Undergrads on Ice

by April Jacobs and Liz Miller

COURTESY OF APRIL JACOBS AND LIZ MILLER

FIELD WORK AND FROSTY BOY: April Jacobs, on right, and Liz Miller flank their advisor Dr. Berry Lyons in Wright Valley

Editor's Note: April Jacobs and Liz Miller, senior geological sciences majors at Ohio State University as well as student workers at the Byrd Polar Research Center, where director Berry Lyons praised their "tremendous" diligence, spent nearly two months (22 December to 15 February) working in Antarctica.

After five planes, four days, and almost 25 hours of flying, we reached the bottom of the world. It was 22 December 2005, and, bundled up in all of our cold weather gear, we waited anxiously inside the C-17 that had finally delivered us to Antarctica after a five-hour flight from Christchurch. It was our first time to "The Ice," and we were both excited to deplane.

It's impossible to prepare for your first step out of the plane. The first breath of cold air stings your lungs, and if you don't get goose bumps from looking at the snow and ice that surrounds you, you at least get them from the wind whipping across the ice shelf.

The first week in McMurdo was hectic: Outdoor Safety and Waste Lectures, Field Safety Training ("Happy Camper") School, and getting settled in to our rooms all took some time, not to mention learning our way around and meeting all kinds of new people!

We were roommates, and our room consisted of two beds, two armoires, a TV, a sink, and a shared bathroom. The galley was a close walk, and the food was usually pretty good, with meat and vegetarian options at every meal, and occasional "freshies" like salad and fruit. Even if the meal was unappealing, there was always "Frosty Boy," the vanilla soft serve "ice cream" rumored to only have five ingredients, none of them dairy.

We both worked as lab assistants in the Crary Laboratory for the Long Term Ecological Research (LTER) program, analyzing samples from a variety of sites in the Dry Valleys. Liz ran phosphate analyses on Antarctic water samples and chlorophyll analyses of soil samples. April ran the ion chromatography instrument, analyzing water samples for major anions and cations.

McMurdo life was great: there were tons of unique and interesting people to hang out with, three bars and even a bowling alley for entertainment.

But life in McMurdo was nothing compared to life in the field. There, everyone is either working or sleeping, but mostly working. We experienced this level of dedication firsthand when we left for Taylor Valley, one of the Dry Valleys, on 10 January. Taylor Valley is beautiful: white glaciers cresting majestic mountains, snow-covered lakes with sky-blue icy moats. For the first time, we saw the place where all of those samples had come from.

As we flew into Taylor Valley, we were flashing pictures left and right, our eyes wide and smiles from ear to ear. Back home we had been working with data from the very lakes we were flying over!

Our first stop was Lake Hoare. There's only one main building (about 24'X10') which has a kitchen, a camp business office, craft table, lounging area and computer lab. It was pretty intriguing that we could get along with very little space, very few personal items and still have a tremendous amount of fun and comfort!

We each slept in our own tent, our only real bit of privacy. We both slept better at Lake Hoare than we ever did back in McMurdo. After a full day of field work, a comfortable down sleeping bag in the warmth of a tent was the perfect place to lay your head.

In both Taylor and Wright Valleys, numerous extinct volcanic cones punctuate the landscape. Their deep blackish-red color makes them stand out against the surrounding brown and white. For her senior honors thesis, Liz looked at the rate of weathering of the cones. The ages of the cones are very well constrained (between 1.5 and 4 million years old), so a qualitative study can be performed to estimate the rate of weathering.

Each day, we and our advisor Dr. Berry Lyons were picked up at Lake Hoare by one of the helicopter pilots and flown to an area where Liz could collect rock samples. We loved being out hiking around in the field, although hiking from volcanic cone to volcanic cone did prove to be rough sometimes.

Due to the lack of vegetation, deciphering distances in Antarctica can be quite difficult. Sometimes we would hike and hike, look at our watches, sigh, and turn around so we were sure to be back in time to catch the helicopter back to camp.

Rae, the camp manager, always had great meals cooking, perfect for re-energizing after a day of fieldwork. The homemade meals were always delicious, and totally made up for the Asian-food-nights back "in town," when we survived on just bread and Frosty Boy.

After three days of rock collecting and re-

cording, the two of us headed to F6, an even more remote field camp located next to Von Guerard Stream, a glacial meltwater stream near Lake Fryxell. Here we assisted Karen Cozzetto, a Ph.D. student from Colorado working on the LTER project, in her stream tracer experiment, a.k.a. the mother of all stream experiments! It was unbelievable how many different types of data were taken for this one experime: water temperature at depth, weather data, stream samples (for a myriad of data), all taken at five different sites simultaneously over about 18 hours.

We spent two full days just setting up the equipment. April worked on getting the right number of bottles to the different sites and Liz helped to set up and wire the thermocouples. Our goal was to collect as much data as possible to understand the flow dynamics and chemical interactions of the stream and the streambed.

On Field Day 7—completely exhausted and still unshowered, our "field hair" greasy beyond belief—we returned to McMurdo.

It was definitely a bit weird. For the first time, the crowd of people in the galley at dinner wasn't appealing. Perfumes and fragrances were noticeable to the point of annoyance.

"So how was it?" several McMurdo buddies asked. But it was difficult to put into words—and sometimes still is.

Liz (hometown: Maineville, Ohio) will begin pursuing a Ph.D. at Johns Hopkins University and is returning to Antarctica in December ("I can't wait!" she says). Antarctica "definitely exceeded all expectations" for her.

Working in the field, she says, was by far the best part of the trip: "There's so much work to be done, collecting rock samples, describing the landscape, taking GPS points. There's nothing more satisfying."

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A helo ride to Garwood Valley was another highlight. "It was a day trip to help with some CO^2 flux sampling, and we were flying out in an A-star, one of the smaller helos. Flying 50 feet above the ground, swaying back and forth as you zoom up a streambed, then quickly shooting up to 200 feet before plummeting back down to land, was the best ride of my life!"

Says Liz: "It sounds clichéd to say that my trip to Antarctica was a life-changing experience, but it really was. I was given the chance of a lifetime, and it was absolutely amazing."

April (hometown: Bellefontaine, Ohio), who is currently job-hunting, is interested in doing field work with "almost any research team." In the longer term, she plans on educating the public about environmental issues and general science education.

She was equally affected by their southern journey. "Though I was well prepared and had been shown numerous pictures by my colleagues, I was awestruck and speechless as I stepped off the plane," she recalls. "I nearly started to cry. As a young girl, I had often imagined myself taking amazing adventures for the sake of science and discovery."

She was likewise thrilled by their fieldwork at F6. "I was tickled to be doing "real" science," she says. "I felt like I was taking part in a legacy, a world-changing (at least, textbook-changing) project. I was put in charge of organizing one part of the experiment and that just put me on top of the world."

Smells and sounds—or their absence in Antarctica—impressed April. "The only smells I experienced in the field were those made by people: clean people, dirty people, sunscreened people, people making food. And the quiet was hard to imagine, even now. It was so peaceful. I slept like a baby.

"And for the first time, I caught a glimpse of what it would have been like to be an explorer, driven solely by adventure and discovery of unknown places."

To read more and see photos of the women's adventure, visit www.lizsadventures.blogspot.com/ and www.flickr.com/photos/iceflicks. ❑

Antarctic Notes

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Macquarie—nicknamed "Macca"—for more than 50 years. ❑

Asbestos Cause of Macquarie Pullout

***[Hobart] Mercury*, 12 January 2006, by Anne Mather**—Scientists are concerned that a plan to abandon research at Macquarie Island is based on budget pressures exacerbated by asbestos contamination, which could cost tens of millions to remediate. Up to half the buildings on Macquarie contain asbestos; the Antarctic Division is under pressure to eradicate the material in accordance with national guidelines. Scientists say budget cuts are the real reason behind the move. The Antarctic Division yesterday said no firm decision had been made on the base's future. Chief scientist Michael Stoddart said discussions were ongoing, adding that whatever decision was reached it would be made "on the basis of scientific research." He denied that budget constraints were behind the plans. ❑

2005 Ties for 2nd Warmest Year

***University of Alabama Huntsville (UAH)* press release, 5 January 2006**—With a global average temperature that was 0.3°C warmer than seasonal norms, 2005 tied with 2002 as the second warmest year in the past 27, according to data gathered by NOAA satellites and processed at UAH. Temperatures in 2005 followed a general pattern seen over the past 27 years, with the most significant warming seen in Earth's northernmost third, especially in the Arctic. "It just doesn't look like global warming is very global," said Dr. John Christy, director of UAH's Earth System Science Center. "Even if you acknowledge the effects of greenhouse gases, when you look at this pattern of warming you have to say there must also be something else at work here." ❑

India Plans Third Station

***http://in.rediff.com*, 26 December 2005**—A site at 69°S, 76°E in East Antarctica's Larsemann Hills has been selected by the Department of Ocean Development for the site of India's third permanent station. "At this stage, it is not possible to give a time frame for setting up of the third station," sources at the Ocean Development Department said. ❑

New Map of Tides Beneath Ice Shelves

***Ohio State University* press release, 5 December 2005, by Pam Frost Gorder**—Using the twin satellites of the Gravity Recovery and Climate Experiment (GRACE), scientists have used minute fluctuations in gravity to produce the best map yet of ocean tides that flow along the ocean floor beneath the Larsen and Filchner-Ronne Ice Shelves. While the tides cause only minute fluctuations in Earth's overall gravity, they are actually composed of massive amounts of water, said C.K. Shum, professor of civil and environmental engineering and geodetic science at Ohio State. The ice is a mile thick in parts, and the tides are so large that they can lift the shelves—with a combined area bigger than California—as high as 15 feet. ❑