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Global Temperature Report: Aug 2022

Global climate trend since Dec. 1 1978: +0.13 C per decade

August Temperatures (preliminary)

Global composite temp.: +0.28 C (+0.50°F) above the seasonal average

Northern Hemisphere: +0.31 C (+0.56 °F) above seasonal average

Southern Hemisphere: +0.24 C (+0.43 °F) above seasonal average

Tropics: -0.04 °C (-0.07°F) below seasonal average

July Temperatures (final)

Global composite temp.: +0.36 C (+0.65°F) above the seasonal average

Northern Hemisphere: +0.37 C (+0.67 °F) above seasonal average

Southern Hemisphere: +0.35 C (+0.63 °F) above seasonal average

Tropics: +0.13 °C (+0.23°F) above seasonal average

Notes on data released September 8, 2022 (v6.0, with 1991-2020 reference base)

The global temperature departure from average in August dropped a bit from July to +0.28 °C (+0.50 °F) above the long-term average, down from +0.36 °C (+0.65 °F) last month. The decline was most prominent in the tropics as the temperature fell there -0.17 °C (-0.31 °F). However, the extratropical warmth during this multi-year La Niña episode is a remarkable feature that has kept the global average near or above zero for most months since commencing in late 2020 and is consistent with a long-term upward trend in global temperature. That trend according to these observations is +0.13 °C per decade since December 1978.

The latest values of various El Niño/La Niña indices indicate the La Niña (cold phase of the cycle) is still quite evident and predicted to continue through the NH winter. The influence of La Niñas generally induces cooler temperatures, so that one would expect with its potential demise next year, global temperatures will rise somewhat from where they are now. This is not a prediction, simply an observation based on the past. The latest on the evolution of La Niña and its anticipated diminishment by 2023 is provided by NOAA here: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf.

The planet's warmest spot, in terms of the monthly departure from average was over western China near Yushu at +4.0 °C (+7.1 °F). Areas of especially warm temperatures compared with average occurred over western N America, western Russia, the north Pacific ocean and a large area from New Zealand eastward almost to South America.

The coolest departure from average was near the Ross Sea off of Antarctica at -3.6 °C (-6.4 °F). There were fewer especially cold areas, but eastern Russian and the equatorial-south-Pacific were cooler than average. A phenomenon of aliasing is seen in the southern hemisphere between the Antarctic continent and around 50° south latitude. We have seen this before in which a large temperature anomaly rotates around the South Pole and is sampled by the orbits of the satellite in a time-pattern that gives the appearance of warm and cold stripes in short distances.

The conterminous US averaged above the 30-year mean at +0.59 °C (+1.06 °F) as the warmth in the NW was balanced somewhat by coolness in the SE. Alaska was not quite as warm, so that the 49-state average came in a little lower at +0.50 °C (+0.90 °F). [We don't include Hawaii in the US results because its land area is less than that of a satellite grid square, so it would have virtually no impact on the overall national results.]

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. As of now, the calibration equations applied by the agency have changed at least twice, so that the data stream contains inhomogeneities which obviously impact the type of measurements we seek. We are hoping this is resolved soon with a dataset that is built with a single, consistent set of calibration equations. 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.

As part of an ongoing joint project between UAH, NOAA and NASA, 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. Drs. Danny Braswell and Rob Junod assist 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 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.

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/

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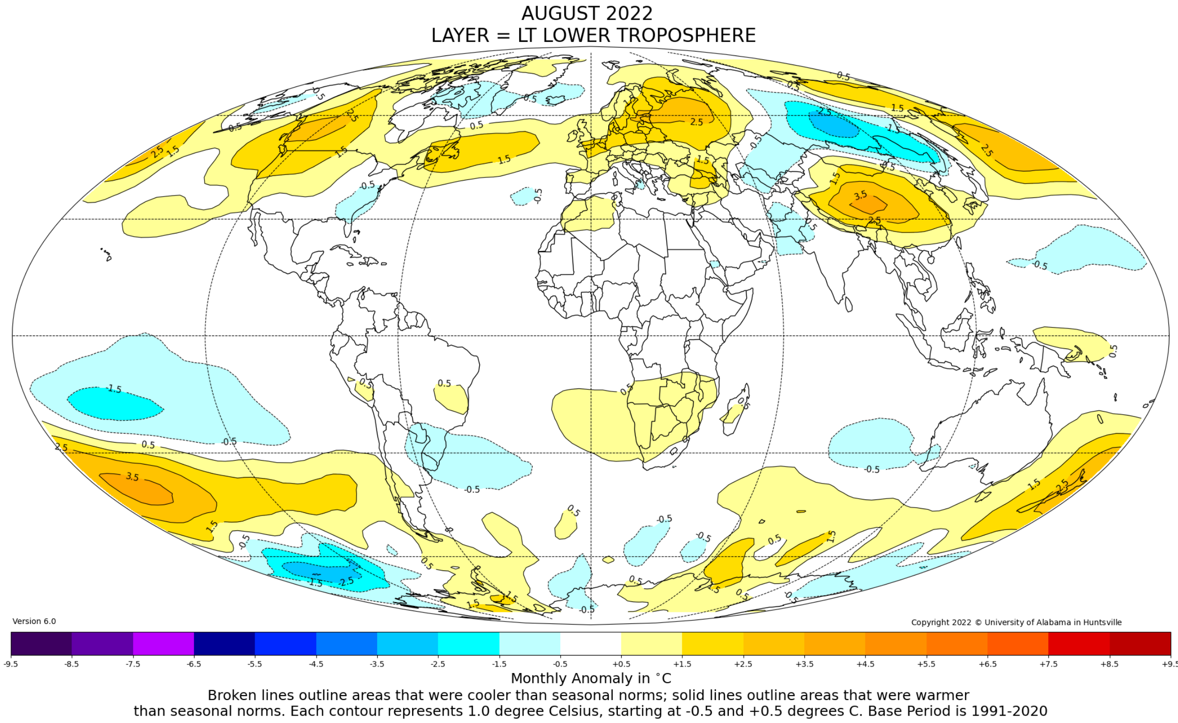

Figure. Lower tropospheric temperature anomalies for July 2022

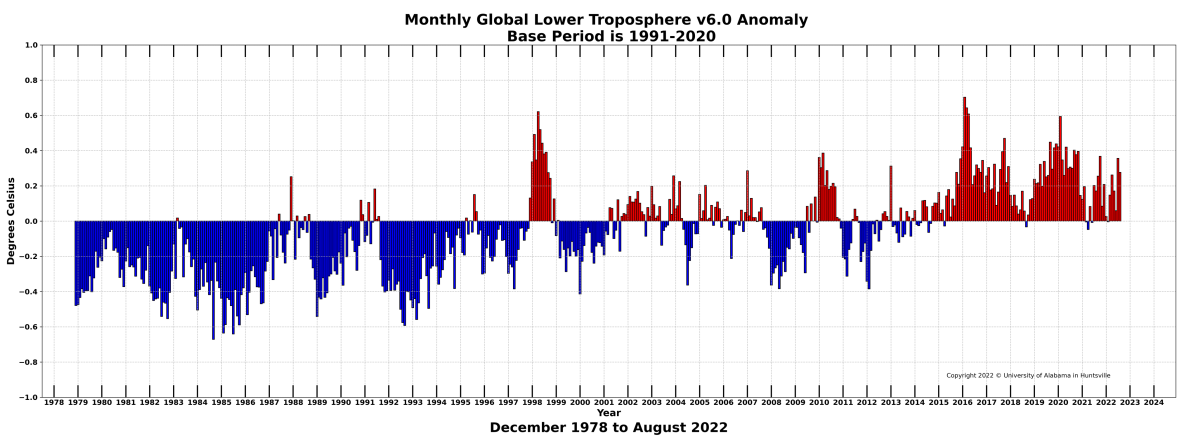

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.