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**Global Temperature Report: July 2020**

Global climate trend since Dec. 1 1978: +0.14 C per decade

**July Temperatures (preliminary)**

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

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

Southern Hemisphere: +0.42 C (+0.76 °F) above seasonal average

Tropics: +0.46 C (+0.83°F) above seasonal average

**June Temperatures (final)**

Global composite temp.: +0.43 C (+0.77 °F) above seasonal average

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

Southern Hemisphere: +0.41 C (+0.74 °F) above seasonal average

Tropics: +0.46 C (+0.83°F) above seasonal average

**Notes on data released August 3, 2020 (v6.0)**

July’s seasonally-adjusted, large-scale temperature averages were almost identical to those observed in June. The global average edged up an insignificant +0.01 °C to +0.44 °C (+0.79 °F). The tropical belt and the northern hemisphere matched temperatures from June at +0.45 and +0.46 °C respectively. The tiny uptick of +0.01 °C in the SH led to the global increase.

If you’ve been watching the situation in the tropical Pacific Ocean you will note that sea surface temperatures there have declined since mid-April. Indeed, the deeper layer of ocean there has lost a considerable amount of heat, some of which made its way to the atmosphere, keeping the tropical and global temperatures quite warm during the boreal spring. One of the key indicators of La Niña formation is NOAA’s MEI index which for May-June slipped into the moderately negative territory, which if continued will suggest a cool La Niña event for the coming year. NOAA’s forecast group is indicating a slightly better than 50% chance of a La Niña event this winter. Stay tuned on that front but see the latest here.

https://www.cpc.ncep.noaa.gov/products/analysis\_monitoring/lanina/enso\_evolution-status-fcsts-web.pdf

The globe’s warmest departure from averaged occurred near the small research base of Eureka on Ellesmere Island, Canada (+3.1 °C, +5.6 °F). Other warm areas included the NW Pacific Ocean, the Arctic, portions of western and eastern Antarctica and a band that extended eastward from southern Brazil across South Africa to southern Australia.

The largest cold anomaly was in the far South Atlantic Ocean just off Antarctica south of the Sandwich Islands where it dipped to -3.8 °C (-6.9 °F). It’s already winter there, so this was especially cold. Other cooler than average areas were found in the Gulf of Alaska, Scandinavia westward to Iceland, Kazakhstan and southward, Japan and the Koreas, and the area surrounding the cold spot in the South Atlantic.

Overall, the conterminous U.S. experienced slightly above-average temperatures at +0.56 °C (+1.01 °F) with the NE experiencing the warmest departure. Alaska was cooler than average in June so that the 49-state mean temperature departure was a bit lower than the 48-state value at +0.43 °C (+0.77 °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.]

**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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