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Global Temperature Report: April 2020

Global climate trend since Dec. 1 1978: +0.135 C per decade

March Temperatures (preliminary)

Global composite temp.: +0.38 C (+0.68 °F) above seasonal average

Northern Hemisphere: +0.43 C (+0.77 °F) above seasonal average

Southern Hemisphere: +0.34 C (+0.61 °F) above seasonal average

Tropics: +0.45 C (+0.81°F) above seasonal average

March Temperatures (Final)

Global composite temp.: +0.48 C (+0.86 °F) above seasonal average

Northern Hemisphere: +0.61 C (+1.10 °F) above seasonal average

Southern Hemisphere: +0.34 C (+0.61 °F) above seasonal average

Tropics: +0.63 C (+1.13°F) above seasonal average

Notes on data released May 2, 2020 (v6.0)

Seasonally-adjusted temperatures dropped a bit in the tropics and northern hemisphere from March values leading to a global temperature departure from average of +0.38 °C (+0.68 °F). As indicated last month we suggested that the drop is due in part to the cooling of the central Pacific Ocean. Recall that in the latter months of 2019, a weak, warm El Niño-like event occurred which aided in warming up the atmosphere for a few months but that impact is mostly exhausted now. The two-month drop in the Northern Hemisphere temperature of -0.53 °C is rare – exceeded only once in the 497-month history when the hemisphere cooled between the 1987 warm El Niño and the cold 1989 La Niña. The NH temperature dropped -0.69 °C between December 1987 and February 1988.

The region with the warmest departure from average was a large hot spot in central Russia in the Krasnoyarsk Krai region. The peak occurred near Vorogovo at a remarkable +6.4 °C (+11.4 °F) above average. As is usual, when it's very warm in one place, there are usually a series of alternating cold and warm regions in the same latitude belt, reflecting a somewhat stationary pattern. This month the pattern indicates three warm peaks (Central Russia, Gulf of Alaska and Europe) with three cool areas in between (Sea of Japan, Canada and western Russia.) Moving eastward from the peak in central Russia to the cool area in central Canada we find the coldest departure from average near the Prince Albert National Park in Saskatchewan with a -3.3 °C (-6.0 °F) anomaly.

Besides the locations mentioned above, warmer than average conditions prevailed in the Caribbean Sea, Eastern Antarctica and western Australia. Cooler than average temperatures were found in the southern oceans.

The conterminous U.S. experienced its coolest April since 1998 being -0.59 °C (-1.06 °F) below the seasonal average. April U.S. temperatures have a large range though, being as cool as -2.54 °C (1983) and as warm as +2.08 °C (1981). Alaska was warmer than average in April, so that the 49-state mean temperature departure was not quite as cold as the 48-state value being -0.24 °C (-0.43 °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.]

The remarkable warmth of the lower stratosphere that was linked to the aerosols from the Australian fires last year is apparently fading. The global departure from average for this layer was +0.00 °C in April, down from +0.32 °C last month. Even so, April's temperature was the warmest since the volcanically-induced warming in 1993 after the eruption of Mt. Pinatubo in 1991.

Spoiler Alert first published March 2019: As noted over the past several months in this report, the drifting of satellites NOAA-18 and NOAA-19, whose temperature errors were somewhat compensating each other, will be addressed in this updated version of data released from March 2019 onward. As we normally do in these situations we have decided to terminate ingestion of NOAA-18 observations as of 1 Jan 2017 because the corrections for its significant drift were no longer applicable. We have also applied the drift corrections for NOAA-19 now that it has started to drift far enough from its previous rather stable orbit. These actions will eliminate extra warming from NOAA-18 and extra cooling from NOAA-19. The net effect is to introduce slight changes from 2009 forward (when NOAA-19 began) with the largest impact on annual, global anomalies in 2017 of 0.02 °C. The 2018 global anomaly changed by only 0.003°C, from +0.228°C to +0.225°C. These changes reduce the global trend by -0.0007 °C/decade (i.e. 7 ten-thousandths of a degree) and therefore does not affect the conclusions one might draw from the dataset. The v6.0 methodology is unchanged as we normally stop ingesting satellites as they age and apply the v6.0 diurnal corrections as they drift.

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. Research Associate Rob Junod assists 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:

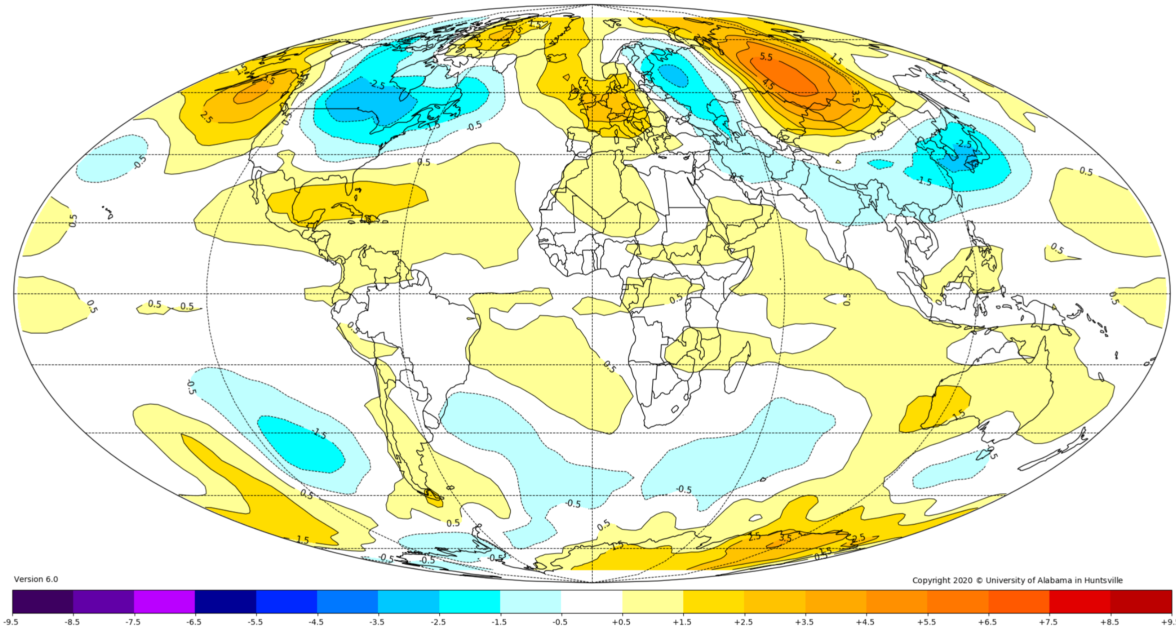
http://www.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.txt

Archived color maps of local temperature anomalies are available on-line at:

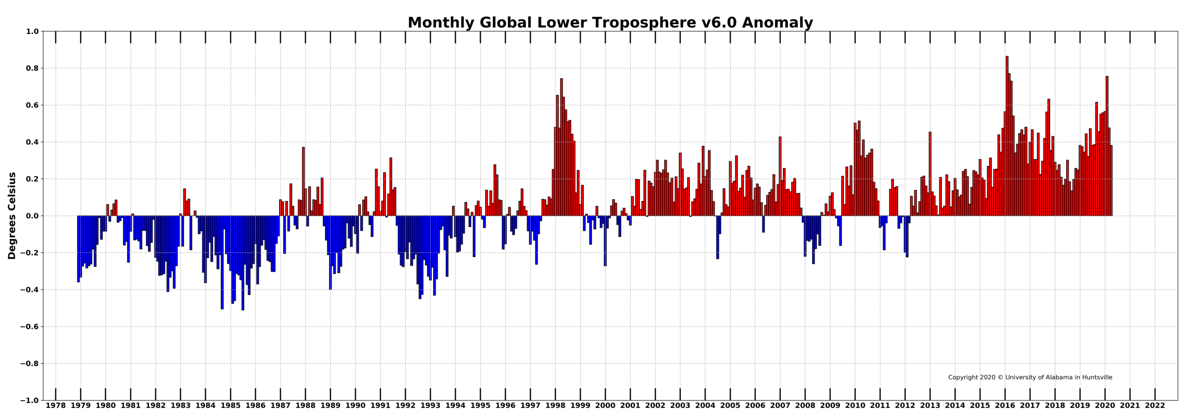
http://nsstc.uah.edu/climate/

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.

APRIL 2020
LAYER =LT LOWER TROPOSPHERE



Broken lines outline areas that were cooler than seasonal norms; solid lines outline areas that were warmer than seasonal norms. Each contour represents one degree Celsius, starting at -0.5 and +0.5 degrees C.



December 1978 to April 2020