A preliminary comparison between these retrievals finds significant systematic differences for single layer thin ice clouds (visible optical depth < 3) as presented in figure 1. Explanations for these differences are many, ranging from algorithm implementation to differences resulting from the physical assumption built into the MODIS and CALIOP optical thickness (OT) retrieval methods. A factor of two difference in cirrus OT has a significant impact on the characterization of the net cloud forcing for both the solar and IR, especially at low optical thickness (OT<1). To investigate the MODIS we developed an IR retrieval cirrus optical depth retrieval using the MODIS IR channels (8.5 – 11 um) channels. The advantage of the IR is that it has limited sensitivity to scattering and as a result is insensitive to the single scatter properties used in the MODIS visible retrievals. The IR retrieval was processed on a limited subset of the month of August 2006 and collocated with CALIOP (Nagle; Holz 2009) with results presented in figure 1 and 2. The comparison of the MODIS OP retrievals to the IR is presented in figure 1. Based on this comparison we find that the MODIS retrievals are biased high, but with bias smaller then when compared to the CALIOP retrievals (Figure 2a). This result suggests that the MODIS single scatter properties are not representative of the true characteristics of cirrus. Research is on going in determining more appropriate properties that will provide better radiative consistency with the IR retrievals and CALIOP.

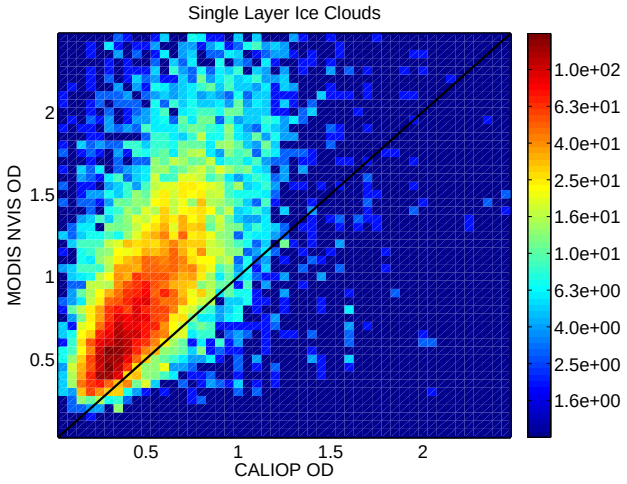

Figure 1 presents a comparison between the MODIS optical property retrieval with the IR retrieved cirrus optical depth.

For CALIOP, we find that there is a discontinuity between the constrained and unconstrained retrievals as presented in figure 2. The unconstrained retrievals, which compose most of the daytime cirrus optical depths has a systematic bias relative to the IR as presented in Figure 2a. This bias has the opposite sign relative to MODIS (Figure 1). For the constrained retrievals (Figure 2b) the CALIOP OD is in relatively good agreement with the IR. This result suggests that

CALIOP is correctly accounting fro multiple scatter scattering but for retrievals that require an assumed lidar ratio CALIOP is using a ratio that is too large.

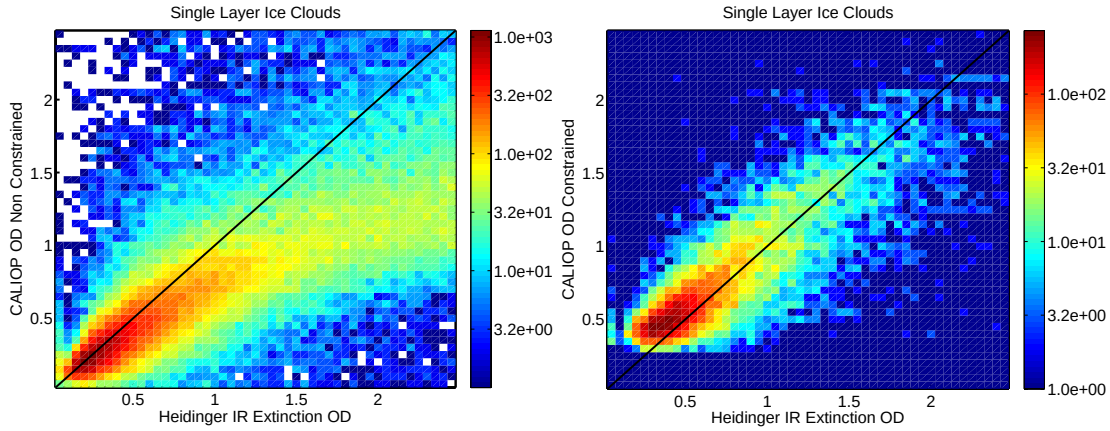

Figure 2 presents the unconstrained (left) CALIOP retrieval compared to the IR and the constrained (right) retrieval compared to the IR.