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Interactive comment on “Comparison of satellite limb-sounding humidity climatologies of the uppermost tropical troposphere” by M. Ekström et al.

Anonymous Referee #1

Received and published: 19 October 2007

The paper compares different data sets of humidity climatologies for the tropical troposphere. Data stem from three microwave limb sounders, from an infrared spectrometer and from in situ measurements. The humidity products that span the time period from approx. 1991 - 2006 are mainly for two altitude layers at 12 and 15 km. Comparison of the data is based on the determination of probability density functions and on seasonally averaged horizontal fields. The paper addresses the different data sets with a particular weight on how cloud effects are taken into account and also differences in vertical and horizontal resolution. An analysis of the geographical distribution reveals that humidity at 12 km is located over regions with strong convection and at 15 km altitude the humidity field is more controlled by zonal mixing than local convection. The

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authors conclude that the Aura-MLS data set is the most complete view on the UTH available today.

By far the largest part of the paper is devoted to the description of the data sets and the statistical analysis and inter comparisons and thus makes it relatively unattractive to read. Of course it has to be recognized that detailed analysis of this kind are needed and important but they are unthankful. Nevertheless important findings regarding geophysical research should be pointed out in more detail. In this case some more weight could have been put on the geographical distribution of humidity.

The section about the seasonal mean value comparison unfortunately is not written in a clear way. The title suggests that seasonal averages are somehow compared and one thus would expect some information about the seasonal behavior. This however is not the case. None of the four plots (Figure 9 to 12) that are given exhibit any information about the seasons (or may be the explanation is so sparse that the reader did not check the intention). Also the text is not clear indicating errors in RH_i. As an example it is stated that the relative accuracy of Odin is 0.3% of RH_i which result in an average of approx. 13%RH_i. It would be more helpful for the reader to have a table indicating the different errors for the different sensors. This section definitely should be restated in a more reader i.e. user friendly form.

some specific comments: - line 24, p. 12621: The main error source for Odin is a random calibration uncertainty. What is the origin of it? How big is the effect? Is there a link to line 12 on p. 12632 - line 26, p.12621: what is meant by other systematic uncertainties? - line 6, p.12622: it might be helpful to indicated the local resolution corresponding to an integration time of 1.85s - line 9, p. 12626: is the vertical resolution of MIPAS in case of clouds really less than 20km? - line 15, p.12633: Explain how and why the tropospheric lapse rate affects the Odin retrieval. Why is this not a problem for the other limb sounders?

typos: - line 22, p.12620: ...on fine vertical scales... - line 9, p. 12620: UARS-MLS has

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12617, 2007.

ACPD

7, S6162–S6164, 2007

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