

The Icebreaker

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Director's Message

This is our second newsletter after the establishment of the Center. Several ongoing projects on remote sensing of polar regions at KU have become a part of the Center for Remote Sensing of Ice Sheets (CReSIS). One of these is the Mobile Sensor web for Polar Ice Sheet Measurements. A team of students, faculty and staff from KU and ECSU performed radar measurements at the West Antarctic Ice Sheet (WAIS) drill site during December 2005-January 2006. Dr. Jennifer Holvoet accompanied the team to obtain field experience and communicate the excitement of visiting

and conducting field experiments to K-12 students. In this newsletter she provides a summary of her activities and experiences.

We are also pleased to introduce Dr. Terry Hughes to our readers, who recently received the Goldthwait Polar Medal for his contributions to polar research and education. I hope that you will join me in congratulating Terry for this well-deserved honor. Recently Drs. Eric Rignot and Pannir Kanagaratnam, both associated with CReSIS, reported increased Greenland ice sheet contribu-

tion to sea level rise in *Science*. This article received wide coverage in print, radio, and television news media. I hope that you enjoy reading the newsletter and please send us any comments or suggestions.



Conferences Held

--2/22/06: CReSIS Annual Advisory Board Meeting, Lawrence, KS

Conferences/Workshops Attended

--12/5/05-12/9/05: Robert Bindshadler, James Fastook, Prasad Gogineni, Coen Hofstede, Dave Pollard, Glenn Prescott, Timothy Rink, Marylee Southard, Robert Thomas, George Tsofilias, American Geophysical Union (AGU) Meeting, San Francisco, CA

Posters

--B.R. Parizek, R.B. Alley, T.K. Dupont, D.A. Vacco, "Ice-flow Sensitivity to Variable Resistive Stresses," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--A. Larson, A. Nyblade, D. Weins, S. Anandakrishnan, T. Watson, M. Benoit, P. Shore, D. Voight, "Examining the Mantle Transition Zone Beneath the Transantarctic Mountains From Receiver Functions Using TAMSEIS Data," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--A.D. Huerta, D.B. Reusch, "Quantitative Analysis of Glaciated Landscapes," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--Dave Pollard, R.M. DeConto, "A Coupled Ice-sheet/Ice-shelf/Sediment Model Applied to Antarctica: Forced and Unforced Variations," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--A.P. Rathbun, C.J. Marone, S. Anandakrishnan, R.B. Alley, "Laboratory Study

2005-2006 Talks and Events

of Till Rheology," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--D.B. Reusch, "Antarctic Sea Ice-Atmosphere Interactions: A Self-organizing Map-based Perspective," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--T. Rink, P. Kanagaratnam, D. Braaten, K. Zimmerman, T. Akins, S.P. Gogineni, "A Fine-Resolution Radar for Mapping Near-Surface Isochronous Layers," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--M.K. Spencer, R.B. Alley, "Developing a Bubble Number-Density Paleoclimatic Indicator for Glacier Ice," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

--D. Vacco, R.B. Alley, D. Pollard, "Modeling Glacial Stagnation With Higher-order Flow-line Models," AGU Meeting, San Francisco, CA, Dec. 5-9, 2005

Talks/Interviews

--8/4/05: Ellen Mosley-Thompson, "Evidence for Climate Change: Unique Insights to the Earth's Climate History from Glaciers," Stone Lab (OSU)

--9/4/05: Ellen Mosley-Thompson & Lonnie Thompson, research highlighted on 60 Minutes, "Meltdown"

--9/16/05: Ellen Mosley-Thompson, discussion with Fred Anderle on "Open Line," WOSU Radio

--9/22/05: Ellen Mosley-Thompson, "Unique insights to the Earth's climate history preserved in its cryosphere," Department of Earth and Atmospheric Sciences, Georgia Institute of

Technology, Atlanta, GA

--9/28/05: Ellen Mosley-Thompson, "Climate Change: How to Read the Evidence?" Upper Arlington Seminar Series: Great Issues Series, Upper Arlington Municipal Center

--11/1/05: Ellen Mosley-Thompson, "Unique insights to the Earth's climate history preserved in its cryosphere," Microbiology 301 class lecture

--11/29/05: David Braaten, interview with KSNT Topeka (Channel 27 News) about PRISM/ CReSIS field work in Greenland and Antarctica

--12/5/05-12/9/05: J. Winberry, S. Anandakrishnan, R.B. Alley, C. Marone, D. Voigt, R. Bindshadler, M. King, I. Joughin, "Control of Ice Stream Stick-slip Dynamics by Frictional Healing," AGU Meeting, San Francisco, CA

--12/11/05: Richard Alley, interview featured on NPR's Living on Earth

--1/8/06: Richard Colgren, presentation on 1/2 scale CryoHawk UAV program, AIAA Aerospace Sciences Conference, Reno, NV

--1/17/06: Richard Colgren, presentation on 1/2 scale CryoHawk UAV program, Math, Science, Engineering, and Technology Consortium, Palmdale, CA

--1/19/06: Richard Colgren, presentation on 1/2 scale CryoHawk UAV program, Emery Riddle University sites in Prescott, AZ, and Palmdale, CA

--1/20/06: Richard Colgren, presentation on 1/2 scale CryoHawk UAV program, Antelope Valley College, Lancaster, CA



The Center for Remote Sensing of Ice Sheets is made possible by a five-year award from the National Science Foundation (#0424589), which began in June, 2005.

Joel Plummer Receives Fellowship

Joel Plummer, a doctoral student in the Department of Geography at the University of Kansas, has received a NASA Earth System Science Fellowship. The award provides \$72,000 over three years to support Plummer's studies in the area of Geographic Information Systems (GIS).

NASA selected Plummer's research proposal, "A Geographic Information System (GIS) Application to Ice Sheet Mapping and Mass Balance," for one of approximately 50 fellowships the agency awarded this year. Plummer's fellowship is the

first associated with CReSIS.

The ESS Fellowship Program awards outstanding students pursuing graduate degrees in fields supporting the study of the Earth as a system. More than 700 fellowships have been granted since the program's inception in 1990, in fields such as climate and hydrologic systems, ecological systems, solar influences, and data and information systems. Each fellowship provides funds for tuition and a stipend over a period of three years.





Antarctica: Exploring at the “bottom of the Earth”

by Jerome Mitchell, Elizabeth City State University

For some people, the idea of exploring a remote place plagued with sub-zero temperatures, harsh living conditions, and unusual wildlife can dampen the hunger for any adventure. For me, the idea can captivate my thoughts and curiosity and lead to a new outlook on life. So when the opportunity arose for a research journey to Antarctica, I knew something astonishing would result from it.

The team I accompanied to the ice was part of a project funded by the National Science Foundation (NSF) and entitled “Polar Radar for Ice Sheet Measurements (PRISM).” The project aims to collect radar data to contribute to models and predictions related to the polar ice sheets’ current state and future behavior. Global climate change, due to greenhouse gases trapping the sun’s heat within the atmosphere, has been connected to the melting of the polar ice sheets of Antarctica and Greenland, which in turn could affect sea levels around the world, with devastating impacts on the millions of people living in coastal areas.

Having spent two consecutive summers at the University of Kansas conducting polar ice research, I was familiar with the

threats and concerns of the coastal regions. KU’s Center for Remote Sensing of Ice Sheets (CReSIS), which has a partnership with Elizabeth City State University to encourage minority students to pursue careers in science and technology, has multiple teams involved in the areas of robotics, sensors, intelligent systems, communications, radar, and geography. While I was at the West Antarctic Ice Sheet (WAIS) field camp, my responsibilities centered on operating the plane-wave radar, which measures the annual accumulation of snow for determining its net balance, and digging snow pits to accurately test the results of the plane-wave radar by comparing them to data from snow pit samples.

The outcome from the field testing revealed new details about the state of the West Antarctic ice sheet. The radar measurements revealed ice thickness and bed characteristics, and permitted the mapping of deep internal ice layers for the first time.

My overall experience was worthwhile and priceless. In order to survive on the ice shelf, I learned the basics of camping in the harsh environment, which involved pitching tents, operating high frequency radios, cooking in the cold, windy conditions, and building emergency shelters and snow walls to protect us from the winds. The expedition also taught me about the “patience of science” and that experiments don’t always go as planned. Working with notable scientists, I have learned more about artificial intelligence as well as radar. The research trip provided not only valuable new knowledge, but also an appreciative attitude toward life and the amenities we usually take for granted.

Study Abroad for CReSIS

CReSIS has received a grant of \$138,000 from the National Science Foundation to supplement its international student exchange program. We will send students from the US to our international partners at the University of Copenhagen, the Technical University of Denmark, the University of Tasmania, and the Centre for Polar Observation and Modelling at University College, London. In return, students from these partners will visit the US. Our first visiting student is Susanne Buchardt, a Ph.D. student at the University of Copenhagen who will spend six months at the University of Kansas.

Interested students and faculty should contact Gary Webber, the CReSIS Education Coordinator, at: gweber@crisis.ku.edu.

Education from Antarctica

Junior high and high school students in Kansas and Ohio received an opportunity to talk with Dr. Jennifer Holvoet, K-12 Outreach Coordinator for PRISM and CReSIS. While in McMurdo Station, Antarctica, Dr. Holvoet used Digital Mud Studios webcast/video web conference software to talk to students. Over 100 students from California Trail Junior High School in Olathe, Kansas, and 35 from New Albany High School in Columbus, Ohio, participated. A short webcast by Dr. Holvoet was followed by a 60-minute video question/answer session. There was less than a 5-second delay in the transmission of questions and answers in spite of the distance. Questions from the students covered topics such as climate change, radar, meteorites, ice sheets, icebergs, the Antarctic marine web, ice-coring and expedition logistics. The students sent follow-up thank-you notes, with many expressing their amazement that they could have a video conference with a person so far away, as well as how much they enjoyed learning this way.

Dr. Holvoet also regularly e-mailed 21 other teach-



ers and answered questions from their students. In addition, photos were posted in the Virtual PRISM website along with a daily photo journal that chronicled the team’s work in Antarctica. Digital video was taken several times and uploaded to the Virtual PRISM Dashboard, while the PRISM weather station at WAIS transmitted daily weather data for classroom use. Upon the team’s return to Kansas, Bears on Ice storybooks, featuring two Geobears, were posted on the PRISM website to allow younger students to learn more about the team’s work and living conditions. Short biographies of some of the interesting support people we met, more photos and videos and some experimental data taken just for students will be posted over the next few weeks. More web conferences and visits to classrooms took place in February.

T. Hughes Awarded 2005 Goldthwait Polar Medal

On October 26-28, 2005, the Byrd Polar Research Center at The Ohio State University sponsored the Goldthwait Symposium on “Our Polar Past and Present: History and Science Moving Forward From the 20th Century.” On the final day of the symposium, Terence J. Hughes, a Professor of Earth Sciences and Quaternary and Climate Studies at the University of Maine, was awarded the 2005 Goldthwait Polar Medal. Following the award ceremony, Dr. Hughes presented a talk, “Oceans Head for Land When an Ice Sheet Becomes an Ice Shelf.” He also conducted an informal seminar on his modeling approach with

students at The Ohio State University.

Dr. Hughes’ glaciological research has included ten Arctic trips and thirteen trips to Antarctica since 1968. Within glaciology, his primary research interest is the dynamics of ice streams, which are fast currents of ice that drain up to 90 percent of present-day ice sheets and which may have been the conduits through which deglaciation of Quaternary ice sheets was accomplished, in large part. His major research tool for studying ice streams is aerial and satellite remote sensing of their surface elevation and velocity which, with data on ice thickness and mass balance, provide input to numerical models of ice dynamics developed in cooperation with colleagues.

