NATIONAL GEOGRAPHIC Daily News

Shrinking Arctic Sea Ice Linked to Snowier Winters?

Northern Hemisphere may get heavier snowfall, model suggests.

A worker clears snow at the Lincoln Memorial in Washington following a blizzard on February 11, 2010.
Photograph by Kevin Lamarque, Reuters

Ker Than

for National Geographic News

Published February 27, 2012

Rapidly shrinking Arctic sea ice could be behind the recent unusually cold and snowy winters in the Northern Hemisphere, a new model suggests.

From 2007 to 2011, large parts of the U.S., northwestern Europe, and northern and central China experienced early or abnormally heavy snowfall.

Some scientists have speculated that such harsh winters might be a result of disappearing Arctic sea ice, which reached a record low in 2007 due to global warming, according to the U.S. National Snow and Ice Data Center.

To test that theory, scientists entered data about Arctic sea ice and sea-surface temperatures into a climate model created by the U.S. National Center for Atmospheric Research.

The results pinpointed two mechanisms for how a decline in sea ice could lead to more snowfall.

For one, major sea ice loss could alter how air circulates in the atmosphere, so that more cold air masses from the Arctic would travel farther south. At the same time, melting sea ice also exposes more ocean water, which results in increased water vapor in the atmosphere that can be transformed into snow.

"The implication from this research is, if Arctic sea ice continues to decrease, we will probably see more snowfall and stronger snowstorms in the winter," said study leader Jiping Liu, a climate scientist at the Georgia Institute of Technology in Atlanta.

(See a world map of potential global warming impacts.)

Sea Ice-Snowfall Link Tricky

A connection between declining Arctic sea ice and increased snowfall sounds reasonable, said David Rind, a climate scientist at NASA's Goddard Institute for Space Studies in New York City.

Yet complex atmospheric events can rarely be caused by a single factor, cautioned Rind, who was not involved in the study.

"The atmospheric dynamic is so variable, and the basic equations of motion on the time scale that we're discussing have so much inherent variability in them that you can have the same situations next time but everything is different," Rind said.

Take the current Northern Hemisphere winter, for example, he said. "This year also has very little Arctic sea ice, but it's going to be one of the warmest winters on record in the United States. The snowfall totals have been abysmal. ... And in Europe the cold air did not come in the beginning of winter, but later."

(See "2011 Among Hottest Years, Marked by Extreme Weather.")

Scientists predict that as the climate continues to warm, unusual weather phenomena will become more common. The challenge, Rind said, will be determining whether these anomalies are part of global warming or natural variability. (Quiz: Test your global warming knowledge.)

"I think the only thing that will ultimately answer that is the durability of the effect," he added. "If, year after year, we're getting the same type of effect, that then looks like it's not a variability issue but a climate change issue."

The Arctic sea ice research appears in this week's issue of the Proceedings of the National Academy of Sciences.