MSU/AMSU atmospheric temperature products
Changes from RSS Version 3.0 to RSS Version 3.2

Carl Mears, Remote Sensing Systems
July 2, 2008

I. Introduction and Brief Summary

In changing from Version 3.0 to Version 3.2 of our MSU/AMSU atmospheric temperature products, we made a number of small changes and improvements to our quality control and merging methods. The most important of these are informally described in this document. A paper describing the methods we use to construct the V3.2 products "Construction of climate-quality atmospheric temperature records from the MSU and AMSU microwave sounders", has been submitted for publication. A preprint version of this paper is available on this website. Both the paper and this document only discuss the simple, non-extrapolated products (TMT, TTS, and TLS). An update of the lower tropospheric temperature product (TLT), which is obtained by extrapolating MSU channel 2 and AMSU channel 5 measurements lower in the atmosphere, will be released in a few months.

We choose to call this new version V3.2 (skipping 3.1) for TMT, TTS, and TLS so that it will match the version number of the upcoming TLT release. V3.1 data already exist for TLT.

The most important changes:

- Target Factors and Scene Temperature Factors are determined entirely during the merging process using monthly gridded data . In V3.0, the target factors were determined offline using monthly global averages, and then applied to the monthly gridded data. The new methods streamline the data processing, and result in very small changes in long-term trends.
- A more comprehensive analysis of the intersatellite differences has been performed. As a result of this study, we have identified several satellite-months of data that appear to be inconsistent with measurements from other satellites during the same time period. These typically occur near the beginning or end of a satellites life. These data have been removed from processing.

II. Global-scale differences between V3.0 and V3.2

The processing changes resulted in small, insignificant changes in the long-term global trends. In Fig. 1, we plot global (82.5S to 82.5N) time series for both V3.2 and V3.0. The differences in long-term trend a few hundredths of a degree per decade, with the largest difference begin for the shorter TTS time series. The small "spikes" in the

difference time series occur when a month was removed from the V3.2 dataset, while seasonal scale fluctuations are causes by small changes in the target factors.
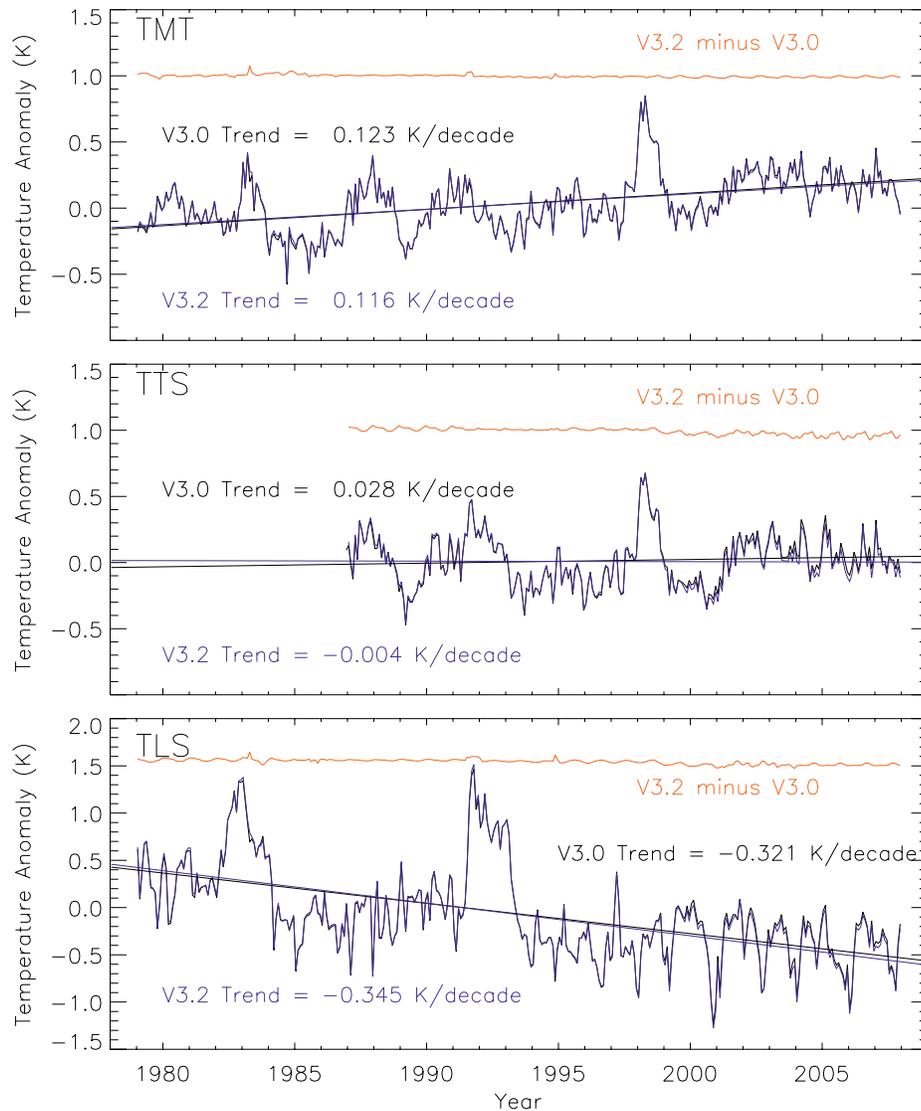

Fig. 1. Comparison between V3.0 and V3.2 of global-averaged (82.5S to 82.5N) time series. Each time series is shown for each channel, along with the difference time series. Trends are calculated for the 1979-2007 period.