



Fieldwork near Beardmore Glacier and the Queen Alexandra Range — on Mt. Kyffin at the limit of the last glacial maximum (Photo by Lesley Urasky)

Traveling to Antarctica, a dream for many, became a reality for me thanks to PolarTREC (Teachers and Researchers Exploring and Collaborating). Administered by the Arctic Research Consortium of the United States (ARCUS) and funded by the National Science Foundation, it is designed to provide teachers with research experiences in an interdisciplinary environment that fosters deeper conceptual understanding used to better motivate students (Timm and Warburton, 2009; Dresner and Worley, 2006).

Research shows that the length of time a teacher participates in a research experience must be extensive enough to provide for authentic, real-world science practice. PolarTREC expeditions immerse teachers in 24-hour-day expeditions that last from ten days to eight or more weeks. Most Arctic research experiences take place during the summer, while those in Antarctica occur during the austral summer (our winter). My field assignment was in Antarctica with John Stone (University of Washington) and his team, who are investigating the rate of retreat of glaciers in the Transantarctic Mountain Range since the last glacial maximum.

If you participate, expect a whirlwind experience—and plenty of travel. Participants are flown in

.....
LESLEY URASKY (lurasky@crb1.k12.wy.us) is a former geologist who is in her fourteenth year of teaching. She is currently at Rawlins High School, Rawlins, Wyoming. Journal entries and photos from her PolarTREC expedition can be found at <http://www.polar-trec.com/expeditions/glacial-history-in-antarctica>

PolarTREC: To Antarctica in the Name of Research and Teaching

early spring to Fairbanks, Alaska, the headquarters of ARCUS, for an orientation to the program. During this week, members of the cohort learn about program requirements, how to communicate polar science to the public, and how to incorporate this experience into the classroom.

In order to reach Antarctica at the height of the research season, we left the U.S. on November 29, 2010. Departures for Antarctica take place at the United State Antarctic Program's (USAP) flight terminal in Christchurch, New Zealand. Prior to departure, all USAP participants go through the Clothing Distribution Center (CDC) and receive the cold weather clothing and gear needed to survive Antarctica's worst weather.

Before we left the U.S., we were reminded of the need to be flexible: All travel in Antarctica is weather dependent. It was good advice. Our trip was delayed for three days because of adverse weather at McMurdo Station, Antarctica. We used the opportunity to explore the region around Christchurch.

Our C-17 flight finally departed December 6. Upon arrival in McMurdo, we were immersed in preparations for our departure to our base field camp in the Central Transantarctic Mountains (CTAM). Once again, the need for flexibility arose: Our flight was delayed due to extremely strong winds at CTAM.

While waiting, we relaxed and explored the region around McMurdo. Then, on December 17, we boarded a LC-130 Hercules for a two-hour flight to CTAM and the field work component of the expedition.

After a day at CTAM we made the first of many helicopter flights to our beginning field camp on the slopes of Cloudmaker Peak, which borders the Beardmore Glacier (one of the 10 largest glaciers in the world). We spent six days here collecting samples in the worst weather (35-40 mph winds) of the entire trip. As part of the scientific team, I walked the limits of the moraine created during the last glacial maximum looking for appropriate samples, labeled sample bags, took photos of the sample site, and carried samples back to camp. My responsibilities as a PolarTREC teacher included submitting daily journals chronicling the expedition (the science and my experiences), answering questions submitted to the "Ask-the-Team" forum, and conducting live webinars from the field via satellite phone.

From Cloudmaker Peak, we flew to Mt. Kyffin, where we celebrated Christmas and conducted field work for six days, then flew to our final field camp on Mt. Hope. On New Year's Day we hiked to the summit of Mt. Hope, which figures prominently in Antarctic exploration history. It took only a few days to collect the needed samples. Unfortunately, the day we were scheduled to leave, we awoke to fog. It persisted either at our camp or CTAM for almost a week before the helicopter could retrieve us. Once we returned from our field camps, it was time to say goodbye to Antarctica; we returned to the U.S. on January 19.

When I embarked on this experience, there were two main things I hoped to learn.

First, I wanted to learn how to better bring scientific inquiry into the classroom. It is important for students to see that current science builds upon the work of earlier scientists and that techniques and technology are continually improving; I wanted to connect early research in glacial retreat to what my team did in the field. In the fall of 2011, I am planning a field trip to Snowy Range in southeastern Wyoming where students will map the retreat of the glaciers during the last glacial maximum. This will simulate the project we conducted in Antarctica as an authentic field experience.

Second, I wanted to learn how I could better prepare students for success in post-secondary education. My discussions with college-level faculty

reinforced my concern that too many students lack the math and writing skills to succeed in college. My introductory science classes already write summaries of current science news articles. This fall I am extending this practice to my upper-level students by having them write abstracts and outline scientific research papers related to our studies.

My positive experiences are not unique. Columbia researchers Silverstein et al (2009) found that of teachers who participated in such programs:

- 96% increased hands-on classroom activities and/or introduced new laboratory activities
- 93% developed new or revised content to lessons and/or laboratories
- 83% introduced new technologies in their class and laboratory exercises
- 73% increased requirements for formal written and/or oral reports
- 65% read scientific journals more frequently
- 64% discussed science careers and related jobs with their students
- 53% assumed new leadership roles/responsibilities in their schools or districts (p. 441)

Simply put, the PolarTREC experience is one I'd recommend to every teacher who is looking for a meaningful professional development experience that will enrich his or her interdisciplinary science teaching. It will expand your horizons beyond your expectations.

WORKS CITED

- Dresner, M., & Worley, E. (2006). Teacher Research Experiences, Partnerships With Scientists, and Teacher Networks Sustaining Factors From Professional Development. *Journal of Science Teacher Education*, 1-14.
- Silverstein, S. C., Dubner, J., Miller, J., Glied, S., & Loike, J. D. (2009). Teachers' Participation in Research Programs Improves Their Students' Achievement in Science. *Science*, 440-442.
- Timm, K., & Warburton, J. (2009). Using Interdisciplinary Polar Research to Enrich Teachers and Classrooms. *SACNAS News Precollege Issue*, 8-10.

WEB LINK OF INTEREST

PolarTREC (Teachers and Researchers Exploring and Collaborating), <http://www.polartrec.com>