The Antarctic Sun
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McMurdo trains to expect the unexpected

By Peter Rejcek
Sun staff

McMurdo Station is a small place, about one and a half kilometers at its widest point. But when disaster strikes on both ends of town, emergency response capabilities can be stretched real thin, real quick.

That's what organizers and participants learned during an emergency response drill on Dec. 7. Such exercises are held each summer and winter to evaluate the station's capabilities to deal with a major emergency.

This summer's event organizer, Ted Morris, put an additional twist on the drill. He designed the exercise with two separate emergencies, one a vehicle accident near the fuel pumps, the second

See EMERGENCY on page 11

Emily Stone / *The Antarctic Sun*

The Antarctic Fire Department responds to an imaginary fuel spill, simulated by water pouring out of the back of a truck's tank, that resulted from a staged vehicle accident during an emergency response exercise last week.

See related story about Pole and Palmer on page 9.

Berg data equipment rescued before lost

By Steven Profaizer
Sun staff

"Beautiful." "Mind-boggling." "Breathtaking."

Most people wouldn't choose these words to describe a squiggly line stretching across a computer screen. But in that line, glaciologist Doug MacAyeal sees years of work and a reward well worth the effort.

That line represents data from a seismometer placed on the B-15A iceberg about one year ago, which was recovered Nov. 14. That device has spent the last year logging the vibrations of the massive ice chunk bobbing along the Antarctic coast.

MacAyeal is studying the acoustic waves icebergs generate to help learn how they drift. These waves are signals that originate as ice quakes in icebergs and emanate into the surrounding waters. The waves then permeate through the ocean as acoustic waves and return to

See SEISMOMETER on page 13

Brien Barnett / *The Antarctic Sun*

GPS and weather equipment are installed on iceberg B-15A in this file photo. Seismometer equipment from 2004 was recovered Nov. 14 on the same berg.

Quote of the Week

"They flushed the freshies!?!"

— Woman's lament upon learning that a plumber found an orange stuck in a toilet.

Inside

The way it was

Dave Grisez / Special to *The Antarctic Sun*

Operation Deep Freeze workers help themselves to a meal in the mess tent at McMurdo Station. The U.S. Navy, which ran Deep Freeze, established a base camp of tents on Ross Island in December 1955, as they began construction of what would become McMurdo Station. This photo shows the "chow line." A permanent mess building was constructed later that summer so the men could enjoy their meals free of the wind and cold. This month marks the 50th anniversary of Operation Deep Freeze, which brought 1,800 men to Antarctica during its first year to build the modern U.S. Antarctic stations. McMurdo Station and Little America V, on the Ross Ice Shelf, were built in 1955-56, and the South Pole Station and Byrd Station, in Marie Byrd Land, were built the following year, along with four other U.S. stations on the continent. The stations were built for the International Geophysical Year, which began in 1957.

Cold, hard facts

The stats on science

National Science Foundation Antarctic projects for 2005-06

Number of projects: **149**

Number of grantees: **760***

Number of principal investigators: **137**

Number of institutions represented: **91**

Projects by field:
Biology: **63**
Aeronomy and astrophysics: **33**
Geology and geophysics: **19**
Ocean and climate: **14**
Glaciology: **13**
Artists and Writers: **7**

Hippest acronym: **SAMBA** (South American Meridional B-field Array)

* Some grantees are part of multiple projects and were counted more than once.

Source: NSF Science Planning Summary

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Level 1 Comix **Matt Davidson**

RIME to find reasons for Antarctic weather

By Peter Rejcek
Sun staff

Scientists hoping to better understand how weather interacts between Antarctica and latitudes to the north believe they've found the right tool — one that's got them hyper about its potential.

Actually, spell that HIAPER. That's the name of a modified Gulfstream V airplane outfitted to serve the National Science Foundation's atmospheric research needs. The acronym stands for High-performance Instrumented Airborne Platform for Environmental Research.

This aircraft could be a key component for a proposed project called Antarctic Regional Interactions Meteorology Experiment (RIME). David Bromwich, with the Byrd Polar Research Center at Ohio State University, is the project's coordinator. The purpose of RIME is to study regional atmospheric exchange of air, heat and moisture.

For example, researchers know that when El Niño strikes in the central tropical Pacific region it affects what happens in the Ross Sea area. What's less obvious is why these two disparate climatic regions are sometimes in phase with each other, according to Bromwich. RIME may be able to answer that question and others.

"The impact of El Niño on Antarctica is intermittent. Sometimes it has been very strong," explained Bromwich. "We know these regions acted together in the 1990s."

El Niño is officially defined as sustained sea surface temperature anomalies that are greater than a half-degree Celsius across the central tropical Pacific Ocean. During El Niño, sea ice decreases in Antarctica's Ross, Bellingshausen, and Amundsen seas. The latter two regions also become warmer and have higher atmospheric pressure.

While the project is intended to look at what happens between the Ross Sea region and areas north of that general longitude, Bromwich said his group might focus its attention on the Weddell Sea, largely because of its easier access from South America using the HIAPER aircraft. Researchers could then extrapolate their findings from the Weddell region to the Ross Sea area.

"What goes on in the Ross Sea is similar to what goes on in the Weddell Sea," he explained. "This initiative of HIAPER is the regional component of the Antarctic RIME project."

The $80 million airplane operates at a maximum ceiling of about 15,545 meters, and can cover more than 11,000 kilometers in a single flight. While it's possible HIAPER could operate out of New Zealand to collect data over the Ross Sea, Bromwich said the aircraft would get more time taking measurements if it was based in Chile because of the shorter transit time.

Courtesy of Gulfstream Aerospace Corp. / Special to *The Antarctic Sun*

The HIAPER aircraft is a modified Gulfstream V airplane designed for atmospheric research.

"You could spend more time on site doing science," he noted.

The plane was initially acquired and modified for the NSF by the National Center for Atmospheric Research-HIAPER Project Office. Since its completion this year, the aircraft was turned over to the NCAR-Earth Observing Laboratory in Broomfield, Colo. It made its first operational flight in November, according to Al Cooper, HIAPER chief scientist.

He said the current projects are small studies that take advantage of the plane's high-altitude capability and long range. "They are intended partly to check out the performance of the new equipment and gain familiarity with the aircraft prior to its first major deployment in March [to] April 2006," he said via e-mail.

HIAPER's instruments, some still under development, include a satellite communications system for remote, worldwide operation, and a lidar, a laser radar used to obtain measurements of aerosol particulates, clouds, temperatures and water vapor. The green plane can carry a science payload of up to 2,700 kilograms.

"The aircraft's long range makes it suited to research in the polar regions, and we expect that such research will be an important part of its agenda," Cooper said. "While none of these [instruments] were designed specifically for research in polar regions, they provide many of the capabilities that such research will need."

This newest tool in the atmospheric science community's inventory is expected to be a popular one. Bromwich said he does not anticipate getting approval and use of the aircraft until perhaps the 2008-09 austral summer.

Until then, Bromwich and his colleagues are making use of the streams of data generated by the network of automatic weather stations scattered across the continent, as well as the Antarctic Mesoscale Prediction System (AMPS). AMPS went online in 2000, and was specially designed for computer weather forecasting in Antarctica.

AMPS provides graphs and animations of data such as temperature, wind speed, humidity and precipitation at various altitudes and times. It's credited as being a critical tool during a winter medical evacuation at the South Pole in 2001.

"It enhances the safety and reliability of the aircraft operations at McMurdo — in fact, all over Antarctica," Bromwich said. "There are many nations that use the AMPS output."

The system's data output is archived, allowing scientists to use the information in a variety of ways. Bromwich, with three colleagues, recently published a paper in the *Journal of Climate* using AMPS data that led to some interesting hypotheses.

For instance, the article's authors say they were able to draw some conclusions about why the McMurdo Dry Valleys are ice-free. Bromwich said the data show that moisture comes around Ross Island to the east and south, and largely falls as precipitation at Minna Bluff and the mountains to the west like Mount Discovery. The areas to the north and west of the mountains are cut off from that precipitation.

"The Dry Valleys are in a precipitation shadow," Bromwich said. "It's a very important reason for why the Dry Valleys are there."

The archived AMPS forecast data allowed the researchers to put together what they say is the first "high-resolution climatology of the McMurdo region from a physically based numerical weather prediction model adapted for polar regions."

The AMPS archive also helps researchers focus their efforts for future studies.

"Some of the complex features shown in the figures, such as the modification of the winds by Minna Bluff and Ross Island, are useful for locating potential field sites for RIME," said Andy Monaghan, another member of the RIME project and a co-author on the *Journal of Climate* article, via e-mail.

The relationship between the RIME project and the AMPS system is not a one-way street, according to Bromwich. He noted that the models that run in the AMPS system are adapted for Antarctica; however, they must estimate some of the processes here because there is no detailed knowledge about many of the climate events. RIME is intended to fill that knowledge gap.

"If we can get those processes more accurately represented in the models that are used in AMPS, then we can do a better job of predicting what's going to happen," Bromwich said.

Perspectives

Searching for a new experience

By Andrew Hiester
Special to the Sun

Around these parts, emergency preparedness is taken to a whole new level. For one thing, medical evacuations are extraordinarily expensive. Weather is always a factor — it can go from mild to wild to wicked in a hurry. And there is often no backup team to call in.

There are a handful of out-of-town destinations where people can walk by themselves. The farthest is Scott Base, which is about three kilometers away on a well-traveled road. Any other jaunt requires at least two people, a radio, and giving the firehouse your estimated time of return. If you are five minutes late for your check-in, you enter the uncertainty phase. Thirty minutes late brings the alert phase, which is a Search and Rescue (SAR) All-Call page. Sixty minutes after failing to check back in, you are considered in distress and the SAR team deploys.

Why? Because even on the best of days, Antarctica is a harsh continent.

One of my goals while on the Ice was to try to join the SAR team. Although I have never been on a rescue team, I'm a former EMT and have extensive rock climbing experience. My son is a SAR incident commander in Montana, and I hear from him how challenging, gratifying and interesting rescue work can be. Plus, I've always enjoyed problem-solving scenarios, and SAR can be high-stakes problem solving. And I'd be dishonest if I didn't add that I also wanted to test myself.

At McMurdo, there is a primary SAR (first response team) and a secondary SAR (backup crew). In winter, the secondary SAR team becomes the primary rescue crew, so preference is given to wintering workers. But a few spots, maybe three, on the secondary team are available to summer folk like me.

The day began in a classroom at the field safety training program, known as FSTP and pronounced 'f-stop', with a refresher in basic knot tying. Then 15 of us hopped into a PAX-Delta — a huge vehicle with balloon tires — and rode out to the Ross Ice Shelf. Once there, we worked on efficient ways to negotiate steep terrain

Photos courtesy of Andrew Hiester / Special to *The Antarctic Sun*

Above, Andrew Hiester works as an electrician apprentice at McMurdo Station. Hiester tried out for the Search and Rescue (SAR) team this year.

Left, three SAR team hopefuls show their abilities in a crevasse simulator, a four-meter-deep trench dug by a tractor in the snow.

— kick stepping up fairly steep slopes, traversing, changing directions (keeping the ice axe ALWAYS on the uphill side).

Next came personal fall arrest — sliding down the slope and rolling to bury the pick of your axe while kicking your toes like crazy to arrest your slide. Then hike back up while telling yourself that next time you'll stop your fall sooner to save yourself such a climb back up. Now try it with the axe in your other hand.

Next we worked on snow anchors. These tools are used if you have an injured person in a crevasse and you need a way to safely hold the victim, a rescuer and possibly a litter in the crevasse while doing the rescue.

Finally, it was time to put all the pieces we'd practiced together in a crevasse rescue. We roped off in teams of three and were walking along when the last person in line "fell" into a crevasse. The other two had to arrest that person's fall, then the middle person had to hold the victim while the leader set snow anchors and transferred the victim's load to the anchors. After a quick check on the victim's situation, a zig-zag pulley system was established and the victim was hauled out of the "crevasse simulator" (a four-meter-deep trench that a tractor had dug in the snow).

Each of us took turns being leader, the person in the middle and victim. Occasionally, after the victim's fall was stopped, one of the SAR trainers would hook onto the loaded rope and pull like crazy to simulate a deteriorating situation. At this point, the leader had to temporarily abandon work on the snow anchors and dive into an arrest position to help the middle person, who was taking a beating at this point.

Ultimately, we all survived and I had a much greater appreciation for the experience and technique of these SAR folks.

Unfortunately, I didn't make the cut. But I was honored by the invitation to try out and thrilled to get a glimpse of this people who puts themselves in harm's way to bring others out.

Andrew Hiester is at McMurdo for the first time, working as an electrician apprentice.

around the continent

SOUTH POLE

Summer sun heats up

By Amnesty Kochanowski
South Pole correspondent

Raucous laughing, catcalls and bingo numbers were heard from the South Pole dining hall on the evening of Dec. 10. "Downtown" James Brown — making his highly anticipated season premiere — entertained 75 people who came to play bingo and socialize. Prizes included gift certificates to Christchurch businesses.

The cargo office was successfully moved earlier this month. It's now standing and operating at its new location near the airfield. However, many flights were cancelled the past week due to a storm at McMurdo Station.

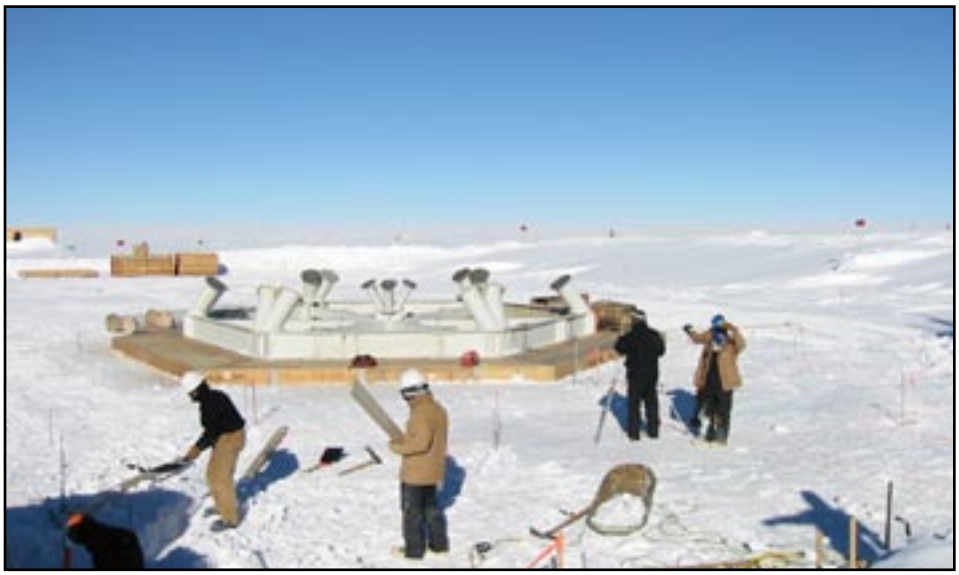
Work on the BICEP telescope, which stands for Background Imaging of Cosmic Extragalactic Polarization, is progressing. The heaviest piece of steel, more than 7,200 kilograms, was installed on Dec. 10. The five-man ironwork crew, using a crane, installed the foundation.

Weather is always a topic of conversation. Winds have recently been weak or nonexistent, with the ambient temperature flirting with a record high. The 1978 record high temperature of negative 13.6 degrees Celsius may be broken this summer. We have already experienced negative 13.9 degrees Celsius. It's so warm at Pole that people are not bothering to wear coats or heavy gloves, just their glove liners. A printout of the warm temperatures is posted in the dining hall.

On Dec. 8, the first non-governmental activity group arrived at Pole.

Borge Ousland and Fredrick Syberg, of Norway, skied from 88 degrees south to the Pole. The duo skied between 15 and 30 kilometers per day to make the 200-kilometer trip in nine days. They hauled their own gear, which weighed about 100 kilograms. Syberg, a chief executive and self-coined amateur adventurer, said he hasn't accomplished the same feats as Ousland (like climbing 6,000-meter peaks), but said he wanted to "actually get this [continent] under my skin."

On Dec. 13, a souped-up Ford van rolled up to the ceremonial Pole around 1 a.m. The crew of six, from the United Kingdom and Iceland, drove 1,100 kilometers nonstop from Patriot Hills in 69 hours.



John "Scot" Jackson / Special to *The Antarctic Sun*

South Pole workers construct the foundation of the 10-meter Telescope. Outside construction at Pole was much easier this week, as temperatures reached record-breaking highs.

PALMER

Sundevil Estates opens

By Kerry Kells
Palmer correspondent

Palmer Station celebrated the opening of Sundevil Estates, our local name for the collections of Antarctic hairgrass (*Deschampsia antarctica*) and Antarctic pearlwort (*Colobanthus quitensis)* in plots behind station.

The spot is named for the Arizona Sun Devils at Arizona State University where Principal Investigator Tad Day is a professor. Christopher Ruhland at Minnesota State University is co-principal investigator. There are 20 plots, each with 12 cores per plot. These cores are round cylinders 10 centimeters in diameter and five centimeters deep that contain the two native Antarctic plants collected in the area.

Opening the estates involves turning on infrared heaters that are designed to heat according to predicted temperature and CO_2 increases caused by global warming. Half of the plots have active warming both day and night to simulate climate change scenarios on the Peninsula. A number of cores in each plot (both heated and not heated) will also receive increased precipitation.

The research team measures the CO_2 gas flux (respiration and photosynthesis) and will perform additional measurements to monitor the cores' carbon and nitrogen input and output. Last year, they found that growth and reproduction were clearly affected by the lights — the plants that were being warmed were two weeks ahead of the un-warmed plants in their bud and flower production.

See CONTINENT on page 6

the week in weather

McMurdo Station
Max Temp: 38F / 4C
Min Temp: 21F / 6C
Max Sustained Wind: 28 mph / 44 kph
Min Windchill: 2F / -19C

Palmer Station
High: 42F / 5C
Low: 27F / -3C
Max. sustained wind: 42mph / 67kph
Precipitation: 9mm

South Pole Station
High: 7F / -14C
Low: -14F / -25C
Peak wind: 26mph / 42kph
Max. Physio-altitude: 3,154m

Continent

From page 5

Below-freezing temperatures kept the core soil frozen for a while early this season.

In other science, the sea bird researchers under Principal Investigator Bill Fraser continued to work in the labs sorting skua and cormorant diet samples collected last summer and testing radio and satellite transmitters.

When the sea ice opened, they continued their regular field visits to all local Adélie colonies, as well as their research on chinstrap penguins, brown and south polar skuas and blue-eyed shags.

All other researchers with the Long Term Ecological Research projects continued their sampling at the water stations and transects near Palmer, and lab work is under way. Palmer's newest group, the biocomplexity group with Principal Investigator Patricia Matrai, also continued sampling on the water and doing lab work.

We also had a different kind of visitor to station — a large, reddish-purple medusae, or jellyfish known as *Desmonema glaciale,* which sat in the water near our Zodiac landing. This type of jellyfish has a large top section, known as a bell, that can be up to one meter in diameter, and has tentacles up to 4.5 meters long. Our visitor was considerably smaller with a bell about half a meter in diameter and short tentacles. The species is well adapted to life in the open water. In Antarctica, they prefer a near-surface location in the continental shelf waters. As gelatinous zooplankton, they lack a rigid skeletal structure but are active swimmers, pulsing their bells to swim. After a while, our visitor freed his tentacle from the rock near our landing area and swam back out to sea.

Palmer Station is now preparing for the holiday season, the arrival of cruise ships and the return of the *Laurence M. Gould* later in the month.

SHIPS

LMG

Compiled from reports by Stephanie Suhr
Marine Projects coordinator

We began steaming due east toward the South Orkney Islands on Dec. 7 in search of a new iceberg. After a little search pattern in the area, we settled on an iceberg not too far from the site of A-52, east of Clarence Island. Although it has a slightly higher face, this berg is considerably smaller than A-52. (We are turning into iceberg snobs.)

The next day's operations began with a circumnavigation of this berg, W-86, to check its drift and shape, followed by a sonar survey. That evening we attempted to deploy the 10-meter Multiple Opening/Closing Net and Environmental Sampling System (MOCNESS), a sophisticated net sampling system. Again, it had to be abandoned.

Sonar has shown large swarms of krill around the iceberg, which is also obvious from what was caught during the unsuccessful MOCNESS deployments. We deployed the one-meter MOCNESS for most of the day, and it came back with a nice sample. The decision is to stick with this iceberg for a little longer to have a good look at it.

The weather has been incredibly good to us — we woke up Dec. 9 to a bright blue sky, and although we saw dark clouds in the distance, they didn't seem to be moving in our direction. The temperature rose up to a balmy 1 degree Celsius in the afternoon. There was no hint of a swell, and for a few minutes, chairs appeared on the back deck.

We completed another circumnavigation of the iceberg with underway sampling and laser imaging, followed by more conductivity, temperature and depth (CTD) casts in the morning for phytoplankton, trace metals and radium.

The MOCNESS-10 is still not working, even after changing absolutely everything that can be changed. By now, we are convinced that it is possessed and in need of an exorcism, which we should arrange for the next port call. We used it as a fishing net yesterday.

The fish, at least, have been giving very interesting data, and using the MOC-10 as a fishing net is successful in that it brings back lots of krill each time, while the individual nets are being fished at increasing distances from the iceberg.

We went in search for a new iceberg on Dec. 11. But since no other suitable berg seems to be around, we decided to return to W-86. The weather is still good, and a successful remotely operated vehicle deployment revealed swarms of krill at 250 to 300 meters down, very close to the iceberg. Finally, the MOC-10 was deployed and worked!

The net sampling systems continue to have problems. After two more CTD casts, an all-hands science meeting was held that evening to decide where to go from here and what to do during our last eight days of science. Finally, we headed west on a new iceberg hunt.

NBP

Compiled from reports by Alice Doyle
Marine Projects coordinator

We continued our transit north to Lyttelton, New Zealand. We are making good time under fair conditions. Temperatures are rising as we head to port.

We completed our final conductivity, temperature and depth sampling Dec. 7. A good relief. We are now focusing on the task at hand — cleaning and packing. Estimated time of arrival at Lyttelton is Dec. 11.

Winds died throughout the next night, making it more conducive to packing and cleaning.

Seas are calm but a bit of fog moved in on Dec. 10. We are almost home!

Continental Drift — What's the best part about working in waste?

"Finding people's personal mail in the garbage."

Paul Smotherman, Palmer waste technician from Stone Mountain, Ga., third season

"The food trough — a big horse trough that holds our snacks during breaks."

Chris Wilt, McMurdo waste technician from Hood River, Ore., sixth season

"Unlimited access to bubble wrap."

Mary Malley, South Pole waste technician from Friday Harbor, Wash., fourth season

Moon gives scientists a helping hand

By Emily Stone
Sun staff

Scientists from Pennsylvania State University want to know what lies beneath the ice streams feeding the Ross Ice Shelf, and they've figured out a way to make the moon do their heavy lifting.

The group discovered a few years ago that tides are the primary factor determining when the ice streams move forward. And the tides affect each stream differently. By tracking how fast the ice streams move, how long it takes the higher parts of each stream to catch up with the movement at the bottom, and where they appear to stick to the ground, the scientists can deduce what the ice streams are moving over.

If an ice stream moves all at once, it's likely sitting on something smooth, said Don Voigt, one of four scientists working in Antarctica on the project this season. If it's atop something that creates a lot of friction, there will be a lag in transferring the movement up to the top of the stream. Imagine the difference between moving something slightly stretchy over a pile of ball bearings versus sandpaper.

"You can see the tides as doing an experiment on the ice stream that we're not capable of doing," Voigt said.

Ice streams are rivers of ice hundreds of kilometers long, and are much like glaciers, except that they flow through ice sheets and not through mountain valleys. They move much faster than the ice sheet itself, so understanding them is critical to determining the stability of the West Antarctic Ice Sheet. The ice streams' extreme sensitivity to tides shows that they are affected by small changes in sea level. This is an important fact in predicting the effect of global warming on the ice sheet.

Voigt and Co-Principal Investigator Sridhar Anandakrishnan figured out that tides were the primary trigger prompting the ice streams' movement while working on a separate project five years ago. They had put Global Positioning System (GPS) receivers and seismometers on several of the ice streams along the Ross Ice Shelf's Siple Coast. Their data showed that the vast majority of movement each day was happening within a 10 to 15 minute period.

"As soon as you see anything daily, you say, 'I wonder if it has anything to do with the tides,'" Anandakrishnan said. They compared it to data on the Antarctic once-a-day tide, and had their eureka moment.

"It was a real shocker when we first realized that's what was going on," Voigt said.

> "You can see the tides as doing an experiment on the ice stream that we're not capable of doing."
>
> — Scientist Don Voigt

They applied for a new grant based on this discovery and are in the third year of that project. The first year they set GPS receivers and seismometers along four of the main Siple Coast ice streams to get an overview of the movement. They're now looking more closely at each stream.

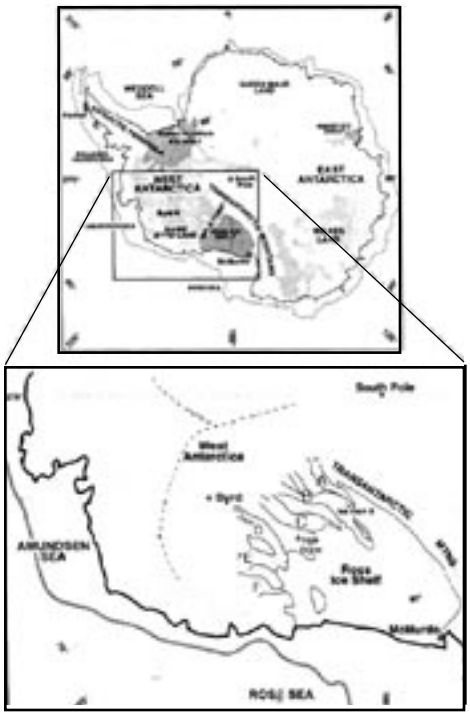
The four ice streams travel from deep inside West Antarctica out to the Ross Ice Shelf. Ice streams, like glaciers, are pushed along by gravity and move toward lower ground, which in Antarctica is toward the ocean. The Ross Ice Shelf is floating on the Ross Sea. The point where the ice stream crosses from land to ocean is called the grounding line.

"It doesn't look that different," Anandakrishnan said. "But here you're

See LOWERING on page 8

By Don Voigt / Special to *The Antarctic Sun*

A Twin Otter brings equipment to Sridhar Anandakrishnan and Ian Joughlin on the Whillans Ice Stream last year. The men are part of a science group studying the way tides move ice streams. The group returned to the field this summer.



Courtesy of Sridhar Anandakrishnan

This map shows the Siple Coast ice streams. The ice streams are labeled by their old names, which corresponded to letters. Ice stream A is the Mercer, B is the Whillans, C is the Kamb, D is the Bindschadler, E is the MacAyeal, and F is the Echelmeyer. The scientists are working from the Siple Dome field camp.

Lowering tide causes ice streams to surge

From page 7

standing on rock. There you're standing on fishies and water. … That seems to be where a lot of the action is."

The tides move the Ross Ice Shelf up and down by about a meter a day at the grounding line. When the shelf moves up, it's pushing back against the forward motion of the ice stream. When it drops back down again, there's nothing to keep the ice stream from surging forward.

The Bindschadler Ice Stream, which is one that the group is focusing on, moves about half a meter a day. Ninety percent of that happens during the switch to low tide.

"Forty to forty-five centimeters is taken up with the sudden slip within 10 or 15 minutes," Anandakrishnan said. "And for the rest of the time it just does nothing. It really is quite extraordinary."

A meter change in the ocean level may seem large, he said, but it's minimal compared to the entire ice stream.

"When you compare that to [an ice stream] that's 75 or 80 kilometers wide, a kilometer deep and 500 kilometers long, then a meter of water change doesn't seem like so much," Anandakrishnan said. "The system is so delicately poised that somehow small changes have a very dramatic effect on it."

The Bindschadler Ice Stream is the most dramatic sudden surger of the group. The Whillans Ice Stream behaves differently and has what the scientists call a "stick-slip" pattern. It's still for 18 hours, jumps forward for five minutes, is still for six hours, then jumps forward again for a few minutes, Voigt said. The group is eager to figure out why this second jump is happening.

The Bindschadler Ice Stream doesn't come to a complete halt like this, though its movement slows down dramatically after its surge when it's traveling at a pace of about two meters a day.

It takes a few seconds for that motion to travel up the ice streams. On the Whillans, which the group has analyzed in the most detail so far, the movement travels at about 88 meters per second. The different streams can register tide-related movements up to 350 kilometers away from the grounding line, Anandakrishnan said.

This year the project is focusing more closely on the Bindschadler, MacAyeal and Kamb ice streams. They will put about 30 GPS receivers and seismometers on the ice streams during the summer to gather data, which they will analyze when they get back home.

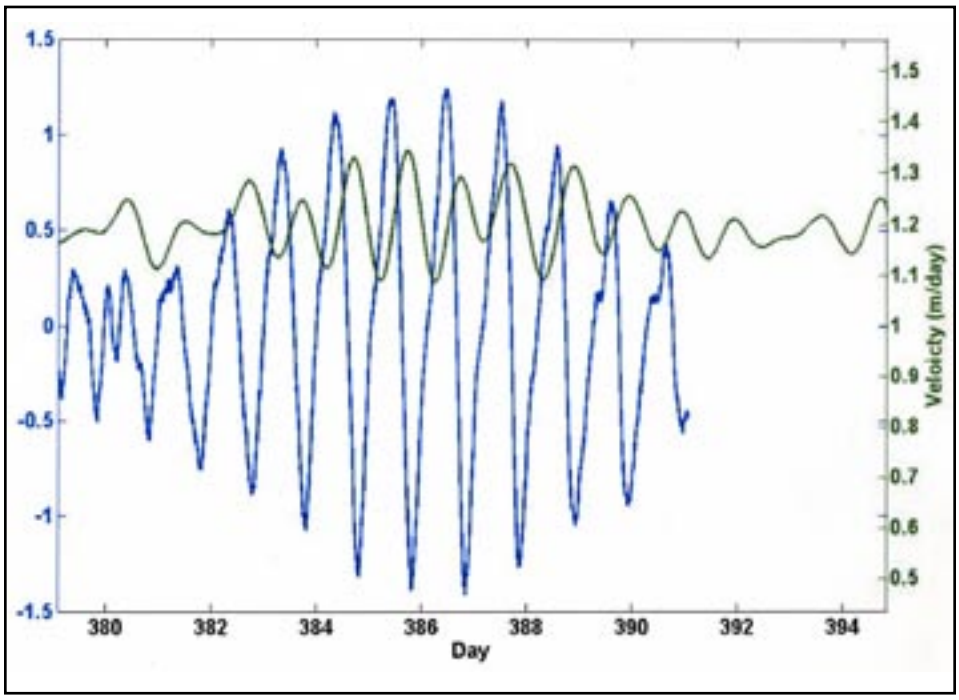
The group is using the seismometers to hone in on mini-earthquakes happening in the ice streams as they move. They want to know if the quakes happen in the same place each time, which would indicate that the ice is sticking to something in the ground there, or if the quakes are spread throughout the ice, Voigt said.

They also want to see if the breaks that are causing the quakes are happening in the ice or if it's actually a piece of ground being ripped off by the ice.

Voigt said that the group's work has furthered the recent realization that ice shelves play an important role in the movement of the continent's ice. Ice shelves used to be ignored by modelers trying to predict changes, Voigt said. This is no longer the case.

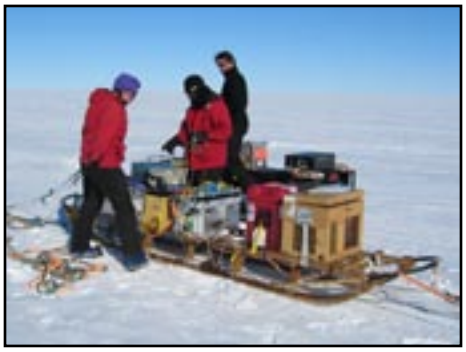
The knowledge that a meter of movement on the ice shelf can cause ice streams to burst forward played a part in this switch. As did the behavior of the glaciers on the Antarctic Peninsula after the break-up of the Larsen B Ice Shelf in 2002. Those glaciers started speeding up when the shelf was no longer there to hold them back, carrying more ice from the interior of the continent out toward the ocean.

NSF-funded research in this story: Sridhar Anandakrishnan and Richard Alley at Pennsylvania State University, Bob Bindschadler at NASA; www.geosc.psu.edu/~sak/



Courtesy of Don Voigt / Special to *The Antarctic Sun*

This graphic shows how the daily tides influence the forward movement of the Bindschadler Ice Stream. The blue line shows the tide, and the green line shows how the ice stream reacts by surging forward as sea levels fall at the beginning of low tide each day.



Ian Joughlin / Special to *The Antarctic Sun*

Sridhar Anandakrishnan / Special to *The Antarctic Sun*

Left, Ginny Catania, Sridhar Anandakrishnan and Huw Horgan prepare their instruments last year on the Whillans Ice Stream along the Siple Coast to study how tides affect the movement of the ice. Right, Horgan prepares seismometers before installing them on Whillans Ice Stream last year.

Pole, Palmer volunteers train for serious emergencies

By Peter Rejcek
Sun staff

South Pole and Palmer stations are limited on professional help if an emergency occurs, but there's no shortage of trained and experienced volunteers to fight fires and respond to medical mishaps.

If McMurdo Station is remote, then South Pole is in the outer regions of isolation. It's a three-hour plane ride via LC-130 between the two stations during the busy summer months, roughly late October to mid-February. That's assuming good weather exists at both airfields. It's another five to eight hours to the nearest hospital in Christchurch, New Zealand, depending on what plane is available.

The rest of the year, the South Pole is physically cut off from the outside world, so any emergency must be met swiftly and efficiently.

To that end, the station can quickly muster more than 60 trained volunteers in the summer. Many of those fire and trauma team members have worked in emergency services, search and rescue, or simply as "backcountry aficionados" with first aid training, according to Liesl Schernthanner, South Pole winter site manager. She also serves as the incident commander, running the station's emergency operations center.

"We're fortunate here, in that we have so many motivated and uniquely experienced individuals on station," Schernthanner said via e-mail. "We choose leaders with experience, verve, and the ability to both listen and teach."

Logistically, Palmer Station is as remote as South Pole. Unlike Pole and McMurdo, there is no dedicated airfield at Palmer, as all transport is usually by vessel.

It would take several days to muster help from Chile, the closest country to the station, estimated Barbara Watson, Palmer Station instrument technician. Formerly a volunteer firefighter in North Carolina, Watson serves as the station's assistant fire marshal. During the summer season, when cruise ships are often in the vicinity, a distress call could bring a vessel within eight hours, she said.

Still, with an average summer population of 40 people, half of whom are scientists, Palmer must rely on a handful of people to perform a variety of tasks.

"The biggest problem at Palmer is that everybody is on multiple teams," noted Watson, who also serves on the station's spill response squad, and the ocean search and rescue team.

Fire teams at both stations train for a week in Colorado before leaving for Antarctica. The South Pole crew generally consists of members expecting to spend a full year at the station. Year-round duty at Palmer is rare, Watson said, so there is little carryover between summer and winter fire crews.

This year's fire school took place at the Red Rocks Fire Academy in Arvada, Colo., near Denver. The South Pole trauma team also took a two-day course from the Wilderness Medicine Institute, while the Palmer crew attended a search and rescue course. Additional members for both fire and trauma teams at Pole are recruited while on the Ice, according to Schernthanner.

South Pole workers simulate a medical emergency during a drill in August, carrying a "victim" on a backboard up the stairs in the elevated station.

Getting in shape

Training is an ongoing exercise at both stations.

Fire drills are carried out once a month at Palmer, and are designed by the station's doctor, currently Dr. James Ramseier, an emergency room physician from Las Vegas. The fire team also meets monthly to practice skills such as how to properly lift and carry victims. Additionally, team members often conduct their own equipment inspections, which includes making sure that some 160 fire extinguishers are operating properly.

Ramseier said he started the summer season conducting drills, such as a small electrical fire, designed to make the fire team comfortable with its equipment. Eventually, the scenarios become more complicated, with an entire building being engulfed in flames.

"I'm a little more aggressive as the season progresses," he said.

At Palmer, six people are trained to use a self-contained breathing apparatus (SCBA), which is not unlike scuba gear, for working in smoke-filled rooms. Another four members are first-responders, who initially arrive on a scene with a handheld fire extinguisher and assess the situation, reporting whether or not the SCBA crew is needed.

There are five people on the trauma team to assist Ramseier. Their training includes learning everything from how to take vital signs to working the X-ray machine to drawing blood. Ramseier said it's invaluable to have their assistance when the

See VOLUNTEERS on page 10

"We're fortunate here, in that we have so many motivated and uniquely experienced individuals on station."

— Liesl Schernthanner, South Pole winter site manager

Volunteers ready for emergencies

From page 9

only other medical professional on station is an EMT.

"It allows me to focus on the patient," he said.

Currently at South Pole, there are about 30 people spread across three fire teams and another 35 on trauma. Each fire team has a different function, Schernthanner said.

The first fire team responds to a scene as quickly as members can dress in their extreme cold weather gear and get to the site safely. Their job, like the first-responders at Palmer, is to assess the scene, report it to the incident commander, and if it's a small event, like a trash can fire, put it out on the spot. Meanwhile, fire team two is suiting up in their firefighting gear and making its way to the scene. Team three works in support, mustering where the station's spare gear is located.

"The trauma team gathers at a location near the scene to assess, stabilize and transport victims, as needed, to medical," Schernthanner said.

The South Pole teams are required to conduct monthly exercises that combine fire and medical emergencies, but they generally go beyond that, Schernthanner said.

"Our teams are enthusiastic and take their role seriously, so we have trainings every week," she explained. "False alarms ... serve as team-response exercises, but we prefer something more orchestrated to accomplish our training goals."

Pole is due to have an emergency response drill later this month like the one that occurred at McMurdo (see related story on page 1) on Dec. 7. The drill is an event that exceeds the station's normal response capabilities, Schernthanner explained.

"We only have two beds in the sick bay, for example, so three injured people can be qualified as [a major emergency]," she added.

The real thing

In a real operation, all of Palmer Station gets involved.

For example, in October, a Palmer community member was evacuated for medical reasons. After U.S. and British officials approved an air operation using a Twin Otter aircraft from Rothera Station, about 320 kilometers away, Palmer Station personnel went into action. The glacier and ocean search and rescue teams prepared a landing area for the twin-prop aircraft.

Meanwhile, the trauma team attended to the patient, keeping an around-the-clock vigil and checking the patient's vital signs every four hours. Under the supervision of Ramseier and the winter physician, Dr. Kelvin Mar, the volunteer members were even involved in mixing medications.

"They were a tremendous help," said Ramseier, who is in his first season on the Ice. The trauma team also assisted in transporting the patient from the station to the top of the nearby Marr Ice Piedmont glacier, where the plane landed.

Barbara Watson / Special to *The Antarctic Sun*

Members of Palmer's volunteer fire team exit a smoking building during training exercises in Colorado before the summer season began.

"That was a good experience for them," Ramseier said of the successful operation to evacuate the patient, who has reportedly recovered and is doing well.

Previous South Pole winter crews have also had to manage their own medical evacuations. Since 1999, there have been three medevacs, including one in April 2001 in full darkness. All three were successful.

Schernthanner said the emergency response team will change little in the winter besides shrinking with the rest of the station population.

"[They are] enthusiastic about training, hard working, take their role seriously, and are committed to the community," she said of the response teams. "It is an example of what makes Pole 'Pole' and a reason why we like it here."

South Pole breaks three record high temperatures

From South Pole Meteorology Dept.

Three consecutive daily high temperatures were broken at South Pole Station in the past week.

On Dec. 11, the high temperature of negative 17.8 degrees Celsius (0 degrees Fahrenheit) easily broke the previous high of negative 21.1 degrees Celsius (negative 6 degrees Fahrenheit) set in 1974.

The high temperature of negative 13.9 degrees Celsius (7 degrees Fahrenheit) on Dec. 12 was well above the 1984 record of negative 17.2 degrees Celsius (1 degree Fahrenheit).

The year 1984 lost another record on Dec. 13 when the mercury hit negative 14.1 degrees Celsius (6.6 degrees Fahrenheit). The previous record was negative 19.4 degrees Celsius (negative 2.9 degrees Fahrenheit).

The heat wave even flirted with the all-time record high. That was in 1978 when the tempeature reached negative 13.6 degrees Celsius (7.5 degrees Fahrenheit).

Dr. Kimberly Merris, far left, gives instructions to medical auxiliary team members during the Dec. 7 emergency response exercise at McMurdo Station. The primary medical scene was set up in the firehouse apparatus bay.

Peter Rejcek / *The Antarctic Sun*

Emergency designed to 'stretch' capabilities

From page 1

a dorm fire up the road from the Chalet administrative office.

"It caught them off guard," Morris said of the added hiccup in the drill. A construction coordinator for Raytheon Polar Services Co., Morris' background also includes firefighting and working with Jefferson County Emergency Management in Colorado. Additionally, he created an emergency response drill there involving numerous state and federal agencies, from the Federal Bureau of Investigation to the Civil Air Patrol and sheriff's offices.

"These [drills] are intended to be learned from and help prepare for the future," Morris explained. "Overall, everybody was pleased [with the drill's results] and how everybody reacted and responded."

Antarctic Fire Department Chief Sharon DiGiacomo said the addition of a second scenario did surprise the department. At first, she said, she feared a real emergency was under way while most of the station's resources were still concentrated on the fabricated vehicle accident, which included three victims and an imaginary fuel spill. A fire engine truck and ambulance were immediately dispatched to the new scene on the other side of McMurdo.

"It was a good exercise for us," DiGiacomo said. "We were stretched pretty thin."

Morris said that's exactly what the exercise is designed to do: stretch resources and see where the deficiencies are, "to see how far we could stretch before something broke." An important component is also testing communications, he added.

"Communication always breaks down. It's the first thing that goes in a [major emergency]," he explained. "How we recover is the key."

The station's comprehensive emergency management plan details how people are expected to respond, who's in charge, and what scenarios they should prepare for. There's even a contingency plan should Mount Erebus suddenly erupt.

Eric Hobday, the McMurdo Station site manager for Raytheon, said while there are plenty of "doomsday scenarios" that could be played out, a typical event in town, real or imagined, usually involves the station's three primary responders — the fire department, the medical team and the spill team. An out-of-town incident would likely also include the Joint Antarctic Search and Rescue Team.

The breakdown

The fire department is typically the first agency on the scene of an in-town emergency. Not far behind are Mark Furnish and his spill team should a release be involved.

"The fire department calls us to the scene, we get busy," said Furnish, the waste operations manager and spill team coordinator.

During this month's drill, when a fuel truck going up a hill suddenly lost power and started to slide back down, it sideswiped a pickup truck and hit some nearby fuel pumps, causing a leak. Fuel headed for the bay, possibly heralding an environmental disaster.

The spill and fire teams simulated diverting the fuel from a chute leading to the sea ice. The stream was rerouted onto the road, where they set up what's called a weir dam on a flat spot. The liquid pools at the dam, with the fuel floating to the top where it can be absorbed.

"The whole idea is to keep [the fuel] out of the bay," Furnish said. "Once it gets into the bay, we're in a lot of trouble."

Contaminated dirt and rock from the road would be cleaned using a "soil cooker," which burns off the fuel, according to Furnish. Should fuel reach the sea ice, response must be fast because the warmer fuel first melts down the ice then often travels laterally under the surface. Snow on top of the ice can make the spill team's job easier.

"The snow acts as a great absorbent," Furnish said. "It will soak up a lot of fuel."

In what Furnish called "very labor

See STATESIDE on page 12

Stateside training augments fire, spill team experience

From page 11

intensive" work, the contaminated snow would then be shoveled into 55-gallon drums and shipped from Antarctica for proper disposal.

While all this action was under way, something akin to what Morris calls a "war room" was assembled in the first floor of Building 165, where McMurdo Station operations, also known as MacOps, is located. That's where Hobday, his National Science Foundation counterpart Terry Melton, and others monitored radio traffic as part of the emergency operations center (EOC). As individual events unfold, the EOC team looks at the big picture, and can coordinate helicopter operations or fixed-wing flights north to Christchurch should the need arise.

The first "victims" from the vehicle accident arrived by ambulance at the fire department, where the primary medical operation had been set up in the firehouse apparatus bay. The scene was calm, as patients were triaged and transferred to one of three medical teams depending on the severity of their injuries. Large green oxygen tanks stood near the two medical stations for the more critically wounded — the red zone for those needing immediate care and the yellow zone for patients with less severe injuries. The third area, the green zone, was for the so-called "walking wounded."

Dr. Taylor Dunn, McMurdo Hospital lead physician, said the professional medical crew, along with the medical auxiliary, stretcher-bearers and recorder teams, performed well. He added that the rest of the season will be spent working with the auxiliary medical team on increasing its skills.

Honing skills

While the fire and spill teams consist of trained professionals, the medical team relies on a large auxiliary force to help with major emergencies, especially at the primary medical scene in the firehouse. There are about 24 people on the auxiliary team roster. They range from people with basic CPR/first aid training to former EMTs.

"We do have a range of experience on the auxiliary team," Dunn noted, adding that other community members not on the auxiliary squad have volunteered their skills in case of a real emergency. On the professional level, the hospital staff is deep with experience, according to Dunn, who has worked as a physician in remote parts of Alaska.

During the remainder of the season, the auxiliary team will meet and practice skills that will help the professional medical team in the case of a major emergency, Dunn said. They may learn such things as how to "bag" a patient, using a bag-valve-mask to assist a patient's breathing and deliver more oxygen. A first aid/CPR class will also be available for medical emergency response team members, as well as cross-training for interested stretcher-bearer and recorder volunteers. The recorders write down patient information, such as vital signs, on a clipboard as the medical pros and auxiliary attend to victims.

Peter Rejcek / *The Antarctic Sun*

In the "green zone" of primary medical operations, located at the McMurdo firehouse, "victims" with lesser injuries are attended to.

The fire and spill teams hone their skills by regular practice as well as through practical experience, and both crews also receive stateside training before deploying to Antarctica.

The McMurdo fire department members spend about 10 days in Salt Lake City training in ways to respond to an aircraft mishap, which includes scenarios with as many as 200 victims, DiGiacomo said. The fire team must know how to assess the scene and triage people, she explained.

"We look at what's going to do the most good for the most people," she said. "We call it controlled chaos. You have to learn what to expect. You have to expect the unexpected in this business."

Preparation is also key for containing fuel spills as well as hazardous materials releases, according to Furnish. The spill response team consists of 22 people, 16 from waste management and six from the environmental department.

The team spends a week in Corpus Christi, Texas, where the U.S. Coast Guard also trains. They receive hazardous materials training and practice maritime skills for containing possible leaks from tankers. Those exercises involve using two boats and a boom, which contains the fuel so that it can be "mopped" up using skimmers that scoop the fuel off the surface of the water.

Furnish said the spill team has not had a chance to work on their boating skills in about five years because there's been no open water in front of McMurdo Station. If that changes this year, his crew will begin "booming" the tanker before the first drop of fuel is unloaded.

"Prevention is so important," he said.

The entire Dec. 7 drill was videotaped and will be used for future training, Morris said.

Training continues into the winter, when a separate emergency response drill is held. Not much changes in the winter besides there being fewer people available to respond to an emergency, according to Hobday. Since there are no flights or field camps during that part of the year, there are fewer scenarios to worry about as well.

"Anything that's going to happen is going to be right around town, in walking distance or driving distance," Hobday said.

Summer or winter, you can never train enough, Morris said.

"We have to be self-reliant," he explained. "Everybody in the community has to be 100 percent ready to act at a moment's notice. Your life depends on it. My life depends on it."

Seismometer data also key in sea ice study

From page 1

seismic waves as they hit land.

MacAyeal's co-principal investigator, Emile Okal of Northwestern University, has even detected these waves in places as far away as Tahiti.

"The data [from the B-15A seismometer] shows exactly the same patterns as were picked up at the equatorial Pacific," MacAyeal said. "In some ways, we still don't know all that will be revealed."

The scientists didn't know if they would be able to retrieve the seismometer until just a few days before the mission happened. The team set up the seismometer last year while B-15A was more or less stationary near McMurdo Sound. It had stayed in the same location for several years, so the team hoped it would remain long enough for them to retrieve the data this season.

Instead, the iceberg started moving early this year and is now racing up along the coast near Cape Adare at 16 kilometers a day.

"We deployed this seismometer knowing it was a huge risk," MacAyeal said. "But we figured — nothing ventured, nothing gained."

The teamed placed a number of instruments on B-15A, totaling $25,000, but the seismometer is the only one that produces files too large to retrieve remotely through satellites. They had to travel to the berg or lose the information.

MacAyeal said he did not expect to be able to recover the data this year because the iceberg had drifted so far from McMurdo.

"I was really depressed coming down here because we didn't have any instruments to go fetch for seismometer data," MacAyeal said.

But MacAyeal and his team continued to work toward a recovery mission this summer, and the National Science Foundation decided it was worth the investment to at least attempt to recover the equipment. The NSF allocated one day and one Twin Otter aircraft to rescue the equipment from B-15A. The mission had to be completed with the minimum amount of people possible to conserve weight, and therefore fuel, on the long flight. Only one person could be sent with the pilots to recover the instruments.

The team and the NSF made the decision to make that one person Brennen Brunner, supervisor of the field safety training program at McMurdo. Brunner has extensive training in traversing glaciers and was sent because of unknown conditions on the iceberg, such as crevasses and other hazards.

"It was up to my group to train Brennen [on the science equipment]," MacAyeal said. "He would have to be a seismologist for the day."

Brien Barnett / *The Antarctic Sun*

Glaciologist Doug MacAyeal adjusts wires on a weather and GPS station installed on iceberg B-15A in 2003 in this file photo. MacAyeal enters the final field season of his project next year.

The Twin Otter landed on the iceberg about 1 p.m. Brunner made his way across the surface to the equipment, where he had to excavate it from under more than a meter of snow and ice.

Brunner then had to locate the seismometer and capture the latest data by pressing a button before disconnecting it from its power source, two batteries and two solar panels.

"The only thing I could really do wrong is hold down the button for 10 seconds and then hold it down again for 10 seconds," Brunner said. "That would have erased everything."

Luckily for the science team, Brunner did not do that, and the operation on B-15A took about 25 minutes to complete.

It was important to retrieve this instrument before the iceberg floated out of range toward the open ocean.

"Once icebergs get ejected from the coastal region, they're doomed," MacAyeal said. "The icebergs develop huge melt ponds, and as the water draws to the center, the edges stick up like a mattress at a cheap motel. And in one catastrophic moment, it breaks apart."

The retrieval of this seismological data provides valuable information on iceberg movement, but the science group also worked on a number of other projects this summer. These include trying to repair a Webcam fixed on a large section of ice the group expects to become an iceberg and mounting a GPS unit on the Drygalski Ice Tongue. The scientists believe a piece of that ice formation will break off and become an iceberg in the next five to 10 years, and the scientists want to be ready and waiting to track it.

Apart from the iceberg study, the science team is also looking at the seismography of the sea ice. The intent of this project is to see what effect waves have on the sea ice, but the group is also getting a new view on the effects of repeatedly landing planes on the ice runway.

C-17 aircraft hit the ice like "giant hammer blows," MacAyeal said.

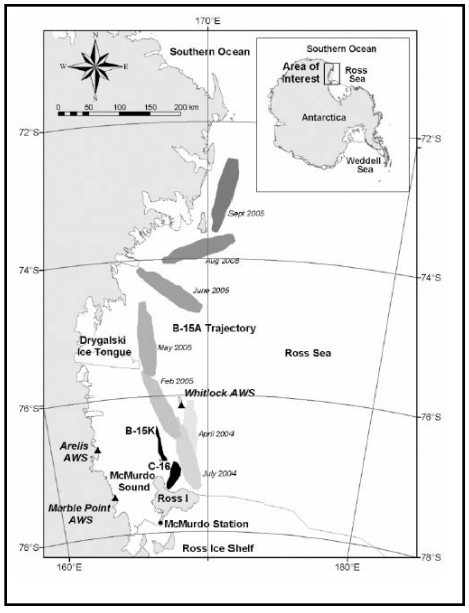
"When we placed the seismometers on the sea ice, the impact of the C-17s was like hitting a drum head," he said. "As time went on, we could tell the drum head was getting less tight."

Surveyors and planners for the ice runway are interested in using this data to help judge suitability of the sea ice for aircraft landings at different points during the year, MacAyeal said.

Next year is the final field season for the project and will largely be spent recovering three seismometers and repairing several of the existing monitoring stations.

"This is not the end of the project," MacAyeal said. "There are still many years of data analysis to be done."

NSF-funded research in the project: Doug MacAyeal, University of Chicago, http://ice.ssec.wisc.edu/iceberg.html



Courtesy of Antarctic Digital Database / Special to *The Antarctic Sun*

Iceberg B-15A's journey away from McMurdo Sound is tracked in detail using GPS and satellite imagery.

Profile

Still rockin' on the Ice

By Peter Rejcek
Sun staff

Punk isn't dead. But it has grown up.

Jay Fox is a case in point. The 42-year-old musician still wears blue jeans and Converse sneakers, just as he did as an anti-establishment teen. But these days, he's traded his Army jacket for a Carhartt parka. The hairline is slightly receded, and the rectangle-shaped spectacles belie the rebellious stereotype of leather, long metal spikes and even spikier colored hair.

"I just like playing music," said Fox, who's worked at McMurdo Station for 10 years. "I like having a hobby where I can interact with friends and accomplish something."

Fox is still punk at heart. He's never laid down his bass guitar since starting his first band, United Mutation, around 1980. Twenty-five years later, the bands he plays in are more mature, the music more textured, but the lyrics still swagger with the social conscience that attracted him to the music.

"It's punk lyrics without sounding like punk," he said of the musical and artistic projects he works on here and back in Denver. "The music I've … been associated with has always had a social aspect to it."

Fox came of age in the Washington, D.C. area, during the heady and hectic time when Mayor Marion Barry ran the town. It was a tough place to grow up, though according to a famous quote by the mayor in the late 1980s, "Outside of the killings, D.C. has one of the lowest crime rates in the country."

The modern punk movement can be traced to the mid-1970s. It was a rejection of highbrow rock-and-roll, epitomized at the time by bands like Led Zeppelin with their bloated stage performances, billowing blouses and complicated guitar solos. Punk wiped away the façade with a sneer, returning to simple, raw rock. It was in the late 70s that Fox said he saw the Ramones on TV and realized he was already in the same scene.

"They were wearing ripped-up jeans, dirty T-shirts and Converse sneakers, and I was wearing ripped up jeans, a dirty T-shirt and Converse sneakers," he recalled. "I thought, 'those guys look like us.'"

Like many punk bands of the time, United Mutation channeled its anger about society into its music. The group, which included Fox's older brother, didn't know anything about crafting songs or recording albums or even really how to play. It was all about the punk attitude — "do it yourself."

"In 1980, we were just kids jumping up and down and screaming in people's basements," Fox said.

But the band quickly morphed beyond its garage days. Within a year, they had rented time in a basement studio to put together their first demo. Eventually, one of the most prestigious punk rock labels of the day, Discord Records, would pick up the band, launching United Mutation into the company of groups like the Sex Pistols and The Clash.

In some ways, the punk rock scene deteriorated for Fox in the late 1980s. Anger and aggression turned to violence at his shows. He and some of his other band mates formed a new group, Bullhead, just to torque their former fans.

"Our music became less hard-core punk rock, and became more progressive rock," Fox explained. "Of course that didn't work. People hated it. Punks don't want progressive; they want punk."

The bassist continued to work with different bands as Barry went to jail and President Bill Clinton took office, taking an edge off anti-establishment gripes. In the early 1990s, Fox developed an interest in Antarctica while working as a manager at a major retail chain. He even wrote a song trilogy about krill, the small crustaceans at the bottom of the food chain. In 1995, he took a job as a general assistant at McMurdo Station, and has been with the program ever since. He's now the full-time retail supervisor, overseeing store operations at all three United States stations.

On the Ice, the new dad is active in the local music scene. He jams with many different musicians, playing with bands like Son of Prog and Mrs. Chippy at the station's various entertainment hotspots. One of his band mates here, singer, songwriter and guitarist Matt Hurley, also plays with him back in the States in a group called the Jane Wymans. On the Ice, the band performs under the name Anesthesia.

While the two first met on the Ice, they didn't jam together until about 2001 when Fox had moved to Denver. The collaboration, Hurley said, began as jam sessions in his small Denver apartment, "The Treehouse."

"We immediately clicked. I never played with anyone when it was so instant," said Hurley, who works in the McMurdo fuels department. "Jay is easy to play with because he's so versatile."

Anesthesia appears on a compilation CD with two other Ice bands, The Ashamed and Under the Trellis, that Fox and others put together. "White Cold Days" is the name of the release and the title track on the CD. The title song certainly evokes a different sound in contrast to the days of United Mutation — a mournful lament against a riot in a closet. But the words in the song "White Cold Days" still speak of escape, still defy authority.

Peter Rejcek / *The Antarctic Sun*

Jay Fox plays a "fat-sounding bass" according to band mate Matt Hurley. Fox works at McMurdo Station as retail supervisor.

Fox promotes music, particularly the punk rock scene, when he can. He scored a 2005 documentary about the seminal punk band, The Minutemen. The movie made its Southern Hemisphere debut at the South Pole on Oct. 28. In Colorado, Fox is involved in a more avant-garde group, Birdmanray, which combines visual images and dance into its instrumental music.

"I really like instrumental music," he said. "If you do it right, you're giving the audience a picture without giving them the words."

However, with the punk rock scene coming of age, along with those there since its inception, more and more words are being written about the musical epoch: Earlier this season, another punk rocker showed Fox a history book on punk while in the station store. Fox remembers pointing out to the younger man that United Mutation appears in the book.

"This wasn't a book about some scene I wasn't involved in," Fox told the fan. "This is a book about my life."

Contact Jay Fox if you're interested in a copy of "White Cold Days."