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Comment

## ***Interactive comment on “Science impact of MODIS C5 calibration degradation and C6+ improvements” by A. Lyapustin et al.***

**Anonymous Referee #1**

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General Comments: Based on MODIS level 3 data and MAIAC analysis, this paper presented that (1) due to on-orbit degradation, the MODIS on Terra showed systematic calibration trends, which can be seen from the C5 MODIS Terra datasets in the visible and near-infrared bands; (2) a majority of the C5 calibration trends are removed with the MODIS C6 calibration; (3) some residual errors are resulted from the change of polarization sensitivity of the sensor and the polarization correction approach is introduced to remove them; and (4) a MAIAC-based de-trending and cross-calibration method is developed to account for the residual Terra-Aqua bias, which leads to the C6+ dataset that brings the trends in Terra and Aqua MODIS together (almost indistinguishable) and shows promises in future science analysis. The logic flow of the article is clear and the analysis is very much needed by the community. I recommend publi-

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cation of the paper after some minor revisions. Specific comments are listed below.

Specific Comments: 1) Page 7286 and Figure 1-middle: why does the AOD from Terra have a consistent positive bias compared to Aqua? If the retrieval algorithms for Terra and Aqua are the same, since the Terra TOA reflectance has a downward calibration trend, shouldn't the Terra AOD be biased low? 2) Page 7288: regarding the MCST C6 calibration, it appears to me that using moon view and Earth view ratio (Moon/EV) as the normalization coefficient would only make the trends in Earth view and Moon view consistent with each other. It isn't clear to me how this procedure can also remove a large portion of the calibration trend (Figure 5). More explanation would be helpful. 3) Page 7293, first sentence from the top: does the author mean to say "... , while it almost removes the entire trend ..."? 4) Page 7294 (regarding Figure 10): "blue color shows C6 Aqua data", please make the description and the figure match. 5) Section 5: from the context, the justification for the MAIAC-based de-trending procedure is that trends existed in the selected desert sites are non-physical, but is this true? Additional justification would be helpful.

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 7281, 2014.

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