



## Here are some science guidelines and tips for writing about heatwaves, global warming and attribution:

The fingerprint of global warming has been found in the global increase in heatwaves.

Climate change has been found to increase the global frequency, severity and duration of heatwaves.

In the United States the increasing heat in the west is already so severe that the signal of climate change has been detected rising above the wide range in natural variation in temperatures seen at the local level (the range in natural variation is greater at the local level than the global scale).

Gone beyond the long-term trend in heat waves, attribution studies for individual heat waves are relatively rare. Moreover when attribution studies for individual heatwaves are done, the results are published weeks to months later.

However, writers can discuss global warming, heatwaves, and attribution in real-time by looking at how the event compares to the long-term trend and then ask how that long-term trend is linked to climate change. Writers can put an individual heatwave into the context of the long-term trends; they can compare a heatwave to the historic averages and then ask how global warming is affecting that average.

In particular, writers can look at whether heatwave is especially severe or record-breaking, whether it is lasting longer than usual, and whether it appears unusually early in the season. Writers can also ask whether the event brings the total number of hotter-than-normal days in the year to date above the long-term average for the year to date, reflecting the increasing frequency of heat waves.

To judge severity and frequency, looking at weather records can be useful. Record breaking heatwaves reflect the trend driven by of climate change. Weather records tend to fall when climate change runs in the same direction as natural variation. With heatwaves, both natural variation and climate change are running towards extreme heat, with climate change amplifying the natural phenomena of extreme heat. Four out of five record-hot days globally are now amplified by the trend in global warming. Global warming contributed to the record for hottest day of the year globally in at least 82 percent of the records over the 1961-2010 period

To judge whether an event is particularly severe, reporters can also look at weather stats such as the cumulative number of days of heat above 90°F or 100°F so far in the year, and compare to the historic average for that location. Climate change is increasing the frequency of hot days and nights, and expanding the length of the “hot” season.

High humidity is another trend driven by climate change, creating a double whammy, that writers can examine in any heatwave. This trend particularly important as high humidity drives up the heat stress index dramatically.

Writers can also look at the overnight lows in heat waves, i.e. hot nights, as hot nights are a classic signature of climate change on warming planet. The influence of global warming is particularly strong in elevating overnight temperatures. The impact of hot nights is especially important as heatwaves with hot nights do not permit any respite from the heat, respite that is critically important for children, the elderly and the ill.

NWS offices are a great source for all of the above weather records, as is NOAA and the National Centers for Environmental Information. Local meteorologists are another great source.

One tip about historic averages: reporters should be sure to ask about the average observed 1951-1980, a standard 30-year weather reference period that occurred during a relative stable climate era, prior to the surge of observed changes over the past 40 years. When “normal” is defined as the average of the most recent 30-year reference period (1980-2010), that “normal” actually reflects a lot of climate change.

Here are two great sources in particular for reporters looking for data on heat trends for their area:

**Climate Explorer**: a weather database tool that provides graphs and maps of historical and projected temperatures for any county in the contiguous United States, developed by an interagency team including the Environmental Protection Agency (EPA), NASA, NOAA, and the U.S. Geological Survey.

**Climate at a Glance**: View and download data and charts illustrating how a daily highs (max temp), overnight lows (minimum temp) and cooling degree days have trended in any city or state since 1895. The user can also define the month or season of interest. Provided by NOAA.