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Global Temperature Report: April 2022

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

April Temperatures (preliminary)

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

March Temperatures (final)

Global composite temp.: +0.15 C (+0.27°F) above the seasonal average

Northern Hemisphere: +0.27 C (+0.49 °F) above seasonal average

Southern Hemisphere: +0.02 C (+0.04 °F) above seasonal average

Tropics: -0.08 C (-0.14 °F) below seasonal average

Notes on data released May 16, 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 April warmed to +0.26 °C (+0.47°F). The main warming shift occurred in the Southern Hemisphere as the area warmed by +0.16 °C

(+0.29 °F) from March. A change of 0.1 °C in monthly global temperature values is fairly common. As noted in February, this may be the beginning of the return to warmer temperatures as the La Niña typically declines in influence during the NH spring. However, 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" have remained below average through mid-May. In particular, the tropical Pacific waters south of the equator are below average and quite extensive. The latest on the evolution of La Niña and its anticipated diminishment 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 in the Zhanaarka District of central Kazakhstan where one grid cell hit +3.7 °C (+6.7°F) above normal. Above average temperatures extended north through western Russia, southwest to Africa and southeast to northern India. In addition, Greenland, the SW US with NW Mexico, eastern north Pacific and the South Atlantic and South Pacific harbored higher than average temperatures too.

The coolest departure from average occurred over the Quaee Indian Reserve No.7, British Columbia, Canada with an anomaly of -3.2 °C (-5.8 °F). Other cooler than average regions were found in the tropical Pacific, especially south of the Equator, So. Africa, eastern Russia and the northern European countries.

With the very cool temperatures in the Pacific NW extending across the northern US, the conterminous US averaged slightly below average; -0.26 °C (-0.47 °F). Alaska also felt part of the cool temperatures so that the 49-state average came in a little cooler at -0.31 °C (-0.56 °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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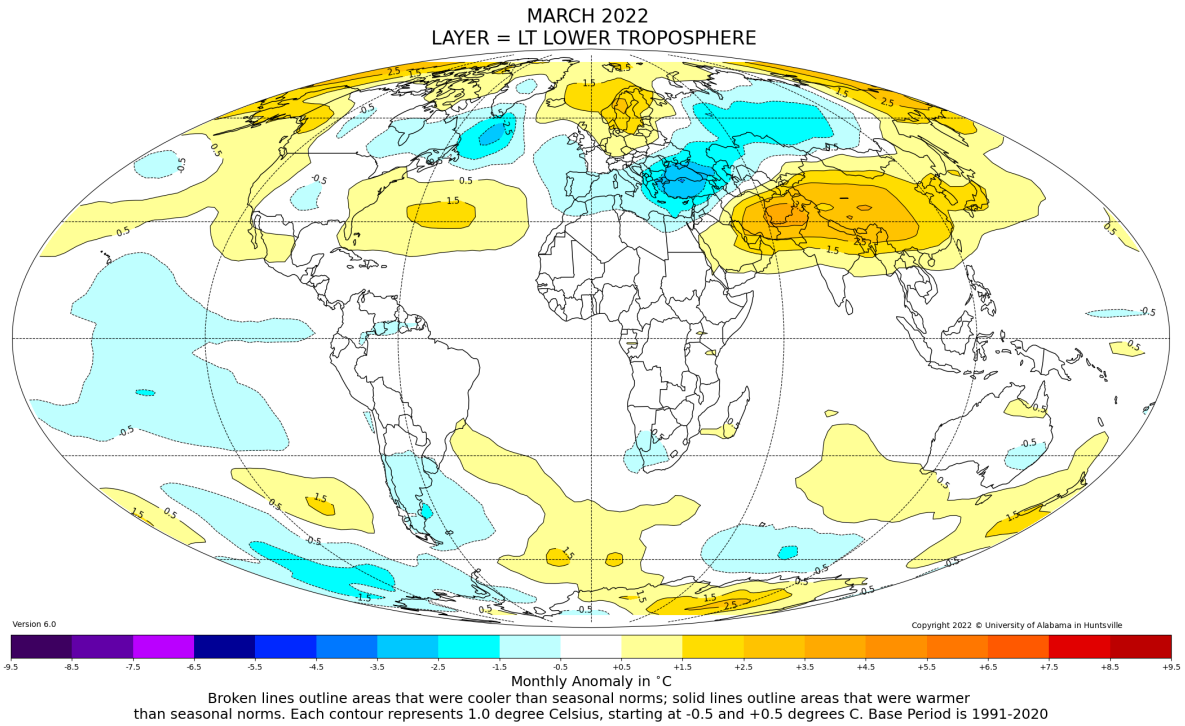

Figure. Lower tropospheric temperature anomalies for March 2022

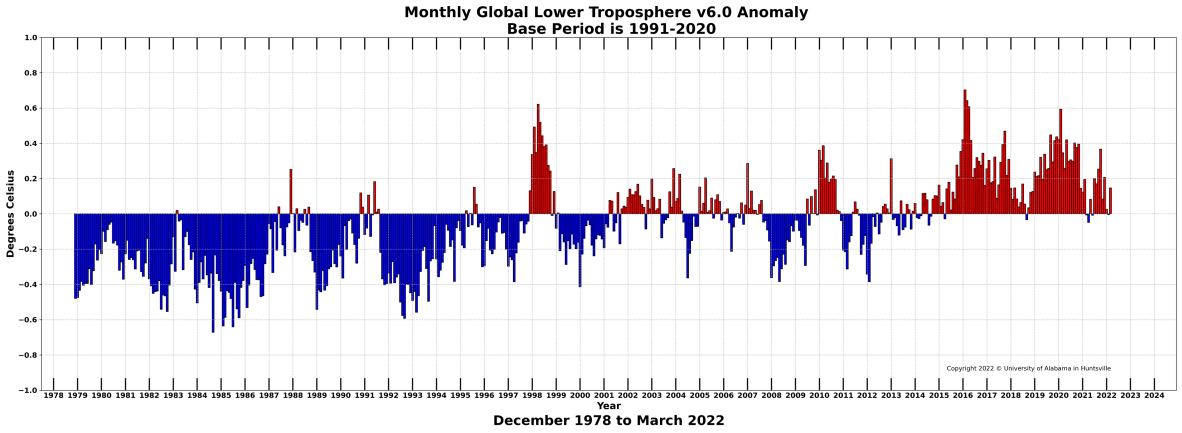

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.