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Interactive comment on "Marine boundary layer cloud property retrievals from high–resolution ASTER observations: Case studies and comparison with Terra–MODIS" *by* Frank Werner et al.

Anonymous Referee #1

Received and published: 29 August 2016

'Marine boundary layer cloud property retrievals from high-resolution ASTER observations: case studies and comparison with Terra-MODIS', F. Werner, G. Wind, Z. Zhang, S. Platnick, L. Di Girolamo, G. Zhao, N. Amarasinghe, and K. Meyer, submitted to AMT

This manuscript describes a long overdue attempt at cloud optical thickness (COT) and effective radius (CER) retrievals from the ASTER instrument using a MODIS-like look-up table approach. Some adjustments have to be made because of spectral response function differences but overall the approach is very similar. As ASTER and MODIS are located onboard EOS-Terra that makes pixel-level comparisons (as done in this paper)

Discussion paper

straightforward with new insights gleaned on resolution-dependent issues between the two instruments.

This is an excellent paper that is very straightforward in its presentation and messaging with two primary purposes: to describe the retrieval, and compare the ASTER results to MODIS Collection 6 retrievals. A couple of case studies are presented in detail with images shown and details of the scene described at length, then 48 scenes are shown for statistical comparisons between ASTER and MODIS. In my opinion, there is little to improve upon in this paper and I only have a few minor revisions to suggest and comments to make below.

What about the land challenge? Can this approach be extended to land retrievals without much development? Are there plans to do so, and if not, why not?

p. 3 around lines 65-75: there is at least one other attempt at an ASTER cloud mask that could be considered for citation (if deemed relevant): Hulley, G. C., and S. J. Hook (2008), A new methodology for cloud detection and classification with ASTER data, Geophys. Res. Lett., 35, L16812, doi:10.1029/2008GL034644.

Lines 101-102: do the authors think that the backward-viewing direction has some potential to improve upon the ASTER COT and CER retrievals? If so, what geophysical field(s) would this benefit the most?

Section 3.2.1 cloud top properties: First, it wasn't fully clear how the ASTER pixel level data was averaged up to the MODIS resolution. Second, are all ASTER retrievals done at the ASTER resolution then averaged to the MODIS resolution for comparison, or are the reflectances/radiances averaged then the retrieval is performed? It appears that the former was the case for most, if not all, of the paper but it should be made clearer or in a few places if made already. Third, are retrievals compared if ASTER is partly cloudy within a cloud-identified MODIS pixel?

Line 413: constrained

Lines 580-587: how do the ASTER uncertainties fall within the MODIS uncertainties? Does this work yield further insight on the character of MODIS COT and CER pixel-level uncertainty estimates?

Lines 753-756: it is somewhat unclear in the way currently described how the ASTER uncertainties are obtained. Maybe a graphic, table, or improved discussion will help clarify.

Figure 3: the authors may want to consider labeling flag=0,1,2,3 also as the four categories of clear/cloudy and how they map to the MODIS cloud mask. Labeling as flag=0,1,2,3 makes the figure less useful because you have to page to the discussion to figure it out.

Figure 9: are MODIS pixels really perfect squares? How does the spatial weighting of the reflectance as seen by the instrument look like within the pixel? Same point about ASTER. Any references of previous work discussing current state of knowledge of pixel-level characteristics would benefit the methodology of the paper.

Figure 11: Impossible to see 'partial' in the upper row. May consider shrinking y-axis scale or presenting data in a different manner if seeing gray points is a key take-away from this figure.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-265, 2016.