2009 Member Activities

The **2009 Fall Meeting of the American Geophysical Union** took place in San Francisco, California, December 14–18. Larry Hinzman, IARC Director and former U.S. Permafrost Association (USPA) board member, was invited to present the prestigious Nye Lecture on "Arctic Hydrology and the role of feedbacks in the climate system." Approximately 200 talks and posters dealt with frozen ground, presented across virtually all AGU sections and focus groups. Presentations covered climate feedbacks and interactions, remote sensing and modeling techniques, geomorphology, environmental change, and many other topics.

The **USPA Annual Meeting** was also held on 17 December during the 2009 AGU Fall Meeting. Jim Rooney replaced Yuri Shur as President. Coordinated by the new Permafrost Young Researchers Network (PYRN)-USPA liaison Anna Liljedahl, the USPA established a USPA-PYRN Educational Fund to provide long-term support for early career permafrost researchers. The effort is managed by a PYRN-USPA committee who provide advice to the USPA Board of Directors. 2009 USPA-PYRN initiatives included five partial travel grants to the 2009 AGU Fall Meeting, and a social networking and professional development event during AGU. Activities are announced through the website http://pyrn.ways.org.

The **2009 Annual Meeting of the Association of American Geographers** took place March 22–27 in Las Vegas. The AAG's Cryosphere Specialty Group (CrSG) sponsored 14 sessions, including two sessions specifically on frozen ground, as well as sessions on cryospheric remote sensing, IPY, glaciers, water resources, and Arctic hydroclimatology. The annual CrSG awards were presented: H. Jesse Walker, Boyd Professor Emeritus at Louisiana State University, was recognized with the 2009 *Francois Emile Matthews Award*. The *R. S. Tarr Illustrated Student Paper Award* went to Venu Chu of UCLA, for her presentation on "Rapid response of sediment plumes to Greenland ice-sheet surface melt."

Tom Krzewinski reports the **American Society of Civil Engineers**' 14th International Specialty Conference on Cold Regions Engineering was held in Duluth, Minnesota, 30 August–3 September 2009: 70 papers were presented and published in conference proceedings. Awards were presented with Duane Miller receiving the Harold R. Peyton Award, Doug Kane the Can-Am Award, and Ted Vinson as the Eb Rice Lecturer. Speakers included Representative Oberstar and President-Elect Blaine Leonard of ASCE. TCCRE Committee meetings were held at the conference. A number of meetings are planned: ISCORD 2010, from 1–5 June in Yakutia, Russia. ASCE will propose to host ISCORD 2013 in Anchorage, AK. ASCE's 15th International Specialty Conference on Cold Regions Engineering will be in 2011 in Quebec, joint with CSCE, organized by Guy Doré. ASCE/TCCRE will cosponsor CSCE "Circum Polar Engineering Conference 2012," to be held in Yellowknife in September. TCCRE Committee meetings will be held in Las Vegas, in conjunction with AGU and USPA meetings in San Francisco in December of 2009, and in May 2010 in Seattle. TCCRE provided members for the Standards Committee, charged with updating the Standard on Frost Protected Shallow Foundations (FPSF). Recent rewrites were by Krzewinski and Ed Clarke, and changes are being accepted by committee polling at this time. TCCRE has been representing ASCE

in supporting a PBS Documentary "Building Alaska," to be released shortly. Krzewinski is leading ASCE efforts with Billy Connor (UAF), Keith Korri (ADOT), and Tom Brooks (Alaska Railroad). Recently shown as a part of the Anchorage Film Festival, the film will air on PBS in late 2009.

T. Zhang and the permafrost group at the **National Snow and Ice Data Center** at the University of Colorado in Boulder (O.W. Frauenfeld, K. Schaefer, B. Sheffield, R. Jin, M. Parsons, R. Armstrong, L. Liu, Z. Fan, J. Wahr, and R.G. Barry) continue work on many aspects of frozen ground. Frauenfeld has accepted an appointment in the Geography Department at Texas A&M University, but continues to collaborate with Zhang on investigating changes in permafrost temperatures, active layer thickness, and depth of seasonally frozen ground using soil temperature data from 400+ stations across Russia. With Q. Wu (CAREERI), Zhang is also studying permafrost changes over the Qinghai-Tibetan Plateau. With support from NSF and IARC/NSF, daily snow depth and soil temperature acquisition from the Russian high latitudes is in progress. Using InSAR data, surface deformation over permafrost is detected on the North Slope of Alaska (Liu, Zhang, and Wahr). The NSIDC Frozen Soil Algorithm is being further developed, validated, and calibrated using surface soil temperature data from Russia, China, and U.S. (Zhang, Jin, and Armstrong). Under NASA, NSF, and IARC/NSF funding, permafrost samples from 7 boreholes to 2.9 m were taken in Fairbanks and the North Slope of Alaska in summer 2009 for carbon studies (Zhang, Schaefer, and Liu) with USGS-Boulder. A NASA-funded modeling project studies permafrost carbon in the Arctic (Schaefer and Zhang). A one-dimensional model of water and heat transport in boreal soils with freezing and thawing was developed to simulate soil response to climate change (Fan and Zhang). Zhang and Parsons continue to describe global permafrost distributions and statistics using the IPA permafrost map and other available data. With NASA support, "All About Frozen Ground" (<http://nsidc.org/frozenground/>) was developed and is available as a public resource (Sheffield and Zhang).

Wendy Eisner (**University of Cincinnati**), with collaborators Chris Cuomo (University of Georgia) and Kenneth Hinkel (University of Cincinnati), reports on "Connecting Indigenous Knowledge to Landscape Process Research, Arctic Coastal Plain of Alaska." The classification of 260 records from the Iñupiaq Knowledge GIS is reported in "Advancing Landscape Process Research through the Incorporation of Iñupiaq Knowledge" (Eisner et al. in press at *Arctic*). The entire data suite (GIS layers, videotaped interviews, and related archived data) will be part of a web-based GIS, to be included in a website of resources, research, and information related to indigenous and local community knowledge in northern Alaska, and collaborations between scientists and indigenous communities more generally. They presented their GIS data to the Barrow community in the form of a day-long workshop in June 2009, which generated lively feedback from the 40 attendees, including over 20 Iñupiaq elders. Ken Hinkel, John Lenters (University of Nebraska), Yongwei Sheng (UCLA), and their students continued surveying lakes on the North Slope of Alaska. 2009 summer work was concentrated near Atqasuk, ~100 km inland from Barrow. Research components included (1) surveying lake shores with DGPS to determine shoreline changes between mid-June and mid-August, and correlating changes with measured drop in water depth and lake volume; (2) mapping lake bathymetry and collecting summer temperature profiles from lakes; and (3) modeling the energy and water balance of instrumented "focus" lakes near Barrow and Atqasuk. Graduate student B. Winston has been analyzing archived satellite images to verify that some lakes consistently experience ice melt-out earlier than surrounding lakes, and that lake ice melt-out occurs later in a wide Arctic littoral zone due to lower temperatures and cloudy/foggy conditions in late spring.

The permafrost group at the **University of Delaware** (UD) has undergone significant changes during the past year. Kolia Shiklomanov has accepted a professorial appointment in the Geography Department at George Washington University (GWU) in Washington DC. In August 2009 the Circumpolar Active Layer Monitoring (CALM) program received a five-year award from the U.S. National Science Foundation, and will be a component of the Arctic Observing Network. This new CALM III will be administered jointly through GWU and UD, with Shiklomanov acting as project director and Nelson as co-principal investigator. UD doctoral students D. Streletskiy and M. Demitroff are making good progress, with dissertation research focused on active-layer studies in northern Alaska and fossil periglacial features in the Mid-Atlantic region, respectively. New graduate students who will be involved in CALM III include Chris Marquez (GWU) and Adam Campbell (UD). The 2009 field parties in northern and western Alaska included Shiklomanov, Nelson, A. Klene (University of Montana), C. Seybold (U.S. Natural Resources Conservation Service), Streletskiy, Marquez, Campbell, and L. Polyakova (Moscow State University).

Kevin Bjella, on behalf of the **Cold Regions Research and Engineering Lab**, reports on studies at the Permafrost Tunnel in Fox, AK, including electrical resistivity and GPR studies by the Southwest Research Institute, tunnel roof support load and creep analysis by CRREL, ice wedge isotope analysis by UNLV and Dan Lawson. The University of Alaska, Institute of Northern Engineering is conducting a study at the Fairbanks Permafrost Research Station, aka Farmers Loop Road Site, for lateral loading of pipe piles. Bjella also reports on the installation of a 12 m thermistor cable at Thule, Greenland, to investigate the state of the permafrost and the effect on infrastructure. B. Astley and Bjella conducted an Army-funded demonstration on Fort Wainwright of permafrost delineation techniques (DC resistivity, capacitively-coupled resistivity, ground-penetrating radar, electromagnetics, and frost probing) to be used in future site selection and geotechnical surveys on military installations underlain by permafrost.

Nicole Mölders and Debasish PaiMazumder (**UAF Geophysical Institute**) examined how the design and density of a permafrost network may affect regional climatology calculated therewith. Biases most likely occur in mountainous regions. Mölders and Kramm wrote a review book chapter on the status of treating permafrost in climate, numerical weather prediction, and chemistry transport models, and how to improve the permafrost representation in these models.

Tom Osterkamp reports on his project “Physical and Ecological Changes Associated with Warming Permafrost and Thermokarst in Interior Alaska,” in collaboration with M.T. Jorgenson, E.A. G. Schuur, Y.L. Shur, M.Z. Kanevskiy , J.G. Vogel, and V.E. Tumskoy. Air temperatures decreased (1985–1999) while permafrost warmed and thawed creating thermokarst terrain, probably as a result of increased snow depths. Permafrost, active layer, and ground-ice conditions at the Healy site are the result of the interaction of climatic, ecologic, and other factors. The slow accumulation of ground ice in an intermediate permafrost layer formed by upward freezing from the permafrost surface leads to long-term differential frost heave and microrelief. When ground ice in the permafrost melts, the ground surface settles differentially resulting in thermokarst terrain (pits, gullies). Windblown snow fills the thermokarst depressions causing further warming and thawing of the underlying permafrost —a positive feedback effect that enhances permafrost degradation. Thermokarst-induced changes in relief alter the near-surface hydrology and ecological processes. Changes in vegetation included differential tussock growth and mortality and a shift in moss species abundance and relative productivity, depending on microtopographic position created by the thermokarst terrain. Water

redistribution towards thermokarst depressions caused adjacent higher areas to become drier and resulted in increased moss mortality and shrub abundance.

Ice wedges exposed along the Colville River on the North Slope, June 2009 (photo: G. Grosse).

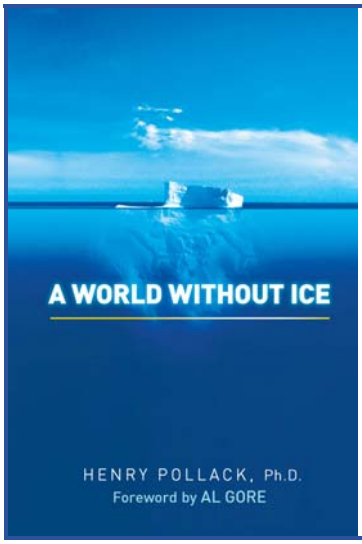
Vladimir Romanovsky reports for the growing **UAF Geophysical Institute/ International Arctic Research Center Permafrost Group** (K. Yoshikawa, S. Marchenko, R. Daanen, G. Grosse, A. Kholodov, and R. Muskett). They continue work on projects including permafrost and active layer dynamics within Alaska, instrumentation of boreholes, acquisition of subsurface temperatures from circum-arctic permafrost regions (Thermal State of Permafrost, TSP), and the modeling of permafrost in various regions: Alaska, Siberia, and Greenland. Permafrost spatial dynamics, implemented by Marchenko for an Alaskan permafrost domain, use a high-resolution spatial data set (2 × 2 km) and Scenarios Network for Alaska Planning (SNAP) data for climate forcing (http://www.snap.uaf.edu) derived from five GCMs: ECHAM5, GFLD21, MIROC, HADLEY, and CCCMA using the A1B emissions scenario. G. Grosse continued fieldwork within NASA and NSF projects in the northern lowlands of the Seward Peninsula, AK, with K. Walter Anthony (UAF), L. Plug (Dalhousie University), M. Edwards (University of Southampton), L. Slater (Rutgers), and N. Bigelow (UAF), and together with B. Jones (UAF/USGS) and K. Peterson (UAA) along a transect of the Colville River (Alaska North Slope). Additional field work took place in eastern Siberia with S. Zimov (Northeast Science Station Cherskii). B. Jones completed remote sensing analyses of thermokarst lake dynamics on the Seward Peninsula, AK, and M.S. student M. Tillapaugh is completing her thesis on remote sensing of thermokarst lakes dynamics in the Kolyma lowland (Siberia). R. Daanen continues simulating permafrost conditions in Greenland and Alaska (NSF-funded). Results from 25 km resolution Greenland permafrost simulations are used to project degradation from infrastructure development; similar simulations for Alaska are available online. He continues EPSCoR-funded work on debris glacier-like features in the Brooks Range. A new DOE study has started, forecasting soil freezing rates in northern Alaska, and new outreach efforts were established with the Watershed School of Fairbanks, teaching fifth graders about the permafrost life cycle. Part of TSP, the GI permafrost group collaborated with Russian, Kazakh, and Mongolian colleagues to update their national Permafrost Monitoring Networks, resulting in many new and improved sites. R. Muskett continued work on space geodesy and remote sensing of the northern hemisphere (MODIS, ICESat, GRACE,

and AMSR-E) with an emphasis on water equivalent mass changes of Eurasian and North American watersheds as related to permafrost changes.

Snow mobile traverse in western Alaska spring 2009, drilling at Eek (photo: K. Yoshikawa).

Kenji Yoshikawa (**UAF Water and Environmental Research Center**) reports on the Permafrost/Active Layer Outreach Program, which builds on work begun in 2005 to establish long-term permafrost and active layer monitoring sites adjacent to schools in Alaska and other countries including tropical high mountains such as Kilimanjaro, Tanzania. Monitoring stations are located at the over 150 Alaskan schools/communities. The sites collect permafrost temperature data and active layer depth. Data gathered from these stations are shared with other schools and made available to the public through: <http://www.uaf.edu/permafrost>. This project involves more than 10,000 students and 500 teachers across Alaska. Specialists in outreach education are developing a classroom lesson *Permafrost/Active Layer in Alaska* that will be included in a "Tunnel Man" movie series. Activities and teaching materials in the Permafrost Handbook encourage students to collaborate and communicate new ideas.

Permafrost temperature monitoring at the village of Kwigillingok, 59° 52' 37.67" N, 163° 9' 32.70" W (photo: K. Yoshikawa).



Henry Pollack of the **University of Michigan** reports on the publication of his new book titled "A World Without Ice." The book is fundamentally a tale of climate change and people, told through the prism of ice. Published by Penguin and with a foreword by Al Gore, the book describes the role ice has played in the development of Earth's landscape, climate, and human civilization, and the reciprocal impact of people on the planet's ice. It describes the delicate geological balance between ice and climate, and why the rapid disappearance of ice portends serious consequences in our not-so-distant future. It provides insight into why ice matters, and how we humans are dramatically changing this critical component of our global environment. More information about the book can be found at <www.worldwithoutice.com>.