

## ***Interactive comment on “Retrieval of daytime total columnar water vapour from MODIS measurements over land surfaces” by H. Diedrich et al.***

### **Anonymous Referee #3**

Received and published: 3 October 2014

This paper presents results of a modified water vapour retrieval algorithm originally developed for MERIS and applied to MODIS with some modifications. The paper is appropriate for AMT and presents some indications of uncertainties or errors in the MODIS radiance measurements which are important to document. The first review is very detailed and I agree with all of the comments made. I add a few more comments below that should be addressed before publication.

#### General comments

I missed a description of the assumed aerosol vertical distribution and type. Pertur-

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bations are discussed in Sect. 3.3, but there appears to be missing a description of the assumptions before this. Aerosol scale height is mentioned in several places, so the assumptions about the exact vertical distribution (assumed shape) should be discussed.

On p. 7769, it is stated that all outliers are removed. Approximately what fractional percent of the data does this represent? To what do you attribute these outliers? Might they not be correct measurements or do you have a reason to suspect these as poor quality?

On p. 7770 it is mentioned that only cases with 100% valid MODIS pixels were considered. What happens to the comparison with a less stringent test. How many data are excluded with this check?

Section 5: It is not necessary to repeat the statistics shown in the figures in the text unless there is a subsequent discussion of these statistics and reason to repeat this information.

The figures should be reordered in the number in which they are discussed.

As mentioned in the previous review, the figures need some work. A color scale for the frequency of occurrence plots is not optional. Since AMT is an online journal, there is no excuse not to use color and in fact other figures are in color. Most of the scatter plots have a lot of white space and the scale could be cut off at 50 mm for example. Are all of the bins actually shown here down to the smallest one? Typically there is a lot more scatter when comparing water vapour measurements from different sources (see Wang et al., 2014 for example).

The points on Figure 5 are difficult to see.

As suggested by the other reviewer, color maps are desirable for validation (evaluation), particularly comparing the standard MODIS product or the MERIS product (during overlap) to this one (both plots of the actual field and difference maps). The same

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goes for comparisons with other data sets, particularly the GNSS that has decent coverage. A map of the biases provides more information than a frequency of occurrence plots and may show for example a pattern of bias such as latitudinal that would be important. Scatterplots do not convey such information and are therefore limited.

#### Technical comments

There are a lot of technical issues with the manuscript. I expect most will be caught in the light copy editing. Here are just a few examples.

pg. 7757, L. 15: Change sensible to sensitive, L. 18, change is to are., L. 20 change this to these., enables to enable., L. 23 change sufficient to sufficiently pg. 7759, L. 3, remove comma. L. 12, change at to from. pg. 7765, L. 17, change is to are. pg. 7767, L. 24, suggest to replace 'change a lot' with 'vary substantially'

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 7753, 2014.