

Interactive comment on “Evaluation of ECMWF ERA-40 temperature and wind in the lower tropical stratosphere since 1988 from past long-duration balloon measurements” by T. Christensen et al.

Anonymous Referee #1

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This paper presents a careful comparison of wind and temperature measurements from long-duration balloon observations in the tropical stratosphere with results from ERA40 reanalysis data. There are numerous balloon flights originating from three locations, with many thousands of measurements spanning 1988-2001. Overall the comparisons seem to be carefully handled, and I especially like the inclusion of Fig. 1, comparing temperature measurements from the two sensors on the balloons. The key points of the comparisons are that there are relatively small temperature biases in the ERA40 data (typically less than 1 K), but that these biases change slowly over time. These slowly changing temperature biases are consistent with previous analyses of ERA40 data. The wind comparisons show small biases of 5-10% for the zonal winds, and an

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underestimation of variance for the tropical meridional winds. The authors also include some statistics comparing observed and calculated trajectories, and these allow accurate estimates of uncertainties in the calculated results (which is very useful). Overall these results are novel and interesting, and the paper is well organized and clearly written. I don't have any substantial suggestions for improvement. One clarification: do the quoted standard deviations represent the population std. dev., or the std. dev. of the means? (in the latter case, you should divide by the square root of the number of observations). Because the quoted standard deviations are relatively large, I wonder if you have missed this factor (which would greatly increase the statistical significance of the bias estimates).

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 3423, 2007.

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