

## Scientists learn volumes from ancient tracks

By Emily Stone

*Sun staff*

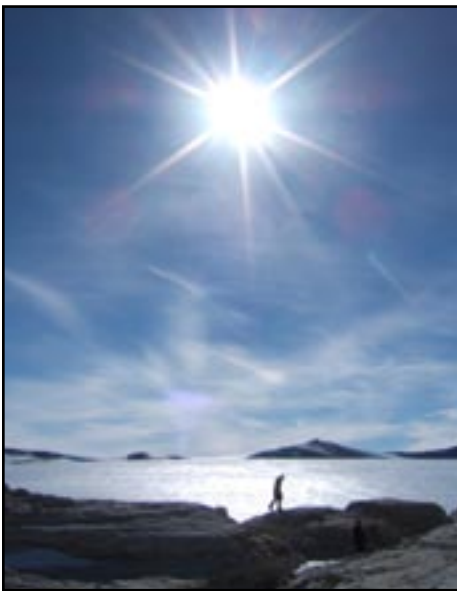
To Molly Miller, little lines etched in stone are the history books of ancient Antarctica.

Miller and her fellow scientists are hunting for tracks left by the tiny animals that inhabited the continent's lakes and streams between 240 million and 280 million years ago. Understanding what was living here will reveal much about the climate, landscape and ecology of the period.

"We're piecing together a picture of the past," said Miller of Vanderbilt University, who is a co-principal investigator on the project.

Her two co-principal investigators are doing similar searches. John Isbell of the University of Wisconsin, Milwaukee is looking for features in the rocks that

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Cecelia Mortenson / Special to The Antarctic Sun

A researcher walks along the rocks in the Allan Hills searching for animal tracks, fossils and geological features that will help scientists piece together a picture of the ecology, climate and landscape of ancient Antarctica.



Steven Profaizer / The Antarctic Sun

Randy "Crunch" Noring prepares to hook a hanging cargo net to a helicopter hovering at Marble Point Refueling Station. The facility functions as a gas station, food stop and way station for many flights in the McMurdo Dry Valleys.

## Much more than fuel

Marble Point Refueling Station gives pilots a taste of home

By Steven Profaizer

*Sun staff*

There is no question what continent you are on when standing outside the main hut at Marble Point Refueling Station. A large glacier terminates a few hundred meters away. Icebergs stick up out of the sea ice, frozen in place. And the cold, dry wind whips across your face.

Inside the hut, however, you might think you've been whisked away to a friend's house, complete with a small kitchen wafting the smell of chicken noodle soup, fresh-baked bread and homemade cookies.

The small facility sits about 80 kilometers northwest of McMurdo Station and serves as an operational outpost for helicopters traveling in the McMurdo Dry Valleys. It offers fuel, hot meals, a place to relay cargo, and shelter in bad weather.

"We're a truck stop for helicopters," said Randy Noring, who is known as "Crunch."

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### Quote of the Week

"What an emotional roller coaster."

— McMurdo resident after seeing his same last name but different first initial on the package list.

## Going deep

Drillers prepare to bore a 2.4-kilometer-deep hole for the IceCube project at South Pole Station last month.

Below, a digital optical module is lowered into a hole in the ice. A total of 80 holes will be drilled into the ice to make the world's largest neutrino detector, which will help scientists answer questions about the beginning of the universe.



Albrecht Karle / Special to The Antarctic Sun



Ethan Dicks / Special to The Antarctic Sun

## Cold, hard facts

### The Southern Ocean

Year it was designated as a separate ocean by the International Hydrographic Organization: **2000**

Boundary: **Water between 60 degrees south latitude and Antarctica**

Area: **20.3 million square kilometers**

Rank in size: **Fourth; it's bigger than the Arctic Ocean but smaller than the Pacific, Atlantic and Indian oceans, in that order**

Coastline: **17,968 kilometers**

Water temperature variation: **10 degrees Celsius to negative 2 degrees Celsius**

Average depth: **4,000 to 5,000 meters**

Deepest point: **7,235 meters at the southern end of the South Sandwich Trench**

Source: *CIA World Factbook*

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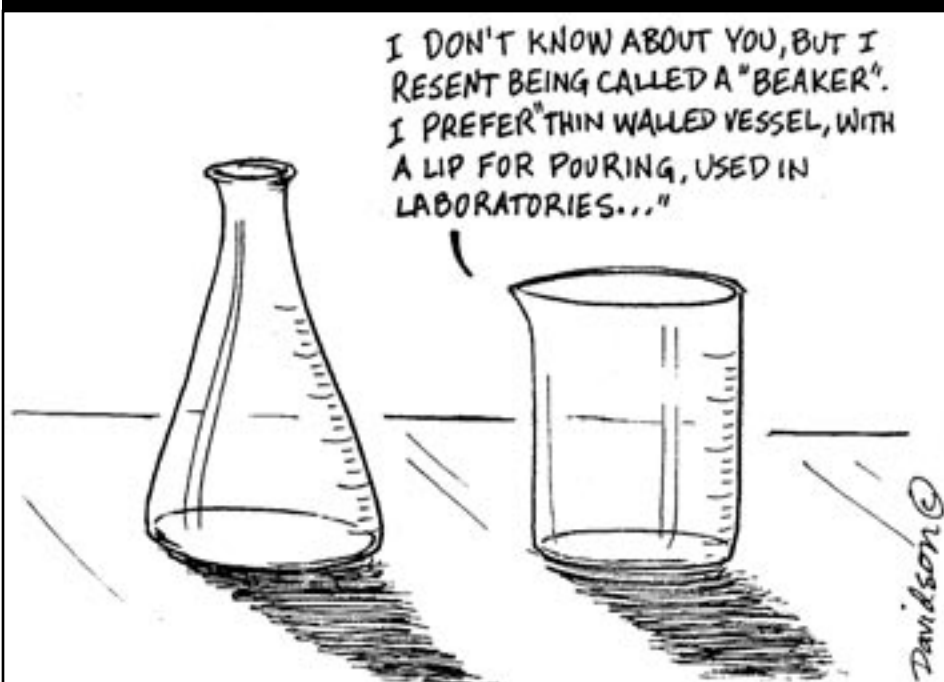
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### Level 1 Comix

Matt Davidson





# Researchers check penguin stress levels

By Emily Stone  
*Sun staff*

The tourists who flock to Torgersen Island off the Antarctic Peninsula every summer come in part because the Adélie penguins there are so unfazed by people that they'll wander right by them.

"The Adélies basically ignore the tourists," said Bill Fraser, who has studied the island's Adélies for nearly 20 years. "They'll literally walk through a group of tourists that are chatting and they could care less."

Fraser and his science group want to know if the penguins are naturally comfortable with humans or if years of heavy tourism have conditioned them to people. They're testing out a new tool this year — a pretend penguin egg that measures the penguin's heart rate — to help them determine how much stress the tourists induce in the birds. The group's findings could influence how tourism is managed in Antarctica.

Tourism has exploded in Antarctica over the last few decades, with 20,000 people visiting the continent and surrounding islands every year, according to the International Association of Antarctic Tour Operators. About 800 people visited Torgersen Island last summer, according to an association database.

Fraser, with the Montana-based Polar Oceans Research Group, has been studying the Torgersen Adélies since the late 1980s to see what effect the tourists have on the birds. Half the island is open to tourists, and half is closed. So there's a de facto experiment taking place there.

Fraser and his group have watched tourists and birds interact for years, and have recorded data on the birds' breeding and survival rates for both halves of the island. The group has found that tourists have little impact on the population's health, Fraser said.

"That doesn't mean there is no impact," he said. "It's just that the effects of natural variability are probably much more severe to penguin populations. They swamp any human effect if there is one."

Fraser suspects that tourism has been so concentrated in certain areas that the penguins in those spots are no longer concerned by people. But what of the penguins that rarely see people? Fraser wants to know if they are agitated by humans. If so, then Fraser said he thinks tourism should stay concentrated in a few areas. That way, the penguins that are used to people can entertain the tourists, and the penguins who get alarmed by tourists can be spared the experience.

The group has added a new component to their study to understand how people effect the birds. This summer, they've started testing a computerized penguin egg that records the birds' heart rates. Researchers place the egg in a penguin nest so that a penguin is sitting on it when people come by. The egg has sensors that measure the penguin's heart rate, which is a good indicator of stress.

Scientists working out of Palmer Station were able to make one trip to Torgersen to test the egg so far this season. Their goal is to test two prototype eggs several times this summer so that the full experiment can begin next year.

Brett Pickering, a researcher with Fraser's group, said the first test went well logistically. The pretend egg was placed in a penguin nest where there was one other egg. The penguin sat back down and appeared to accept the second egg as its own.

"It shifted around for a second and tried to get its nest comfortable again, but it didn't seem to notice that anything was up with having two eggs," Pickering said. "They're really not the smartest birds in the world."

The eggs have a faint line between the two halves, which can be opened to remove the batteries and memory card.



Courtesy of Bill Fraser / Special to *The Antarctic Sun*



Photos by Brett Pickering / Special to *The Antarctic Sun*

*Top, some of the roughly 800 tourists who visit Torgersen Island each year to get a close-up look at Adélie penguins. Above left, a penguin accepts a computerized egg as its own. The egg, above right, measures the penguin's heart rate to see if it is stressed by tourists.*

"Otherwise it looks like a real penguin egg, maybe a little cleaner," Pickering said.

The egg's software didn't perform as well as hoped, however.

It logged temperature data during its 24-hour stint under its adopted parent, but the group couldn't access the heart rate information. They've sent the data to the egg's manufacturer in Idaho to see if the results can be extracted.

The temperature sensors tell the researchers when one penguin gets off the egg and its mate takes over. This is important because the scientists want to study the heart rate of the mate, because the original penguin has already been exposed to humans when the researchers came and put the egg in the nest. The team is interested in how the second penguin, which hasn't seen a person for a while, reacts when a tourist approaches.

Fraser said there's anecdotal evidence that penguins on the non-touristed side of the island and other remote sites are upset by approaching people. When scientists get near a bird, the feathers on the back of its neck and head stand up, and its eyes get bigger.

"They do show alarm," he said.

This could be a problem if tour operators decide to visit more and more of Antarctica.

"Everybody wants to give their customer a wilderness experience," Fraser said. "One way to ensure that they don't see each other is to spread activities all over the place. ... We're against that strategy."

*NSF-funded research in this story: Bill Fraser, Polar Oceans Research Group.*

# Delegation visits stations

A congressional delegation led by Sen. John McCain (R-Ariz.) and Rep. Sherwood Boehlert (R-N.Y.) arrived at McMurdo Station on Jan. 6 for a tour of the U.S. Antarctic Program facilities at McMurdo and South Pole.

The other delegation members were: Sen. Susan Collins (R-Maine), Sen. John E. Sununu (R-N.H.), Rep. Roscoe G. Bartlett (R-Md.), Rep. Bob Inglis (R-S.C.), Rep. Phil Gingrey (R-Ga.), Rep. Darlene Hooley (D-Ore.), Rep. Robert E. "Bud" Cramer (D-Ala.), Rep. Lincoln Davis (D-Tenn.), Rep. Brad Miller (D-N.C.), Rep. Jim Costa (D-Calif.), Rep. Ben Chandler (D-Ky.), and Under Secretary of the Air Force Ronald M. Sega. Boehlert heads the Congressional Science Committee. Many of the others sit on the committee as well.

Kathy Olson, deputy director of the National Science Foundation, hosted the group. She said it was a great occasion for them to learn firsthand about the unique scientific research conducted here, and the technology, infrastructure, and support that enable success in this extreme environment.



Steven Profaizer / The Antarctic Sun

The group, in their standard issue red parkas, enters the new South Pole Station for a tour.



Steven Profaizer / The Antarctic Sun

Above, Costa and Boehlert listen to a South Pole scientist talk about climate change.

Center, McCain points out a photo at New Zealand's Scott Base to Sununu and Collins.

Far right, Interim Lab Supervisor Tracy Szela, center, talks about the fish in the Crary Science and Engineering Center aquarium to, from left, Sununu, Collins, Sega and Costa.

Below right, the entire group, with staff, poses for a photo at the geographic south pole.

Below, Fleet Operations Supervisor Gerald Crist with McCain at a reception at McMurdo. Crist amended his name tag to read "Dawn's Dad," since his daughter, Dawn Crist, cooked lunch for the delegation at Marble Point the previous day.



Emily Stone / The Antarctic Sun



Peter Rejcek / The Antarctic Sun



Emily Stone / The Antarctic Sun



Steven Profaizer / The Antarctic Sun



# around the continent

## SOUTH POLE

### In the home stretch

By Mike Mulvihill

*South Pole correspondent*

Despite tattered Carhartts and confused sleep cycles, Polies are beginning to see the light at the end of the tunnel. It's the second week of January, and with the clock ticking and the temperature dropping, the crew here is making its push to finish another successful season.

The majority of summer staff will leave the South Pole on Feb. 15. But if temperatures cooperate and cargo and fuel are still needed at Pole, flights will continue into the following week. That leaves just a few short weeks to finish up the projects at hand and turn over the keys to the winter crew.

Construction on the elevated station continues inside and out, and the transformation is quite remarkable. The exterior siding project is moving along at a determined pace and the station is taking on a sleek new look. The gunmetal grey finish and sharp lines present a modern image in a place that is surrounded with history — a symbol of the bright future that lies ahead.

The station operations center (SOC) is the new home for communications in the elevated station, with a clear view of the skiway and flight deck, and with mounted cameras to see the rest of the station. Lately, it's not unusual to see two planes at once on the ramp. Near the SOC, the new gym is shaping up to be a great place for folks to get a workout. Outside of the elevated station, work to excavate and raise the biomed arch continues.

Polies got a special treat from home last week. A congressional delegation came for a visit and tour on Jan. 7 to see what life at the Pole is like. There were assorted senators and congressional representatives, including Sen. John McCain



Peter Rejcek / The Antarctic Sun

*Snow is removed from around the old biomed arch next to the South Pole Dome. The arch will eventually be raised as part of a new cargo arch.*

(R-Ariz.) and Sen. John Sununu (R-N.H.). They were accompanied by Kathie Olsen, National Science Foundation deputy director, and Erick Chiang, head of the NSF's Polar Research Support Section.

The group of visitors toured the new station, observed the IceCube science project, visited the Atmospheric Research Observatory and lunched in the dining hall.

Redeployment meetings began this week, and the question everyone around station is asking is, "When are you leaving?" For most, it's a melancholy moment to see the date on paper and realize the life you have forged here is coming to an end.

The other side, of course, is the giddiness that comes from knowing that in a little over a month you could be sitting on the beach in Fiji or Australia with your toes in the sand — and the only ice to be seen is in your drink.

## PALMER

### LTER cruise begins

By Kerry Kells

*Palmer correspondent*

We welcomed the *Laurence M. Gould* on Jan. 5 for a short port call before its Long Term Ecological Research (LTER) cruise. The ship brought more researchers to station, as well as cargo, mail and freshies. At the same time, a Chilean naval ship, the *Lautaro*, stopped by for a visit. Seven Chilean officers and one Argentinian meteorologist came ashore for a tour of the station.

The *Gould* brought back long-time Principal Investigator Bill Fraser with the seabird ecology portion of LTER, and Rick Lee, principal investigator with the polar insect research project. New members of Principal Investigator Patricia Matrai's

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### the week in weather: Jan. 6-12

#### McMurdo Station

High: 39F / 4C

Low: 14F / -10C

Max. sustained wind: 23mph / 37kph

Windchill: -15F / -26C

#### Palmer Station

High: 41F / 5C

Low: 30F / -1C

Max. sustained wind: 14mph / 23kph

Precipitation: 0mm

#### South Pole Station

High: -3F / -19C

Low: -20F / -29C

Peak wind: 38mph / 61kph

Max. physio-altitude: 3,206m

## Continent From page 5

biocomplexity project, which studies the sulfur compound dimethylsulfide, arrived along with her co-principal investigators Ronald Kiene and Raymond Najjar.

The ship then left, heading south on a grid pattern along the same route as previous years to collect samples for each component of the Palmer LTER. They will stop briefly at Raynaud Island not far from Palmer and then go as far south as Avian Island, more than 325 kilometers away from Palmer Station. The seabird researchers will camp on Avian for a few nights. The island is just south of Adelaide Island, the location of the British Rothera Station. The *Gould* is scheduled to return to Palmer on Feb. 4.

Many community members and scientists departed with the LTER cruise. Langdon Quetin and Robin Ross-Quetin are co-principal investigators with the krill component. Hugh Ducklow, principal investigator with the microbial biogeochemistry ecology component, returned to station for the port call and departed for the cruise with several team members. Many researchers with the phytoplankton and bio-optics components of LTER also left on the cruise.

Arriving on station for his second consecutive season is Richard Lee, principal investigator from Miami University, Department of Zoology. Lee was in the Antarctic in 1980 to document the stress tolerances of the Antarctic midge, *Belgica Antarctica*, the largest and most southerly insect that undergoes a complete metamorphosis. He deploys this year with a team of four, including a sixth-grade science teacher who is part of their field team as an educational outreach participant.

They will research how the midge survives in different microclimates and with



Cara Sucher / Special to The Antarctic Sun

*The Laurence M. Gould cruises by an iceberg. The Gould will be at sea for the next month as part of the Palmer Long Term Ecological Research project.*

different microhabitants, and look at their primary food sources as a possible clue to their survival. Their research will take them to different locations in the Palmer vicinity that have high populations of the larvae.

## SHIPS

### NBP

Compiled from reports by  
Harold "Skip" Owen

*Marine Projects coordinator*

We gradually picked up speed by Jan. 2 as this first CORSACS transect routine smoothed out. CORSACS, or Controls on Ross Sea Algal Community Structure, is a project studying what controls phytoplankton dynamics. A series of instruments are deployed at various stations to collect samples and study the phytoplankton.

The next day we steamed east on the CORSACS transect line, stopping at stations every 55 kilometers to deploy instruments and nets. Winds are still up a bit. We continued along the same transect until Jan. 5 with favorable conditions.

On the 5th, we completed the easternmost station of the first CORSACS transect line and began our westward push along the second transect line. We had solid fog the next three days, but continued deploying instruments.

By Jan. 9 we were working through the last few stations of the CORSACS transect westward along 76 degrees south. We'll finish up the last station in time to proceed to the helicopter rendezvous planned to pick up some critical science items on Jan. 11. We will then move south on to a modified transect line at 77 degrees 30 minutes south and work eastward.

### LMG

Compiled from reports by Andrew Nunn  
*Marine Projects coordinator*

We arrived at Palmer Station on Jan. 5 and began cargo operations immediately. Excellent weather and sunshine helped all operations go smoothly, and the work was done by that evening.

We departed Palmer on Jan. 7. Long Term Ecological Research (LTER) operations are under way, including conductivity, temperature and depth (CTD) tests and net tows at each station. We are also dropping drifter buoys at three stations on each track line and deploying a CTD at the midpoint between each station. The new frames for the nets are working well, as is the net depth sensor. After getting everything rigged and ready at the first station, the later stations are becoming routine.

We completed four additional stations on Jan. 8. The weather and seas are cooperating. On the last net tow of the day, the drive chain on a winch broke and had to be rebuilt and replaced. The winch was back in operation and working for the morning station. We completed three deep stations the next day. All operations are running smoothly.

## Continental Drift What's the most interesting scientific thing you've learned here?



Kerry McElroy,  
Palmer research  
assistant from  
Syracuse, N.Y.,  
first season

**"Our research is attempting to prove that a byproduct (DMS gas) created by organisms as simple as phytoplankton may play a crucial role in the future of curbing the side effects of global climate change."**



Liesl Schernthanner,  
South Pole winter  
site manager from  
Sun Valley, Idaho,  
11th season

**"I learned that dark energy is 65 percent of the universe — and that's scary."**



Andy Bauer,  
McMurdo janitor  
from Hudson, Wis.,  
first season

**"How difficult it is to calibrate the seismic equipment on Mount Erebus."**



By Steven Profaizer

*Sun staff*

No human was around to record the long histories of the lakes in the McMurdo Dry Valleys. So scientists are asking the lakes to reveal their own story.

"We are looking at fossil chemical signatures [in the water and sediment] of these lakes," said Glen Snyder, co-principal investigator of the project from Rice University in Houston.

As geochemists, the group studies the chemical changes preserved in the lakes and looks at them as records of the past. The group aims to learn three major things from those liquid fossils: how the lakes are supplied with water, the source of the salts in the lakes, and how long they've been covered with ice.

"These lakes are an isolated part of a big picture," Snyder said. "We want to see if global events we know occur at certain times truly happen all over the globe. ... In a way, these lakes are barometers of environmental change in the past."

The lakes record climate changes especially well because they exist in a delicate equilibrium and are therefore sensitive to such changes.

"We're looking at an ecosystem that can change dramatically with just a few degrees change in temperature," Snyder said.

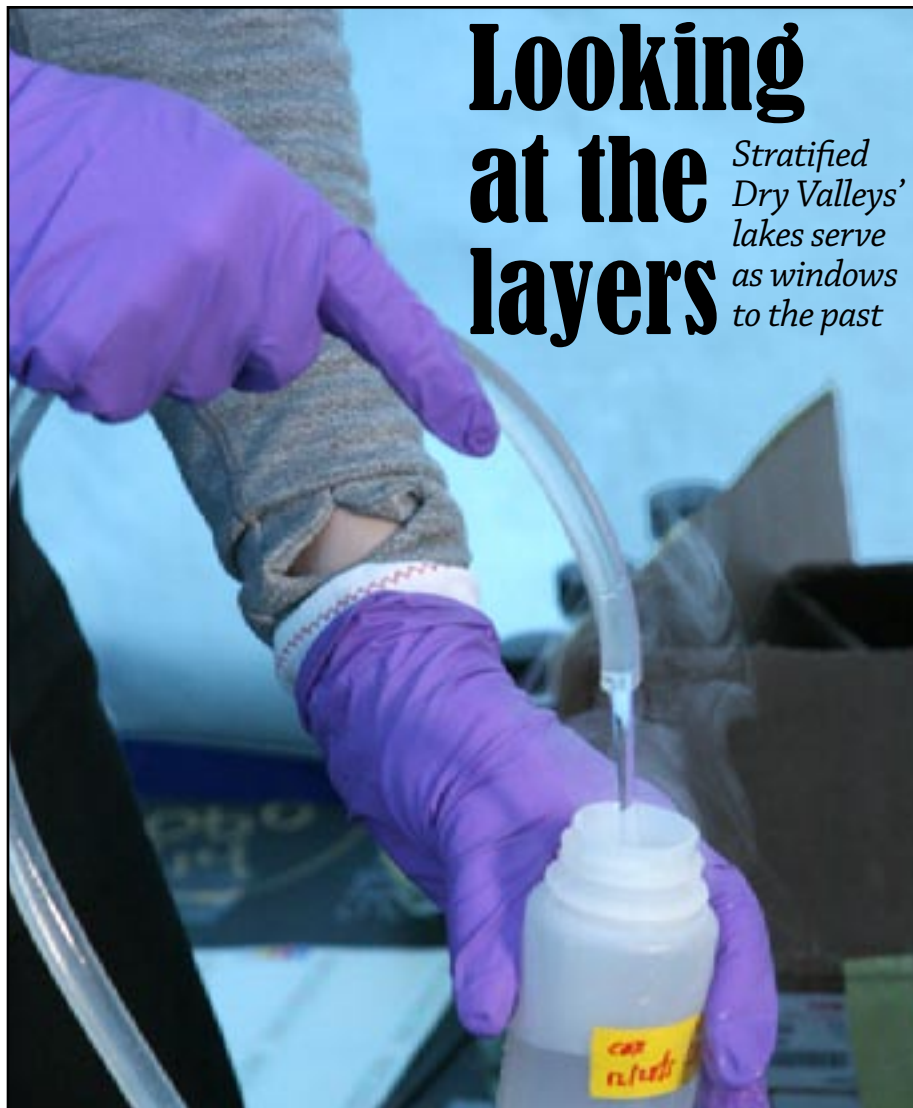
The team has the ability to sample at different depths and retrieve the lakes' records because the lakes are stratified, which means there are distinct layers in the water due to differences in chemical composition.

"Each layer of the lake is a slice of time," said Carolyn Dowling, lead principal investigator of the project from Arkansas State University.

The group uses cutting-edge geochemical techniques to search the lakes and their layers for chemical records of climate changes. This is geochemistry's version of looking at the rings in a cross section of a tree to deduce information about the climate as the tree grew.

Dowling is focused on the dissolved gasses contained in the lake water. Her results will be used to study happenings in the lake over the last few hundred to last few thousand years. Snyder is honing in on the salts prevalent in the lakes — those still in the water, those in the lake sediment, and those that have been re-deposited to the immediately surrounding area. Dry Valleys' lake water can get saltier than seawater, and those salts represent a much older piece of the lakes' past.

"We're combining efforts and look-



Photos by Steven Profaizer / The Antarctic Sun

Above, Carolyn Dowling fills a container with water from Lake Fryxell on Dec. 28. She is the lead-principal investigator for a project using advanced geochemical techniques to learn about the history of the lakes in the McMurdo Dry Valleys.



Left, the team's Go-Flow, a water sampling device, is lowered down into the waters of Lake Fryxell through a hole cut in the ice.

ing at what is presently going on in these lakes, along with the relics preserved in the lake water," Snyder said.

The group recently completed its scheduled sampling at lakes Joyce, Vanda, Hoare and Fryxell.

"We spaced out the lakes we chose to see exactly what it is that influences them," Dowling said. For instance, lakes closer to McMurdo Sound are more likely

to pick up salts from seawater, both directly and from winds carrying the salts.

While the group carefully chose the lakes they would study, Fryxell was a last-minute addition after their first choice, Lake Garwood, fell through.

The group flew out to the lake, but the helicopter pilot judged the ice to be too

**See TEAM on page 8**

# Team flooded with uses for samples

## From page 7

thin to safely support the aircraft.

"We have had to be flexible," Dowling said. "One thing we can count on is that plans will change."

## Out on the ice

On the first day at each lake, the team begins the two-day process of creating a hole through the ice covering, which can be several meters thick. The group brings a member of the McMurdo field safety training program to help with the process. The first step is to drill a meter-wide hole until they are about a meter from breaking through the bottom of the ice. The group uses a "hot finger" heating element that melts away the remaining ice, a process that can take up to 13 hours.

The team then heads back to McMurdo to prepare for sampling. The drilling process disturbs the dissolved gases Dowling is studying, and this reprieve allows the lake to settle before they collect water from it.

The group flies back to the lake two days later, its helicopter stuffed with equipment for a 12-hour day of fieldwork.

Setting up and breaking down each day is one of the largest single tasks. Because the team samples during day trips to the valleys, everything they need to complete their work has to be hauled in, set up, broken down and hauled back out each day.

The team uses a device called a Go-Flow to sample the lake water at discrete depths. The Go-Flow is a plastic cylinder about a meter long. Both ends of the cylinder are covered by a sliding door that can be locked in the open or closed position.

"It's really quite a nice system," said Dowling. "It's quite elegant for a primitive place."

The bottom of the device attaches to a hanging weight that leads the device straight down into the icy water. The top connects to the cable of a winch that is used to lower and raise the device in the water.

When the group is ready to sample, a team member slowly lowers the weight into the ice hole, followed by the Go-Flow.

Slade Wright, an undergraduate student at Arkansas State University, normally works the winch and holds it in position as the cylinder hangs beneath the surface of the ice but above the water.

The group takes a quick break here to do something that is just as routine to their procedure but much less scientific. They dedicate the sample.

Sonny and Cher. The Muppet Babies. The parts of lyrics that are just noises because they have run out of words. They've all had samples dedicated to them by the group. While the ritual serves no practical purpose, it helps keep the mood light during long days of sampling.

After the dedication, Wright turns the peddle-like cranks and plunges the Go-Flow into the water. There are marks on the cable every meter, and Wright lowers the device until he reaches the desired depth and locks it in place. The team then sends a messenger, a small weight, down along the cable to the Go-Flow. When it makes contact, it triggers the release on the spring-loaded doors that flip shut and capture the five-liter water sample.

The Go-Flow is then winched back up and out of the hole so the team can begin bottling, labeling, testing and preserving the sample.

Each sample will have about 16 tests run on it, but only four of those happen here on the Ice. The rest will be performed back in the States, many by experts at other institutions. Because the sample is being used for so many different purposes, a lot of prior thought goes into packaging and preserving the water.

**See GROUP on page 10**



Photos by Steven Profaizer / The Antarctic Sun

*Above, Leonette Cox and Glen Snyder set up the full Go-Flow after pulling it out of Lake Fryxell on Dec. 28.*



*Left, Slade Wright uses a winch to lower the Go-Flow down to the next pre-selected sampling depth.*

*Below, water samples sit in a case ready to be transported out of the Dry Valleys with the team. The group added chemicals to this particular series of samples. Each bottle represents a different depth, and the increasingly dark color is due to the differences in water composition at each layer of the stratified lake.*





# Marble Point crucial to Dry Valleys science

## From page 1

The station was originally a very Spartan installation, but it now offers much more than a tankful of gas.

"It's great for morale," said helicopter technician Gifford Wong. "It's so much more than it was initially intended to be."

While the facility dishes out hot, home-cooked food with its fuel, it serves a very practical purpose. If it were not for Marble Point, pilots would have to fly an extra 150 kilometers every time they needed to refuel and return to the Dry Valleys.

"It's not just nice but vital," helicopter pilot Paul Murphy said.

The Marble Point location was originally investigated to be the home of a new station that would replace McMurdo Station and Williams Field Skiway as the seat of operational support of the United States scientific program in Antarctica. But that plan was later abandoned, and Marble Point now has a resident population of three. A season-long cook and a fuelie, who rotates every three weeks, join Crunch each season.

Dawn Crist, this season's cook, plays the most crucial role in creating the at-home feeling Marble Point is known for. Newcomers to the station are greeted as visitors from out of town. She stops her cooking long enough to give tours of the kitchen and explain to guests that they are to make themselves at home.

It is only in the details where the back-at-home illusion is ruined. For instance, Crist not only tells you where the bathroom is but explains how to use the urine barrel and separate solid waste facility.

Crist has her own day-to-day challenges to remind her exactly where she is working. Since the closest grocery store is far out of reach, her meals are dictated by what is on the shelf. She said that sometimes she has to wait until dinner is done to know exactly what they are having.

"You can't really think like a chef here; you'll just get frustrated," Crist said.

As a hostess who is in a constant state of expecting surprise guests, flexibility is key.

"One day we'll have 10 people for lunch, and the next we'll have two," she said. "Suddenly, the weather will fluctuate, and we'll have 10 staying the night."

Crunch said the pilots see Marble Point as an oasis — a place to get a good meal and a nice break.

"It's sort of like running a bed and breakfast on the Ice," Crist said. "People normally stop here in good spirits looking to enjoy their stay. ... Everybody out here prays for bad weather, so they can spend the night."



Photos by Steven Profaizer / The Antarctic Sun

*Left, flags mark a fuel line at Marble Point. The station plays many important roles in helicopter travel in the Dry Valleys, including acting as a gas station. Top right, Dawn Crist, this season's cook, makes cookies in the station's kitchen on Dec. 27. Bottom right, Randy Noring, right, talks with Fuels Supervisor Scott Taube. This is Noring's fifth season managing Marble Point.*

Helicopter pilots and their passengers are not the only ones, however, who are hoping for a stay at Marble Point.

"Everyone is always asking me if I'm coming back," said Crunch, who has spent the last five summers managing Marble Point.

"Most of them aren't friends wondering how my season is going, but people who are wondering if my job is going to be available."

Marble Point is made up of four helicopter landing pads, six 95,000-liter gasoline storage tanks and six small buildings. The cluster of civilization sits on an ice-free area at the edge of the Dry Valleys, covered in pools of melted snow and rocks dropped by glaciers moving across the region.

Crunch oversees the operation and maintenance of the station and has initiated several improvements to both the facilities and the operations processes dur-

ing his years there. These include walkways, improved drainage and a crash/spill emergency center.

"It's all those little things together that have really made a difference here," he said.

Crunch hopes to continue improving Marble Point by helping bring a new electric fuel system in to replace the outdated engine-driven pump currently in use.

The priority for Marble Point next season, however, will be refueling it.

The station pumps out about 170,000 liters a year and only has about 246,000 remaining of its 568,000-liter capacity.

In past years, the annual fuel tanker would get close enough to run a fuel line up to the facility. But thick sea ice conditions have kept the ship at bay since January 2004.

It now appears that a fleet operations crew will need to bring fuel across the sea

**See LIFE on page 10**

# Group digs deep to learn lakes' histories

## From page 8

Each sample is split between eight different containers, ranging in size from a few drops to a liter.

Leonette Cox, an Arkansas State University graduate student, fills several small containers and immediately performs the only tests the group completes in the field — temperature, conductivity, acidity and salinity.

Dowling then attaches the Go-Flow to a thin copper pipe by a piece of plastic tubing and allows the water to run through it. She then taps the tube to remove air bubbles and seals both sides, trapping the water inside.

This sample is used to study the dissolved gasses in the water.

"Helium and a lot of other gasses will go right through most glass and plastic containers," Dowling said. "Copper is dense enough to hold it."

These samples are then placed by a portable heater. This prevents the gas from escaping from the water as it freezes and the water from bursting through the seals at the ends of the tube when it turns to ice.

"If you break through the seals," Dowling said, "the sample is toast."

After everyone takes the samples they need to study later, any excess water is emptied into a bucket, the Go-Flow's ends are again cocked to the open position, and Wright begins to lower the device to the next depth interval.

## The core of the issue

Once the team has completed the water sampling, Snyder and Wright prepare to take a sediment core. They remove the Go-Flow from the winch and replace it with



Steven Profaizer / The Antarctic Sun

*Glen Snyder looks at a new sediment sample from the bottom of Lake Fryxell on Dec. 28. The samples are taken by using the device on the table behind him.*

a metal device similar in length but much heavier than the Go-Flow. It is shaped like a top with a narrow half-meter cylinder sticking out from the top's point.

The team lowers the device into the water until it is submerged and dangling above the lake floor. Snyder then takes some slack from the winch into his hand and suddenly lets it all go, sending the

device plummeting the last few meters and slamming the cylinder into the lake bed. They again send messenger weights down to capture the sample and then winch the device back to the surface.

Snyder and Wright remove a hard plastic sleeve containing the sediment core from the cylinder, seal it at both ends, and set it aside for later study.

## Headed home

The group completed its field season on Jan. 1 and returned to the lab to prepare their samples for distribution. Because of the many different tests being run, the samples have varying storage temperatures — ranging from negative 80 degrees Celsius to above freezing.

Snyder also got the opportunity to return to Lake Garwood, the mission locale the group had to skip earlier, for some shore-side sampling. His most interesting find was 20-centimeter-long mineral crystals in a dried pool by the lake.

Snyder said he hopes to get insight into why the ice is so thin on top of that lake.

Looking into processes like the formation of the ice covers, rather than things like rocks and fossils, is a relatively new area of geology and a prospect Dowling finds particularly interesting.

"I think it's absolutely incredible to apply chemistry to geology in order to figure out how old something is or how long it has been there," Dowling said. "I'm excited about the combining of [both fields of study]."

*NSF-funded research in this story: Carolyn Dowling, Arkansas State University.*

# Life at Marble Point station comes with challenges and advantages

## From page 9

ice by tractor from McMurdo next season. This may prove a major challenge. The second sea ice traverse to deliver supplies to Marble Point this season was canceled after the first struggled with poor ice conditions.

"The people who came through in the first traverse were veterans," Crunch said. "If they had a rough trip, it was rough."

Despite the operational challenges of running a tiny and very isolated refueling station, Crunch prefers Marble Point to McMurdo's relative metropolis.

"There is no real negative to working here," he said. "This place is cool."

One does, however, have to be OK with missing out on much of McMurdo's social life.

"If you're [in Antarctica] to spend lots of time with your friends, well, you're not going to see many of them out here," he said.

So, will Crunch come back to fill his coveted job next year?

"One season at a time," he said.



Steven Profaizer / The Antarctic Sun

*A sign hangs on the main building at Marble Point.*



# Tiny fossils provide clues to global history

## From page 1

will help him recreate the environment of the time. And Christian Sidor of the University of Washington is searching for fossilized vertebrates.

The tracks Miller is searching for will provide insight into global history. They are the best record on Earth of the evolution of freshwater animals. They also tell much about life before and after a mass extinction that occurred 251 million years ago and killed off 90 to 95 percent of all marine life.

The tracks' location at high latitudes makes them the best record of ancient polar life and of life during the most recent transition from a mostly cold environment to a generally warmer one.

The group is 210 kilometers away from McMurdo, in the Allan Hills, for three weeks. They'll carefully scan the rocks there for fossils, burrows and footprints left by the creatures, and for clues to what the environment was like. This is the first field season for the project, though Miller has been here five times since 1985 doing similar research.

They are looking at mud that got compacted over the years and formed rock. The different layers of mud can define where the rock will later erode. If an insect left a trail in a stream bed and that trail then filled with a new layer of mud in a flood, that new layer of mud would tend to fall away from the old layer after millions of years of erosion, revealing the tracks.

The group picked the Allan Hills because it has exposed rock both horizontally and vertically, in a stair-like pattern. This is important because it lets the scientists see what is in both the tops and sides of the rocks.

In past years, the scientists have found important differences in the type and location of tracks left in the Permian era, just before the mass extinction, and in the Triassic era that followed. The Permian period occurred between 290 million to 245 million years ago. The Triassic period started at that point, and lasted until 208 million years ago.

Animal burrows have been found in the bottom of stream beds from the Triassic period, but only along the edges of the streams during the earlier Permian era. These animals were dealing with a cold, dark climate.

"A good strategy is to burrow," Miller said. "But there's a problem."

The problem is that if the water table is too high, the burrows fill with water and the animal drowns. Miller believes a higher water table during the Permian era explains the absence of streambed



Photos by Cecelia Mortenson / Special to The Antarctic Sun

*Researchers walk by a frozen lake in the Allan Hills, where they look for clues in the rocks that will tell them about what used to live in Antarctica between 240 and 280 million years ago.*

burrows from that period. This theory is backed by evidence from an ancient forest, whose trees had the shallow roots common in areas with a high water table.

The inability to burrow may also explain why no tracks of four-legged reptiles, known as tetrapods, have been found in Antarctica during the Permian era. Such tracks are common in Permian South Africa, which is believed to have been attached to Antarctica at the time and had a similar climate. Tetrapod tracks have been found in Antarctica dating to the Triassic period, meaning the animals were likely able to develop once they could burrow into the ground as the water table fell.

This information reveals much about the evolution of freshwater animals. The earliest tracks are from insects, Miller said, meaning that the first freshwater animals were not ocean dwellers that simply swam upstream and colonized a new area. Freshwater insects evolved from air-breathing insects on land. That evolution from marine animal to land animal to freshwater animal takes a long time, which explains why there are hundreds of millions of years separating the colonization of the ocean and of lakes and streams.

The tracks are also the best record of life during the last major change from a generally cold climate to a warmer one, as happened between 240 and 280 million years ago.



*A rock in the Allan Hills is dotted with holes left by ancient worms.*

"It would be good to know what that transition was like the last time," Miller said, since global temperatures now appear to be rising as well.

The group was eager to explore a new area, which they hope will yield many squiggles and holes to help them complete their picture of ancient Antarctica.

"We don't know what we're going to find," Miller said. "That's fun."

*NSF-funded research in this story: Molly Miller, Vanderbilt University; John Isbell, University of Wisconsin, Milwaukee; Christian Sidor, University of Washington.*

# Profile

## Just keep on rollin'

### Shuttle driver Grandchamp doesn't let cancer put the brakes on his life

By Peter Rejcek

*Sun staff*

Four days before getting on a plane bound for Christchurch, New Zealand, to start his sixth season as a McMurdo shuttle driver, Hal Grandchamp's life took an unexpected detour.

He was diagnosed with colon cancer. A tumor the size of a lemon was found in his upper colon.

"After the first diagnosis when you have colon cancer, it's kind of shocking. You think your world's come to an end," said Grandchamp, who turned 74 this month. "I had no symptoms. That's the other thing that's scary — you have no idea that you have it."

That was October 2003. Three days after the diagnosis, Grandchamp was in surgery to have the tumor removed. He candidly described the surgery that took out a part of his upper colon, motioning with hands over his chest and stomach to illustrate how the procedure was performed. He likened the operation to shortening a radiator hose.

"The first 10 days were rough in the hospital," he said. "In a couple of months, I was back to normal."

Grandchamp bounced back from the operation so quickly that the next year he tried to return to his shuttles job. He went through a battery of tests, including CAT scans of his liver and stomach, but said he was denied a job over concerns that the cancer had occurred so recently.

Undeterred, Grandchamp made another bid to return to Antarctica this season. Two weeks before the station's main population deployed in October, he said he received a medical waiver from the National Science Foundation.

"I really wanted to come down here as a cancer survivor and see that I can still do the job," he explained.

He can, according to his supervisor, Sam McQuiston.

"Hal is quite a dynamo, and his energy and drive outpace most of the folks ... half his age," said McQuiston, who has known Grandchamp since he trained her in shuttles in 2001.

"I've always been able to rely on him to work as long and as hard as needed," she added. "This has not changed since his victory over cancer, and it is fantastic to have him down again."

The septuagenarian said he wants his victory over "the big C" to be a cautionary tale for other people: "Get the colonoscopy," he said. "It will save your life."

Nearly 105,000 colon cancer cases and 40,000 rectal cancer cases were expected to occur in the United States in 2005, according to the American Cancer Society (ACS). Colorectal cancer is the third most common cancer in both sexes, as well as the third leading cause of cancer death. It accounts for about 10 percent of all cancer deaths.

Age is the biggest risk factor with more than 90 percent of cases diagnosed in people 50 and older, based on data from the ACS. The five-year survival rate if the cancer is detected early is 90 percent. Doctors recommend regular colonoscopies after age 50.

Grandchamp not only survived cancer, but found ways to beat retirement as well.

"You can't sit around and do nothing," he decided after retiring from United Airlines in 1993, after 43 years with the company. He was employed in a number of positions with the airline in Chicago and later Denver, from the ticket counter to business manager. For the past 11 years, he's worked for the Colorado Rockies, eventually moving up to team leader of the club, suite and guest relations



Peter Rejcek / The Antarctic Sun

*Hal Grandchamp, 74, is a familiar face behind the wheel of the Delta shuttle. He's worked as a shuttle driver at McMurdo for six seasons.*

department of 70 ushers and eight supervisors.

"You solve people problems," he said of his Rockies job, which is the perfect seasonal work, unless the last-place baseball team should ever make it into the October playoffs. That would conflict with a return trip to the Ice.

Grandchamp first came south in 1997, about five years after his daughter Sandy came down. In fact, three of his eight children have come to Antarctica, including his son, Paul, who works full time for Raytheon Polar Services Co. in the IT department as a database management specialist.

Paul Grandchamp said he and his father both applied for jobs in Antarctica around the same time. They ended up spending their first summer in McMurdo together. The younger Grandchamp said that he's not surprised his dad decided to come to the Ice, or that he keeps returning.

"I'm 44, and I think he's in better shape than me," Paul Grandchamp said, adding that he was on the Ice with his father to celebrate the shuttle driver's 70th birthday.

Does Hal Grandchamp have any plans to celebrate his 75th birthday on the Ice? He's not discounting the possibility.

"You never close a door behind you," he said. "The people down here are just outstanding."