Study of MSU Channel-3 Brightness Temperature Time Series Using SNO calibration method

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1. Introduction
- MSU observations have been extensively used to investigate the temperature trends of the atmosphere. This paper focuses on the channel 3 trend analyses.
- There are biases among different satellites. To merge the multi-satellite time series, different inter-satellite calibration algorithms are compared.
- MSU channel 3 trends are obtained with different algorithms.
- Based on Zou et al. (2005) and Goldberg (2004) research, MSU channel 2 and channel 3 trends are combined to minimize the influence of the stratosphere.

2. Calibration algorithms used in this study
- **Linear Calibration** \( R = R_0 + u(C - C_0) \)
- **SNO calibration** (see Zou et al. 2005)

3. Channel 3 SNO dataset (continued)

4. Apply SNO calibration on channel 3 observations

5. Bias comparison between linear and SNO calibration

6. Channel 3 trend comparison for different algorithms

7. Adjust channel 2 trend

8. Summary and Future work
- The inter-satellite biases are largely removed after using the SNO calibration and Goldberg calibration on MSU channel 3 observations.
- The biases resulting from the non-linear SNO calibration is 50% ~ 75% less than that of the linear calibration.
- Applying Goldberg’s calibration on pentad data after the original orbit data calibration results in a MSU channel 3 trend 0.08K/Decade.
- Using the above MSU channel 3 trend, Zou et al’s MSU channel 2 trend (0.1K/Decade) and Goldberg’s channel 2 and channel 3 combination algorithm, the MSU channel 2/3 trend is 0.2K/Decade.
- Future work will investigate the combination algorithm of trend analyses on MSU channels 2, 3, and 4. Compare Fu’s combine algorithm (channel 2 and channel 4) with that of Goldberg’s.


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