2005 Talks and Events

- Oct. 28/05: Terry Hughes, "Oceans Head for Land When an Ice Sheet Becomes and Ice Shelf," Goldthwait Polar Medal Lecture, Byrd Polar Research Center Colloquy, The Ohio State University.
- Oct. 29/05: Arvin Agah, "Weekend of Two Scientists to Win the 2005 Tyler Prize for Environmental Achievement," The Ohio State University Byrd Polar Research Center Colloquy, The Ohio State University.
- Nov. 14/05: Lonnie Thompson, "Glaciological Evidence of Abrupt Climate Change: Past and Present," The inaugural Geoffrey O. Selvick Lecture, College of Arts and Sciences, Syracuse University, NY.
- Nov. 11/05: Lonnie Thompson, "Abrupt Tropical Climate Change: Past and Present," March of Dimes 2005 Awards Ceremony Keynote Speaker, Greek Orthodox Church, Columbus, OH.

Lonnie Thompson Awarded the 2005 Tyler Prize for Environmental Achievement

Lonnie G. Thompson, a Distinguished University Professor of geological sciences at The Ohio State University and senior research scientist with the Byrd Polar Research Center, is one of two scientists to win the 2005 Tyler Prize for Environmental Achievement. The Tyler Prize, administered by the University of Southern California, was established by the late John and Alice Tyler in 1973. It is the premier award for environmental science, energy, and medicine conferring great benefit upon mankind. Through their work, Tyler Laureates have focused worldwide attention on environmental problems.

Dr. Thompson's research has resulted in major revisions in the field of paleoclimatology, in particular, by demonstrating how tropical regions have undergone significant climate variability, countering an earlier view that higher latitudes dominate climate change. Thompson is one of the world's foremost authorities on paleoclimatology and glaciology. He has led more than 50 expeditions during the last 30 years, conducting ice-core drilling programs in the world’s polar regions as well as in tropical and subtropical ice fields. Recently, Thompson and his team developed lightweight solar-powered drilling equipment for the acquisition of histories from ice fields in the high Andes of Peru and on Mount Kilimanjaro in Tanzania. The results of these studies, published in more than 180 articles, have contributed greatly toward the understanding of the Earth’s past, present, and future climate system.

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have recovered a 460-meter-long ice core, the world’s longest from a mountain range (Alaska, 2002); the first tropical ice core (Peru, 1983); and cores containing the entire sequence of the Last Glacial Stage as well as cores dating over 750,000 years in age, the oldest outside the polar regions (Tibet, 1992).

Thompson has received numerous honors and awards, including the Dr. A.H. Heineken Prize for Environmental Science, Royal Netherlands Academy of Arts and Sciences; the Vega Medal of the Swedish Society for Anthropology and Geography; and the Commonwealth Award for Science and Invention (jointly with his spouse and collaborator, Dr. Ellen Mosley-Thompson). In addition to being awarded the Tyler Prize in 2005, Thompson received the Goldthwait Polar Medal Lecture, Byrd Polar Research Center Colloquy, The Ohio State University.
Using a Fine-Resolution Radar to Map Near-Surface Snow Layers

Current methods of gathering spatial and temporal information on snow accumulation by analyzing ice cores and snow pit stratigraphy are time consuming and prone to errors due to the sparse sampling. A radar with fine resolution of about 3 cm developed at the Center for Remote Sensing of Ice Sheets (CReSIS) by researchers at the University of Kansas is providing information on near-surface snow layers. In July 2005 the radar system was tested on the Greenland ice sheet. The information collected while testing in Greenland will be useful for interpreting measurements taken by satellite altimeters.

The fine resolution realized by the radar is achieved by using a wide bandwidth and an antenna which spatially filters surface clutter. The radar operates as a frequency-modulated continuous-wave (FMCW) mode, with a transmit frequency range of 12 – 18 GHz. Utilizing the full 6 GHz of bandwidth produces a range resolution of approximately 3 cm. The fundamental operating principle of the radar is fairly straightforward. The frequency of the transmit signal is increased over time at a specific rate, and as the signal is reflected off layers in the snow, the return signal is compared to the instantaneous frequency being transmitted. The difference in frequency of the two signals is related to a layer depth. The antenna acts as a spatial clutter filter by receiving only signals which take the shortest path from the antenna to the layers and back. The antenna does not receive signals which take longer paths to a layer—signals that would contaminate signals arriving from deeper layers.

A large amount of data was collected during the Greenland field season. The radar was used to collect data from single spots with known stratigraphy, small areas with known accumulation rates and long tracks up to 4 km. Stratigraphy and density measurements taken from several collocated spots are being used to directly validate radar measurements and to build electromagnetic models of the firm. Current analysis indicates a high correlation between layers detected by the radar and actual stratigraphy. Data obtained will also be used to quantify the spatial and temporal variability of snow accumulation on the ice sheet.

-Timothy Rink

Active Source Seismology

At CReSIS’ first All-Hands Video Conference, held in late November, Dr. Sridhar Anandakrishnan from Penn State was our faculty presenter.

- Active Source Seismology consists of making a sound and listening for an echo. The characteristics of the echo help determine the properties of the basal surface.
- Glaciologists use this method to attempt to discern what is below the ice.
- By recording when the echo returns, how strong the sound is, and what the shear-wave velocity profile is, glaciologists are clued into ice depth, thickness of its layers, and whether its base is made of rock, or water saturated, or even just water.
- For fast flowing glaciers, like Jachobshavn and Thwaites, determining the base of the structure is extremely important.

Rafe Pomerance, Chairman of the Climate Policy Center, Visits KU

On Thursday, October 20, 2005, Dole Fellow Karen McCarthy hosted “A Discussion of Global Warming and a Citizen’s Capabilities on Fighting It” at the Dole Institute of Politics. The guest speaker was Rafe Pomerance, former Deputy Assistant Secretary of State for Environment and Development under the Clinton Administration, and an accomplished activist in the fight against global warming. The forum was a lecture and question and answer session about methodologies for alerting policymakers and press about scientific discovery.

Mr. Pomerance has over twenty years of experience as an organizer and was instrumental in drafting the Kyoto Protocol of 1991. The seminar was open to the public, and attended by a group of CReSIS researchers and staff. Professor David Braaten from CReSIS was asked to give a few words about the CReSIS research project. He spoke about the importance of inter-disciplinary research. Mr. Pomerance went on to speak candidly about the need for a relationship between researchers and politicians in order for the public and environmental health and safety to be maintained. Rafe called the evening “A great opportunity to share in this very important investigation.”