

Prehistoric response to global warming informs human planning today

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Since 2004, University at Buffalo anthropologist Ezra Zubrow has worked intensively with teams of scientists in the Arctic regions of St. James Bay, Quebec, northern Finland and Kamchatka to understand how humans living 4,000 to 6,000 years ago reacted to climate changes. Credit: Office of Communications, University at Buffalo

Since 2004, University at Buffalo anthropologist Ezra Zubrow has worked intensively with teams of scientists in the Arctic regions of St. James Bay, Quebec, northern Finland and Kamchatka to understand how humans living 4,000 to 6,000 years ago reacted to climate changes.

Their findings will tell governments, scientists and NGOs how relationships between human beings and their environments may change in decades to come as a result of global warming.

"The circumpolar north is widely seen as an observatory for changing relations between human societies and their environment," Zubrow explains, "and analysis of data gathered from all phases of the study eventually will enable more effective collaboration between today's social, natural and medical sciences as they begin to devise adequate responses to the [global warming](#) the world faces today."

This study, which will collect a vast array of archaeological and paleoenvironmental data, began with the Social Change and the Environment in Nordic Prehistory Project (SCENOP), a major international research study by scientists from the U.S., Canada and Europe of prehistoric sites in Northern Quebec and Finland.

Phases I and II of the study were headed by André Costopoulos and Gail Chmura of McGill University (Montreal), Jari Okkonen of Finland's Oulu University, and Zubrow, who directs UB's Social Systems Geographic Information Systems Lab.

Phase III, underway now, is the International Circumpolar Archaeological Project (ICAP) funded by \$845,796 from the National Science Foundation's Arctic Social Sciences Program of the Office of Polar Programs, which is supported by the American Recovery and Reinvestment Act (ARRA). Headed by Zubrow, it focuses on a third sub-arctic region: Siberia's remote [Kamchatka](#) peninsula, a rough and extremely volcanic wilderness region the size of California.

"With forecasts of sea-level rises and changing weather patterns, people today have been forewarned about some likely ramifications of [climate change](#)," Zubrow says, "but those living thousands of years ago, during the Holocene climatic optimum, could not have known what lay ahead of them and how their land -- and lives -- would be changing.

"This was a slower change," he says, "about one-third the rate we face

today. In the Holocene period, it took a thousand years for the earth to warm as much as it has over the past 300 years -- roughly the time spanned since the beginning of the Industrial Revolution.

"As in other phases of the study," Zubrow says, "our goal in Kamchatka is to clarify ancient regional chronologies and understand the ways prehistoric humans adapted to significant environmental changes, including warming, earthquakes, tsunamis, volcanic eruptions and the seismic uplift of marine terraces that impacted the environment during the period in question."

He points out that, despite our more sophisticated prediction technology, and technologies overall, many of the world's people have residences and lifestyles that are just as vulnerable to climatic shift as those of our prehistoric ancestors. They, too, live along estuaries and coastlines subject to marked alteration as oceans rise.

Most of the ARRA stimulus money used in the project is spent in the United States on salaries and research at various universities. Zubrow reiterates a point he often makes with his students: "This research funding is good for science, good for the economy, good for the government and good for the international reputation of the United States."

Ultimately, information gathered over the next year by the geologists, archaeologists, geochemists, volcanologists and paleoecologists on Zubrow's team will be compared with data from the two other ICAP sites.

During an additional study phase funded by a \$300,000 grant from NSF, through the ARRA, Zubrow will conduct archaeological research in Mexico to ascertain how arctic climatic changes during the mid- and post-Holocene era affected human populations in a changing temperate

climate.

Provided by University at Buffalo

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