

For Immediate Release:

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Contact: Carl Mears, Remote Sensing Systems (RSS) [mears@remss.com](mailto:mears@remss.com), 707-545-2904**Atmospheric temperature measured by satellites sets new record in 2016.**

*Analysis of mid to upper tropospheric temperature by Remote Sensing Systems shows record global warmth in 2016 by a large margin.*

Using the latest version (Version 4.0) of the “Temperature Total Troposphere” (TTT) dataset, RSS scientists showed that 2016 was 0.31 degrees F warmer than the previous record, set in 1998. The third warmest year occurred in 2010. In addition, 9 out of 12 months for 2016 were the warmest of that month ever recorded in the satellite record. By this we mean that January 2016 was the warmest January, etc., for all months except for May, June and December (the December record was set in 2015).

The record warmth was caused by long-term global warming combined with the strong El Niño event that occurred in the winter and spring of 2015-2016.

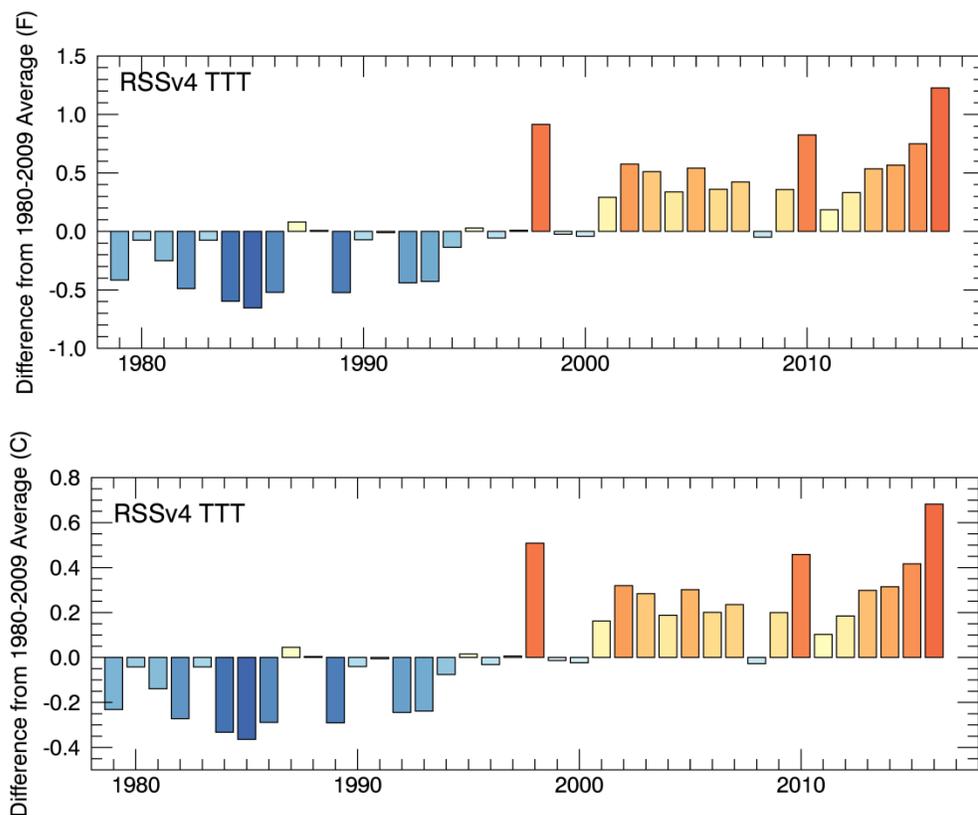


Fig. 1. Annual mean, global (80S to 80N) temperature anomalies (difference from the long-term 1980-2009 average). 2016 is obviously the warmest year. The two plots are in different units. The top plot is in F, and the bottom plot is in C.

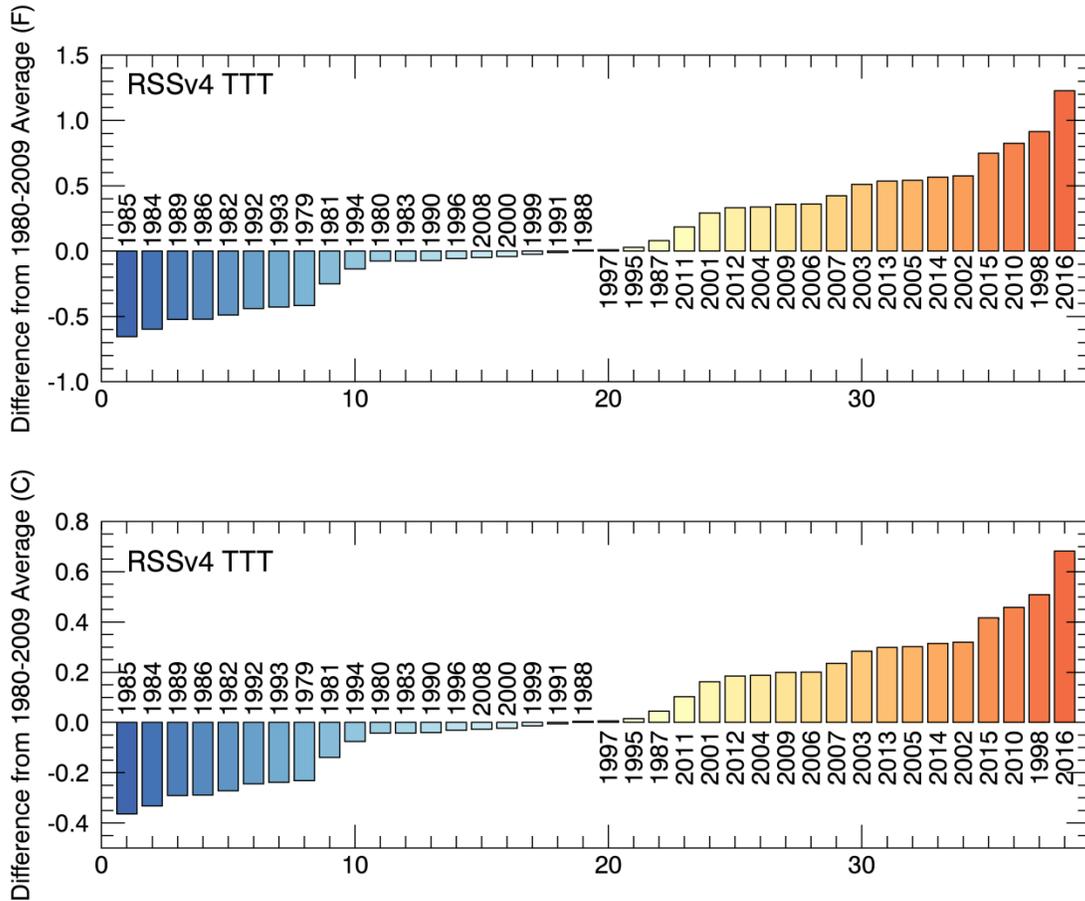


Fig. 2. Annual mean, global (80S to 80N) temperature anomalies (difference from the long-term 1980-2009 average), sorted so that the warmest years appear to the right, and the coolest to the left. The two plots are in different units. The top plot is in degrees F, and the bottom plot is in degrees C.

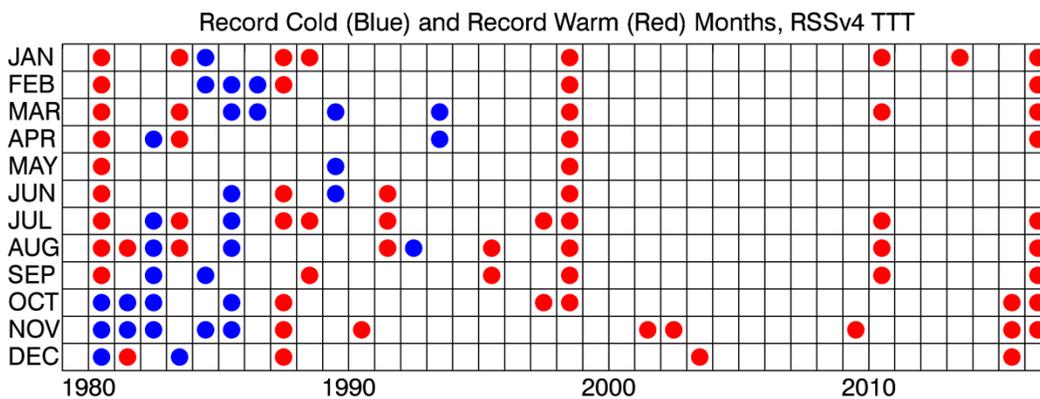


Figure 3. This figure shows when record warm (red) or record cool (blue) record months occurred in the satellite record. (Note that the satellite record began in 1979, so all months in 1980 were either record warm or cool, depending on whether they were warmer or cooler than the same month in 1979.) No record cool months have occurred since 1993. 9 record warm months occurred in 2016.



For this work, we used the “Temperature Total Troposphere” (TTT) dataset instead of the more commonly cited “Temperature Lower Troposphere” (TLT) dataset. TTT measures the temperature of a thick atmospheric layer, extending from the surface to about 8 miles (about 13 km) high. We use TTT because TTT has been updated to version 4.0, while version 4.0 TLT is not yet available. (We use TTT instead of TMT because the latter has not been corrected for the influence of stratospheric cooling.) In the upgrade to version 4.0, we improved the method we use to correct for drifting satellite measurement time, leading to more reliable measurements, particularly since 1998. The new version shows more warming than the older version, particularly since 1998. For more details see: Mears, C. A. and F. J. Wentz (2016). "Sensitivity of Satellite-Derived Tropospheric Temperature Trends to the Diurnal Cycle Adjustment." Journal of Climate **29**: 3629-3646.

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RSS TLT version 3.3 contains a known cooling bias. We are working to eliminate the bias in the new version of TLT. Even with these known cooling biases, 2016 was a record warm year in TLT v3.3. In fact, 2016 was a record warm year in all RSS tropospheric temperature products (TLT v3.3, TMT v3.3, TTT v3.3, TMT v4.0 and TTT v4.0)