Study: Arctic Undergoing Holistic Climate-Change Response

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From glaciers to caribou, rivers to roads, Arctic climate change is having a broad effect on almost every aspect of life in the North.

That's the conclusion University of Alaska Fairbanks researchers and others outline in a paper to be published in the October 2005 issue of the journal "Climatic Change."

The paper is a result of decades of research by dozens of scientists in multiple disciplines, said Larry Hinzman, a research professor with UAF's Water and Environmental Research Center and the paper's lead author.

It is one of the first of its kind to present a comprehensive examination of the broad array of effects attributed to a changing climate within the Arctic and shows that warming has a cascading effect on the land, vegetation, animals, weather and human systems.

"This paper looks at how changes in one component can reverberate through an entire system," said Hinzman. "It really makes the point that you can't look at individual components; you have to look at the system as a whole."

Those effects tend to be more obvious in the Arctic.

"We are so close to the freezing point of water," Hinzman said. "When you change a system from frozen to unfrozen it has dramatic impacts

and dramatic consequences."

Researchers, including a dozen from UAF, started work on the paper in 2002, Hinzman said. It primarily draws on research done in Alaska, as well as studies in Siberia and Canada.

"There were dozens and dozens of research programs that fed into this," he said.

The project was funded through the National Science Foundation's Arctic System Science program. Hinzman said the foundation in recent years has encouraged such collaborative projects as a way to use research to paint a more comprehensive picture.

"NSF is trying to get the most value out of their research investments," he said, "They are also trying to get the most correct understanding of the Arctic and its response to a changed climate."

Such a philosophy is a natural fit at UAF, Hinzman said, where researchers tend to be collaborative anyway. And the Arctic is ideal for such comprehensive studies because of its isolation, sparse human population and undisturbed nature.

"It's somewhat easier to examine how the forces of nature are acting on this system because the effects are so dramatic," he said. Hinzman said papers like this one have the potential to help policymakers and the public understand what climate change means in a practical sense.

"I hope this is of value and of interest to the general population," he said. "We want the people who live here to have a better understanding of the changes we have observed, which could help society prepare for the changes that may be coming."