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Global Temperature Report: April 2024

Global climate trend since Dec. 1 1978: +0.15 C per decade

April Temperatures (preliminary)

Global composite temp: +1.05 C (+1.89°F) above the seasonal average

Northern Hemisphere: +1.24 C (+2.23°F) above seasonal average

Southern Hemisphere: +0.85 C (+1.53°F) above seasonal average

Tropics: +1.26 C (+2.27°F) above seasonal average

March Temperatures (final)

Global composite temp: +0.95 C (+1.71°F) above the seasonal average

Northern Hemisphere: +1.02 C (+1.84°F) above seasonal average

Southern Hemisphere: +0.88 C (+1.58°F) above seasonal average

Tropics: +1.34 C (+2.41°F) above seasonal average

Notes on data released May 4, 2024 (v6.0, with 1991-2020 reference base)

[Please note that we provide these data out of our own initiative, and are only able to produce these updates at times convenient to our working schedules.]

April's global temperature anomaly rose above last month's record-setting value to +1.05 °C (+1.89 °F), bucking the anticipated decline since the current El Niño is waning fast. Indeed, the area of increased warmth was not in the tropics or Southern Hemisphere, both of which declined,

but in the Northern Hemisphere where the departure from average reached +1.24 °C (+2.23 °F). We now have an answer to the question posed last fall as to whether the temperature peak would occur earlier than usual because the El Niño started earlier – the temperature did not peak early.

Along with the global temperature record, Sectional records were also set: NH Land (+1.50), NH Ocean (+1.08), SH Ocean (+0.89 °C), Global Ocean (+0.97 °C) and Northern Extra-tropics (+1.22 °C, 20°N-85°N).

As mentioned since the tropical ocean temperatures started to decline in January, this represents a significant loss of ocean heat content. This heat must go somewhere and we often see an increase in tropical atmospheric temperatures for a few months when this occurs, and has now apparently continued. As stated (accurately) last month, "I still don't think it's a good idea to place a bet on whether April will see the start of the cooling, but I suspect it will be soon." So, though the oceanic heat content has been falling since December and is now below average for the tropical Pacific, the atmosphere is still feeling the influx of this heat and it is taking a while to expel it to space.

See more on NOAA's excellent weekly updates 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 far southwestern Russia with a reading of +5.1 °C (+9.2 °F) above the average. The tropics were mostly above average as were large regions in the southern high latitudes, central Canada and Eastern Asia.

With a reading of -3.2°C (-5.8 °F), the coolest departure from average was found over eastern Antarctica. A few areas of below average temperatures in the South Atlantic Ocean to southern Argentina, Afghanistan and surroundings, and the Pacific Ocean NW of Hawaii.

The conterminous US was above the 30-year average with an anomaly of +1.02°C (+1.84°F) with no areas especially warm or cold. It was slightly cooler than that in Alaska, so the 49-state average came in at +0.94 °C (+1.69°F). [We don't include Hawaii in the US results because its land area is less than that of one satellite grid square, so it would have virtually no impact on the overall national results.]

Background notes.

A note about the global temperature trend. For several years, the trend has been extremely close to +0.135 °C/decade. This past July, the threshold of 0.135 was crossed at +0.1352 °C/decade. With the significant spike in global temperature due to the 2023-24 El Niño, the trend is now +0.15 °C/decade.

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, but we are renewing our efforts as Dr. Braswell is now focused on this task. 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.

Dr. 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 nine 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.

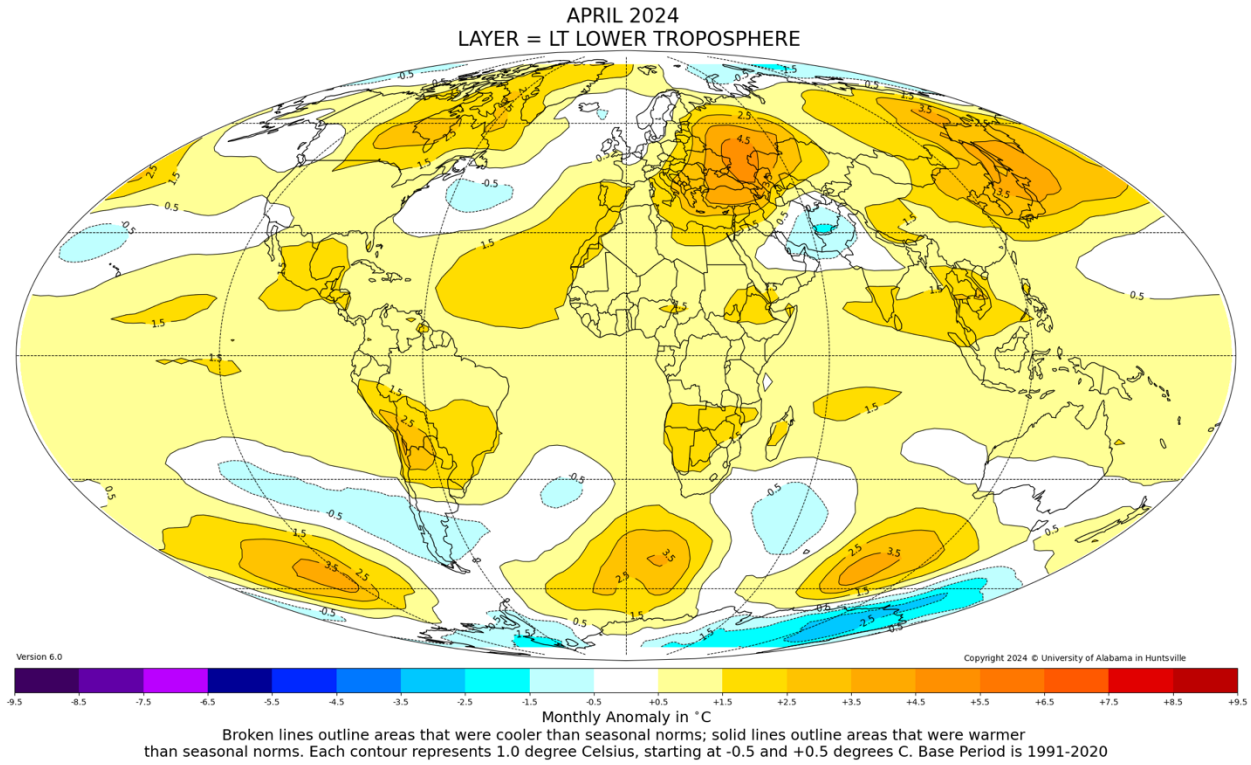

Figure. Lower tropospheric temperature anomalies for April 2024

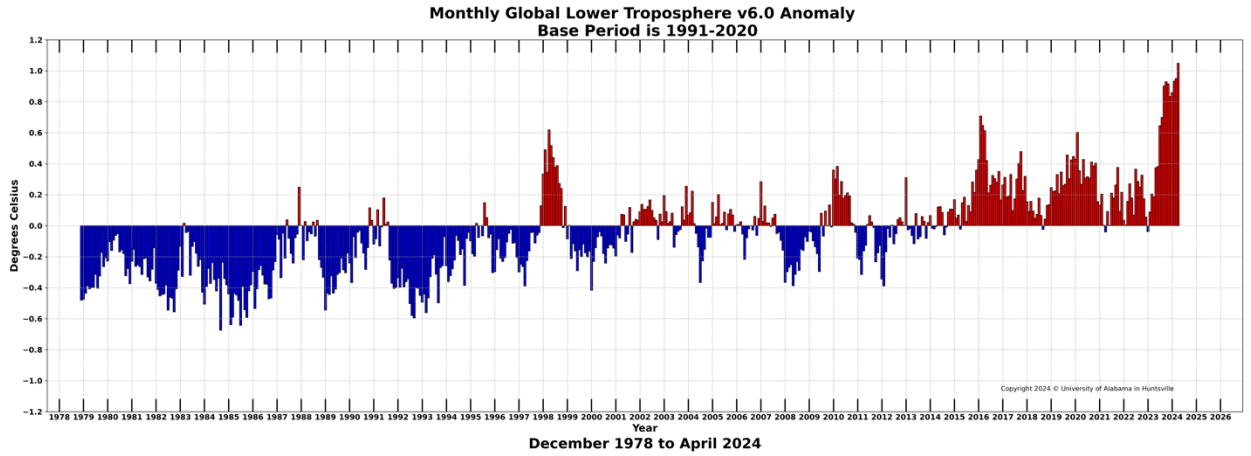

Figure. Bar chart of global monthly lower tropospheric temperature anomalies.