Science takes Elburn men back to Antarctica

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Ross Powell and Reed Scherer think they can predict the future.

Not with Ouiji boards and crystal balls but with ice and dirt and fossils.

By looking at the past, they, as part of a group of 100 international scientists, said they hope to gauge the future of floods, animal extinction and climate changes as part of a $30 million expedition over five years.

In essence, the Northern Illinois University professors want to create a guidebook to global warming.

And the marketplace is ripe for such a book.

During the past century, the average temperature across the globe has risen one degree, according to the United Nations Intergovernmental Panel on Climate Change. It has been the warmest century in the last recorded 1,000 years.

That has caused the ice sheets to recede and Arctic ice to thin 40 percent by the late summer and fall. The warmer weather also has shortened by two weeks the annual length of time that ice covers rivers and lakes and caused the sea level to rise about 7 inches. That has affected animal habitats.
Yet it may only be a taste of what is to come.

Some climate models predict a jump in temperatures of 10 degrees Fahrenheit in the next century.

“ Abrupt climate changes, which in scientific terms would occur over decades, could provide significant problems for humanity, impacting such things as agriculture, air quality, energy usage, the spread of disease and the viability of coastal communities,” Powell said.

If sea levels continue to rise millimeters a year, eventually coastal cities like New Orleans and Venice will need to take steps to stem the rising water, he added.

The poorest nations who are the least prepared face the biggest consequences of global warming, but as seen with the recent earthquakes and tsunamis, taxpayers across the globe will bear the burden of recovering from nature’s disasters.

Scientists say they can’t turn down the dial on current global warming or determine how much is attributed to actions taken by man that increase the atmospheric gases that trigger the greenhouse effect that warms the world. The world has warmed since the advent of burning fossil fuels in cars and factories and the use of chlorofluorocarbons in early aerosol sprays and refrigeration systems. But the Earth was warm before man also.

By uncovering records from the ice that show past trends in warming and cooling scientists hope to find out where we are in the cycle of warming and if the world seems to be warming at an accelerated rate.

What they learn could help scientists minimize future heat waves and prepare for the calamities they cause.

But to do that, Powell and Scherer will have to leave the comfort of their Elburn homes and head to Antarctica. As part of the first of two drilling expeditions from October to December in 2006 and 2007 they will split their time between two sites.

A dirty mining town in McMurdo Sound that resembles the turn-of-the-century gold rush camps will serve as a base for scientific experiments. The data needed for those experiments will come from an ice peninsula jutting into the Ross Sea that sits in the shadow of an active volcano, Mt. Erebus. On the ice, scientists will live in freight containers converted to hold heat and bunk beds. Scherer considers the accommodations an upgrade from the past helicopter drops onto the tundra carrying tents that marked previous science expeditions.

Both men have visited Antarctica several times. The tranquility and scenery filled with penguins, clear skies and mountains made of ice beckons them back.

But they also know too well that weather on the bottom of the world comes in extremes,
often preventing travel on or off the ice shelf for weeks at a time.

The sensitivity of the area is why it is considered a global thermostat and the best record of historic climate shifts. It is also the largest and oldest sheet of ice. The polar cap responds first to climate changes and then produces a chain reaction across the globe. When ice sheets melt, they accelerate the earth's warming. When ice sheets expand, they accelerate the earth's cooling.

“Antarctica is really the engine of our modern climate,” said University of Nebraska-Lincoln professor David Harwood, director of the expeditions science management office. “If we can understand what has happened there in the past — know what the range of environmental change has been, what the magnitude and frequency of changes in the ice sheets have been — we can learn something about climate change and that will help us understand the future.”

While scientists have been trying to do this for the past 30 years, technological limitations in drilling equipment left gaps in the environmental history. New equipment crafted by researchers at NIU and the University of Nebraska at Lincoln and Antarctica New Zealand drilling company will allow scientists to drill in deeper water than ever before. Using the floating ice shelf as a platform, the drill will punch through 902 feet of ice, more than two football fields thick; then drop through 2,953 feet of water, more than a half-mile deep and another half-mile into the sea bed to pull a 3,281-foot-long core of sediment and fossils from the sea floor.

Scientists will focus on 20 million years ago this winter, but will draw information during the entire five-year experiment from as far back as 60 million years when dinosaurs disappeared and Antarctica was shifting from a subtropical climate to a land 98 percent covered with ice.

Because the microbes turned into fossils reacted quickly to temperature changes and evolved quickly, scientists can judge the age of the sediment and environment at the time. The mix of sea and land life in the cores will point to whether the glaciers were expanding or receding. Together that information will give a picture of how typical and long warming periods were prior to man starting to burn fossil fuels at the turn of the century. Computer models based on that data will predict how fast the ice caps will melt and how fast the seas will rise in the future.

The uncharted nature of the Antarctic draws the scientists.

“There is so much unknown in the Antarctica that no matter how much you plan there is always a surprise,” Powell said.

At the previous drill in Cape Roberts, Antarctica, Scherer found previously unknown fossils and more intact specimens than ever before.

Scherer, 48, will lead the group of paleontologists studying the fossils while Powell, 54, serves as co-leader of the entire expedition. A crew of scientists are surveying the area right
now in preparation for siting the massive drilling rig.

The project is touted as one of the largest planned for the world’s scientific community during the International Polar Year, which runs from 2007 to 2009.

The expedition has drawn international support and attention since Harwood, Powell and New Zealand scientists first proposed the drill in 1998.

A documentary crew from the television show “Nova” is following the group of 20 scientists on the ice and will check in with other scientists back in stateside labs for the follow-up research expected to take about a year.

NIU’s contribution to the expedition is three scientists on the ice and two studying back at the DeKalb campus along with a handful of graduate students mixed into both locations.

To highlight the project a half dozen elementary and high school teachers will accompany scientists and blog about their experiences. They also will create education material posted on-line for schools and parents who home school. The teachers are expected to be selected by spring, according to Megan Berg, media specialist at the ANDRILL Science Management Office at the University of Nebraska at Lincoln.

Scherer plans to incorporate his research pulling fossils from the ocean bed into the oceanography class he teaches at NIU once he returns.

“I think it is important to not just read from books but to show (students) science in action,” Scherer said. “It brings them a little bit closer.”

Another three drilling sites are under consideration for the next few years. Powell said he hopes to join in those also and unveil a robotic submarine he designed. It could give scientists their first chance to survey the underside of the continent’s sprawling ice shelves and figure melt rates.

What it finds could change the future.

“It does have ramifications for the entire world,” Powell said.