



Camino del Frío

Newsletter of the Cryosphere Specialty Group
Association of American Geographers



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Bryan Mark, Editor

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While a graduate student, I was also employed at the NOAA Great Lakes Environmental Research Lab in Ann Arbor. My assigned task was to analyze a 10-year data record of measured ice thickness collected from about 30 sites around the Great Lakes, and to develop a model to forecast ice thickness and melt out date using local climate data. In this way, ocean-going vessels could time their arrival in Great Lakes ports so as to avoid breakup. The results formed the basis of my Masters thesis.

Following graduation in 1985, I briefly held a tenure-track appointment at Indiana University-Purdue University at Fort Wayne before accepting a position at the University of Cincinnati. At the time, the Geography Department was largely a teaching-oriented service unit, with heavy loads for new faculty. Within a few years, I had obtained a research grant from NSF's newly-formed Geography and Regional Sciences program. This grant had a major impact on my career since it provided the means to independently continue cryospheric research. Further, it demonstrated to my Department that funded research was beneficial to all. Since that time, the department has expanded and transitioned into a dynamic research-based unit that is consistently ranked among the most productive in the College. More importantly, there are six Geography faculty engaged in cryospheric research that spans the range of geographic subdisciplines including glacial mass-balance modeling, paleoecology, process geomorphology, remote sensing analysis, development of cyberinfrastructure for environmental monitoring, and creating web-based GIS indigenous knowledge geodatabases and maps.

Alaska-based projects in the 1990s were focused on identifying the impact of non-conductive heat transport in the active layer. Most of the field work was done in the discontinuous permafrost region near Fairbanks, but eventually expanded to include sites in the continuous permafrost of the North Slope. A number of papers on this topic were published by our group that included Outcalt, Nelson, myself and graduate students. It was during this period that **Jerry Brown** gave me a photograph he took in Barrow in the 1960s. It showed a long trench where the active layer had been removed during late summer. Although the terrain was extremely homogeneous, the thaw depth demonstrated large variability over short distances. This led me to wonder about the spatial patterns of thaw, the impact of local controls, and the validity of using single point measurements to represent regional units.

In 1998, a group of us received funding from NSF's Polar Programs in support of the Circumpolar Active Layer Monitoring (CALM) Program. Conceptualized and promoted early on by Jerry Brown and Fritz Nelson, this was envisioned as an international effort to collect standardized measurements of end-of-summer thaw depths from representative landscape/land cover plots. Using protocols developed by the community, a robust sample of thaw depths were collected on a regular grid and the data submitted to an archive. Soil and air temperature measurements, snow depth, and metadata were also collected and archived. By the end of the 5-year period, the CALM program included some 100 sites in 15 countries. Subsequent to the 2003 CALM Workshop in Lewes, Delaware, the

CALM II proposal was funded through the University of Delaware, and **Nikolay Shiklomanov** continued CALM III in 2009. The CALM program has been made possible by the hard effort and cooperation of numerous cryospheric scientists from many countries, and is often cited as a successful model of an ever-evolving monitoring and research program.

In 2001, Fritz Nelson and I had a proposal funded to examine the spatial and temporal variability of ground temperature and thaw patterns. As part of this project, we established a network of ~60 air temperature loggers to monitor the urban heat island effect in and around Barrow. The purpose was to determine if anthropogenic heat in the village was promoting the observed earlier snowmelt in the area. Assisted by UC undergraduate alum **Anna Klene**, then a graduate student at the University of Delaware, we observed a very strong heat island (average ~3 C warmer) in winter, with cooler temperatures in summer owing to the coastal location. Other studies that addressed the human impact on near-surface processes included examining the effect of a 4-m high snow fence on the thermal stability of the permafrost and the local hydrology, and identifying the human impact on local lake drainage events. This eventually led to a project focused on lakes and drained lake basins on the Arctic Coastal Plain, which together cover about 50% of the Barrow Peninsula. Working with paleoclimatologist **Wendy Eisner**, soil scientist **Jim Bockheim**, and several graduate students including **Benjamin Jones** (USGS), the emphasis was on understanding landscape evolution and especially the processes of lake formation, growth, and drainage, and

carbon sequestration as a function of basin age. Papers on these topics include an assessment of the carbon stock in drained lake basins, rate of lake drainage, and paleo vegetation reconstruction.

Most recently, research projects involve detailed studies of lake dynamics in northern Alaska. This collaborative effort is undertaken with **Yongwei Sheng** and **Larry Smith** (UCLA) and their graduate students, and involves analysis of high-resolution satellite images coupled with DGPS surveys of lake shorelines in early and late summer to identify spatial and seasonal patterns of lake area changes. These efforts are complemented by bathymetric surveys of lakes and the collection of time series of water temperature and depth. Other components involve detailed energy and water balance studies on a few select lakes by **John Lenters** at University of Nebraska-Lincoln, and the ongoing development of an indigenous knowledge GIS by Wendy Eisner. At lower latitudes, I have been working with Fritz Nelson and Jim Bockheim on the southern shore of Lake Superior where we are examining the impact of topography on microclimate, quantifying and mapping the spatial and temporal thermal patterns of the maritime influence, and identifying glacial drainage channels. It is especially enjoyable to spend time in a lovely and interesting setting with old companions.

Over the years, I have witnessed the cryospheric discipline expand with the implementation of new technologies such as remote sensing, GIS, GPS, sensors and logging systems. New ideas from ecology, engineering and the human sciences have been increasingly integrated. The breadth and vibrancy of the cryospheric sciences became clear to

me when co-editing with **Doug Kane** the 600+ contributions to the Proceedings of the Ninth International Conference on Permafrost. A similar trend is apparent in journals and the popular press, reflecting recognition of the critical role the cryosphere plays in the global environment. As President of the U.S. Permafrost Association in 2008, I was especially encouraged to witness the development and growth of the Permafrost Young Researchers Network. With a current membership of nearly 800 young scientists from all disciplines, PYRN exemplifies the interest of the latest generation of cryospheric researchers.

I have been very fortunate in that I have worked with and learned from very fine scientists and scholars from many disciplines. Often, these cooperative efforts have led to lifelong friendships and, in one special case, bestowed me a delightful and tolerant wife. Along with this award, the friendships, shared memories, and joint accomplishments are among the things I most treasure.

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Highlights from this year's Business meeting

The Cryosphere Specialty Group Business Meeting was held on Saturday, April 17, 2010 at 6:30 pm. This was an awkward time, as the AAG recognized, and two of our Board members and our Matthes Awardee were unable to attend given travel conflicts. Nevertheless, we were able to conduct an efficient, productive and constructive meeting. The following is a brief re-cap, with special thanks to Rob Hellström for acting as secretary proxy.

1. *Call for Nominations:* Kolia Shiklomanov and Larry Smith finished their terms as members of the Board of Directors this year. Nominations of **Gina Henderson**, postdoc at Rutgers, and **Dmitry Streletskiy**, Ph.D. student at U. Delaware were approved by unanimous vote to serve the 2010-2012 term on the board of directors. Bryan Mark (Chair), Tracy Deliberty (Treasurer/Secretary), and Rob Hellström (Board Member) have one more year, but nominations will be taken for these positions prior to the next AAGs (it is never too soon to start thinking of your nominations, and recall that you may nominate yourself!).
2. *Treasurer's Report:* Tracy Deliberty was absent, so Bryan Mark presented the report (printed in full below). A nomination was made and approved by membership vote to increase the Tarr Award from \$250 to \$350, respecting the Board approved guidelines for dispensing with SG funds.
3. *R.S. Tarr Award:* Rob Hellström, chair and organizer of the Tarr session this year, discussed the competition and announced the winner. The board members agreed to present the award at the Business Meeting, since board members would not be present for the AAG Awards Ceremony on 18 April and all students in the competition were invited to attend the business meeting. Rob described the cryospheric contributions of four excellent candidates from three institutions: one undergraduate student, Ms.

Upcoming Cryosphere-related Meetings



1. International Glaciological Society, 15-20 August, Sponsored by Geography Department and Byrd Polar Research Center, The Ohio State University, Columbus, Ohio, USA. More information at: http://bprc.osu.edu/workshops/igs_2010/
2. 67th Eastern Snow Conference “*Here today gone tomorrow, the Eastern North America Cryosphere*” – June 8-10, 2010 at Jiminy Peak Mountain Resort in Hancock, MA, USA, a short ride from Albany NY airport. (http://www.easternsnow.org/annual_meeting.html preregistration deadline 21 May)

Additional opportunity

(by email from Tarr Award winner, Rachel Bernstein)

APECS (Association of Polar Early Career Scientists) is an international and interdisciplinary group formed through IPY which your students may be interested in joining. It is a great resource for networking, funding, outreach, and job opportunities, and there is no membership fee. There are a number of benefits for those involved in APECS so you may want to pass this on to your students.

Faculty members who wish to be involved in APECS may sign up on the website to be mentors.

If you are interested, it will also be possible to send out an APECS notice in the fall to advertise the AAG cryosphere specialty group sessions to recruit more students for the Seattle meeting.

APECS website: <http://apecs.is/>