Is global warming causing harsher winters?

March 28 2013, by Richard Ingham, Claire Snegaroff

People are seen taking their dogs for a walk at the Champ-de-Mars near the Eiffel tower, in Paris, on March 13, 2013. Blizzard-like conditions, coming only eight days before the official start of spring, knocked out power to thousands of people in France and left motorists stranded in their cars.

Millions of people in northern Europe are still battling snow and ice, wondering why they are being punished with bitter cold when—officially—spring has arrived and Earth is in the grip of global warming.

Yet some scientists, eyeing the fourth year in a row of exceptionally harsh late-winter weather in parts of Europe and North America, suggest warming is precisely the problem.

In a complex tango between ocean and atmosphere, warming is causing icy polar air to be displaced southwards, they contend.

"The linkage is becoming clearer and clearer, I think, although the science has not yet been settled," said Dim Coumou of the Potsdam Institute for Climate Impact Research (PIK) near Berlin.

The theory derives from a long-studied Arctic phenomenon called a positive feedback—in plain words, a vicious circle.

Rising temperatures are melting the Arctic's floating cap of sea ice, especially in summer.

An Iceland supermarket lorry passes a section of icicles and ice-covered hedgerow near Hazeley Bottom, south of Reading, on March 27, 2013. Millions of people in northern Europe are still battling snow and ice, wondering why they are being punished with bitter cold when—officially—spring has arrived and Earth is in the grip of global warming.

In 1979, when satellite measurements began, summer ice covered some seven million square kilometres (2.7 million square miles), roughly equivalent to 90 percent the area of Australia.

In September 2012, summer ice hit its lowest extent on record, at just 3.4 million sq. kms (1.31 million sq. miles).

Take away reflective ice, and you have a dark sea that absorbs solar radiation, which in turn reinforces the melting, and so on.

But the theory suggests the added heat, stored over a vast area of surface water, is also gradually released into the atmosphere during the Arctic autumn.

It increases air pressure and moisture in the Arctic, reducing the temperature differential with lower latitudes.

Here's what happens next: The polar vortex, a powerful circular wind that essentially pens Arctic air to the roof of the world, begins to weaken.

A man pushes a jammed car as heavy snow falls in Moscow, on March 15, 2013. Millions of people in northern Europe are still battling snow and ice, wondering why they are being punished with bitter cold when—officially—spring has arrived and Earth is in the grip of global warming.

Finding itself released, a mass of moist cold air spills southward, bringing snow and chill down into North America and Europe.

And it tends to stay there, because of what happens to the jet stream.

Instead of encircling the northern hemisphere in a sturdy and predictable fashion, this high-altitude wind takes a lazy looping path, zigzagging over the United States, the Atlantic and Europe. The southern parts of the loops get a bout of cold weather that becomes stalled in place.

"Heat that is stored in the (Arctic) ocean can rapidly transfer to the atmosphere, and this affects the dynamics" of northern hemisphere weather patterns, said Coumou in a phone interview.

"We've had a couple of winters (in Europe) where you've had rather shorter-term cold spells, of a duration of maybe 10, 20, 30 days... It's been the same in the continental US and Canada where they've seen similar quite bizarre cold spells but of a relatively shorter period."

Charles Greene, director of the Ocean Resources and Ecosystems Program at Cornell University in New York, said Arctic warming added a joker or two to the climate pack.

People are seen at a park on a snowy day in Berlin, on March 21, 2013. Millions of people in northern Europe are still battling snow and ice, wondering why they are being punished with bitter cold when—officially—spring has arrived and Earth is in the grip of global warming.

"With the changes in sea ice, we set up a situation where we stack the

deck, increasing the probability of these invasions of cold Arctic air," he said.

"But what's less predictable is which regions in the mid-latitudes will get hit. We're not sure yet how it will interact with other parts of the climate system in any given year, for instance how it will interact with El Nino and La Nina."

Greene also postulates that Superstorm Sandy last October wreaked its havoc because of a high-pressure zone over Greenland, possibly strengthened by changes triggered by sea-ice loss in the Arctic.

Like a barrier closing off a street, this mass of air forced Sandy to turn sharply west so that it slammed into the US East Coast. Normally, late-season hurricanes follow a northeastern track and peter out at sea.

The warming-and-winter scenario is far from unanimous in climatology. Other experts call for more evidence, especially from longer-term data.

"Looking at what's happening right now, in early spring, it's too early to say whether it is due in part to a temporary climatic swing," said David Salas-y-Melia of Meteo France, the French meteorological agency.

Jeff Knight of Britain's Met Office pointed to a natural climate variation called the North Atlantic Oscillation, whose phases tend to span 30-40 years.

Several decades of relatively harsher winters alternate with relatively milder ones—but there can also be years within these phases that buck the trend.

"In Europe, the effect of climate variability is quite large," said Knight. "There are possible links to explain why sea ice might influence

atmospheric circulation, but the jury is very much still out at the moment."

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