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**Addendum to**  
**A comparison of tropical temperature trends with model Predictions.**  
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We wish to expand on two points in our recent paper

**1. The ROABCORE data: choice of ver1.2**

Haimberger (2007) published a paper in which he discusses ver1.3 and the previous ver1.2 of the radiosonde data. He does not suggest a choice although he refers to ver1.2 as “best estimate.” He later introduces on his web page ver1.4. We used ver1.2 and neither ver1.3 nor ver1.4 in our paper for the satellite era (1979-2004). The reason is that ver1.3 and ver1.4 are much more strongly influenced by the first-guess of the ERA-40 reanalyses than ver1.2. (Haimberger’s methodology uses “radiosonde minus ERA-40 first-guess” differences to detect and correct for sonde inhomogeneities.) However, ERA-40 experienced a spurious upper tropospheric warming shift in 1991 likely due to inconsistencies in assimilating data from HIRS 11 and 12 satellite instruments -- which would affect the analysis for the 1979-2004 period, especially as this shift is near the center of the time period under consideration. This caused a warming shift mainly in the 300-100 hPa layer in the tropics and was associated with (1) a sudden upward shift in 700 hPa specific humidity, (2) a sudden increase in precipitation, (3) a sudden increase in upper-level divergence and thus (4) a sudden temperature shift. All of these are completely consistent with a spurious enhancement of the hydrologic cycle. Thus ver1.3 and ver1.4 have a strange and unphysical vertical trend structure with much warming above 300 hPa but much less below 300 hPa (actually producing negative trends for 1979-2004 in some levels of the zonal mean tropics). Even more unusual is the fact the near-surface air trend in the tropics over this period in ERA-40 is a minuscule +0.03 °C/decade (Karl *et al.* 2006) and so is at odds with actual surface observations indicating problems with the assimilation process. This inconsistent vertical structure as a whole is mirrored in the direct ERA-40 pressure level trends and has been known to be a problem as parts of this issue have been pointed out by Uppala *et al.* (2005), Trenberth and Smith (2006) and Onogi *et al.* (2007). Thus we have chosen ver1.2 as it is less influenced by the ERA-40 assimilation of the satellite radiances.

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## 2. Matching of trends of models and observations at the surface

We wish to expand on the importance of comparing “like” to “like”. Since our goal is to understand what models would project for upper air trends for 1979-2004, in order to perform a legitimate test we needed a robust estimate of what those projections are, given the critical condition that the model surface temperatures match the observations. That many models do not match the observations is clear. Some seem to have misunderstood this point. They put forth all model results, no matter what their surface trend is, to generate a huge spread of upper air trends that can be said to include the observations. Our experimental design specifically required model surface trends to match observed surface trends before the hypothesis test could proceed. That the model average surface trend was very close to the observed surface trend gave us the opportunity to test the hypothesis we set forth.

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