field notes
The VECO Polar Resources Newsletter
February 2007

Digging Science: My Summer in the Kuril Islands

by Misty Nikula

Daily, unpredictable Zodiac rides to and from fog-enshrouded beaches, steep terraces scaled with a 25-pound backpack, a hundred holes excavated, many over a meter deep, then filled back in, and over a thousand samples collected, all in an isolated corner of Russia: this was my summer as a TREC participant. It has left a lasting impression on my students, my teaching and me.

The Teachers and Researchers--Exploring and Collaborating program, appropriately called TREC for short, is funded by the National Science Foundation and managed by the Arctic Research Consortium of the United States. TREC's main goal is to advance science education through teacher research experiences in the Arctic. When I was invited to join an interdisciplinary team of scientists from the United States, Russia and Japan as they studied the Kuril Islands in the Russian Far East during July and August last summer, I jumped at the chance.

Follow along as 36 teachers explore both poles this year as part of the new PolarTREC program. http://www.polartrec.com

Dr. Ben Fitzhugh (University of Washington, Anthropology) is the principal investigator for The Kuril Biocomplexity Project (KBP). KBP aims to better understand the interaction between the peoples, ecology, climate and geology over roughly the past 5000 years within the Kuril Island chain, which stretches between Hokkaido Island in Japan and Kamchatka Peninsula in Russia. In pre-historic times the islands were settled by the Jomon, Epi-Jomon and Ainu peoples, as well as by other hunter-gatherer cultures that lived in the areas around the Sea of Okhotsk. The islands range from a sub-Arctic climate in the north to a nearly temperate climate in the south. They also vary in size and accessibility and could have served as a route to Beringia by early peoples. For all of these reasons, they provide an excellent "laboratory" for studying how early cultures may have adapted to, impacted and been affected by their environment.

In this first field season, the researchers wanted to make preliminary investigations on as many of the over 20 major islands as possible and to gather samples that could be used to correlate time periods and pinpoint cultural occupations between sites. During five weeks aboard the *Gipanis*, a 50-meter Russian vessel, teams visited over 30 field sites on 14 islands, collecting samples from archaeological and geological excavations, taking lake sediment cores, and measuring topographic profiles. These samples and other geologic and climate information will be used to determine the most promising sites for more extensive field research during the next two summer field seasons.

Matt Walsh, Misty Nikula and Dena Berkey (L-R) at Berezovka on Iturup Island. Photo: Mike Etnier

My job as a teacher on the project was twofold--first, to contribute to and learn about the scientific endeavors of the project and second, to communicate the science and my experiences to my class, other classes and to the public both during the field season through the TREC Virtual Base Camp and afterwards through public outreach.

During the field season, I worked with each of the teams--geology, archaeology and palynology (the study of pollen)--spending about a week focusing on each discipline. I quickly learned that scientific disciplines have different approaches. For example, geologists dig many holes as deep and quickly as possible, while archaeologists dig holes in slow, careful steps, sifting and sorting through the dirt as they go. Each group was interested, however, in how their preliminary findings matched up with those of the other groups. Correlating archaeological and geological evidence at each location was crucial, so we began working in cross-discipline teams. I was not the only one enthusiastically learning new areas of science and methods!

In addition to fieldwork, I assisted with lab work back on the ship. Each night, we drew geologic section descriptions, calculated and graphed topographic profiles, and labeled and catalogued archaeological samples. There was more than enough work to go around!

All of these activities gave me plenty of material to write about for the TREC Virtual Base Camp. I kept an Internet journal and answered questions posted by students and the public--all through an excruciatingly slow satellite phone connection!

In addition to describing and explaining the science work, I tried

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to convey what life was like on the ship. With often more than 50 people following a regimented and yet unpredictable daily routine while living in cramped spaces with no common language and dramatic cultural differences, life aboard the *Gipanis* was frequently comical and sometimes frustrating. The Americans were amused by the Russian penchant for salvage (a heavy, rusted freezer was picked up from the beach at our first stop and lashed to the aft deck for the rest of the voyage), and for fishing--the decks, engine rooms, control rooms and any spare spaces were liberally strung with drying fish.

The Russians, in turn, had difficulty understanding American eating habits. Why did we need to carry lunches with us to the work site (which might be 1-2 km from our drop site) instead of just stopping work and heading back to the beach for a hot meal from the ship each day? Several missed noon meals were followed by the cook's dirty looks for the next few days as we took extra food from the breakfast table "just-in-case." In the end, we resolved the conflict and the cook sent lunch to shore with us. By the end of the expedition, everyone generally agreed that it was a success--both culturally and scientifically.

Since my return from Russia, I have worked on translating my experience and KBP science work for other teachers, students and the public through presentations, lessons and curriculum development. Over the summer, my students avidly followed my adventures through the TREC Virtual Base Camp, reading and summarizing the scientific activities and posting questions. Throughout this school year, they continue to learn more about the science and the scientists. Bre MacInnes and Beth Martin, geology graduate students at the University of Washington, recently helped my students make topographic profiles of the playground, simulating some of our activities in the Kuril Islands. I am conducting guest lessons in other classrooms on "How to be an Archaeologist," where students study unknown objects, deciding if they are made by nature or humans, and then use their observations and experience to support their conclusions, just as "real" archaeologists do. I continue to actively seek out additional venues to present "Travelogues" of my experience--telling stories and showing pictures of my scientific adventure.

Misty Nikula and Beth Martin (L-R) work to expose the stratigraphy along a road cut at Golovnina on the southern tip of Kunashir Island. Photo: Jody Bourgeois

A map of the Kuril Islands, located north of Hokkaido Island and south of Kamchatka Peninsula. Image: Magellan Geographix

Bre MacInnes, third from left, works with Whatcom Day Academy Middle School students to measure a topographic profile of their playground. Photo: Misty Nikula

Probably my most ambitious undertaking, however, is the development of a multi-unit, integrated biocomplexity science curriculum. I envision a curriculum incorporating geology, weather and climate studies, archaeology, anthropology and zooarchaeology as well as integrating language arts and mathematics. I recently submitted a proposal to train teachers in the curriculum at a national teacher's conference.

I firmly believe that science is both a dynamic body of knowledge and a process for learning about the natural world. This philosophy infuses my classroom and my instruction.

My summer in the Kuril Islands has reinforced my conviction and further enhanced my ability to convey it to my students through connections with the activities of "real" scientists--which, in their eyes, includes me. ■

Misty Nikula is the Middle School Science and Math Teacher at Whatcom Day Academy, Bellingham, Washington, where she has worked for the past 9 years.

The Warmest Place on Earth

by Susan Zager

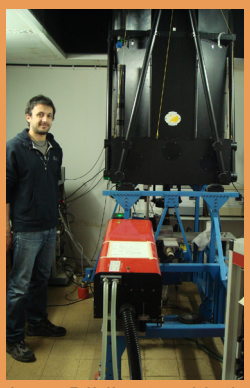
Two hours into the 6-hour flight from Baltimore to Thule Air Base, Greenland, a stomach virus takes hold of me and I'm miserable. When we finally land and the door opens, I rejoice at the shock of fresh, cold air and head directly to my room and to bed. And so my first trip to the Arctic in 2007 begins with a resounding whimper.

I arrive at Thule with two agendas: to give new VPR staffer Kyli Olson a contextual perspective of her work in the Denver office, and to lay the groundwork for the 2007 field season. We have several projects in the area, including the continuing Jeff Welker/ Ron Sletten biocomplexity project, the new Steve Oberbauer/ Jeff Welker ITEX (International Tundra Experiment), and the new Roger Barry/ Shari Gearheard human/sea-ice dynamics project. And so our days are filled with meetings to renew old acquaintances as well as to connect with new people.

Kyli Olson, Col. Ed Fienga and Susan Zager at the Top of the World Club.

The first new person we meet is Base Commander Colonel Ed Fienga. Ed is warm and quick-witted and we are immediate fans. He reminds me of a small-town mayor: proud of his people and proud of the base, and the focal point for issues large and small, on duty or not. But quality of character aside, when Ed bakes chocolate chip cookies for us Kyli and I consider signing on with the Air Force.

We get to know a second new friend, Luca DiLiberto, over coffee on Sunday afternoon as Ed gives lessons in Danish billiards. Luca, a researcher from the University of Roma, has been operating the LiDAR for PI Giovanni Muscari at Thule since December (the laser requires darkness). Apologizing for his English and then proceeding with perfect grammar, Luca is animated as he talks about polar research and the prospect of returning to Thule next year. "It's the best," Luca says.



Luca DiLiberto with the LiDar (L); Kyli on her first helicopter ride (R).

And then the highlight of the trip: hitching along on the Air Greenland helicopter as it makes trips to Savissivik, Qaanaaq, and Moriusaq. Savissivik, a village of approximately 60 people, is the first stop. We fly 45 minutes southeast along the coast in the 9am moonlight. The gray landscape passes beneath us; snow makes fluid the transitions between sea ice, rock, islands and mountains.

The twinkling lights of Savissivik come into view, so impossibly located at the edge of the Earth. I take in the shadowy landscape: a mountain perched on an island, its slope into the sea interrupted by a small belly on which Savissivik sits. We're on the ground for only a moment. A few sled dog barks emanate from the darkness of Savissivik; everything else remains hidden. Then we're off again, swooping over a fishing boat bound in ice, its blazing lights illuminating sled tracks to and from. We're told the vessel is used for wintertime fish processing; when the ice releases it in spring, it will head to market.

Qaanaaq is a metropolis compared to Savissivik; about 600 people live here. There's a school, church, retirement home, satellite dish for cell phone and television, and a lovely place to stay: Hotel Qaanaaq. Hans Jensen, who runs the hotel with his wife Bertie, meets us at the airport and takes us into town. Hans is quite possibly the friendliest person I've ever met, making hotel-keeping an ideal vocational calling.

Susan and Hans Jensen

The hotel is small and perfect, and we sample some of Bertie's baking before taking a tour of town with Hans. Qaanaaq, with its colorful houses in neat rows, looks out onto icebergs and islands, and children play outdoors bundled head to toe in the twilight. Again, our feet are on the ground for too short a time, and Hans and Qaanaaq shrink into the distance.

The passenger we have taken on in Qaanaaq speaks to us in incomprehensible English, but with perfectly comprehensible excitement and happiness: he is going home. As we hover over tiny Moriusaq, I see the black silhouettes of 11 people and 8 dogs coming to greet the helo. The passenger disembarks, is enveloped by the crowd, and walks into the darkness toward town with a small child holding each hand. The others turn back, waving wildly as we rise, and I have the perfect mental photo of Greenland to take home with me. ■

Sleepy Moriusaq in the mid-day twilight

Thule is the Dept. of Defense's northernmost base at approximately 76° N. Lat. Its missions are to track satellite orbits and continously monitor the skies for incoming threats. Scaled back from a peak population of 10,000 during the Cold War, Thule is currently home to about 600 USAF staff and support contractors. The base presents a unique opportunity for NSF researchers: its infrastructure offers private rooms, a dining hall, a store, vehicles, and an AirGreenland Bell 212 helicopter for transportation into the field. Find out more about Thule at http://www.thule.af.mil/

alaska

The VPR Alaska staff spent January looking ahead to what promises to be a busy spring. Among other efforts, Matt Irinaga conducted experiments to determine the efficacy of various de-icing techniques (see photo below). Broader impacts: results will be used to prevent ice buildup on various remote imaging systems, like the Ivotuk webcam.

The de-icing experiment.

Larry Levin spent several days in the field. At the Sag River DOT site, he replaced a failed computer and upgraded the Starband modem and wireless network in support of various hydrology studies led by Doug Kane and/or Larry Hinzman of the Water and Environmental Research Center (University of Alaska). He also stopped at Toolik Field Station to assist with a 2000-hour service and water pump replacement on the 50 kW generator.

Several scientists visited the staff

Toolik looks like a lonely place this winter. Photo: Jason Neely

to pin down support requirements, including Alex Huryn (Marine Biological Laboratory), whose new year-round study (biological activity in a perennial spring) really ramps up at Ivishak Hot Spring in March.

Later this spring, VPR will collaborate with the University of Washington to support a group of researchers working from a Navy sea-ice camp in the Beaufort Sea. Up to 30 scientists and 10 camp staff will spend about two weeks at the camp after the Navy completes its training. A group led by Jennifer Hutchings (University of Alaska) will study the dynamic component of sea-ice mass balance. Another group, led by Max Coon (Northwest Research Associates), will collect information for an ice-motion modeling theory they are developing; their field team will include a high-school student selected competitively for the work. For more information, (including a comprehensive project list) visit the Applied Physics Laboratory Ice Station 2007 website. ■

greenland

Summit Station

January was bitter cold and stormy up on Greenland's apex, with temperatures dropping into the –70s. Biting winds made outside work difficult (but not impossible!) to complete. Blowing snow obscured the first sunrise of the year from the team's view for two days; but "it was an amazing moment" when they finally spied the golden circle on Tuesday, 30 January, manager Kathy Young reported.

The team launched extra balloons for the European-lead Match campaign, which coordinates ozone-sampling activities at participating stations around the Arctic during the campaign season. The goal is to sample parcels of air more than once (in an effort to better understand the complicated chemical reactions that lead to ozone loss). In addition to launching balloons at very specific times for the Match campaign, Andrea Isgro and Sonja Wolter deployed others specifically in support of NOAA's effort to sample early spring stratospheric ozone concentrations. They've also been preparing for the phase 3 crew, due on Friday, February 9.

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Postcard from Kangerlussuaq

Kangerlussuaq, January 22, 2007. Photo: Ed Stockard

Mark Begnaud's been up in Kangerlussuaq working on a "long list of items" to prepare the Greenland hub for spring research support. He sent this note late last month.

You wouldn't have known it was winter when we arrived last Tuesday (January 23). The week before Basse Vængtoft (KISS facility manager) reported they'd had a lot of snow this year and snowmobiling was really good. But as we flew in we noticed the snow was all but gone. It was +51F when we landed, freaky warm for this time of year, and the snow had turned into deep puddles. But it's cooled off again and the wet streets and puddles are now ice-skating rinks. Lots of slips and trips.

It's light enough to see (if dimly) from about 9:00 AM to 3:30 PM, and it's improving every day.

It's commercial hunting season right now, so there are lots of dead musk ox being hauled around on sleds. The hunters plan to take up to 1000 animals this year. They'll process the meat here and ship it out to Denmark and beyond for sale.

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After a two-week turnover, the team will split up and most will head south: Kathy to Hawaii via Arizona; Shannon Zellerhoff to her husband and the ski slopes in Washington; Sonja Wolter to her Colorado home and the relative comforts of NOAA's Boulder facility. As a testament to her stamina and/or to how smoothly phase 2 went, Andrea Isgro will remain behind to tend the

Adrea Isgro shows off her baking skills in the Big House kitchen.

station's science for another phase.

In spite of enduring such dark and stormy conditions at Summit, the phase 2 crew seems in exceptional spirits. VPR Summit operations manager Sandy Starkweather notes that the team shared a "sense of celebration" and a fierce work ethic: "In all of their work, it is obvious to me that they want to leave Summit in better shape than they found it and overall to bring camp to the next level of organization. They are all overachievers and I know we will be implementing their ideas for seasons to come." ■

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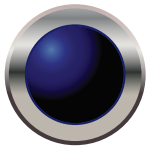

other news

"This is real, this is real, this is real," says Richard B. Alley (Pennsylvania State University) about climate change in this article co-authored by Andrew Revkin in *The New York Times* (may require free subscription). Results show global climate change is underway, an assessment regarded as "unequivocal" by the United Nations-created Intergovernmental Panel on Climate Change in its summary report released on Friday, February 2. Reached by consensus among the panel's scientists (themselves an international body of leading experts), the report also offers 90 percent certainty that recent warming is caused largely by human activities. Read the UN press release.

Bucking the trend, Iceland is experiencing the thickest pack ice in decades this winter, frustrating commercial fishers and giving rise to concerns that polar bears may make unwelcome visits.

Power up those PDAs! Stanford University hosts its Third Annual Polar Technology Conference, this year at SRI in Menlo Park, California, April 26 and 27.

Ivory Gull. Photo by Stuart Tingley

An ivory gull, a rare sea bird potentially to be added to the endangered species list, was found dead along a road in the southern Yukon, far from its home in the high Arctic. Species population has been declining drastically in recent years, perhaps because the bird feeds and nests on sea-ice.

SRI's John Kelly helms a new study of the aurora based in Resolute Bay, Cornwallis Island, Nunavut, Canada. The experiment should provide insight to space weather events, which can disrupt satellite signals.

The House of Representatives approved Joint Resolution 20 on 1 February, which proposes to fund FY 2007 budget items left unfinished by the last Congress. The bill, which is expected to be passed by the Senate, should be presented to the President before 15 February, when the continuing resolution (now funding government activities at 2006 levels) expires. ■

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VECO Polar Resources

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