November 4, 2020

Vol. 30, No. 7

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**Global Temperature Report: October 2020**

Global climate trend since Dec. 1 1978: +0.14 °C (+0.25 °F) per decade

**October Temperatures (preliminary)**

Global composite temp.: +0.54 °C (+0.97 °F) above seasonal average

Northern Hemisphere: +0.71 °C (+1.28 °F) above seasonal average

Southern Hemisphere: +0.37 °C (+0.67 °F) above seasonal average

Tropics: +0.37 °C (+0.67 °F) above seasonal average

**September Temperatures (final)**

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

Northern Hemisphere: +0.58 °C (+1.04 °F) above seasonal average

Southern Hemisphere: +0.56 °C (+1.01 °F) above seasonal average

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

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

October’s seasonally-adjusted, large-scale temperature averages generally fell a bit from September’s with one major exception. The global average was +0.54 °C (+0.97 °F), second warmest to October 2017. The atmospheric temperature over the northern mid-latitude oceans, and in particular the northern Pacific Ocean, was the warmest October value of the satellite era at +0.99 °C (+1.78 F), pushing the whole Northern Hemisphere to its warmest October in the 42 years of record. Th NH Land area and the Globe as a whole have been warmer in earlier Octobers. You can see all of the numbers at the link given at the end of the report.

As you know, the Earth is experiencing a La Niña event now (colder than normal equatorial Pacific sea temperatures) and this should affect global temperatures in the next several months. See here for the latest analysis from NOAA.

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

The current situation looks a lot like the 2007-08 La Niña in terms of the El Niño Indices that describe the event, so I did some comparisons. The global temperature for the first six months of 2008 averaged 0.32 °C cooler than the average for the previous August to October. If this bears out, we would expect January to June 2021 to average about +0.2 °C, i.e., about 0.3 °C cooler than August to October of this year. I also checked the same periods for the La Niña of 2010-11 and came up with the same difference, a cooling of 0.32 °C from late summer/early fall to the following January to June.

I noticed too that though the global temperature did not really begin to fall in these previous two La Niñas until after October, the tropical temperatures indeed had started to fall. Here we see another parallel to 2007 and 2010 in that tropical temperatures in 2020 have declined in the past two months by 0.2 °C, a value similar to the decline in these previous two events. So, evidence from past events indicate a bit of cooling is in the offing for the start of 2021.

There were a number of regions with warmer than average temperatures this month. The warmest was over the Tibetan Plateau at +4.6 °C, but other warm spots appeared in the aforementioned North Pacific as well as the north polar region, Ukraine/western Russia, South Africa and Argentina.

Cooler-than-average regions were less extensive, but the coldest location stood out clearly in Ontario, Canada which experienced temperatures that were 3.9 °C below the seasonal mean. Other cool regions were found in France, parts of the southeastern Pacific Ocean and central Russia to Mongolia.

Overall, the conterminous U.S. experienced an above-average temperature of +1.10 °C (+1.98 °F) with the western third quite a bit above average (again.) Alaska was just as warm so that the 49-state mean temperature departure was the same +1.10 °C (+1.98 °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/

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.

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