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# Global Temperature Report: Apr 2023

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

**April Temperatures (preliminary)**

Global composite temp: +0.18 C (+0.32°F) above the seasonal average

Northern Hemisphere: +0.11 C (+0.20 °F) above seasonal average

Southern Hemisphere: +0.25 C (+0.45 °F) above seasonal average

Tropics: -0.03 °C (-0.05°F) below seasonal average

**March Temperatures (final)**

Global composite temp: +0.20 C (+0.36°F) above the seasonal average

Northern Hemisphere: +0.23 C (+0.41 °F) above seasonal average

Southern Hemisphere: +0.16 C +0.29 °F) above seasonal average

Tropics: -0.14 °C (-0.25°F) below seasonal average

**Notes on data released May 3, 2023 (v6.0, with 1991-2020 reference base)**

The global atmospheric temperature in April was very close to that of March, being only -0.02 °C cooler at +0.18°C (+0.32°F) above the 30-year average. The La Niña that has influenced global temperatures for almost three years has ended as the tropical atmospheric temperature shows a near zero departure from average (-0.03°C). Compared

with March, the April NH temperatures cooled a bit and the SH temperatures warmed by almost the same amount, leaving the total global change, as noted, to be near zero.

The atmosphere takes about 2 to 5 months to reflect major changes in the tropical sea water temperatures, so we can expect generally rising air temperature anomalies from now through the boreal winter in 2024 since the tropical Pacific sea water temperatures are warming rapidly. The sea is expected to warm as NOAA has declared an El Niño Watch, indicating high confidence that a warm phase tropical Pacific event is in the near future. The latest on the evolution of La Niña and its anticipated diminishment in 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 April occurred over western East Antarctica near the Princess Martha Coast with a departure from average of +4.4 °C (+7.9 °F). Warmer than average temperatures were felt from the North Pacific northwestward through eastern Russia, as well as a band from Quebec to Greenland to the Svalbard Islands then south through western Russia. Spain was warmer than average as was East Antarctica to New Zealand.

With a reading of -3.2°C (-5.7°F) the coolest departure from average could be found over western Alaska near Kaltag. Another region of very cool air resided over central Russia, lying between warm areas to the east and west. North Africa eastward to India was cool as was the North Atlantic and central Europe.

Much of the conterminous US was slightly below average giving a 48-state average of -0.38°C (-0.68°F). Alaska was even cooler than that, so with Alaska, the 49-state average fell to -0.66 °C (-1.19°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/

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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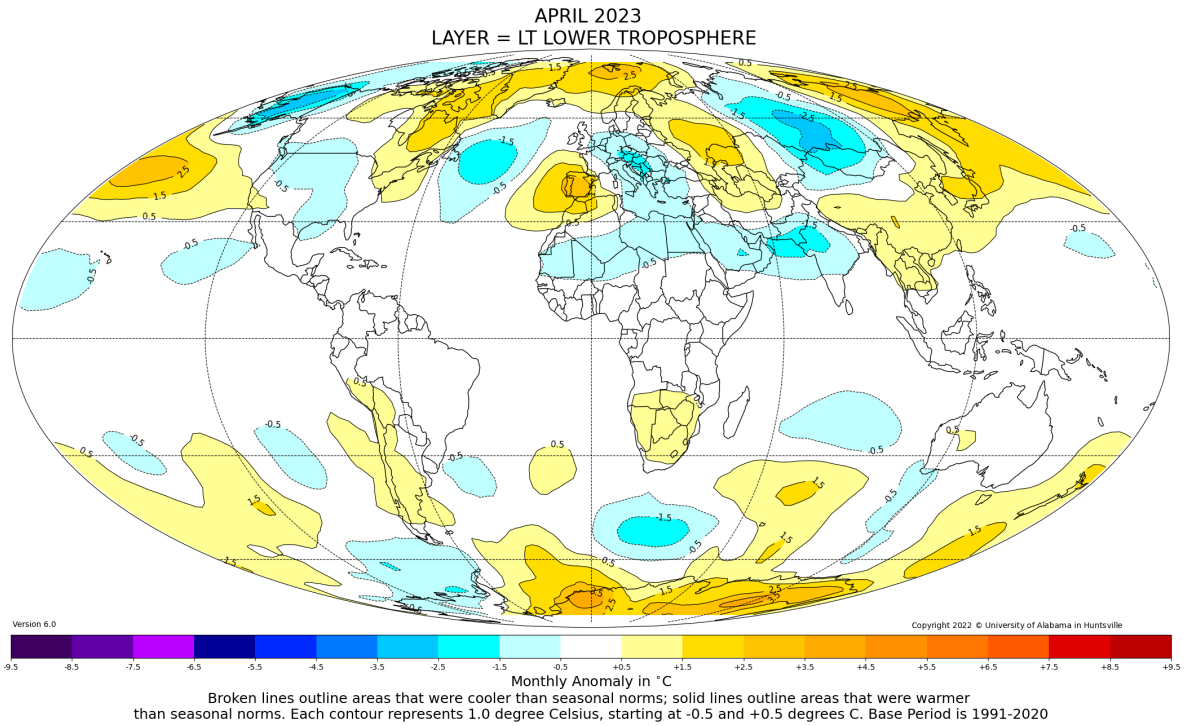


Figure. Lower tropospheric temperature anomalies for April 2023

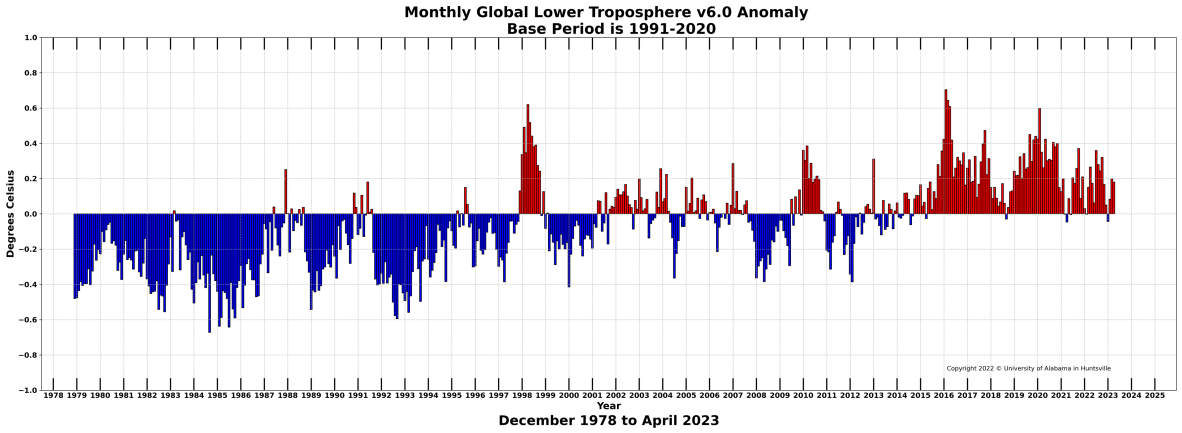


Figure. Bar chart of global monthly lower tropospheric temperature anomalies.