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Global Temperature Report: April 2019

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

April Temperatures (preliminary)

Global composite temp.: +0.44 C (+0.79 °F) above seasonal average

Northern Hemisphere.: +0.38 C (+0.68 °F) above seasonal average

Southern Hemisphere.: +0.51 C (+0.92°F) above seasonal average

Tropics.: +0.54 C (+0.97 °F) above seasonal average

March Temperatures (final)

Global composite temp.: +0.34 C (+0.61 °F) above seasonal average

Northern Hemisphere.: +0.44 C (+0.79 °F) above seasonal average

Southern Hemisphere.: +0.25 C (+0.45°F) above seasonal average

Tropics.: +0.41 C (+0.74 °F) above seasonal average

Notes on data released April 1, 2019 (v6.0)

[Note that with March 2019 data forward, we have updated the merging process for the period since 2009 which has very slightly altered the recent values as discussed at the end.]

April's globally-averaged, bulk-layer atmospheric temperature anomaly of +0.44°C (+0.79°F) up 0.1 °C from March and the warmest departure from average since October 2017. While the NH dropped slightly, the SH and Tropics rose from March's values – the SH adding 0.26°C

to reach +0.51 °C above average. As noted earlier, the current El Niño is rather modest, so temperatures are less extreme than in past events. NOAA reports that the equatorial upper ocean heat content has declined steadily since early March, and some of that heat has found its way to the atmosphere before exiting to space. The tropical region, where the largest response occurs, is running at +0.54°C above the mean whereas the major El Niño in 2016 saw April's value at +0.94°C. And, back in the El Niño of 1998, April's tropical temperature reached +1.18°C above average. Nonetheless, the tropical and global temperature departures are feeling the impacts of the 2019 El Niño.

The month's coldest seasonally-adjusted temperature departure from average occurred in northern Manitoba, Canada: -2.6°C (-4.7°F). The warmest spot was not too far away - over the Greenland Sea at +5.3°C (+9.4°F). The rest of the global map of temperature anomalies displays the typical patchwork of above and below average regions except for the El Niño-induced warmth in the tropical belt where essentially no below-average readings are seen.

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/

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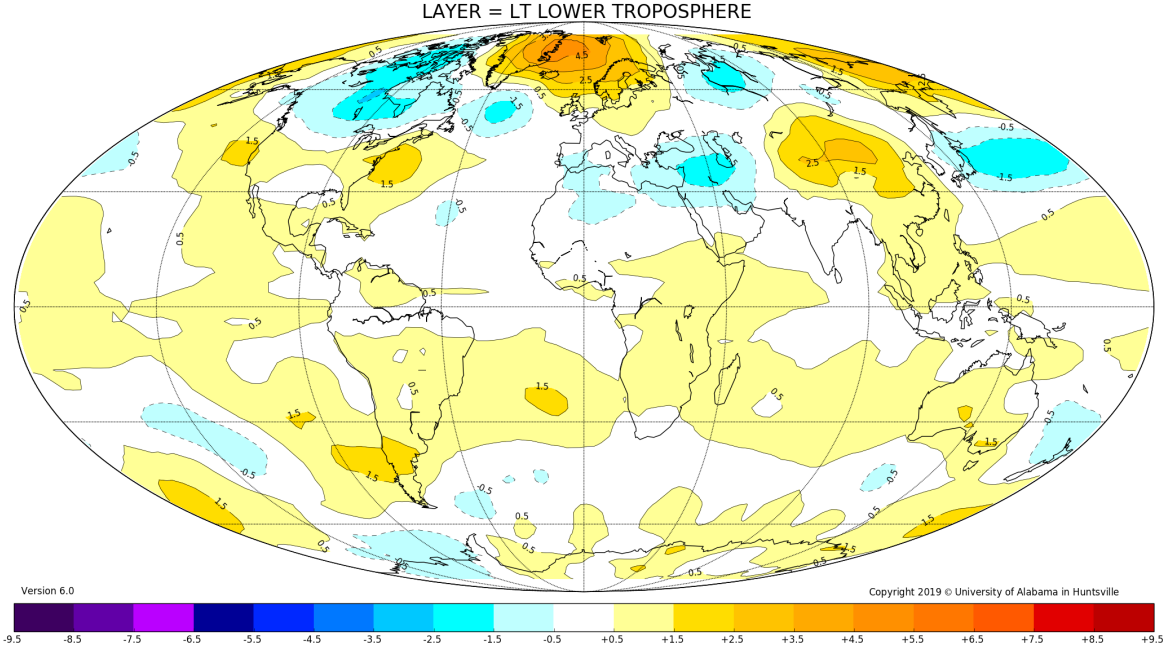
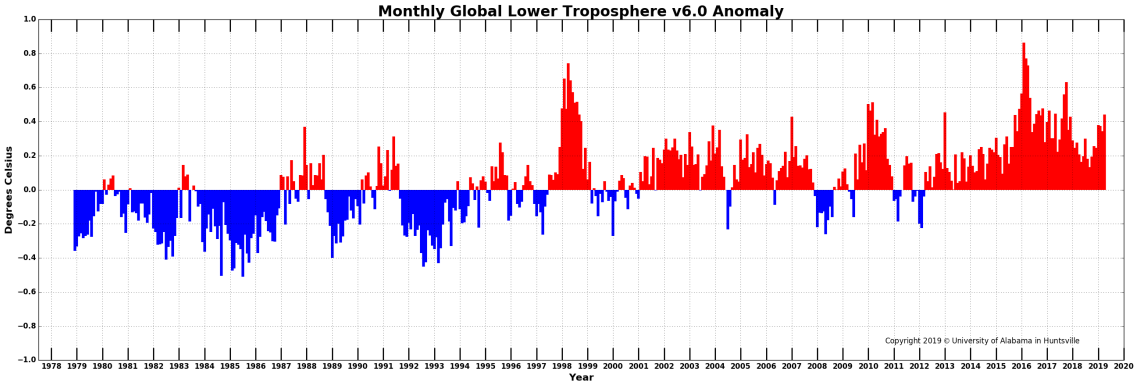
APRIL 2019
LAYER = LT LOWER TROPOSPHERE



Monthly Anomaly in °C

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 2019