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Annual State of the Climate Report Released Showing Effects of Planet's Warming Across Multitudes of Key Indicators

AUGUST 12, 2019 – BOSTON, MA – A new *State of the Climate* report released today by AMS confirms that 2018 was one of the hottest years on record. Global surface temperatures continued the trend in which every year since the turn of the 21st century has been hotter than any year experienced in the 20th century.

State of the Climate puts a peer-reviewed stamp on the evidence that 2018 was one of the four warmest of 137 years of recordkeeping. Only the three record-setting years of 2015-2017 were warmer.

The report is a widely cited documentation of the major events in climate. A comprehensive analysis of sources and varied means of tracking global and regional climate that show that trends are consistent with a warming planet. The annual supplement to the *Bulletin of the American Meteorological Society* is compiled by NOAA's National Centers for Environmental Information and is based on contributions from hundreds of scientists from around the world. "AMS is happy to once again partner with NOAA on the creation and dissemination of this critically important annual assessment," said AMS Executive Director Keith Seitter.

The indicators range across the year's notable weather events in every region as well as conditions in lakes and oceans and from beneath the land surface into the upper reaches of the atmosphere. The sources of data encompass nearly the entire suite of global environmental observing instruments—on land, water, ice, in the atmosphere, and in space.

The report states that the combined direct warming influence of greenhouse gases in the atmosphere is now nearly 43% stronger than in 1990. Notably, global carbon dioxide concentrations rose during 2018 to a record 407.4 parts per million. The prevalence of other major greenhouse gases, such as methane and nitrous oxide, also increased.

One global indicator of this continued warming is the ongoing shrinkage of glaciers. As of 2018, the world's glaciers have collectively lost mass 30 years in a row.

Another indicator is the Arctic ice pack, which is now dominated by first-year ice that is especially prone to summer melting. In March 2018, the first-year ice peaked at 77% of the ice cover, as compared to typically 55% during the spring peaks of the 1980s. Nonetheless, Eurasian and North American snow cover was above average in winter and spring in 2018, amidst an overall downward trend for May and June, the key snowmelt months.

Record-low fire extent in southern hemisphere America and Africa drove the global fire coverage to its smallest area since records began in 1997. It is an example of the complexity of many climate indicators: changes in land use drive a long-term trend toward less fire in the African savanna.

Oceans in 2018 were integral to the warming trend even as a weak La Nina shifted to a weak El Niño—meaning the year lacked a powerful Pacific warming influence such as the record 2016 El Niño. Global sea surface temperatures in 2018 were 0.33°C above the 1980–2010 mean—not as hot as 2016, but enough to sustain the continued trend of 0.10°C increase per decade since 1950 and the acceleration of the trend in this century.

The heating extends to the depths: global ocean heat content from the surface down to 700 meters set a record again in 2018.

The heating is a factor in long-term sea level rise, too. For the seventh year in a row, global annual mean sea level reached a record height as tracked in the 26 years of measurements using remote sensing by satellites.

Here are some of the numbers from 2018:

3.1 mm—the mean annual global rise in sea level in the satellite era—a trend that is accelerating.

11: The worldwide count of Category 5 tropical cyclones, one off the record set in 1997.

22%...the portion of anthropogenic carbon releases in 2008-2017 absorbed by the oceans, moderating the atmospheric warming but acidifying waters.

24 meters: the thickness that would have had to be lopped off the top of the world's glaciers to equal the mass of ice lost since 1980.

30 years: the ongoing streak in which global glacier mass has decreased.

51.3°C: new national record for Algeria set at Ouargla on 5 July.

77%: the portion of Arctic ice pack in March 2018 that was first year ice—highly vulnerable to summer melt.

81 mm: the amount global annual mean sea level exceeded the 1993 level.

710.2 mm: In Hawaii, 1262 mm precipitation at Waipā Gardens (Kauai) on 14–15 April set a new U.S. record for 24-h precipitation.

500 million hectares: the lowest global fire extent area since records began in 1997.

\$40 billion: The combined cost of U.S. wildfires in 2017 and 2018

These key findings and others are available from the *State of the Climate* in 2018 report released online today and can be read in full [here](#).