

Getting to core of the problem

November 28, 2007
sguy@suntimes.com

A piece of the puzzle to understanding global warming lies in Antarctica. Scientists at the Antarctic Drilling program are drilling rock below the ice, and by using software developed at the University of Illinois at Chicago, are better able to examine the rock cores.

The result: Making the data more readily available to other scientists, some of whom study global warming.

Scientists drill for core samples so they can get an idea of the Earth's climate millions of years ago. There's one problem: The cores shrivel up in about a week.

The university's answer to the dilemma started on a boat in a lake in Minneapolis in the summer of 2006. That's where Julian Chen, a Ph.D. student at UIC who was instrumental in developing the technology, learned to drill for a core sample from the Minneapolis lake bed.

He took it back to the National Lacustrine Core Repository at the University of Minnesota in Minneapolis.

"That's the only way to develop effective software -- to immerse the computer scientist in the core-drilling scientist's world," said Jason Leigh, associate professor of computer science at UIC and the director of its Electronic Visualization Laboratory.

Chen sliced open the core, and learned how to identify various rock layers inside. The core helps researchers understand earlier periods when global temperatures and carbon dioxide concentrations were similar to levels that the Earth might reach by the end of this century.

The software Chen developed, called CoreWall, enables scientists in the Antarctic to develop full-resolution digital images of the core. They upload the images back to the United States overnight via the McMurdo station satellite Internet connection.

The software's graphic technique enables the scientists to browse a greater amount of image data for a specific reason, such as climate change or a phenomenon in biology that occurred at a specific depth and age.

"It's something new that commercial Photoshop packages don't have," Leigh said.

CoreWall includes a visualization tool that scientists can use to enlarge the high-resolution core photos so they can be examined closely and annotated. Previously, scientists would take photos of the core and ship them to a depository.

The scientists in Antarctica have asked UIC to develop new capabilities in the software. The Chicago team has received a two-year grant from the National Science Foundation for \$311,663 to continue their work.

Technology is only now catching up to the increased need to know how the Earth's climate has changed.

"It's only recently that these kinds of display technologies have become cheap and available enough to look at cores," Leigh said. "Now that we have low-cost computers and display screens, scientists can look at the cores in their perfect form when they are first dug out" and preserve the images.

Technology also is helping scientists piece together how quickly our climate is changing.

With super-high-speed networks, scientists can now piece together a variety of data and distribute it quickly, helping them do more sophisticated research and come to conclusions quicker.

The UIC team has submitted a proposal to the National Science Foundation to develop more of this kind of "mashup" software to further the information sharing.

sci-tech scene | UIC software helping scientists dig into Antarctic rock to get a better grip on global warming

SANDRA GUY