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**Global Temperature Report: February 2020**

Global climate trend since Dec. 1 1978: +0.134 C per decade

**February Temperatures (preliminary)**

Global composite temp.: +0.76 C (+1.40 °F) above seasonal average

Northern Hemisphere: +0.96 C (+1.73 °F) above seasonal average

Southern Hemisphere: +0.55 C (+0.99 °F) above seasonal average

Tropics: +0.76 C (+1.40°F) above seasonal average

**January Temperatures (Final)**

Global composite temp.: +0.57 C (+1.03 °F) above seasonal average

Northern Hemisphere: +0.60 C (+1.08 °F) above seasonal average

Southern Hemisphere: +0.53 C (+0.95 °F) above seasonal average

Tropics: +0.62 C (+1.12°F) above seasonal average

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

Tropical and Northern Hemispheric warmth contributed to an increase of +0.20 °C (+0.36 °F) in February’s temperature over that of January to +0.76 °C (+1.40 °F) above the 30-year average, and the second warmest February in the 42 years of satellite data. February 2016, during a major El Niño event, was warmer (+0.86 °C or +1.55 °F) and only one other month was a tiny bit warmer (March 2016 +0.77 °C) indicating February 2020 was the third warmest of any month relative to seasonal averages.

The warmth in the Pacific Ocean waters associated with a modest El Niño in early 2019, with a resurgence to a very weak El Niño in late 2019, aided in producing the high temperatures since the atmospheric temperatures lag those of the ocean by a few months. Thus a combination of the weak El Niño warmth, a 42-year positive trend, and the natural month-to-month random variability produced the high temperatures we are seeing. As noted last month, accounting for the cooling influence of volcanoes in 1982 and 1991 as well as the influence of the El Niño/La Niña cycle, the global trend without these natural, ephemeral phenomena is about +0.1 °C per decade.

The conterminous U.S. as a whole experienced a slightly warmer-than-average February (+0.38°C, +0.68 °F). However, it was again much cooler than average in Alaska, so that the 49-state area’s temperature departure was almost exactly average at +0.08 °C (+0.14°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.]

Globally, locations with sustained much-warmer-than-average temperatures for the month appeared over Europe, Russia, the North Pacific and south of South America. The month’s warmest departure from seasonal norms was in Northern Russia over Volochanka at +4.7 °C above the 1981-2010 average.

The coldest departures for the season occurred, as they did in January, over Alaska and Greenland where in the south-central area of the latter, near Sermersooq, a value of -3.9 °C was recorded.

As we look higher up on the stratosphere, it is worth noting that February 2020 produced the warmest global lower stratospheric temperature since the 2-year long warming induced by the Mt. Pinatubo volcanic eruption 27 years ago. The volcano erupted in June 1991 and the stratospheric temperature rose rapidly then fell back in 1993 – the last time the global average was above the 30-year normal until this month.

**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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