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Global Temperature Report: March 2019

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

March Temperatures (preliminary)

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

February Temperatures (final)

Global composite temp.: +0.37 C (+0.67 °F) above seasonal average

Northern Hemisphere.: +0.47 C (+0.85 °F) above seasonal average

Southern Hemisphere.: +0.28 C (+0.50 °F) above seasonal average

Tropics.: +0.43 C (+0.77 °F) above seasonal average

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

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

March's globally-averaged, bulk-layer atmospheric temperature anomaly of +0.34°C (+0.61°F) changed little from February. Values for the large sections (NH, SH and Tropics)

were also similarly unchanged from last month. As noted in last month's report, the official El Niño is having minimal impact on global temperatures thus far.

The month's coldest seasonally-adjusted temperature departure from average occurred just south of Greenland in the North Atlantic: -2.5°C (-4.5°F). The warmest spot, at $+6.2^{\circ}\text{C}$ ($+11.2^{\circ}\text{F}$), is obvious on the map, occurring over Inuvik in the NW Territories of Canada. The NW section of North America, including Alaska, was so warm that the departure from average of the conterminous U.S. was -0.55°C (-0.99°F) but when Alaska is included, the U.S. average rises to $+0.12^{\circ}\text{C}$ ($+0.22^{\circ}\text{F}$).

The monthly map for March 2019 indicates the El Niño signature of warm tropical temperatures is weak but distinct in the eastern Tropical Pacific Ocean but does not follow the usual situation in which these above-average temperatures spread throughout the tropics. Cooler than normal conditions appear from the eastern mid-latitude Pacific NE all the way to the Barents Sea. Warmer than average temperatures paralleled this cool band and are seen from (generally) the El Niño region of the eastern Tropical Pacific NE to Russia. Unusually warm conditions appear along the dateline in the SH with cool, meridional bands on either side.

New Spoiler Alert: 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 $+0.228^{\circ}\text{C}$ to $+0.225^{\circ}\text{C}$. These changes reduce the global trend by $-0.0007^{\circ}\text{C}/\text{decade}$ (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.

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:

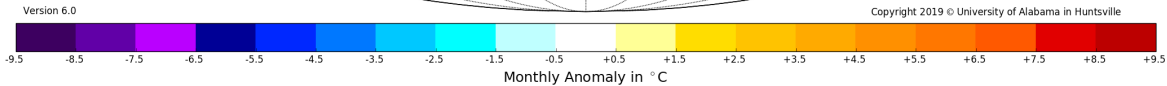
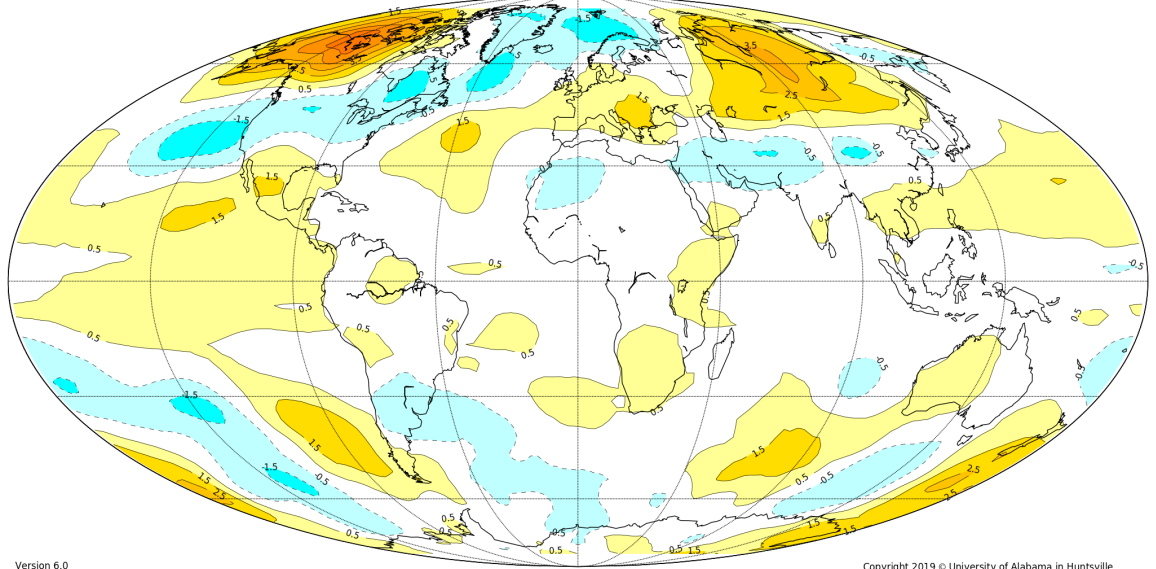
http://www.nsstc.uah.edu/data/msu/v6.0/tlt/uahncdc_lt_6.0.txt

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.

MARCH 2019
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.

