

Interactive comment on “Evaluation of upper tropospheric humidity forecasts from ECMWF using AIRS and CALIPSO data” by N. Lamquin et al.

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The paper describes a worthwhile study utilising different observation sources to assess aspects of ice supersaturation in clear and cloudy situations in relation to the ECMWF forecast model. I have read the reviewers reports and generally support their comments, particularly regarding

- a more critical discussion of the data and the need for an improved explanation of AIRS data characteristics/uncertainties to put the results into context,
- a discussion of any impact of using different ice svp formulas

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- a clearer explanation of some of the results/figures in Sect 4.1
- a more representative summary of the conclusions in the abstract.

I would like to add a few minor comments to the discussion:

Figures: Discussion of the figures can be a bit confusing in places. It would be better to label the figures (a), (b) etc. and reference appropriately in the text for better clarity.

Fig.3: Why is the lower right hand figure (for april) so much noisier than the equivalent plot for october. It looks like a significantly smaller sample but the fraction of supersaturated grid boxes in the left hand plots are similar ?

p17910 L6: The horizontal spectral resolution of the ECMWF model for the period used in this paper is T799 (which corresponds to a resolution of ~25km), not T511.

p17910 L9: Unless I have misunderstood how the data is extracted, T213 corresponds to a resolution of ~94km and so it is this that is the effective resolution of the model data (even after being interpolated to a higher resolution 0.5x0.5 degree grid)

p17915 L10: Obvious when you know, but the acronym UTH is not actually defined anywhere. Suggest expanding it.

p17916 L28,29: The discussion of Figure 7 is confusing. Is "the IFS cloud cover distribution in Fig 7 has larger values than the AIRS effective cloud cover distribution" referring to the section between 60% and 110%, or is it referring to figure 6?

p17921 L6: Sect 2.4 should be Sect 2.3

p17921 L7 and figure 10: Could you be more explicit about the depth of layers used in the analysis of the radiosonde data, i.e. what is the resolution of the low res. layers and the high res. data ?

The s-function is also a characteristic of the relationship between "cloud fraction" and "total water divided by saturation", averaged over some defined scale (e.g. Wood and

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Field, 2000, JAS, fig 3.). This is analogous to the relationship seen here between "occurrence of supersaturation wrt ice" and "RHi" and is characteristic of an underlying humidity distribution. It is interesting to see it in the vertical for ice supersaturated regions.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17907, 2008.

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