Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2015-1008-RC2, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Diurnal variation of tropospheric relative humidity in tropical region" *by* Isaac Moradi et al.

Anonymous Referee #2

Received and published: 25 February 2016

Comments on

"Diurnal variation of tropospheric relative humidity in tropical region" by Isaac Moradi et al.

Anonymous Referee #2

General comments: The paper addresses an interesting topic, it attempts to analyse the diurnal cycle of humidity in tropical regions in a more coherent manner with a multi-channel microwave instrument in a drifting orbit. I agree with the authors that there is still scope for better analyses of the diurnal cycle of tropospheric humidity, and the mesurements used in this paper provide a good basis for such an analysis. As the authors state in their abstract: results showed a large inhomogeneity in diurnal variation of tropospheric relative humidity in tropical region. This is not new. However

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Discussion paper

the authors have not built their analysis on earlier work, as they should do. My second major concern is that the analysis is too descriptive with little attempts to explain the observations in terms of meteorology/physics. Therefore I find the way the analysis is done not acceptable and cannot recommend the paper for final publication. In fact it is rather a reject with an inivitation for a new paper.

Let me develop the reasons for my assessment: - The authors state: Despite the importance of water vapor especially in the tropical region, the diurnal variations of water vapor have not been investigated in the past due to the lack of observations. - This not true. - Let me give you a few examples of papers that analyse the diurnal cycle of upper tropospheric moisture, the first one goes back more than 20 years. And their were even earlier papers in proceedings such as the TOVS conference.

1. Influence of tropical cloud systems on the relative humidity in the upper troposphere, Petra M. Udelhofen,âĂİDennis L. Hartmann, JGR 1995 !!!, DOI: 10.1029/94JD02826

2. Diurnal variation of upper tropospheric humidity and its relations to convective activities over tropical Africa, E. S. Chung, B.J. Sohn, J. Schmetz and M. Koenig, Atmos. Chem. Phys. Discuss., 7, 351–381, 2007

3. Diurnal variation of outgoing longwave radiation associated with high cloud and UTH changes from Meteosat-5 measurements, Eui-Seok Chung , Byung-Ju Sohn, Johannes Schmetz, Meteorology and Atmospheric Physics, October 2009, Volume 105, Issue 3, pp 109-119

4. Chung, E.-S., B. J. Soden, B. J. Sohn, and J. Schmetz (2013a), An assessment of the diurnal variation of upper tropospheric humidity in reanalysis data sets, J. Geophys. Res. Atmos., 118, 3425-3430, doi:10.1002/jgrd.50345.

- Interestingly the authors make use of the reference Chung et al., 2007, yet without comparing their own work rigorously with the results of Chung et al. - The paper as it stands, presents results without referring to relevant earlier work on the very topic.

- The fact the earlier work mostly used IR data is no âĂŽshow stopper' for a rigorous comparison. In fact the diurnal cycle of relative humidity measured with microwave instruments in cloudy regions should be fully in phase with the diurnal cycle of clouds, which in turn can be well observed with IR instruments. So in cloudy regions the microwave observations do not provide much new information on the phase of the diurnal cycle of relative humidity. - The diurnal variability of moisture in clear areas can also be observed with IR instruments, as the authors say. And it can well be compared with results in the current paper. This will be interesting because the diurnal cycle of clear sky moisture is indeed quite variable, as the authors observe.

I summary I cannot recommend publication of the paper in its present form. The main reason is the neglect of earlier work. I am surprised about this neglect given how easy it is today to find relevant papers. And, I am sorry, I also have to recall that this should not happen in a serious scientific analysis.

The data are a good source for an analysis and I recommend that the paper gets completely rewrittten in the light of relevant results from other papers. Please note that it is not sufficient to just work the references I provide above into the paper. There is more relevant work in scientific literature. This means my recommendation is a 'reject in its present form' and a request for a major rewriting.

Another strong suggestion is to interpret the results for the diurnal cycles in different regions in terms of meteorology/physical processes.

I am willing to review a substantially revised paper again. Then I will also provide more detailed comments.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2015-1008, 2016.