

Michael Wehner's statement about Detection and Attribution of a human influence on climate change and the 4th US National Climate Assessment at 2017 meeting of the American Geophysical Union in New Orleans.

Good Morning. My name is Michael Wehner. I am a senior scientist at the Lawrence Berkeley National Laboratory and a member of the lead author team for this Climate Science Special Report. I also am the current chair of the International Detection and Attribution Group, a long standing, ad hoc group of scientists interested in understanding the human role in observed climate change.

Slide #2

I must point out, according to the terms of the Department of Energy's policy on scientific integrity, shown on this slide, that the views that I state today are not necessarily reflective of the United States Department of Energy, the Lawrence Berkeley National Laboratory, the University of California or even the other members of the lead author team. These views are my own and not intended to reflect any US government policies or positions.

Slide #3

Formal detection and attribution studies are assessed throughout this report. New developments in the science of extreme event attribution are reported for thirty different events within the United States, including heat waves, cold snaps, wet seasons, individual storms and droughts. Most but not all of these events revealed an influence from the human interference in the climate system. It is no longer appropriate to state that the influence of anthropogenic climate change on specific individual weather events cannot be quantified. Rather, very much can be stated, sometimes with high confidence, of the effect of global warming on highly impactful weather events within the United States and elsewhere. In the aftermath of this past year's heat waves and hurricanes, this attribution of the effect of human activities on individual extreme weather events is even more important and interesting.

Heat waves and cold snaps generally are found to have a significant human influence.

Slide #4

Heavy precipitation seasons as well as individual extreme storms were analyzed. Analysis of high impacts storms presents numerous special challenges and the field is rapidly evolving. I would note that two attribution papers on Hurricane Harvey's unprecedented precipitation are being presented at this AGU meeting. But of course are not included in the Assessment.

Slide #5

Attribution statements for meteorological drought are decidedly mixed, including that experienced recently in California. The human effect on agricultural drought, a soil moisture deficit, is somewhat more straightforward, at least at the surface, due to the strong relationship between increased evapotranspiration and warmer temperatures.

Slide #4

I would like to turn now to the more traditional detection and attribution results assessed in this report. Much attention has been paid in the press to the statement in the Executive Summary: “...it is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid 20th century.”

Slide #5.

This statement in the Executive Summary is based on Key Finding #1 from Chapter 3: “It is *extremely likely* that more than half of the global mean temperature increase since 1951 was caused by human influence on climate (high confidence).” In fact, this is the most conservative statement that could be made about the human influence on the observed climate. The phrase “extremely likely” is taken from the calibrated language of the Intergovernmental Panel on Climate change and has special meaning. In this statement, it specifically refers to the result that the lower bound on a 5-95% statistical confidence interval of the human contribution to the observed increase in global mean surface air temperature is estimated to be greater than one half. The specifics of the confidence interval are based on climate model simulations. However, this statement is consistent with other techniques that don’t use models to estimate the human increase in the surface energy budget. Some of these techniques date to the 19th century.

Slide #6

The report goes on further to make a statement not just about the lower bound of the human influence on the climate system but to make a best estimate of this influence. Also from Key Finding #1 of chapter 3: “The *likely* range of the human contribution to the global mean temperature increase over the period 1951–2010 is 1.1° to 1.4°F...” Again, the word “likely” is taken from the IPCC calibrated language meaning that there is a two-thirds chance that the true influence lies in this range. The observed warming over this period is 1.2°F. Hence, the key finding goes on to state that there is “a *likely* human contribution of 93%–123% of the observed 1951–2010 change.”

Because the best estimate lies near the center of this range, it is appropriate for me to stand here and state that this report supports the statement “that human activities have caused all of the observed warming since 1951 in the context of this quantified uncertainty.” This is indeed a strong statement but one that needs to be made in my opinion.

These two statements in the report about the lower bound and best estimate of the human influence on climate are supported by a vast body of peer reviewed scientific literature spanning several decades. The lower bound is particularly constrained by our understanding of the climate system. However, the report does not make a statement about the less well constrained upper bound. This worst case scenario is important in a risk assessment context and is perhaps the topic of future National Assessments.

I reiterate that I do not speak for government policy or positions. However, I will say that there is little doubt that human actions, principally the increase in atmospheric carbon dioxide from burning coal, oil and natural gas are responsible for most if not all of the observed warming to date. There are no credible alternative explanations. Thank you.