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Discussions

Interactive comment on "Evaluation of cloud effects on air temperature estimation using MODIS LST based on ground measurements over the Tibetan Plateau" *by* Hongbo Zhang et al.

Anonymous Referee #1

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This paper discusses the important effects of clouds on the relationship between air temperature and satellite LST. It gives a comprehensive analysis on how clouds affect the Tmax-Daytime LST and Tmin-Nighttime LST relations particularly for the LST data from MODIS, based on both AWS and CMA station data. The effects of undetected clouds on MODIS LST accuracies are first explored, and MODIS nighttime LST are found to receive much more negative effects than daytime. Then, the real Tmax-Daytime LST and Tmin-Nighttime LST relations are analyzed using observed LST, and clouds are found to have a much larger influence on Tmax estimation than Tmin. Further, MODIS LST and observed LST are used as proxies for estimating Tair respectively, and the results are compared. The authors conclude that for Tmin estimation,

large errors introduced by undetected clouds are key factors, while for Tmax, clouds strongly affect the relationship between Tmax and daytime LST. This study also discusses the clearly larger errors of Tmax than Tmin estimations and the heterogeneity of daytime LST is considered to be the main factor.

I think the authors have generally done good job of explaining their research and on the whole I found the paper reasonably straightforward to read. This paper is certainly worth of publication as it presents new and very useful information to researchers interested in estimating air temperatures from satellite data. However, there are few minor revisions that are required, as detailed below:

The abstract can be more concise. Some sentences should be condensed.

The order of references cited in the context appears to be a little mess, e.g. Line 53-55, Line 107-108, Line 177 . . . and many other lines. The authors should check and correct all of them.

In section 3.1: The way that "Ld is assumed to linearly increase from clear to overcast 185 conditions at a given temperature" may need a reference.

For section 3.3 "Tair estimation": The discussion about selection of linear regression as estimating method should be intensified.

Figure 3 and Figure 4: sub-plots should be plotted with the same scale.

Figure 5: When x > 0.4, the variation of Tmax estimating accuracy is very flat, especially for Xiao Dongkemadi. I think this should be discussed, possibly due to the sample amounts?