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For Additional Information:
Dr. John Christy, (256) 961-7763
christy@nsstc.uah.edu
Dr. Roy Spencer, (256) 961-7960
spencer@nsstc.uah.edu

Global Temperature Report: October 2024 with Version 6.1

Global climate trend since Dec. 1 1978: +0.15 C per decade

October Temperatures v6.1 (preliminary)

Global composite temp: +0.73 C (+1.31°F) above the seasonal average

Northern Hemisphere: +0.87 C (+1.57 °F) above seasonal average

Southern Hemisphere: +0.59 C (+1.06°F) above seasonal average

Tropics: +0.61 C (+1.10°F) above seasonal average

September Temperatures v6.1 (final)

Global composite temp: +0.80 C (+1.44°F) above the seasonal average

Northern Hemisphere: +1.03 C (+1.85°F) above seasonal average

Southern Hemisphere: +0.56 C (+1.01°F) above seasonal average

Tropics: +0.80 C (+1.44°F) above seasonal average

Notes on data released November 4, 2024 New Version 6.1

[Please note that we provide these data out of our own initiative, and are only able to produce these updates at times convenient to our working schedules.]

In the last two months we've suggested some reasons for the continued exceptional warmth of the global atmosphere even as the El Niño was fading away. One of the causes mentioned was the possibility that the correction for the drift of the aging NOAA-19 satellite was unable to keep

up with its continued movement and produced spurious warmth over the last few years. By comparing the two current satellites, and especially since Europe's MetOP-B does not drift due to on-board propulsion, we've concluded that the adjustment for NOAA-19's drift was inadequate, generating temperatures that were too warm as time went on. This same situation has occurred in the past where we initially utilized old satellites beyond their normal life-span (e.g., NOAA-14, -15, -18 and AQUA) and retroactively removed the latest portion of their records when errors progressively became large enough to affect the anomalies of the last few years. We have now decided to terminate the inclusion of NOAA-19 from 2021 onward. With this adjustment we will identify the product as v6.1. At some point in the near future, we intend to include MetOp-C in the record, so this may introduce some minor changes at that time.

This adjustment produces cooler temperatures after 2021 but does not change the facts that (a) 2023 was the warmest calendar year (and 2024 will be warmer still), (b) April 2024 produced the warmest single monthly anomaly, and (c) every month from October 2023 to September 2024 set monthly temperature records. The overall global trend was reduced slightly from +0.16 to +0.15 °C/decade by this adjustment. See drroyspencer.com for a more detailed report.

https://www.drroyspencer.com/2024/11/uah-global-temperature-update-for-october-2024-truncation-of-the-noaa-19-satellite-record/

As mentioned in the past few reports, the El Niño of 2023-24 has faded and a weak La Niña is present, but the NH continues to be very warm, keeping the global temperature anomaly well above average. To see the latest on the La Niña see: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf.

The planet's warmest atmospheric temperature departure in October occurred over western Tibet, China at +4.6 °C (+8.2 °F) as part of a warm feature that stretches from Afghanistan eastward to the North Pacific Ocean. Argentina, the north Central US and northern Europe were also exceptionally warm.

With a reading of -1.9 °C (-3.5°F), the coolest departure from average was found over the Southern Indian Ocean near the Kerguelen Islands. Regions of cooler than average temperatures were also seen over the NE Pacific Ocean, South Atlantic and Indian Oceans, northern Russia and the subtropical western Pacific Ocean of both hemispheres.

The conterminous US warmed from September as the lower-48 averaged +1.84 °C (+3.31°F) to be the warmest US48 October of the Satellite record since 1979 (check NOAA for October surface temperatures to see if other Octobers prior to 1979 were even warmer). The warmth was centered over the Northern Plains while the NW and Eastern coasts were near normal. It was again relatively cooler in Alaska, so the 49-state October average came in at +1.54 °C (+2.77°F) but also made for the warmest US49 value since 1979. [We don't include Hawaii in the US results because its land area is less than that of one satellite grid square, so it would have virtually no impact on the overall national results.]

Background notes.

New Reference Base Jan 2021 and forward. As noted in the Jan 2021 GTR, the situation comes around every 10 years when the reference period or "30-year normal" that we use to calculate the departures is redefined. With that, we have averaged the absolute temperatures over the period 1991-2020, in accordance with the World Meteorological Organization's guidelines, and use this as the new base period. This allows the anomalies to relate more closely to the experience of the average person, i.e. the climate of the last 30 years. Due to the rising trend of global and regional temperatures, the new normals are a little warmer than before, i.e. the global average temperature for Januaries for 1991-2020 is 0.14 °C warmer than the average for Januaries during 1981-2010. So, the new departures from this now warmer average will appear to be cooler, but this is an artifact of simply applying a new base period. It is important to remember that changes over time periods, such as a trend value or the relative difference of one year to the next, will not change. Think about it this way, all we've done is to take the *entire* time series and shifted it down a little.

To-Do List: There has been a delay in our ability to utilize and merge the new generation of microwave sensors (ATMS) on the NPP and JPSS satellites, but we are renewing our efforts as Dr. Braswell is now focused on this task. The delay is due to the incredibly slow rate at which the data may be accessed. In addition, the current non-drifting satellite operated by the Europeans, MetOP-B, has not yet been adjusted or "neutralized" for its seasonal peculiarities related to its unique equatorial crossing time (0930). While these MetOP-B peculiarities do not affect the long-term global trend, they do introduce error within a particular year in specific locations over land. We intend to add MetOP-C to replace the truncated data from NOAA-19.

Dr. Christy and Dr. Roy Spencer, an ESSC principal scientist, use data gathered by advanced microwave sounding units on NOAA, NASA and European satellites to produce 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. Dr. Danny Braswell has reconstituted the code which converts the satellite radiances to temperature values and Dr. Rob Junod assists with visuals in the preparation of these reports.

The satellite-based instruments measure the temperature of the atmosphere from the surface up to an altitude of about nine 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.

The complete version 6.1 lower troposphere dataset is available here:

http://www.nsstc.uah.edu/data/msu/v6.1/tlt/uahncdc_lt_6.1.txt

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

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

Neither Christy nor Spencer receives any research support or funding from oil, coal or industrial companies or organizations, or from any private or special interest groups. All of their climate research funding comes from federal and state grants or contracts.

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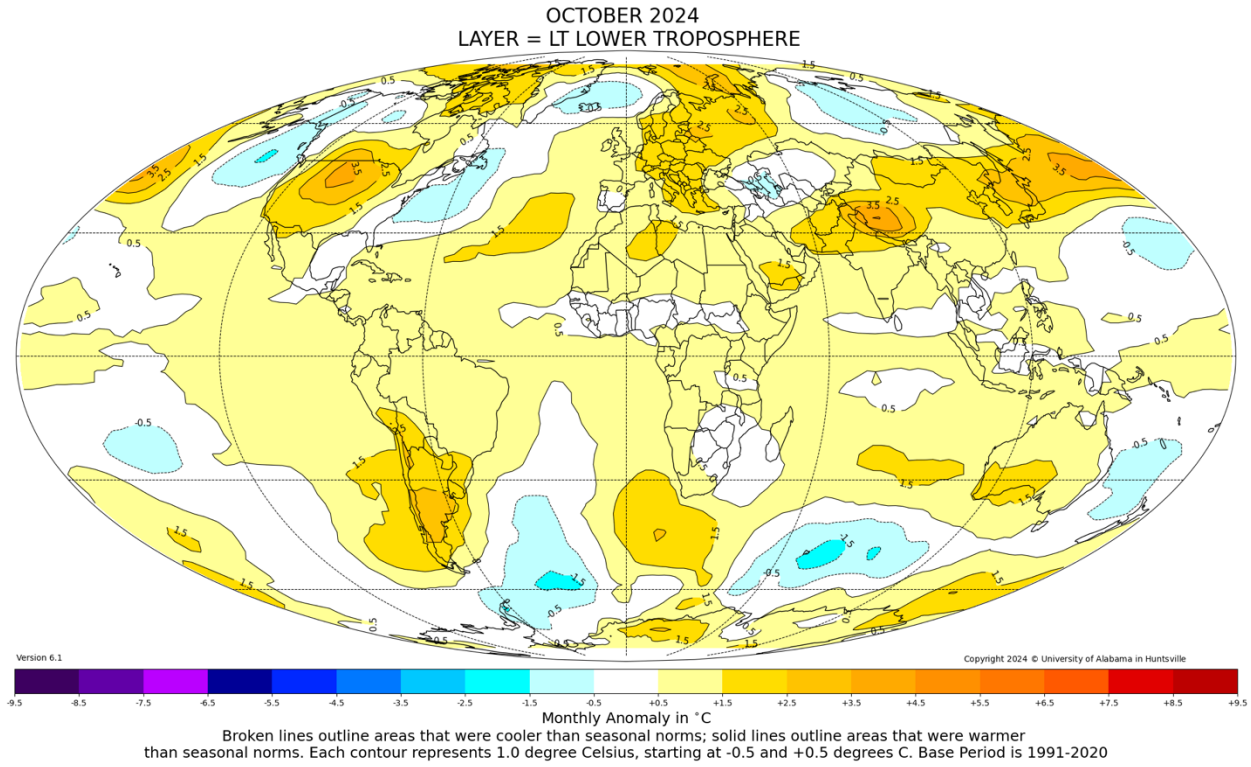

Figure. Lower tropospheric temperature anomalies for October 2024.

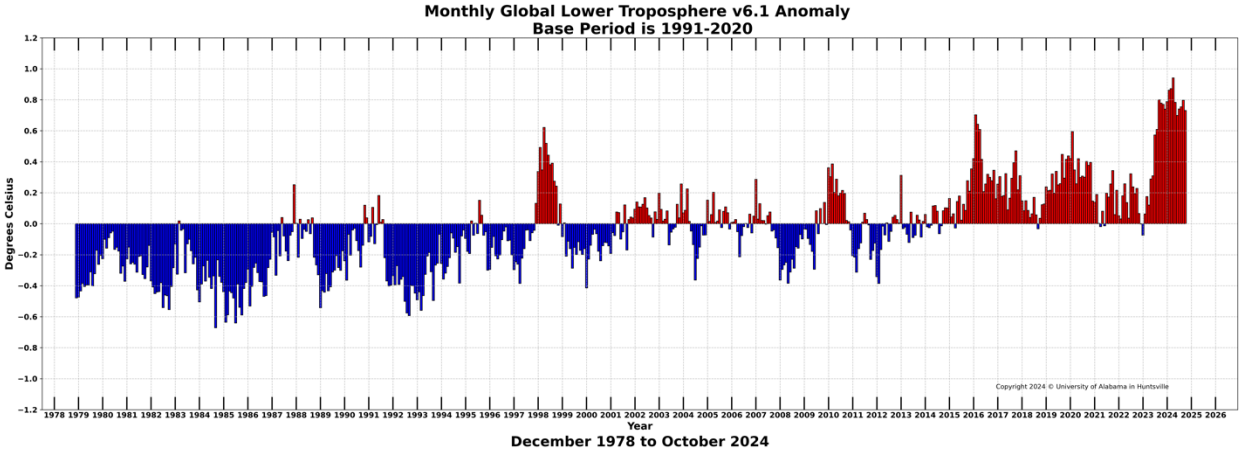

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.