Atmos. Chem. Phys. Discuss., 5, S1139–S1141, 2005
www.atmos-chem-phys.org/acpd/5/S1139/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of microwave satellite humidity data and radiosonde profiles: a survey of European stations" *by* V. O. John and S. A. Buehler

V. O. John and S. A. Buehler

Received and published: 11 June 2005

Response to the comments of the Reviewer
==========

We thank the reviewer for useful comments on the manuscript.

» This paper describes an interesting application of using the
» satellite radiances to validate the radiosonde measurements.
» This kind of study should be extended to global radiosonde
» datasets so that a wider range of different airmasses are

» sampled. If this was done then airmass dependent biases may
» be seen.

This aim of the present study was to apply the satellite-radiosonde humidity comparison methodology developed by Buehler et.al, 2004 to the European Radiosonde stations as a pilot study. We plan to do future studies in which the global radiosonde network will be included thus allowing the sampling of different air masses. The aim of the method is to find out differences between the two humidity measurements, with the least influence of the air masses sampled. A sentence is added in the conclusions to address this point.

» The AMSU-B instrument on NOAA-15 is subject to RFI
» which results in biases in the measured radiances.
» The authors do not explain how they corrected for this and
» I believe they should do as this may explain the reason for
» the 1K bias seen between the 2 satellites.

AMSU data we used in this study were obtained from the Comprehensive Large Array-data Stewardship System (CLASS) of the US National Oceanic and Atmospheric Administration (NOAA). This is the level 1b data which is not calibrated, but the calibration coefficients are stored in the files. Then the ATOVS and AVHHR processing package (AAPP) is used to calibrate (i.e., applying calibration coefficients to the instruments counts) and geo-locate the data. The radio frequency interference (RFI) related problems were identified and the corrections are already implemented in the l1b data set. We did not apply any calibrations or corrections of our own. A paragraph is added at the end of Section 2.1, discussing these points.

» It is a complex process removing the effects of RFI from
» AMSU-B on NOAA-15. The bias of 1K between satellites is not

ACPD
5, S1139–S1141, 2005

» seen in the global NWP monitoring statistics of UKMO
» (see http://www.metoffice.com/research/nwp/satellite/
» radiance/atovs/main.html for plots) which casts doubt on
» the AMSU-B calibration done for this study.

Please see the above paragraph. Also, we found that the differences between the satellites can be due to time dependent measurement errors in radiosonde data, for example, radiation error as pointed out by Holger Vömel in his comments. A detailed discussion of this issue is added to Section 4.2 of the manuscript.

» This study allows an estimate of the error in UTH from
» radiosonde data to be estimated. The authors should
» include this in the paper.

As described in the manuscript, the errors in UTH can be estimated from the errors in brightness temperature units using Equation (5) of the manuscript. An error of 1K corresponds to a relative error of 7% in UTH based on the equation. The advantage of this equation is that the mapping is linear. Therefore an error of 2K should be 14% error in UTH. As suggested by the reviewer, a couple of sentences were added in the conclusions and at the beginning of Section 4 to make the point clearer.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 1529, 2005.