October 30, 2005

# The Antarctic Sun

Published during the austral summer at McMurdo Station, Antarctica, for the United States Antarctic Program

Photos by Peter Rejcek / *The Antarctic Sun*

*Above, Albert Hertzog, Eric Schmitt, Alain Ravissot and Alain Cardonne, from left to right, launch the Vorcore payload that carries instrumentation into the stratosphere to measure the ozone vortex over Antarctica. The balloon, at right, and its instruments are helping researchers better understand the ozone hole.*

# Researchers take spin in ozone vortex

By Steven Profaizer
*Sun staff*

For non-scientists working in Antarctica, much of the cutting-edge research projects conducted here might seem over their heads.

Very few of those projects, however, can make that claim and mean it literally. But the French Vorcore team has been sending its balloons high into the sky over McMurdo since Sept. 5.

The group of nine scientists and engineers has so far conducted 25 launches of balloons, with instrument-carrying payloads in tow, sailing up from the sea ice near the runway into the stratosphere above McMurdo.

See related story on page 7

Vorcore is phase one of a two-phase international research project named Stratéole, which aims to study the mechanics of ozone depletion by developing a greater understanding of the vortex over Antarctica.

**See VORCORE on page 8**

## Quote of the Week

"McMurdo is full of golden brown goodness."

— Woman in the McMurdo dining hall referring to the plethora of fried food options.

## Inside



# Campbells add color to continent

By Emily Stone
*Sun Staff*

Alan and Colin Campbell heard over and over again that they'd better pack plenty of white paint when they set off for Antarctica.

But that turns out to be the one color the father and son landscape painters almost never use. Instead, they are here to capture the color of the continent during the couple months each year when solid darkness gradually gives way to constant light.

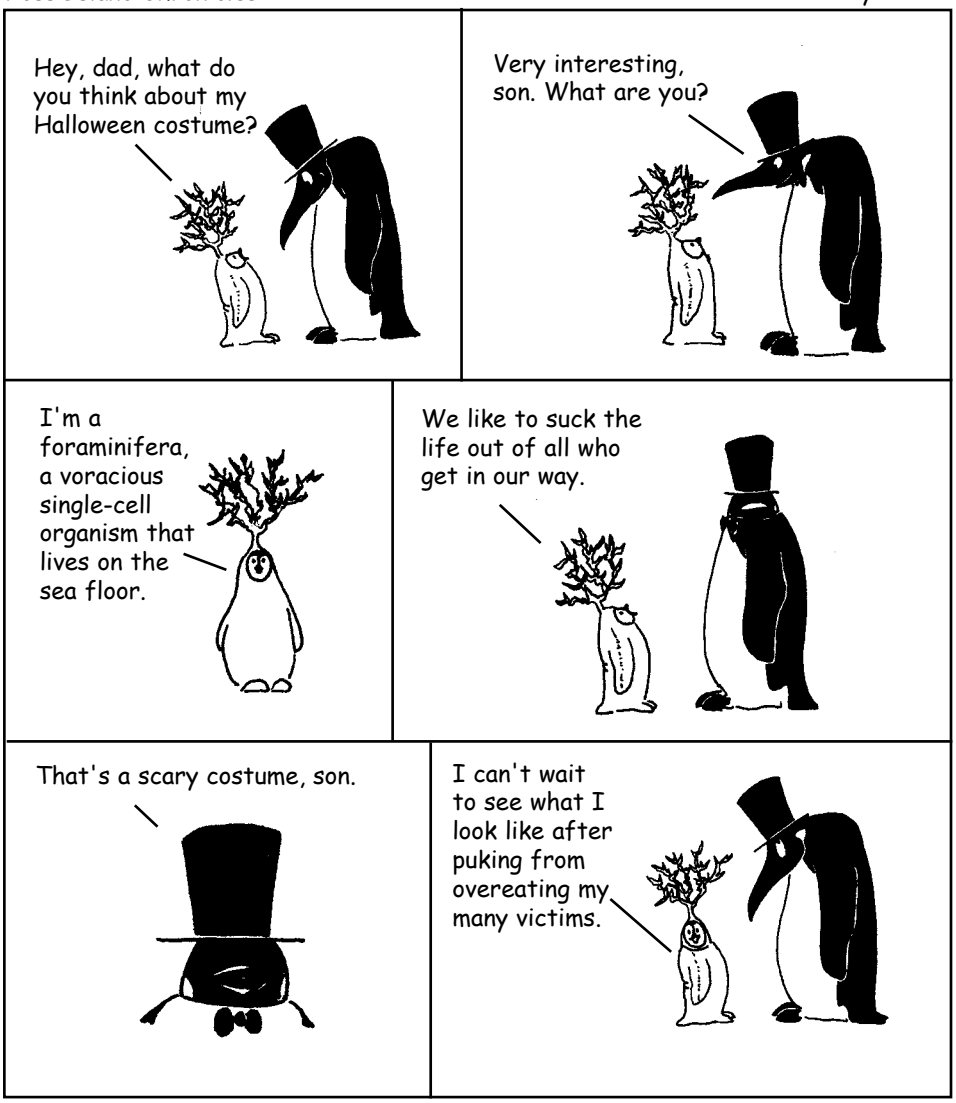
"It's the most colorful place I've ever been to in the world," said Alan, 55, who is at McMurdo Station during his fourth trip to Antarctica.

Colin, 24, who is here for the first time, described the continent's icy backdrop as a projection screen that enhances the vividness of the colors.

The Campbells arrived at McMurdo

**See FATHER on page 10**

Ross Island Chronicles By Chico




# Cold, hard facts

## Covering the stations

Total number of nations that operate seasonal and year-round stations in Antarctica: **26**

Approximate population below 60 degrees south in the summer: **4,000**

In the winter: **1,000**

Year-round stations: **38**

Summer-only stations: **34**

Nation with the most stations: **Argentina with 14**

Nations with only one station: **Bulgaria, India, South Korea, New Zealand, Poland, Ukraine, Uruguay, Ecuador, Finland, Peru and Sweden**

Number of stations with airports: **30**

Number of stations with helo pads: **27**

*Source:* CIA World Fact Book

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**Senior Editor:** Emily Stone

**Editors:** Steven Profaizer, Peter Rejcek

**Copy Editors:** Amanda Barnett, Andre Fleuette, Ed Hyatt, Bill Jirsa, Rob Jones, Traci Macnamara, Erin Popelka, Jessica Spence, Brian Spigel, Laura Wright

**Publisher:** Valerie Carroll, Communications manager, RPSC

**Contributions are welcome.** Contact the *Sun* at AntSun@usap.gov. In McMurdo, visit our office in Building 155 or dial 2407.

**Web address:** AntarcticSun.usap.gov

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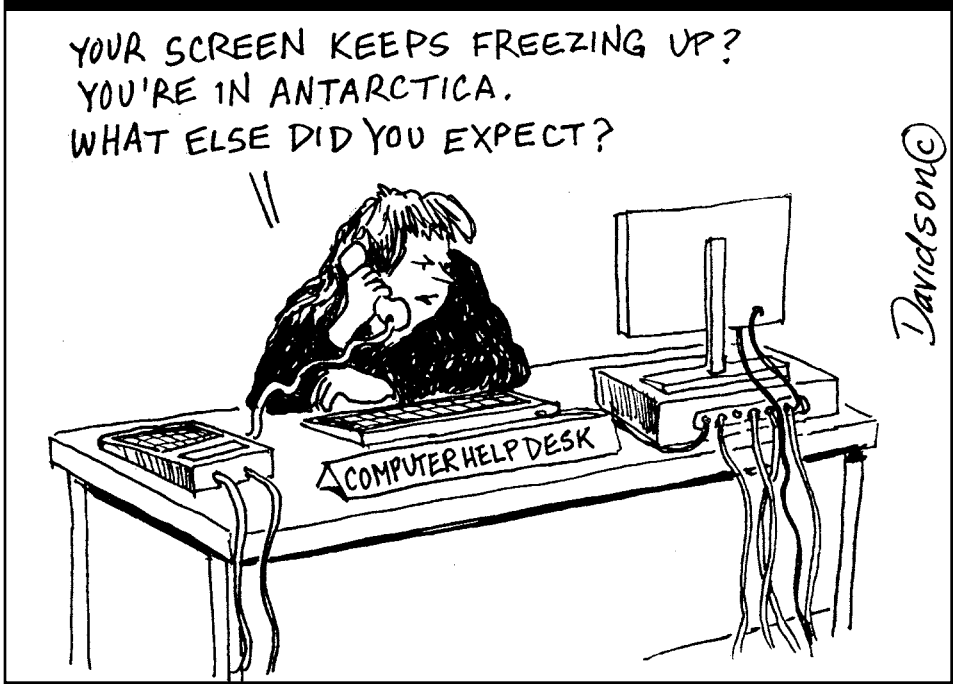

# C-17s add reliabilty to air cargo mission

By Peter Rejcek
*Sun staff*

Air Force crews with the 62nd and 446th Airlift Wings are flying solo this summer as the C-17 Globemaster III becomes the primary air cargo carrier between New Zealand and McMurdo Station.

The strategic airlifter — a military term that refers to cargo planes transporting materials and people — is scheduled to make 47 round-trips to the continent this season between August and February.

"That's the most strategic air flights that we've ever flown [here with the C-17]," said Lt. Col. James McGann. McGann commands the seven active duty and reserve squadrons from McChord Air Force Base in Washington state that make up the air crews.

Those flights translate into some 1.36 million kilograms of cargo and nearly 3,000 passengers. "It should be the most cargo airlifted to Antarctica by strategic airlifters," he added.

The Cold War workhorse C-141 Starlifter made its swan song flight to Antarctica this past February.

The 40-year-old aircraft is being mothballed worldwide, with a target date for retirement of all planes by 2006, according to official military Web sites.

The C-17 is now flying airlift missions from Antarctica to Afghanistan. It can carry twice as much cargo as its predecessor, about 45,000 kilograms total, McGann explained. And while the C-141 could carry 10 more passengers, it was far more limited in the cargo it could carry on such flights, he added.

Thanks to integrated GPS, the C-17 can make its approach to McMurdo with a lower cloud cover ceiling. The C-141 was limited to 1,000 meters, while its newer counterpart can fly in for a closer look at 500 meters.

"Using integrated GPS [we] can pinpoint that runway within 30 feet," McGann noted. That additional precision has already saved a couple of flights that might have turned around had the C-141 been in the air, he added.

The C-17 has one other advantage over the C-141. Because of its extended range fuel tanks, the C-17 can fly to McMurdo and descend to the airfield before reaching the critical PSR, or point of safe return, according to McGann.


Photo by Tech. Sgt. Rich deLucia / Special to *The Antarctic Sun*

*A United States Air Force C-17 Globemaster III sits at the Annual Sea Ice Runway near McMurdo Station. The aircraft is now the primary air cargo carrier bringing supplies and personnel to McMurdo Station.*

"This allows additional time for the weather to clear and is an added safety measure," he said. "If the weather were to suddenly go below landing minimums, the aircraft can climb back to cruising altitude and return to Christchurch with adequate fuel reserves. Without this capability, aircraft descending out of cruise altitude are committed to landing in Antarctica — no matter what the weather is."

These additional capabilities add up to a more reliable aircraft, something that pleases Dave Bresnahan, the National Science Foundation representative at McMurdo.

"They're prepared to fly every day," Bresnahan said, noting that the C-17 can off-load passengers without requiring fuel for the return trip, "which is also advantageous for us." Large cargo trips by the C-17 still require it to take on fuel at McMurdo, he added.

It's a much roomier bird as well, Bresnahan noted. "For passenger comfort, you don't feel so beat up when you get here."

The C-17 made its first appearance on the continent in 1999 for test trials and began supplementing the C-141 in 2002. This summer's Christchurch crew of 37 includes 12 maintenance techs, 10 pilots, eight loadmasters and seven command staff.

"It's probably the most sought-after mission of the C-17 community," noted McGann, a pilot with eight seasons flying the 3,800 kilometers of water and ice between New Zealand and Antarctica.

And that mission could expand as early as next year. Bresnahan said the NSF is exploring the idea of doing airdrops with the C-17 to deep inland sites like remote field camps or even the South Pole.

"It could make those [places] easier to support," he said.

Aircrews from McChord performed the first C-17 polar airdrop at the North Pole in April, according to an article from the 62nd Airlift Wing Public Affairs office.

"I would say it's the most extreme environment we fly in," McGann said of the Antarctic mission. "Everyone loves to do the flying. It challenges them to be better pilots."

Photo by Andre Fleuette / Special to *The Antarctic Sun*

Perspectives

# The mystery of the moving juice machine

## Getting used to changes at the Pole during the last 29 years

By Bill Spindler
*Special to* The Antarctic Sun

My first time at Pole was for 12 months in 1976-77. As I left the domed station at the end of that year, I had no expectation that I'd ever be back again.

I did return nine years later, and the place looked little changed. A bit more snow perhaps, some newer equipment, and some different people. But the Dome and the surrounding buildings looked pretty much the same. In fact, the most significant modification I struggled with was that the juice machine had been moved at some point since I'd last looked for it.

I worked at Pole for four summers between 1986 and 1990, working as an engineer on various major projects, such as jacking up the (old) clean air facility, repairing the cracked Dome foundation, and replacing the generators in the arch power plant.

Fifteen years later, in 2005, things were quite different. The last wing of the new elevated station had been enclosed earlier in the summer, and a new complex of science buildings had been constructed across the skiway. The population of 240-plus was more than three times that of our normal summer crowd in 1976. The old galley building in the Dome was still there, but it wouldn't be for long. And that juice machine had been moved again.

The most important thing about a winter at the Pole is the people you're with. Before my first winter I was a bit apprehensive about the urban legends of what had happened (or had been rumored to happen) during the long, isolated night. But we were a good, close group who could sit around and joke about these tales, smiling and thankful that they were only ghost stories as far as the 21 of us were concerned. And we're still all in touch. In 2000, we had a reunion with 100 percent attendance – something we believe to be unique among Polie winter groups. And we "Pole Souls" of 1977 are starting to think about the next get-together.

Before I came down this time I was apprehensive about the sheer size of the place. I'd been following the program, the station and the changes rather closely from a distance, but how would I react in the midst of it? A friend who visited the station a few years ago once described his feelings about being "the old guy" at the dining table. Would that be me?

The most significant change here after 28 years has been the communications with the rest of the world. In 1977 we were truly isolated. We didn't have an Internet to surf, but we did have a roomful of books and other amenities to keep us occupied. There was no precedent for a Twin Otter visit in midwinter should someone need urgent medical attention. The science suffered from our lack of communication. Most of the data was shipped out on paper or tape at the end of the winter. At one point we experienced what we thought to be a rare solar cosmic ray event, but before we could send the critical data out, our radios were blacked out by the solar storm. As for management, without satellite phones and e-mail, we were rather more independent.

Above, photo by Kirk Roberts; left, courtesy of Bill Spindler / Special to *The Antarctic Sun*
*Above, Bill Spindler at his desk this winter at the South Pole. Left, Spindler strikes a similar pose in 1977. He spent the past winter at Pole, his first trip there in 15 years.*

The changes have been inevitable. Science now requires good communications and lots of it. The scientific facilities require a larger crew to put them together and keep them running. Still, some things haven't changed — the cold, the blowing snow, the spectacular sky displays, and that distinctive LC-130 roar that still chills my spine each time I hear it, or even think about it.

At the end of the 1977 winter, as I stood in the middle of the taxiway waiting for the first aircraft to park, I looked over at the other 20 people and realized that our little world was about to come to an end. Suddenly I had an irresistible urge to run away. If I could make it around behind Skylab where I couldn't see the plane, maybe it would disappear and our lives could go on.

As I'm writing this I have yet to stand with the rest of the 2005 Polies and watch the first flight land. I'm not sure how I'll react when I hear that prop wash blow. But I know I'll also be looking off in the distance and seeing another, smaller group of folks that share my memories of this very special place.

*–Bill Spindler was the Title II inspector for South Pole Station construction during the 2005 winter, employed by RSA Engineering, Inc., of Anchorage, Alaska.*

# around the continent

## PALMER

### Start of summer

By Kerry Kells
*Palmer correspondent*

Palmer Station's summer season began with the arrival of the *Laurence M. Gould* on Sept. 20. The 22 members of the incoming summer crew (some new, some returning) were greeted by an upbeat group of 20 residents who had spent the winter on station.

The station was in great condition, with many improvements, most notably the new International Monitoring System (IMS) building. Half of the winter crew departed, leaving 10 teammates behind to continue working on station for a few more weeks.

Photo by Henry Malmgren / Special to *The Antarctic Sun*

*The* Laurence M. Gould *sails toward Palmer Station on Sept. 20 carrying 22 members of the station's summer staff. The* Gould *begins its journey in Punta Arenas, Chile and crosses the Drake Passage on its way to Palmer Station on the Antarctic Peninsula.*

We've only had a few sunny days since our arrival, with many days of blowing snow, sideways rain and sleet, with winds gusting up to 60 knots. Soft blowing snow one day led to freezing rain the next and then back to blowing snow. The open water we got a glimpse of for a few short days around station has now been completely covered by new ice.

Fire, Trauma, Ocean Search and Rescue, and Glacier Search and Rescue teams have gotten their new summer members and begun training. The winter crew shared stories and photos with the new arrivals, and explained their new improvements and additions to station.

Among the new additions is the IMS building. The IMS was funded partially by the Homeland Security Department to house a Comprehensive Test Ban Treaty air sampling system.

The new building will also replace T-5, the building in which we collect all our geophysical and atmospheric research. This research includes work on the global seismograph network, the collection of atmospheric air samples, work on the remote atmospheric measurements program, and research on global thunderstorm activity.

The October social calendar included a science lecture complete with a screening of "La Marche de l'Empereur," which is the French version of the popular "March of the Penguins" documentary that hit the big screen this past summer; a slide show on the summer work season at Summit Camp in Greenland; and a slide show of travels in Africa by our winter network engineer. Yoga, exercise, Spanish and computer classes are also offered each week.

Now we await the return of the *LMG* in late October and the arrival of most of our science groups. Let the summer begin!

## SOUTH POLE

### First plane arrives

Brien Barnett
*South Pole correspondent*

A German sniper sets his sights on a ruined Stalingrad building where two Russian snipers are about to appear. This tense moment in the movie "Enemy at the Gate" played out on the big screen Oct. 25 in the B1 lounge of the new elevated station at South Pole. But a glance around the room showed only scant interest.

About a dozen winter Polies were scattered in lounge chairs and couches, and all but two were asleep. Their ticket home on Skier 94 had been suspended. The New York Air National Guard LC-130 spent two hours circling before canceling its landing because it was just barely too cold for the plane to stay on the ground. But the next day the first large group of wintering Polies made it to McMurdo for an overnight stay before heading to Christchurch, New Zealand.

That's how October goes at Pole.

New people flooded the station on Oct. 21, nearly eight months to the day that the station went into its winter mode and all flights in and out stopped. The first two of three scheduled flights for the first day of the summer season carried 71 people, mail and freshies. They greeted the sun-shielded eyes of the 86 wintering crew members.

Overnight, the station's population nearly doubled and the pace picked up the next morning. Soon, heavy tractors were clearing snow in front of the elevated station and elsewhere, creating large piles. Inside, the new kitchen staff was humming away, the IT crew was getting up to speed and winter workers were turning over their jobs to summer people. Everyone was busy.

On Oct. 25, three Twin Otter aircraft and their crews arrived, following three from the week before — at that time the

**See CONTINENT on page 6**

## the week in weather: Oct. 21-27

**McMurdo Station**
High: 23F / -5C
Low: -13F / -25C
Max. sustained wind: 59mph / 95kph
Windchill: -51F / -41C

**Palmer Station**
High: 49F / 4C
Low: 18F / -8C
Max. sustained wind: 44mph / 71kph
Precipitation: 8mm

**South Pole Station**
High: -52F / -47C
Low: -66F / -54C
Peak wind: 21mph / 34kph
Max. Physio-altitude: 3,263m

# Continent

From page 5

station's first visitors. The next day, there were 166 people on station, including nine from three Twin Otter crews.

Over the coming week, most of the wintering staff will be flown to Christchurch. Some will vacation; others will return home to be with loved ones; and a few will move quickly on to new jobs.

The summer crews have a busy season ahead. They will work to finish some of the common areas in the new station, such as the gym, and prepare to move out of the buildings under the Dome. Many of these structures are scheduled for demolition next winter.

Winter science is mostly completed and data already shipped out via satellite. Instruments must now be cleaned, calibrated and, in some cases, removed or swapped out during the warmer summer.

A load will gradually lift off the winter crew's shoulders after the first flight arrives, said outgoing winter station manager Bill Henriksen. Fire gear is turned over to the incoming employees on Saturday, the turn-over fire drill is held on Monday and a perceived ownership is, in most cases, gladly passed on.

"It's a bittersweet time as you realize that your winter is over and you can move on," he said. Some will return as early as January, others will vow never to return again. Some will break their own vow."

Photo by Chad Carpenter / Special to *The Antarctic Sun*

*The first LC-130 of the season lands at the South Pole on Oct. 21.*

## SHIPS

### LMG

Compiled from reports by T.J. Hurlburt
*Marine Projects Coordinator*

The *Laurence M. Gould* sailed south toward Palmer Station from Punta Arenas, Chile, in calm seas during the week of Oct. 23. The crew deployed scientific buoys without incident on the 24th and 25th. They entered the Drake Passage on the 25th under fair skies and with calm seas.

Mechanical problems with the starboard main engine led the *Gould* to continue its cruise under one engine. This should not significantly impact the ship's schedule as it continued on its course.

### NBP

Compiled from reports
by Harold "Skip" Owen
*Marine Projects Coordinator*

The *Nathanial B. Palmer* had a productive return trip to Lyttelton, New Zealand, during the week of Oct. 17. The crew collected underwater data and conducted end-of-cruise projects along the way.

"Another nice day — sunny and light winds. We could have used a bit more of this earlier in the cruise but no complaints," wrote Marine Projects Coordinator Harold "Skip" Owen on Oct. 19.

The ship arrived in port on Oct. 21, unloaded its hazardous waste for shipment back to the United States, and set off again on the 26th.

## Continental Drift

**What were you most surprised by when you got here?**

**"I was totally unprepared for the beauty of the Neumayer Channel. Photos don't do any justice to Antarctica."**

Curt Smith,
Palmer network engineer
from Tyrone, N.M.,
first season

**"It was 40-plus degrees the day I arrived my first season. I wondered if I'd gotten on the wrong plane."**

Ethan Dicks, South Pole
winter IceCube scientist
from Columbus, Ohio,
fifth season

**"The inside of the buildings were so modern. From the outside they are so unassuming."**

Jane Marquard,
McMurdo general
assistant from Hood
River, Ore., first season

***Ups and downs of ozone research***

# Projects study the impacts from the ground to the air

By Peter Rejcek
*Sun staff*

Studying ozone has its ups and downs depending on where you look.

For researchers who are analyzing the disappearance of ozone in the Earth's stratosphere the cause is no great mystery. They've known for a long time that the migration of chlorofluorocarbons, or CFCs, into the upper atmosphere has caused the annual ozone hole above Antarctica. But the sudden depletion of surface-level ozone at the planet's poles each spring is a relatively new riddle that researcher Linnea Avallone is one step closer to understanding.

Last season, Avallone and two graduate students spent the summer shuttling between McMurdo and a sea ice hut 19 kilometers away at the Pegasus White Ice Runway to test a hypothesis: Does the presence of snow affect the chemistry of the air, particularly ozone?

"We're pretty convinced it occurs," said Avallone, from the University of Colorado at Boulder, during a phone interview. The researchers found that the snow has a "fairly significant" effect, meaning there is a link between the presence of snow and the loss of ozone. But the discovery has only generated more questions — What's going on in the snow chemistry? How does the snow change with the seasons?

To answer those questions, Avallone said she needs to do more experiments.

"We need a great deal more data," she said, adding that she is currently working on a proposal to return to Antarctica. So far she's made field visits in 2002 and 2004. "The relatively clean air in Antarctica makes it easier to do the study."

## On the ground

One of Avallone's graduate students, Lars Kalnajs, returned to McMurdo in August to work with a separate research group studying stratospheric ozone loss using balloon-borne instruments. But the study has afforded him an opportunity to collect additional data on ground-level ozone and analyze the snow samples on the spot.

"We were quite surprised by what we saw," Kalnajs said.

A key element to ground-level ozone depletion appears to be bromine, which is derived from sea salt. Snow samples analyzed in the lab and on site have registered a ratio of 100 chloride atoms to one bromine, Kalnajs said. Normally, the ratio is 650-to-1.

"There's six times more bromine than there should be," Kalnajs noted.

Ozone is a gas composed of three oxygen atoms. At ground level, it is created by a chemical reaction between nitrogen oxides produced by automobiles, other polluting machinery, and naturally occurring volatile organic compounds in the presence of sunlight.

If bromine is the culprit zapping ozone, researchers still need to understand the chemistry that is going on. Kalnajs said the process is likely heterogeneous chemistry — ozone is being destroyed as a gas but by a solid substance, in this case, snow.

Ironically, pollution can destroy ozone or it can create it, depending on the chemical cocktail that's present when heated by the sun. So while the chemical composition of ozone is the same everywhere, studying what happens on the ground doesn't necessarily translate to what's going on miles above the earth.

"It's not very related to the ozone hole itself," Avallone said.

## Looking up

Jennifer Mercer is one of the researchers who is keeping an eye on that ozone hole above the Antarctic. The United Nations' World Meteorological Organization says the seasonal hole above Antarctica is holding steady this year, peaking at 26.9 million square kilometers on Sept. 19 — the third highest on record. But merely looking at the ozone hole's girth in area doesn't necessarily give researchers a complete picture, Mercer explained. Thickness is also a factor.

"Measuring the vertical column over the last three years, we actually have measured less depletion vertically over McMurdo," Mercer said. "We don't know if that's related to recovery or if that's related to natural fluctuations."

Mercer is the co-principal investigator on the approximately 20-year-old project, along with principal investigator Terry Deshler of the University of Wyoming. Deshler has been working on ozone loss and polar stratospheric clouds nearly since its beginning. Two decades of continuous Antarctic research have taught scientists when and where they need to be to collect their data.

"We always come in on the first flight," Mercer noted, referring to her August arrival. "That's when the ozone hole first starts to form. We can generally catch the very beginning of it."

Watching the ozone hole's life cycle from infancy in August to its eventual dissipation in November involves launching balloons about every three days. About 25 ozonesondes (chemical instruments) and eight aerosol counters were deployed to measure the concentration of ozone and aerosol from the surface to 30 to 35 kilometers in the sky.

Photo by Philippe Cocquerez / Special to *The Antarctic Sun*

*The University of Wyoming team launches an instrument that will measure polar stratospheric clouds.*

Mercer said it would probably be several more years before researchers could determine if the vertical shrinking is a trend or merely a flippant turn of nature. In fact, the timeline for full recovery, if that's possible, is still at least another 40 years out, she said, assuming chlorine levels reached their zenith in 2000 as predicted.

"It's an important time to be watching it," she said.

## Lending a hand

While the two ozone studies are separate, they certainly don't operate in a vacuum. Kalnajs joined the stratosphere study with Mercer and Deshler, but was able to collect data for his project with Avallone, as well as test new instruments that both research groups can use.

"It's becoming quite a collaborative project. … The measuring techniques are similar," Kalnajs explained. "We've run into the same problems with these instruments."

**See OZONE on page 11**

# Vorcore chooses McMurdo for logistics support

**From page 1**

Each winter, violent wind currents in the stratosphere encircle Antarctica. This 30-million-square-kilometer phenomenon is the vortex.

At the end of the spring, the currents begin to destabilize and the vortex breaks down. At this time, the airborne chemicals that have been gathered and stored by the vortex are dispersed to the rest of the world.

The Vorcore project focuses on one particular chemical reaction that takes place inside the vortex: the transformation of chlorofluorocarbons (CFCs) into ozone-destroying chlorine atoms. CFCs are used in the manufacture of products such as aerosol sprays and Styrofoam.

But instead of studying the reactions directly from a chemical perspective, the team looks at the vortex core mechanics to see how it affects the interaction between CFCs and the ozone.

"[When studying ozone depletion], chemistry is important, but so are dynamics, which is how the air is transported," said Albert Hertzog of the French Laboratoire de Météorologie Dynamique. "Our final goal is to help others to better forecast the future of the ozone and try to improve [the current] models."

The team plans to have at least 20 of the instrument-carrying balloons simultaneously riding the stratospheric vortex and transmitting data back to the scientists.

The Vorcore team is using a type of long-duration balloon known as a super-pressure balloon, which has the ability to remain in the same air mass for the duration of its flight, which may last up to three months. These balloons, measuring about 10 meters, are significantly smaller than the balloons launched by NASA each year at Williams Field. And they are designed using a different principal for a different purpose.

"[We created] our balloons to stay in the air mass of the vortex so we can tell better what transformation is happening inside," Hertzog said.

The balloons carry instruments designed to measure temperature, pressure and 3-D position in the stratosphere. Four of the balloons also carry a device to measure atmospheric turbulence. All these instruments are packaged together with a parachute and contained within a shell that looks like a tall Styrofoam cooler with solar panels attached.

Each balloon takes measurements every 15 minutes with all of its sensors and transmits that data to a satellite that redirects the information to a receiving station. The receiving station then sends the information to the two French agencies collaborating on the Vorcore project. These agencies then make the data available to the worldwide scientific community via the Internet about three hours after the measurements are first collected from 18 to 20 kilometers above Antarctica.

Photo by Peter Rejcek / *The Antarctic Sun*

*Alain Cardonne, Alain Ravissot and Jean-Noel Valdivia, from left to right, work together to inflate a balloon that will carry instruments into the stratosphere to measure the ozone hole vortex that appears every year above Antarctica.*

By creating this fleet of balloons to simultaneously study the vortex core from the inside, the team is able to provide information that was previously unobtainable.

Each balloon makes 100 observations a day. By the end of the project, the team expects to have accumulated 100,000 measurements from the balloons, Hertzog said. To date, the balloons have logged over 50,000 measurements.

"The concept of ballooning is not new, but it has always been considered difficult to operate, especially in an environment like Antarctica," said Philippe Cocquerez of the French Centre National d' Études Spatiales. "With new materials, construction methods, technology and launch methodology, we are able to succeed where others did not under these conditions. It is new technology with new ideas that makes possible something that was not before."

Of the 25 launches so far, 19 balloons remain in the air. Leaks, turbulence and drastic temperature changes have claimed four of the probes. The other two balloons failed shortly after takeoff but the scientists were able to relaunch the payloads on new balloons at a later date, Hertzog said.

Despite a few lost balloons, Cocquerez and Hertzog are extremely pleased with the results.

"We expect to lose a few balloons," Cocquerez said. "One thing I think is very important is that, so far, the results have been 100 percent accurate. What is clear is that this new observation technique is now available to science."

Outside interest in the Vorcore project has made it an international effort. In addition to working with Americans for logistical support, the team is collaborating with the Germans, British, Australians and Argentineans at their respective bases.

The Vorcore team decided to come to McMurdo base for several reasons.

"McMurdo is quite close to the South Pole and very well located to get into the vortex," Cocquerez said. "The logistics support at McMurdo is unique in that we can get to [McMurdo] when we need to at the end of winter. The surface wind here is also low as compared to many other stations located on the coast, which gives us many launch opportunities."

With the apparent success of the $5 million Vorcore project, the team working on the Stratéole project will soon start to make plans for phase two, named Voredge, Cocquerez said. This phase of Stratéole will be targeted at studying the edge of the vortex and gathering further information on the depletion of the ozone over Antarctica.

*Francois Vial, Laboratoire de Météorologie Dynamique Ecole Polytechnique, www.lmd.polytechnique.fr/Vorcore/McMurdoE.htm*

# Antarctic rocks find home at Ohio repository

By Emily Stone
*Sun staff*

Traveling to Antarctica might be the most glamorous part of being a polar geologist, but it's costly, time-consuming and increases human impact on the continent.

Now there's a simpler way for scientists to get samples to study. They can request a rock from the U.S. Polar Rock Repository at Ohio State University. The 2-year-old institution catalogs and stores rocks donated from scientists' collections and makes them available to any researcher, educator or museum that wants to study them.

The repository, which was jointly funded by the National Science Foundation and the university, has 7,000 samples cataloged in its collection and another 3,000 that are being processed, said Curator Anne Grunow.

Scott Borg, head of the NSF's Antarctic Sciences Section, said he remembers geologists talking about creating a repository as much as 25 years ago. The discussions became more focused in the late 1980s because many of the older Antarctic geologists, whose careers began in the 1960s, started to retire.

"People started asking, 'What's going to happen to these samples,'" Borg said.

Photos courtesy of Anne Grunow / Special to *The Antarctic Sun*

*The U.S. Polar Rock Repository at Ohio State University, inset, has 7,000 samples cataloged in its collection, shown in the larger picture. Another 3,000 samples are being processed.*

Borg put together a group of scientists in the mid-1990s to study the idea, and they came up with a white paper detailing why a repository would be beneficial. In addition to explaining that some scientists would be able to shorten or eliminate their field seasons, the group said it would be useful to have rocks available for future study when methods inevitably became more sophisticated. Samples could also be used for pilot studies to see if a new research method is feasible before scientists set out into the field.

Ohio State bid on the project and was awarded $504,000 in NSF funds, Grunow said. The repository opened in October 2003.

The repository is just starting to become useful to scientists as the collection grows, Grunow said. They've relied primarily on word of mouth and directly contacting former geologists to get researchers to donate their rock collections. Most of the collections are coming from retiring scientists.

So far there are no samples from the Arctic. Borg said he wasn't terribly surprised by this since you can fly to Alaska on a commercial airline or drive to Canada, whereas a trip to Antarctica is a good bit more involved. Therefore the Antarctic rock collections are more important to share.

The Arctic is also comprised of sovereign countries that might have their own ways of collecting rocks, as opposed to Antarctica, which no country owns. He and Grunow said they hope to add Arctic samples to the collection eventually.

Only rocks that are accompanied by a fair amount of background information are accepted in the repository, Grunow said. Researchers need to know where a sample came from, when and why it was collected, as well as a description of the rock. This can be tricky with old collections that were acquired before the invention of GPS technology to pinpoint their locations or that came from areas that didn't have names until recently.

Grunow and her co-worker enter all the data from field maps and researchers' notes for each sample into a database that scientists can access online. The two also photograph, weigh and number each rock.

They are currently working through about 3,000 new rocks from the Dufek Massif in the Pensacola Mountains. Tom Wagner, NSF's geology and geophysics program manager, said this collection is very important for understanding Antarctica's geologic history. Developments in fields like geochemistry will allow new questions about Antarctica to be answered with these rocks, such as the nature of the forces that split Antarctica from Gondwanaland two hundred million years ago or the flow patterns in the deep earth that drive Antarctica's current deformation and volcanism.

Wagner said that while some scientists are reluctant to part with their collections, most polar researchers are enthusiastic about the project. It will become more and more useful as the collection grows.

About 1,000 people a year visit the repository, Grunow said, most of them school kids from central Ohio. They can see some of the rocks on display, learn about the science, and try on cold weather gear. Occasionally people with a connection to the continent will stop by, like cruise ship lecturers or people who worked on the Ice years ago.

"They'll come in and look around and chat with us about Antarctica," she said.

Additionally, the Web site has had more than 3,000 visitors. Researchers can search the site and pinpoint what they want before putting in a request.

> "There will always be reasons for people to go to the field to collect samples."
>
> —*Geologist John Goodge*

This is what geologist John Goodge did when he needed some rocks from Wilkes Land to test a new way of gathering information about the ground buried deep under the ice of East Antarctica. He is hoping that rocks from the coast, which were deposited by glaciers pushing from deep inside the continent, will help him study the part of the continent where the rocks originated.

Goodge, of the University of Minnesota Duluth, requested four rocks from the repository to test his theory. If the results show that he's onto something, he'll either have demonstrated that field work in Wilkes Land would be worthwhile, or he might be able to solely use rocks from the repository for his study.

The repository won't replace the need to travel to Antarctica, said Goodge, who is at McMurdo Station on his 10th visit to the

**See ROCK on page 11**

*This oil painting by Alan Campbell captures the colors of late winter sunset across the sea ice from McMurdo Station.*

Photo by Alan Campbell / Special to *The Antarctic Sun*

# Father-and-son artists have different styles

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during the short Winfly season — the six or so weeks from mid-August to the beginning of October, between the long winter and summer seasons. This is when Antarctica wakes up from its four-month night and the sky is filled with brilliantly colored sunrises and sunsets, which eventually meld into one long day.

The chance to paint during Winfly is what brought Alan back. He first came to Antarctica for the 1987-88 summer season at McMurdo. He went to Palmer Station in 1989 and in 1994 painted from aboard the *Nathanial B. Palmer* research vessel. Since then he has spent most of his time painting in Central America and along the coast of his native state of Georgia.

A couple years ago he got the itch to return after talking to the person in charge of the National Science Foundation's Antarctic Artists and Writers Program. That's also when he decided to bring along Colin, a professional painter in his own right.

"There's some unfinished business in the Antarctic," Alan said he remembers thinking when he was deciding whether to make the trip again. "There will always be unfinished business in the Antarctic."

Colin, who grew up with his father's stories and paintings of Antarctica, said he'd never really considered coming here himself. But he jumped at the chance. He's interested in light, color and structure, and Antarctica is the perfect place to explore all three.

He wasn't worried that he was going to his dad's place, he said. He knew how differently they would approach Antarctica artistically, and he wasn't worried about getting swallowed up by his dad's style or history here.

The two have spent the past two months living and working literally side by side. Seeing how amiably they accomplish this is a wonder to anyone who has a parent or child. But the Campbells say the arrangement has worked well for them, despite being something of an experiment. They had never spent so much time together before, they said. And aside from painting portraits of each other, the only paintings they had ever done together were a couple still lifes of cabbage and oysters, and a landscape or two.

At McMurdo they share a small dorm room, a tiny office, and generally set out twice a day in a little tracked vehicle called a PistenBully. They look for the best vista, park the PistenBully and turn it into a makeshift studio. They use plywood easels and palettes held on their laps as they look out the cab's large front window. They usually paint a couple hours at a time. When they're not outside, they often find a good window on station and sketch or paint from there. They also spent a week in the McMurdo Dry Valleys at the end of their stay, painting one of the few ice-free areas on the continent.

By mid-October, they'd produced about 120 watercolor and oil paintings and filled scores of pages in their thick sketch books. They practice mixing colors in the books and make initial sketches for paintings. They also draw images from science lectures or engine diagrams during vehicle training classes.

The Campbells figure about half their paintings will be exhibited in museums and galleries in New Zealand and the United States. They already have exhibits planned for next year at the Otago Museum in Dunedin and the Canterbury Museum in Christchurch, sponsored in part by the American Embassy in New Zealand.

The difficulty in painting in Antarctica, they said, is not the logistics. It's that they are trying to capture something ephemeral.

"You're really trying to do the impossible," Alan said. "You're trying to paint light. Pure light. … There's no way when you're looking at (the finished painting) not to feel dismayed."

"It's this constant pursuit," Colin said. "You can't quite get it."

Colin said he basically had to relearn how to paint because the quickly changing light and shadows presented a challenge. He was reminded of an art teacher's advice that painting isn't just about representing what you're looking at, but also painting the air between you and that object, expressing the entire feeling of that space.

The men say they rarely know how a painting will end up when they set out to capture a scene.

"There's a conversation that goes on with a landscape," Alan said. "When it starts talking, I realize I'm just along for the ride."

The two said they've learned from each other here, both by

**See Artists on page 11**

Photo by Colin Campbell / Special to *The Antarctic Sun*

*This oil painting by Colin Campbell illustrates his use of broad brushstrokes to capture the beauty of Antarctica. This is Colin's first trip to the continent.*

# Artists invigorated by trip to Antarctica

From page 10

seeing how the other approaches a scene and by talking so much about the process during the hours they've spent together.

"He's helped me loosen up a lot more," said Alan, who describes his brushwork as much more controlled than his son's.

Colin said he's learned patience from his dad, and now he is more apt to let a painting unfold slowly instead of jumping right in and painting aggressively.

Matt Charnetski, a computer technician in the Crary Lab where the Campbells have their office, will stop by to chat with the men and check out their latest work. He also attended a showing they had at the end of Winfly when the men laid out their 100-plus paintings on the floor of the Crary library.

"They have very distinct styles," Charnetski said. He described Alan's work as what you would see in a National Geographic article that faithfully represents the scene. Colin's work reminds him of an illustration in a children's book, where the picture is more fantastical.

Charnetski has spent five Winfly seasons at McMurdo and has taken and seen hundreds of photographs from that time. Still, the Campbell's paintings showed him something new.

"What happens in paintings is so different," he said.

A photograph captures just one fraction of a second in time, the Campbells explained. Whereas paintings represent what happened over a period of minutes or hours.

Both men said they'd like to return to Antarctica to paint again. Alan said he approached this trip as his last, but changed his mind once he got here.

"Every painting I do I get an idea for six more," he said. "It's like a hall of mirrors."

He would love to come back for another Winfly or for a winter season, and would like to spend time on Mount Erebus.

Colin, who had been working as a video game animator in Baltimore before the trip, said being here has reinvigorated his excitement for painting.

Photo courtesy of Alan Campbell / Special to *The Antarctic Sun*

*Alan and Colin Campbell, left to right, pause from their work on the hill above Lake Bonney. The father and son are both painters here on a grant from the National Science Foundation's Antarctic Artists and Writers Program.*

"I had to relearn to paint in Antarctica, and that's really become an exciting idea to me," he said. "Painting and drawing helped me observe it. I'm now very interested in seeing other places in the world through art, through relearning the process."

*More information about the NSF's Antarctic Artists and Writers Program, which supports serious art and writing to increase the understanding of the Antarctic and help document America's Antarctic heritage, can be found at http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12783&org=OPP*

*To see some of Alan Campbell's previous work, check out his exhibit in the Antarctic Passenger Terminal in Christchurch. Or go to www.alancampbellstudios.com to see both his and Colin's work.*

# Rock collection preserves samples for future and present scientific studies

**From page 9**

continent. There's a benefit to him in using his own eyes to pick out samples and to see how they're arranged in relation to the rocks around them. But the repository could cut down on the number and extent of the trips.

"There will always be reasons for people to go to the field to collect samples," he said. "[The repository] could reduce ... the impact on the Antarctic environment."

Borg explained that the repository's value is as much in preserving samples for the future as it is in providing them to researchers now. He illustrates this by telling a story about scientists who did some creative keyword searches in the database of a comparable sea floor sediment repository. The researchers were able to discover the site of a meteor crash by comparing various samples.

"You make an investment in keeping materials because you know people are going to come along later with new ways of looking at things," he said. "The samples may then yield some very interesting stories."

*Learn more about the repository at: http://bprc.mps.ohio-state.edu/rr/samples/*

# *Ozone studies unravel problems*

**From page 7**

Some of the grunt work for ground-level ozone studies, particularly in the Antarctic, isn't necessary because it's already been done in the upper atmosphere. "That was the starting point," Mercer said.

Avallone said she became interested in ground-level ozone phenomena in 1996 while studying stratospheric ozone problems.

Much has happened over those last 10 years, she said. Avallone added that early on "we were kind of naïve" about how complicated the problem was when ground-level ozone research began.

But as scientists continue to peel away the layers of mystery, that problem could someday shrink out of existence.

*NSF-funded research in this story: Linnea Avallone, University of Colorado at Boulder; Terry Deshler, University of Wyoming.*

# Profile Back again 50 years later

By Emily Stone
*Sun staff*

Ask Lonnie Clayton how many seasons he's spent on the Ice, and the answer might not seem so remarkable. After all, this is only season number two. It's just that the last one was 50 years ago.

Clayton came to McMurdo Sound in the summer of 1955-56 as part of the Navy's Operation Deep Freeze I. The goal that summer was to create a runway for planes to use the following year to fly to the South Pole and build a station there. Clayton was an electrician on one of the ships, known as an attack cargo ship. The fleet of nine ships spent the summer moored to the sea ice off Hut Point.

This time, the 71-year-old Clayton is a shuttle driver who sometimes ferries passengers to the sea ice runway not far from where his ship used to sit. Stepping out of the plane and onto that runway three weeks ago was astonishing, he said. Pictures of the modern station hadn't prepared him.

"The reality of it was startling," he said. "It was banging off my brain pan."

The last time Clayton saw McMurdo Station it was a small collection of tents. Now the thousand-person strong station has just over 100 buildings.

Clayton said he came to Antarctica the first time "by mistake." He was hoping to spend his last year in the Navy in a tropical locale. Instead, his ship, the *USS Wyandot*, was sent to Rhode Island for a retrofit in early 1955. None of the crew knew what was going on. Nor did they care much.

"We were having too much fun chasing the girls, drinking, carousing and carrying on," he said. Eventually they learned that the reinforced hull, cold weather gear and large construction equipment was destined for Antarctica.

Photo by Emily Stone / *The Antarctic Sun*


Photo above courtesy of Lonnie Clayton / Special to *The Antarctic Sun*

*Far left, Shuttle driver Lonnie Clayton in front of his favorite vehicle. Clayton was last at McMurdo 50 years ago while in the Navy. Left, Clayton, then 21, as pictured in the commemorative book from Operation Deep Freeze I, 1955-56.*

> "The reality of it was startling."
> *– Lonnie Clayton, on seeing McMurdo after 50 years.*

When they arrived at McMurdo in December, Clayton and his shipmates were restricted to the boat. Only the Seabees (the Navy construction battalion) were allowed onto "the beach," as Clayton puts it. But Clayton, a self-described hustler, hooked up with a National Geographic photographer by offering to carry his film canisters. So Clayton was able to get out and explore.

One of his most vivid memories from that trip is an unhappy one. His friend Richard Williams was killed when the tractor he was driving fell into a crack in the sea ice. The doors were wired open — standard practice for crew driving over unknown and unstable ice — but he couldn't escape. One of McMurdo's runways, Williams Field, is named after him.

The *Wyandot* left McMurdo in February 1956, with plenty of scientific specimens, including about 50 live penguins destined for zoos. Clayton said he looked back at the fledgling station and remembers thinking, "Geez, wouldn't it be great to come back here and see what they've done."

Clayton got home, left the Navy, married, had three kids and worked as a senior vice president for distribution at several companies around the country. In 1999, he and his wife went to New Zealand, where he talked with some U.S. Antarctic Program employees in Christchurch. The conversation brought back many McMurdo memories, and the idea of returning gained momentum. But Clayton wanted to wait a few years until he settled into his new life in Rio Rancho, N.M., where he moved after retiring.

In 2002 he went to the Raytheon Polar Services Co. job fair in Denver and got an offer. The next step was to pass a physical. His doctor noticed some alarming results during a stress test, Clayton said. The next morning, Clayton was in the operating room getting two stents put in his heart. He credits the physical with preventing a heart attack.

He recovered. But instead of reapplying the next year, he accepted a position on his city council. In 2004 he was back at the job fair, but there were no positions open for which he was qualified. He returned this spring and got his job as a shuttle driver.

"I love it," he said of the serendipity of being at McMurdo on the station's 50th anniversary. "I think it was meant to be."

Then, in another twist, his son Russ Clayton got a job at McMurdo as a senior telecommunications technician, which he said was not something he would have considered if his dad wasn't coming down.

"I thought he was nuts at first," Russ said of his dad's notion to return. But now that Russ is here, he's enjoying the work, camaraderie and adventure. It's more adventurous, even, than the full-contact jousting tournaments that Russ participates in at home. Being in Antarctica has also allowed him to see the places his dad talked about in his old Navy stories, and to get to spend time with his father, whom Russ doesn't see nearly as often at home.

Lonnie Clayton is known affectionately around station as the "Old Fart," because of a large black and white button bearing those words that he wears most days. He's also a Shriner clown and has brought down some of his supplies. He happily makes gifts of balloon creations or little dogs made out of Mardi Gras beads. He said he's looking forward to revisiting Scott's Discovery Hut and would love the opportunity to see the South Pole.

Clayton said he's been thinking a lot about his great-grandmother recently. He remembers sitting around her potbelly stove listening to her stories of crossing the American West in a wagon train.

"My grandmother was a witness to history," he said. "I'm like my great-grandmother. I partook of history in Deep Freeze I, and now I'm back. Out of Deep Freeze I came what we're sitting in. … Everything started with us."