

# Events in the Arctic Affect Climate 'Down South'

**T**he end of the Cold War and growing concern about global warming have made the frigid Arctic a hot spot for research.

The disbanding of the Soviet Union has opened up the Russian half of the Arctic to American scientists, who previously had very limited access to those areas. Such opportunity for scientific exploration couldn't come at a better time. Mounting evidence suggests that signs of global warming will be magnified at the top of the earth. This sensitive polar region not only is a barometer for major climate changes, research suggests, but may also be driving such changes via its strong influence on ocean and atmospheric circulation.

These and other concerns occupied arctic scientists, research managers, and others interested in the northern polar regions at a daylong symposium at the National Academy of Sciences building in March. The session was sponsored by the Arctic Research Consortium of the United States, the National Research Council's Polar Research Board, and the U.S. Arctic Research Commission.

"Events at the poles interact profoundly with those of the larger earth," said Philip Smith, executive officer of the Research Council. "We study these areas not only for their own secrets but also to learn about climate change, ozone depletion, and other phenomena affecting our planet. As we face problems such as global warming, we look to the Arctic for answers as never before," noted Smith, former deputy director of the National Science Foundation's Office of Polar Programs.

Research reveals that over the past 30 years there has been a warming trend in the Arctic, reported atmospheric scientist John Walsh of the University of Illinois. This trend is most apparent over the northern areas. It also is consistent with currently favored climate models that predict a warming of the earth due to excess production of such gases as carbon dioxide and methane by industry, cars, and other human activities. These "greenhouse" gases trap heat in the atmosphere. But other factors, such as changes in atmospheric circulation or the sun's activity, may also be fostering the warming seen in the Arctic, Walsh pointed out.



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A better handle on climate change promises to come from studies of a nearly two-mile-long core currently being extracted from the Greenland Ice Sheet. Trapped in the ice are air bubbles, various compounds, and other features that are expected to reveal atmospheric and ocean temperatures on a yearly and sometimes seasonal basis as far back as 200,000 years. Ice cores, used in conjunction with models and mathematical manipulations, can indicate climate conditions not only in Greenland, but also elsewhere in the world.

By matching changes in climate seen in the ice core to changes in human,

volcanic, and solar activity, and other factors, scientists are gaining a better understanding of the driving forces in global climate change.

Researchers already had detected a warming trend in the late 19th century, which may have been tied to large-scale agricultural clearing, according to Paul Mayewski of the University of New Hampshire. "With ice core studies [developed in the last three decades], we've opened up a whole new way of looking at climate change," he said.

### **Vulnerable Ecosystem**

The Arctic is not just a bellwether for climate change, however, but a valuable ecosystem. It's a nesting ground for many North American birds, and its oceans support an abundance of marine animals and some of the richest commercial fisheries in the world.

This Nordic ecosystem is extremely vulnerable, however. It suffered irreversible damage at the hands of early Viking settlers, who destroyed forests, disturbed bird and walrus colonies, and prompted massive soil erosion during the Middle Ages, said anthropologist Thomas McGovern of Hunter College.

Since 1911 several international treaties have been forged to protect the Arctic's natural resources. These treaties include those that regulate the harvesting of fish, caribou, or seals

and those that protect seabirds and polar bears. These treaties have had mixed success, according to Dartmouth social scientist Oran Young. Some of the treaties failed, he said, because they were too narrow in scope. A treaty to protect caribou, for example, may fail to limit oil development or other encroachments on the caribou's habitat. Success often follows treaties that allow each country



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**Caribou**

to be responsible for its own implementation and are flexible enough to adapt to changing circumstances. Young noted that a tradition of friendship between participating countries is not enough to guarantee a treaty's success. A treaty between the United States and Canada, for example, that regulates the harvesting of the caribou herd was not successful, whereas a treaty between Norway and the Soviet Union on fishing was able to transcend the Cold War, even though it encompassed an area of strategic importance.

### **Pollution and Health**

There is growing concern that water and air pollution is endangering arctic marine fish, birds, and mammals and the native people who depend on them for food, especially in arctic regions of the former Soviet Union. But physician John Middaugh of the Alaska Department of Health and Social Services noted that no death, birth defect, or major illness of an Alaskan has been found to be caused by PCB's, dioxin, DDT, mercury, cadmium, or other pollutants thought to pose a problem. Studies of 500-year-old Alaskan mummies, he added, have found levels of heavy metals in their bodies that are similar to those found in people today.

Other serious health problems, however, are related to life style. "We must remind our government," said Middaugh, "that it spends millions to abate environmental contaminants [in the Arctic], but does little in comparison to prevent and control tobacco and alcohol." These substances are causing illness and death in epidemic proportions among Alaskan natives, he noted.

### **Partners in Research**

Native Alaskans need to be more involved in the research and management of the wildlife resources on which they depend, said Jeslie Kaleak,

## Lessons from the Past

If major climate changes are around the corner and society will have to learn to adapt, it may pay to learn from mistakes people have made in the past when confronted with new climate conditions.

Early British Navy explorers, for example, continued to wear their government-issued uniforms throughout the arctic winter when their ships were frozen in ocean ice. Only after some decades did they finally adopt parkas and other garb

that native people had long worn for protection, according to Donald O'Dowd, chair of the U.S. Arctic Research Commission.

Their predecessors, the Viking explorers of the Middle Ages, never adapted to the arctic environment in Greenland. They relied on farming strategies appropriate for northern Europe and also failed to adopt the warm clothing and ringed seal hunting that the native people depended on. The Vikings perished

about 1500 A.D., when the climate grew colder.

But it's not just a matter of "it got cold and they died," emphasized anthropologist Thomas McGovern of Hunter College. The native people survived and prospered in Greenland, while the Norse died out, he said, "reminding us that the social dimension of climate impact has been at least as important as the biological dimension."

— M.P.

mayor of the North Slope Borough. Most of the people living in his large jurisdiction have a subsistence lifestyle. Kaleak called for more efforts to minimize industry's impacts on the environment. He also noted that better funded and more coordinated research projects can provide data for effective management of subsistence use of wildlife.

"We need to apply our research findings to native concerns and use natives as partners in research," concurred anthropologist Douglas Anderson of Brown University. "Their insider environmental knowledge should be appreciated and actively incorporated into research designs."

Another valuable partner in arctic

research, many participants noted, is the U.S. Navy. Its submarines have collected a wealth of classified data on ice cover and ocean circulation. The Navy is just starting to release these data to researchers, who are anxious to sift through them for signs of global warming.

But getting the data into a manageable form prior to their release requires funds that now are in short supply, according to Navy Rear Admiral William Houley.

"The good news is that the enemy has gone away," he said. "But the bad news also is that the enemy has gone away," and the Navy is curtailing a number of its arctic operations.

New research areas in the Arctic opened up by the end of the Cold War,

however, create a "window of opportunity we must not miss," said John Knauss, undersecretary of the Department of Commerce for oceans and atmosphere.

The Research Council's Smith concurred with Knauss. He noted that the Arctic takes its name from a star in the northern heavens called Arcturus. "I think the light of Arcturus is shining especially bright these days," he said. "It beckons us to find the secrets of this forbidding, desolate, yet beautiful region at the top of our earth."

— Margie Patlak

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