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Global Temperature Report: August 2024

Global climate trend since Dec. 1 1978: +0.16 C per decade

August Temperatures (preliminary)

Global composite temp: +0.88 C (+1.58°F) above the seasonal average

Northern Hemisphere: +0.96 C (+1.73°F) above seasonal average

Southern Hemisphere: +0.81 C (+1.46°F) above seasonal average

Tropics: +0.88 C (+1.58°F) above seasonal average

July Temperatures (final)

Global composite temp: +0.85 C (+1.53°F) above the seasonal average

Northern Hemisphere: +1.02 C (+1.84°F) above seasonal average

Southern Hemisphere: +0.68 C (+1.22°F) above seasonal average

Tropics: +1.06 C (+1.91°F) above seasonal average

Notes on data released September 4, 2024 (v6.0, with 1991-2020 reference base)

[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.]

August's global temperature anomaly, again somewhat unexpectedly, rose slightly to +0.88°C (+1.58 °F) rather than decline as usually occurs as the El Niño's effects fade away. With this value, each of the last 12 consecutive months achieved their highest value in the 45+ year satellite

record with this month being +0.17°C above August 2023 which itself had been a record at that time. We noted last month that the global trend was on the verge of crossing over the +0.155 °C/decade threshold which would round up to +0.16 °C/decade and that has now happened with a trend of +0.156 °C/decade, or +0.16 °C/decade.

The sight increase in August's warmth over July is seen most strongly over the southern hemisphere's land masses which achieved a record anomaly of +1.87 °C which in turn boosted the global land anomaly to +1.35 °C, the tiniest (and insignificant) of fractions above the previous global land anomaly of +1.34 °C recorded in September 2023. Australia helped the record setting southern hemisphere with a record of its own at +1.80 °C. While the La Niña cooling still continues somewhat in the tropical Pacific Ocean waters, the remaining parts of the globe have not yet participated. 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 August occurred over Eastern Antarctica near Dome A at +7.0 °C (+12.5 °F). Besides Eastern Antarctica, Northeastern Canada, Europe and locations northward from there to the Arctic, China to Japan, South Africa and Australia were all noticeably warmer than the average.

With a reading of -2.6 °C (-4.7°F), the coolest departure from average was found over northeastern Russia in the Bilibinsky District. It was cooler than average over the southern Atlantic and Pacific Oceans as well.

The conterminous US cooled a bit from July as the lower-48 averaged +0.69 °C (+1.24 °F). The Southern Plains were above average while the northern tier to the East Coast were just average. It was again relatively cooler in Alaska, so the 49-state August average came in at +0.62 °C (+1.08°F). [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. 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.

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 lower troposphere dataset is available here:

http://www.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.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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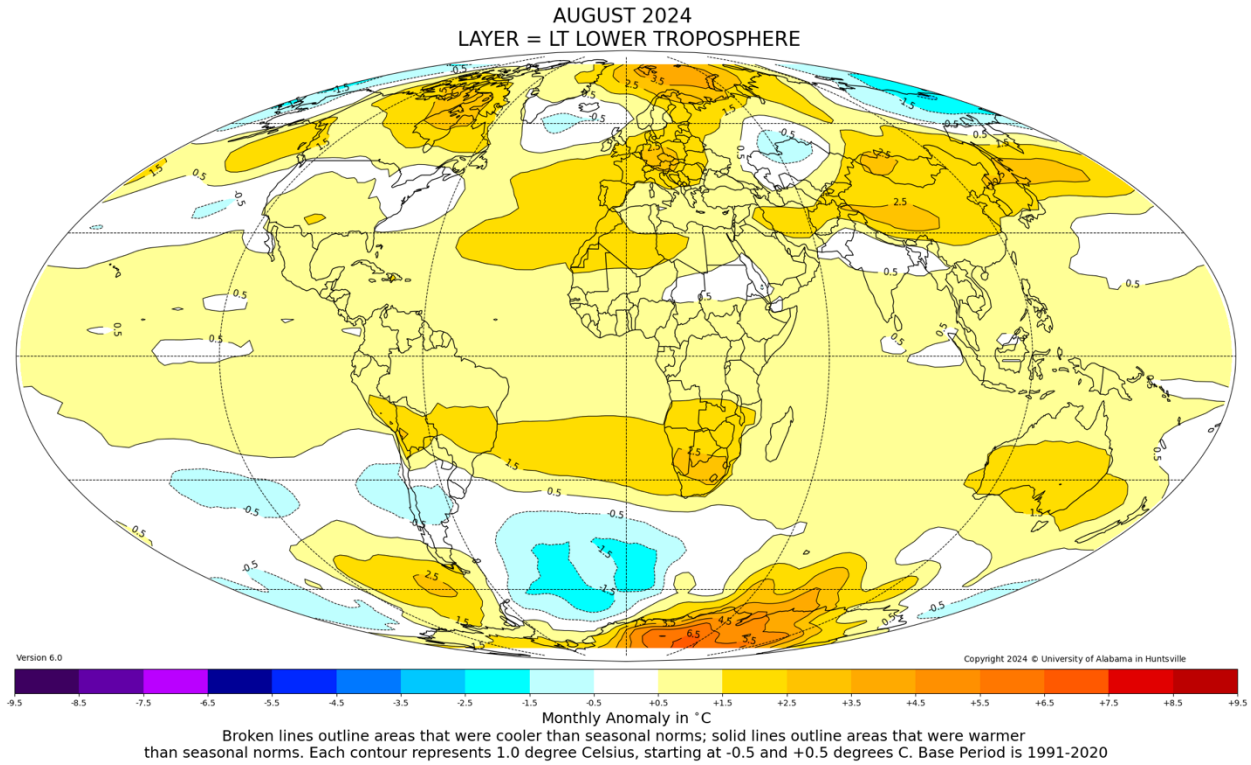

Figure. Lower tropospheric temperature anomalies for August 2024

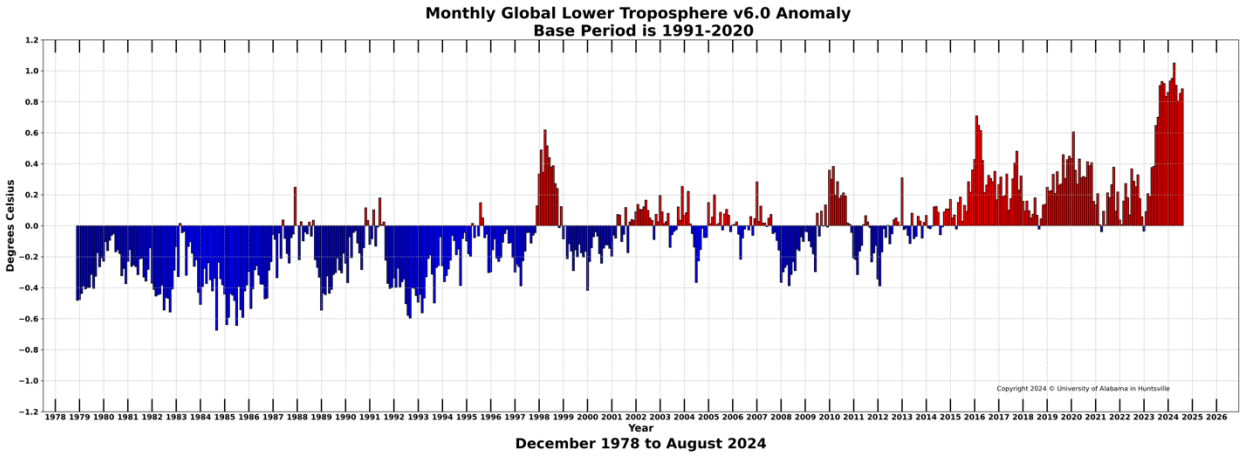

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.