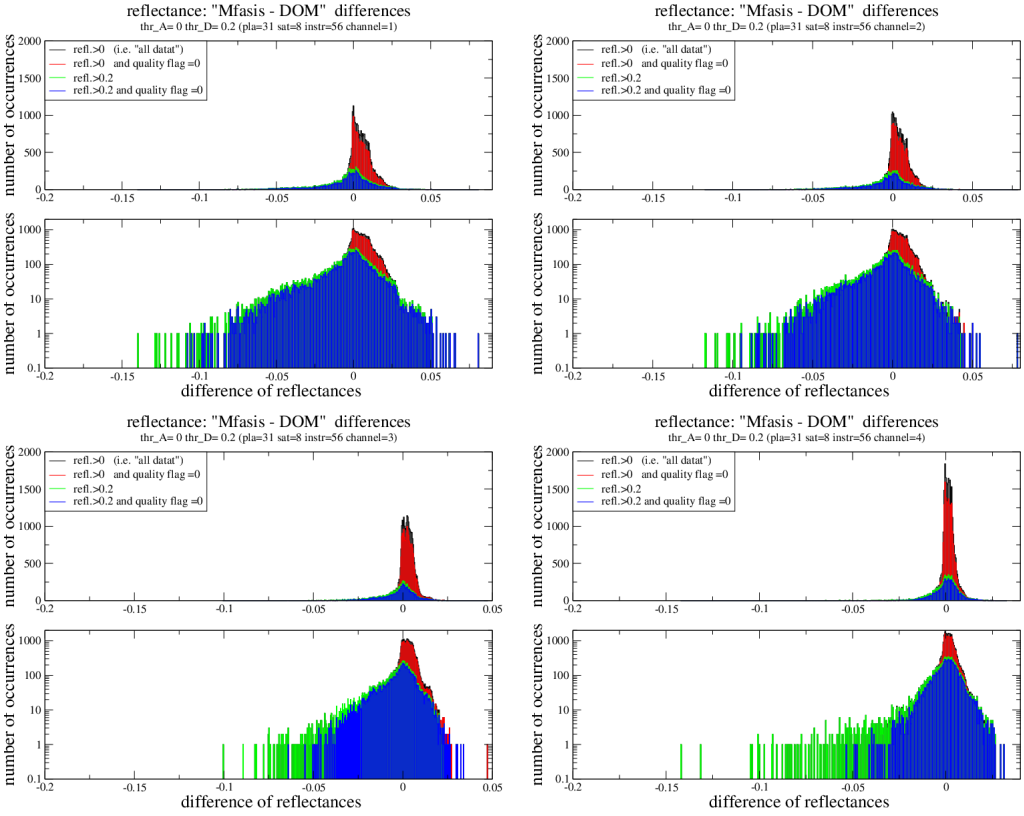

Figure 5: HIMAWARI AHI channels 1-4 (1: 0.47μm, 2: 0.51μm, 3: 0.64μm, 4:0.86μm)

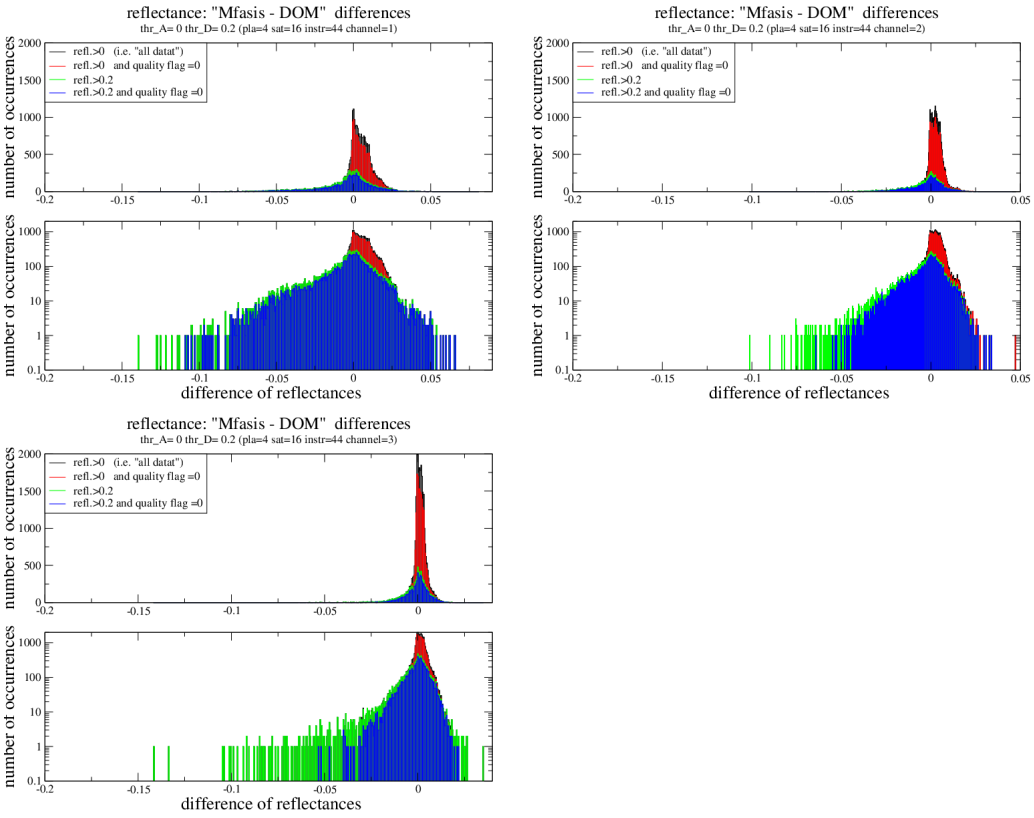

Figure 6: GOES ABI channels 1-3(1: 0.47μm, 2: 0.64μm, 3:0.86μm)