

November 15th, 2013 (2:11)

Kevin Trenberth, distinguished senior scientist in the climate analysis section at the National Center for Atmospheric Research, Boulder, CO

IRA FLATOW, HOST:

This is SCIENCE FRIDAY. I'm Ira Flatow. Typhoon Haiyan barreled into the Leyte Gulf of the Philippines this week killing thousands of people. It brought 13-foot storm surges, 195 mile per hour winds. Super typhoons, Franken-storms, superstorms, we call them hurricanes, and in Asia they're typhoons. But it seems like each year a record-breaking tropical storm batters some coastline worldwide. Models of climate change predict more intense storms. When can we point to a storm and say, just as predicted by climate change research?

Let me introduce my guests. Kevin Trenberth is a distinguished senior scientist in the climate analysis section at the National Center For Atmospheric Research in Boulder, Colorado. Welcome to SCIENCE FRIDAY. Welcome back.

KEVIN TRENBERTH: I'm good. Good day to you, Ira

FLATOW: So there you point out a lot of dots and then you connect the dots. Can you connect the dots that this tropical - well, this Typhoon Haiyan is a result of global warming then?

TRENBERTH: Well, I don't think that's quite the right question. You know, the real question is, is global warming playing a role and I think, you know, my view on this nowadays is that the environment has changed, especially the water - the ocean environment. The oceans are simply warmer than they used to be by about one degree Fahrenheit, say prior to about the 1970s.

And the air above the oceans is warmer and moister. It's warmer by maybe by a little bit more than one degree Fahrenheit and there's about 5 percent more moisture on average over the oceans than there used to be, say, in the 1970s and earlier. And so this environment is where all of the storms are developing. It adds to the fuel that these storms feed upon, especially with regard to precipitation and especially with regard to hurricanes where there's a more direct relation between the subsequent intensity of the storms and this fuel that's actually feeding them.

February 1st, 2013 (2:43)

Michael Mann, Author, Distinguished Professor in Departments of Meteorology and Geosciences at Penn State, State College, PA

IRA FLATOW, HOST:

This is SCIENCE FRIDAY. I'm Ira Flatow. 2012 was the hottest year on record here in the U.S., and not only that, but the Midwest was devastated by drought, what the USDA calls the most extensive drought since the 1950s. And then of course Superstorm Sandy hit. All that and the climate change we've been hearing about in the Arctic, melting sea ice, shrinking glaciers in Greenland.

Maybe it's finally hitting home, at least that's the conclusion of this year's draft of the National Climate Assessment, the government report put out every four years to give the president and Congress the state of the climate.

Michael Mann is the author of, "The Hockey Stick and the Climate Wars: Dispatches from the Front Lines." He's also a distinguished professor in the Departments of Meteorology and Geosciences at Penn State in State College. Welcome back to SCIENCE FRIDAY, Dr. Mann.

MICHAEL MANN: Thanks, Ira, it's always a pleasure to talk with you.

FLATOW: Give us an idea of what this study - it's still in the works, the National Climate Assessment, is it not?

MANN: Sure, but it's an assessment of the existing scientific research, the existing literature. So we already have a pretty good idea of what science will ultimately constitute that report. It's the science that has been done in recent years, establishing the linkage between climate change and actual impacts that aren't just theoretical, they're not just something that we predicted, they're actually taking place.

We are seeing climate change now play out in terms of the way the weather is changing, the changing characteristics of our weather towards more extreme events of various types.

FLATOW: You know, and for the first time we're actually seeing or hearing scientists make that connection. They've been fearful about saying oh, you know, this is just the weather, it's not really the climate. But more and more we're hearing people saying this is what climate change looks like.

MANN: Well, that's right. You know, there's of course a certain randomness to weather. Weather you get on a given day is going to depend on the random vagaries of the

atmosphere. But when you step back, and you look at the statistics of the weather, you can look to see if they're changing.

It's sort of like rolling dice. You know, you roll a die, sixes are going to come up, on average, one every six times. What we are seeing now is sixes coming up twice as often as they should. And what I mean by that are we are seeing all-time records for warmth in the U.S. over the past decade being broken at twice the rate we would expect from chance alone.

Over this last year, it was about 10 to one. And so there's a larger context. It was the warmest year in the U.S., as you alluded to earlier, and within that warm year were a very large and record-breaking number of extreme warm days.

January 11, 2011 (1:57)

John Wallace, professor in the department of Atmospheric Sciences, University of Washington, Seattle, WA.

IRA FLATOW, HOST:

Here in New York, we got almost two feet of snow dumped on us this week, accompanied by something really unusual, a thunderstorm. It was a record-breaking January.

And earlier in the week, low temperatures had plummeted almost down to zero, but at the same time, there was a warm spell up north over Greenland and the Arctic.

Was this all just a coincidence or not? And could there be any connection to climate change? Joining us to sort through all of this is my guest, John Wallace. He's a professor in the Department of Atmospheric Sciences at the University of Washington in Seattle. Welcome to SCIENCE FRIDAY, Dr. Wallace.

Are we talking about global warming here, or is it too nebulous to say that?

Dr. WALLACE: Yes, well, I would never associate an event in as short a period of time as a single winter, or even a single couple of years, with global warming, which is a very slow process that's really evolving on the timescale of decades and longer.

FLATOW: But you do believe that global warming is real, a reality?

Dr. WALLACE: Oh, that's quite a different thing unfolding on a much longer timescale. And there we have - we can employ conventional, statistical methods to separate what's a real trend from just the year-to-year, up-and-down noise.

And of course we have all this corroborative evidence with the changes in melting and freezing dates and independent verification of the temperatures rising both over the oceans, from the ship data, and over land, from the land data, and the upper air temperatures. So there's a tremendous case there that we have had substantial warming over the - on the period of the 20th century, the last 110 years or so.

August 28th 2007 (3:05)

Chris Mooney, Washington Post Blogger and author of “Storm World: Hurricanes, Politics, and the Battle Over Global Warming”

IRA FLATOW, FLATOW:

Here now to talk with us about Hurricane Dean and what scientists are saying about the hurricane-global warming connection is science author, blogger, and pundit, Chris Mooney. His new book is "Storm World: Hurricanes, Politics, and the Battle Over Global Warming." He's also the Washington correspondent for Seed magazine. And joins us from our NPR studios in Washington. Welcome back to the program.

FLATOW: How do - what do scientists believe the way that global warming will affect hurricanes and the hurricane season?

Mr. MOONEY: Well, it's interesting. It's very complicated. This debate started out, especially after Katrina, as being about the intensification of hurricanes. And there's a basic thermodynamic theory, which suggests that if you store more heat in the sea surface...

FLATOW: Mm-hmm.

Mr. MOONEY: ...then the hurricanes are able to achieve a greater potential intensity. So you see a shift in terms of the total intensity achievable by hurricanes. And more recently, actually, now they're arguing over whether storm numbers are going up and down in the Atlantic. And there's lot of other things that I imagine that their going to picking apart such as the regional distributions of storms, whether season lengths are changing, and all of those things.

FLATOW: Let's talk about some of the numbers. Numbers for the last 100 years different, or the numbers for the last 50 or 25 or what?

Mr. MOONEY: Well, a scientific paper just came out from Greg Holland of the National Center for Atmospheric Research and Peter Webster of Georgia Tech saying that they've have been quite an increase in the total number of storms in the Atlantic region, you now, looking at it over the last century. And then a skeptic, Chris Landsea from the National Hurricane Center, quickly came in and said, well, you know, I'm measuring techniques for these storms and not nearly as good and we're probably missing way more storms earlier in the century when we didn't have the same techniques for measuring and when we weren't flying planes into them, when we didn't have radar, when we didn't have satellite, all these things. It makes it really hard to make definitive statements because of these data gaps and inhomogeneities.