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Global Temperature Report: June 2022

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

June Temperatures (preliminary)

Global composite temp.: +0.06 C (+0.11°F) above the seasonal average

Northern Hemisphere: +0.07 C (+0.13 °F) above seasonal average

Southern Hemisphere: +0.04 C (+0.07 °F) above seasonal average

Tropics: -0.36 C (-0.65°F) below seasonal average

May Temperatures (Final)

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

Notes on data released July 7, 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 June declined a bit to +0.06 °C (+0.11°F). The drop was most prominent in the tropics as the cool La Niña episode lives on for the 3rd

year in a row. As noted in previous posts, the tropical temperature had been rising since February in a sign that the La Niña might be fading, but in June the temperature fell somewhat rapidly to its lowest level since the La Niña of 2012.

The latest values of various El Niño/La Niña indices indicate the La Niña is quite evident. The sea surface temperatures of the key region "Niño 3.4" in the tropical Pacific has warmed a bit over the last month, but are still below the 0.5°C threshold. As noted before, the midlatitude sea water temperatures are above average in the North and South Pacific. Of interest here is that the total heat content of the tropical Pacific is actually slightly above average as the subsurface water in the western portion is much warmer than normal and may at some point make its impact felt on the atmosphere above. 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 in East Antarctica +5.1 C (+9.1°F). This warmth extended northward into the south Indian Ocean. Another extended warm region covered NE Canada, eastward across the Atlantic to all of Europe then bifurcated northeastward to northern Russia and southeastward to China.

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 over the Amundsen Sea off West Antarctica -2.1 C (-3.7°F). The tropical Pacific was below average with an extension southward to Argentina. Greenland was below average as were parts of Africa and Indonesia.

The conterminous US averaged above the 30-year mean at +0.46 C (+0.83 °F) as the southern two thirds of the region was modestly above average. Alaska was about the same, so the 49-state average came in only a little lower at +0.43 C (+0.77 °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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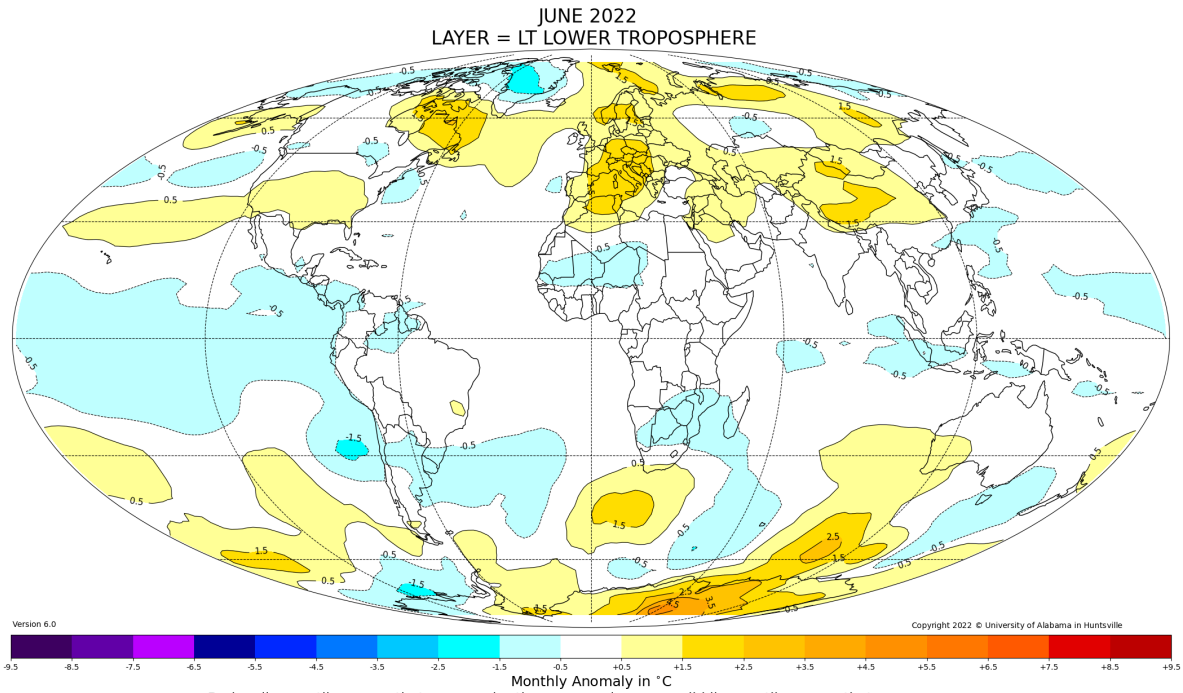

Figure. Lower tropospheric temperature anomalies for June 2022

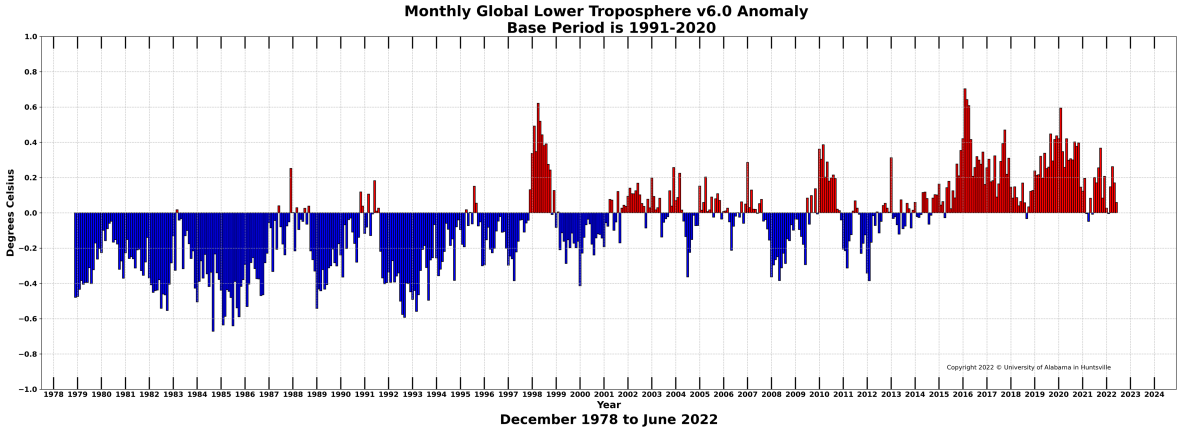

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.