

N93-20068

Title: Global Temperature Variations

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Significant Accomplishments for the Past Year:

Lower stratospheric temperature anomalies from MSU channel 4 were compared to ten years of radiosonde data to validate the satellite record, and the results were submitted for publication. Various assumed stratospheric weighting profiles were tested to determine whether the theoretical channel 4 weighting function had significant errors. It was found that the real weighting function is slightly sharper than the theoretical weighting function. We also found evidence for a step-function cooling in the radiosonde record during 1982, a period when two satellites were operating with no evidence of changes in the satellites. Lower tropospheric bulk temperature datasets continue to be sent to climate researchers and modelers, as well as to the Climate Analysis Center (CAC). The CAC is also implementing our MSU software to be able to do the MSU processing at their site. Drift in MSU channel 3 is being quantified and corrected to allow it to be used together with channel 2 for a better lower-tropospheric gridpoint temperature product. A new global oceanic precipitation dataset has been produced from MSU channel 1 data, and compared to ten years of global rain gauge data. A manuscript has been submitted to J. Climate describing this work.

Focus of Current Research and Plans for Next Year:

Monthly updates of MSU data from NOAA will be processed at the end of each month and the derived datasets will be updated, along with satellite intercomparison statistics relating to noise and drift. Datasets are routinely accessed electronically by NCAR, GISS, CAC, and other climate research centers.

Publications:

- Spencer, R.W. and J.R. Christy, 1990: Precise monitoring of global temperature trends from satellites. *Science*, 247, 1558-1562.
- Spencer, R.W., J.R. Christy, and N.C. Grody, 1990: Global atmospheric temperature monitoring with satellite microwave measurements: Method and results, 1979-84. *J. Climate.*, 3, 1111-1128.
- Spencer, R.W., and J.R. Christy, 1991a: Precision and radiosonde validation of satellite gridpoint temperature anomalies, Part I: MSU channel 2. In press.

- Spencer, R.W., and J.R. Christy, 1991b: Precision and radiosonde validation of satellite gridpoint temperature anomalies, Part I: A tropospheric retrieval and trends during 1979-90. In press.
- Spencer, R.W., and J.R. Christy, 1992: Precision lower stratospheric temperature monitoring with the MSU: Technique, validation, and results 1979-1991. Submitted to J. Climate.
- Spencer, R.W., 1992: Global temperatures, satellite measures. Encyclopedia of Earth System Science, Vol. II, Academic Press.
- Spencer, R.W., 1992: Global oceanic precipitation estimation from the MSU during 1979-91. Submitted to J. Climate.
- Spencer, R.W., 1992: Monitoring of global tropospheric and stratospheric temperature trends. Atlas of Satellite Observations, Cambridge University Press. In press.