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Global Temperature Report: August 2016

August 2016 and 2016-to-date are second warmest

Global climate trend since Nov. 16, 1978: +0.12 C per decade

August temperatures (preliminary)

Global composite temp.: +0.44 C (about 0.79 degrees Fahrenheit) above 30-year average for August.

Northern Hemisphere: +0.55 C (about 0.99 degrees Fahrenheit) above 30-year average for August.

Southern Hemisphere: +0.32 C (about 0.58 degrees Fahrenheit) above 30-year average for August.

Tropics: +0.59 C (about 0.90 degrees Fahrenheit) above 30-

year average for August.

July temperatures (revised):

Global Composite: +0.39 C above 30-year average

Northern Hemisphere: +0.48 C above 30-year average

Southern Hemisphere: +0.30 C above 30-year average

Tropics: +0.48 C above 30-year average

(All temperature anomalies are based on a 30-year average (1981-2010) for the month reported.)

Notes on data released Sept. 1, 2016:

Through the first eight months of the year, 2016 seems to be racing toward what might be its place in history — as the second warmest year in the satellite temperature record. But just by a little bit, according to Dr. John Christy, director of the Earth System Science Center at The University of Alabama in Huntsville. “While global average temperatures peaked higher this year than they did in 1998, temperatures fell faster this spring and summer to levels that are cooler than they were at this same time of year in 1998. We had three months this year that were warmer than their 1998 counterparts, and five that were cooler. There is really no reliable way of predicting what the next four months will do, compared to those same months in 1998.”

1998 and 2016

Month-by-month comparison

| | | | | | |
|------|---|-------|------|---|-------|
| 1998 | 1 | +0.48 | 2016 | 1 | +0.54 |
| 1998 | 2 | +0.65 | 2016 | 2 | +0.83 |
| 1998 | 3 | +0.47 | 2016 | 3 | +0.73 |

| | | | | | |
|------|---|-------|------|---|-------|
| 1998 | 4 | +0.74 | 2016 | 4 | +0.71 |
| 1998 | 5 | +0.64 | 2016 | 5 | +0.55 |
| 1998 | 6 | +0.57 | 2016 | 6 | +0.34 |
| 1998 | 7 | +0.51 | 2016 | 7 | +0.39 |
| 1998 | 8 | +0.52 | 2016 | 8 | +0.44 |

The 2015-2016 El Niño Pacific Ocean warming event is officially over, and sea surface temperatures in the equatorial eastern Pacific Ocean are cooler than normal, which should augur a coming decline in atmospheric temperatures as heat released into the atmosphere as the ocean cooled is itself released into space. 1998 was also the second year of an El Niño Pacific Ocean warming event.

January – August composite Global average anomalies

| | | |
|-----|------|---------|
| 1. | 1998 | 0.5725 |
| 2. | 2016 | 0.5662 |
| 3. | 2010 | 0.4000 |
| 4. | 2002 | 0.2462 |
| 5. | 2015 | 0.2150 |
| 6. | 2007 | 0.2087 |
| 7. | 2005 | 0.1987 |
| 8. | 2014 | 0.1637 |
| 9. | 2003 | 0.1587 |
| 10. | 1991 | 0.1312 |
| 11. | 2013 | 0.1275 |
| 12. | 2001 | 0.1075 |
| 13. | 2006 | 0.0950 |
| 14. | 2004 | 0.0875 |
| 15. | 1988 | 0.0837 |
| 16. | 1995 | 0.0800 |
| 17. | 2009 | 0.0375 |
| 18. | 2011 | 0.0225 |
| 19. | 1987 | 0.0162 |
| 20. | 1980 | 0.0075 |
| 21. | 1983 | 0.0025 |
| 22. | 2012 | -0.0062 |

| | | |
|-----|------|---------|
| 23. | 1999 | -0.0071 |
| 24. | 1990 | -0.0212 |
| 25. | 1996 | -0.0287 |
| 26. | 2000 | -0.0375 |
| 27. | 1997 | -0.0712 |
| 28. | 1994 | -0.0862 |
| 29. | 1981 | -0.1012 |
| 30. | 2008 | -0.1650 |
| 31. | 1986 | -0.2200 |
| 32. | 1984 | -0.2250 |
| 33. | 1993 | -0.2400 |
| 34. | 1992 | -0.2612 |
| 35. | 1989 | -0.2637 |
| 36. | 1979 | -0.2662 |
| 37. | 1982 | -0.3025 |
| 38. | 1985 | -0.3737 |

With temperatures that were 0.55 C (about 0.99° F) warmer than seasonal norms, August 2016 was the warmest August in the Northern Hemisphere in the satellite temperature record. August 1998 was second warmest at 0.49 C warmer than normal. August 2016 was the second warmest August in the tropics, trailing August 2015 0.52 to 0.50 C. It was the third warmest in the Southern Hemisphere, where the August 2016 average was 0.32 C warmer than normal. August 1998's Southern Hemisphere average was hottest at 0.54 C warmer than seasonal norms.

Compared to seasonal norms, the warmest average temperature anomaly on Earth in August was southwest of Dome F in East Antarctica. August temperatures there averaged 4.91 C (about 8.84 degrees F) warmer than seasonal norms. Compared to seasonal norms, the coolest average temperature on Earth in August was about 1,500 miles north of West Antarctica, in the region where the South Pacific meets the southern ocean. August's temperatures there averaged 2.78 C (about 5.00 degrees F) cooler than seasonal norms.

The complete version 6 beta lower troposphere dataset is available here:

http://vortex.nsstc.uah.edu/data/msu/v6.0beta/tlt/uahncdc_lt_6.0beta5.txt

Archived color maps of local temperature anomalies are available on-line at:

<http://nsstc.uah.edu/climate/>

As part of an ongoing joint project between UAHuntsville, NOAA and NASA, Christy and Dr. Roy Spencer, an ESSC principal scientist, use data gathered by advanced microwave sounding units on NOAA and NASA satellites to get accurate temperature readings for almost all regions of the Earth. This includes remote desert, ocean and rain forest areas where reliable climate data are not otherwise available.

The satellite-based instruments measure the temperature of the atmosphere from the surface up to an altitude of about eight kilometers above sea level. Once the monthly temperature data are collected and processed, they are placed in a "public" computer file for immediate access by atmospheric scientists in the U.S. and abroad.

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