

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

### **Anonymous Referee #2**

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#### General Comments:

The paper “Science impact of MODIS C5 calibration degradation and C6+ improvements” by Lyapustin et al. (2014) performed careful assessment of the impact of MODIS C5 calibration degradation as well as C6 and C6+ calibration improvement on some atmospheric and terrestrial products from the perspective of long-term trend. It is indeed that detection of a sensor calibration trend and its distinction from physical variations is very challenging and the authors’ effort in the paper deserves applaud and the results will benefit the user community greatly. The study performed in this paper is generally thorough and the results are mostly convincing. I only have some minor comments below and hope they can be addressed in a recommended minor revision.

Comment 1: The de-trending coefficients derived in section 5.2 are averaged from the results of 4 selected desert sites. Then, RnTOA from one of the four sites (Libya4) is used to check the improvement using the new coefficients as shown in Fig. 11. The improvement is achieved indeed in the Libya4 site which is used as one of the 4 sites deriving the coefficients (in other word, the check is not completely independent). Actually, a more convincing and independent check is to applying the new coefficients to an independent desert site not involved in the derivation of the new coefficients to see the improvement, such as one of the three desert sites excluded from the derivation of coefficients mentioned in the paper.

Comment 2: The BRFn over desert was first used to develop de-trending calibration coefficients, which turns out to be ineffective due to some residual trends. Thus, RnTOA was identified as a more proper variable to develop the de-trending coefficients as mentioned/demonstrated in the paper, which deserves a mention in the abstract.

Comment 3: It is nice to use the BRFn of Georgia tile to demonstrate the improvement of C6+ calibration developed from RnTOA. I believe more elaboration and discussion are needed to generalize this Georgia tile case to global application.

Comment 4 (page 7288, line 3): I am not sure this 0.01 (~1.5%) NDVI decreasing trend is due to calibration degradation as the 27% AOD and 17% COT decreasing do. One way to check it is using NDVI at TOA without doing atmospheric correction (AC). I suspect this small 1.5% signal is due to the error from AC but I may be wrong.

Comment 5 (page 7289, line 8): replace “right” in “The right plot. . .” with “bottom” since the two plots are arranged in vertical not in horizontal direction.

Comment 6 (Fig.9): The plot is somewhat too busy to see the difference. How about also plot the difference between Aqua\_C6 with Terra\_C6 and Terra\_C6\_PC?

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

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