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Global Temperature Report: May 2022

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

May Temperatures (preliminary)

Global composite temp.: +0.17 C (+0.31°F) above the seasonal average

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

Southern Hemisphere: +0.10 C (+0.18 °F) above seasonal average

Tropics: +0.01 C (+0.02°F) above seasonal average

April Temperatures (Final)

Global composite temp.: +0.26 C (+0.47°F) above the seasonal average

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

Southern Hemisphere: +0.18 C (+0.32 °F) above seasonal average

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

Notes on data released July 5, 2022 (v6.0, with 1991-2020 reference base)

Note for Reports over the past year: These text reports have been delayed due to the extra duties Christy has acquired since June 2021 as interim VP for Research and Economic Development – an operation of $125M/yr and 1,100 employees. This adds to his current duties as Director of the Earth System Science Center, Professor, and State Climatologist. He will be relinquishing the duties of VP on 1 Aug 2022. Please note that Spencer and Christy generate/provide these data on a volunteer-basis as federal funding was terminated a few years ago.

The global temperature departure from average in May declined a bit to +0.17 °C (+0.31°F). In general, all of the large-area regions cooled slightly except for the tropics which warmed up slightly to virtually match the average of the past 30 years (+0.01C, +0.02°F). As noted previously, a change of 0.1 C in monthly global temperature values is fairly common and in fact is the average change the earth experiences from month to month.

The latest values of various El Niño/La Niña indices indicate the La Niña may survive for several more months. Indeed, the sea surface temperatures of the key region "Niño 3.4" in the tropical Pacific have remained below average though May. However, the midlatitude sea water temperatures are above average in the North and South Pacific. 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 region, in terms of the monthly departure from average was near Lake Markakol in eastern Kazakhstan at +3.8 C (+6.9°F). This warmth was centered in a north-south oriented area from the pole south to northern India. Other warm spots stretched from the subtropical eastern Pacific, across the southwestern US and up to New England and eastern Canada. Western Europe was warm as was the Gulf of Alaska, the region between New Zealand and Australia and parts of Antarctica.

The coolest departure from average, as we often find, was not far from the hottest spot as these stationary features are like waves with alternating peaks and troughs. In this case the coldest spot was near Nizhny Novgorod in western Russia at -3.4 C (-6.1°F). The Pacific NW of the US and Canada were cool along with Greenland, far eastern Asia, Argentina, North Africa and patches in the South Pacific.

The conterminous US averaged above the 30-year mean at +0.59 C (+1.06 °F). Alaska was a bit cooler than that, so the 49-state average came in a little lower at +0.46 C (+0.83 °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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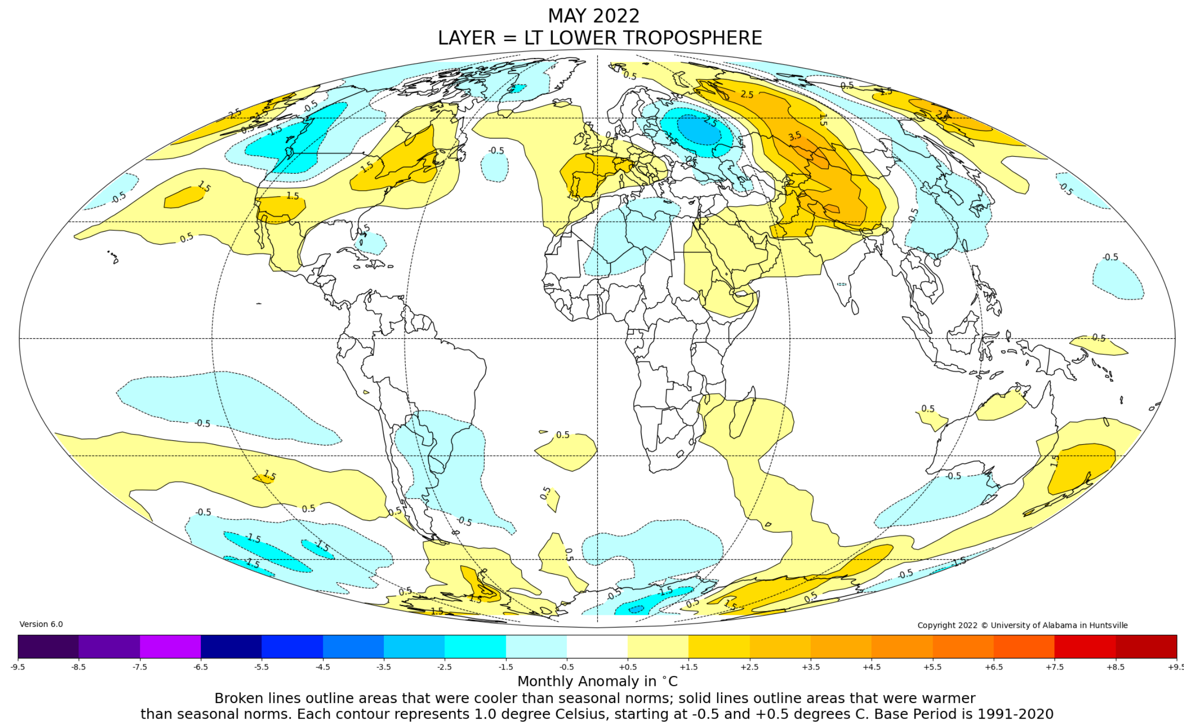

Figure. Lower tropospheric temperature anomalies for May 2022

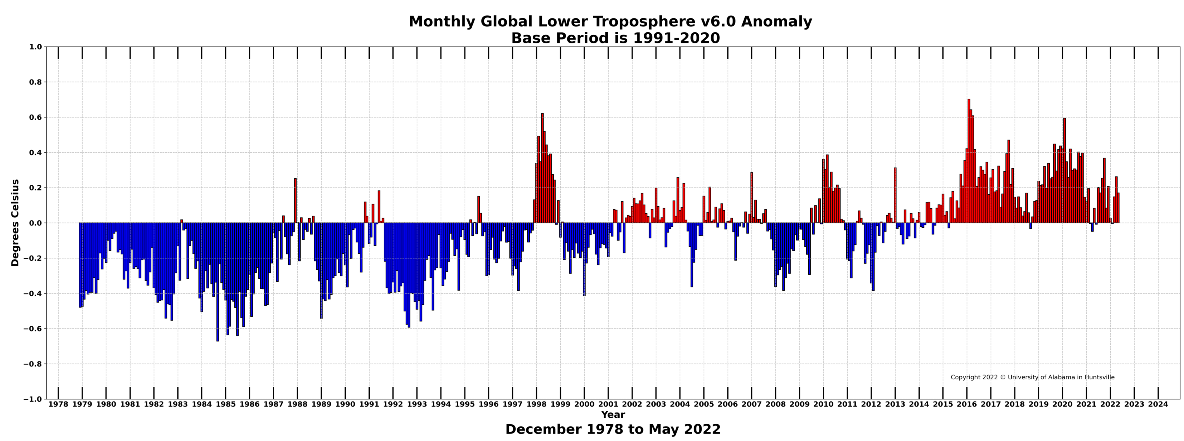

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.