

The Antarctic Sun

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Dual breakers to take on double ice

By Kristan Hutchison

Sun staff

With twice the ice this year, the U.S. Coast Guard may need twice the ships to cut a channel to McMurdo Station.

This week the National Science Foundation officially asked the Coast Guard to send down a second icebreaker to help the *Polar Star* open a path through ice that is thicker and wider than ever recorded for this time of year.

"This unprecedented ice is certain to make the task of breaking the channel into McMurdo difficult, if not daunting," Polar Research Support section head Erick Chiang wrote to Coast Guard Commander April Brown this week, in the official request. "A second Polar class icebreaker (the *Polar Sea*) ... is deemed necessary and is hereby requested."

The backup icebreaker is likely to cost the NSF about \$3 million, said NSF Representative Dwight Fisher. The NSF already authorized Raytheon Polar Services Company to buy 1.3 million gallons (5 million liters) of fuel, enough to supply the second icebreaker and provide extra for the first icebreaker, Fisher said. Last year the single ice breaker used 1.1 million gallons (4.2 million liters) of fuel.

See Breakers on page 9

Life below the ozone hole

By Melanie Conner

Sun staff

Sunglasses and sunscreen. They are not always the first items stowed away for a trip to Antarctica. But they should be.

"November is the most dangerous month for eyes and skin in Antarctica," said John Marwitz, professor emeritus from the University of Wyoming in Laramie, Wyo., who recently left Antarctica, where he and others were conducting ozone studies.

In November, the sun rests high above the horizon in the Southern Hemisphere, allowing ultraviolet (UV) rays to penetrate the recently-thinned stratospheric ozone layer. The UV rays can cause eye cataracts and skin cancer in people.

"When the sun is high in the sky, UV light is coming through fewer atmospheres. When it comes from the side, the light is scattered," said Chuntao Liu, of the University of Wyoming.

The stratospheric ozone is at its thinnest from now until December when the air warms, the polar vortex breaks up and the ozone begins its recovery, which completes the annual growth and destruction cycle of the ozone.

See Ozone on page 8



Photo by Melanie Conner/The Antarctic Sun

Dave Anderson of Calif, right, and Dennis Rabehl of Minnesota walk to the dining hall during a condition two weather alert at McMurdo Station.

Chilling out in the wind

By Mark Sabbatini

Sun staff

Those working outside might not feel any warmer on windy days, but trust the government - it's no longer as cold out there as you think.

A revised wind chill temperature index effective in the U.S. and Canada as of this month generally lists the "real" temperatures for windy situations as warmer than previously calculated. A 15 mph (24 kph) wind on a minus 10F (-23C)

See Chill on page 7

INSIDE

Treating letters with latex gloves

Page 3

Dwight Fisher, the big boss

Page 10

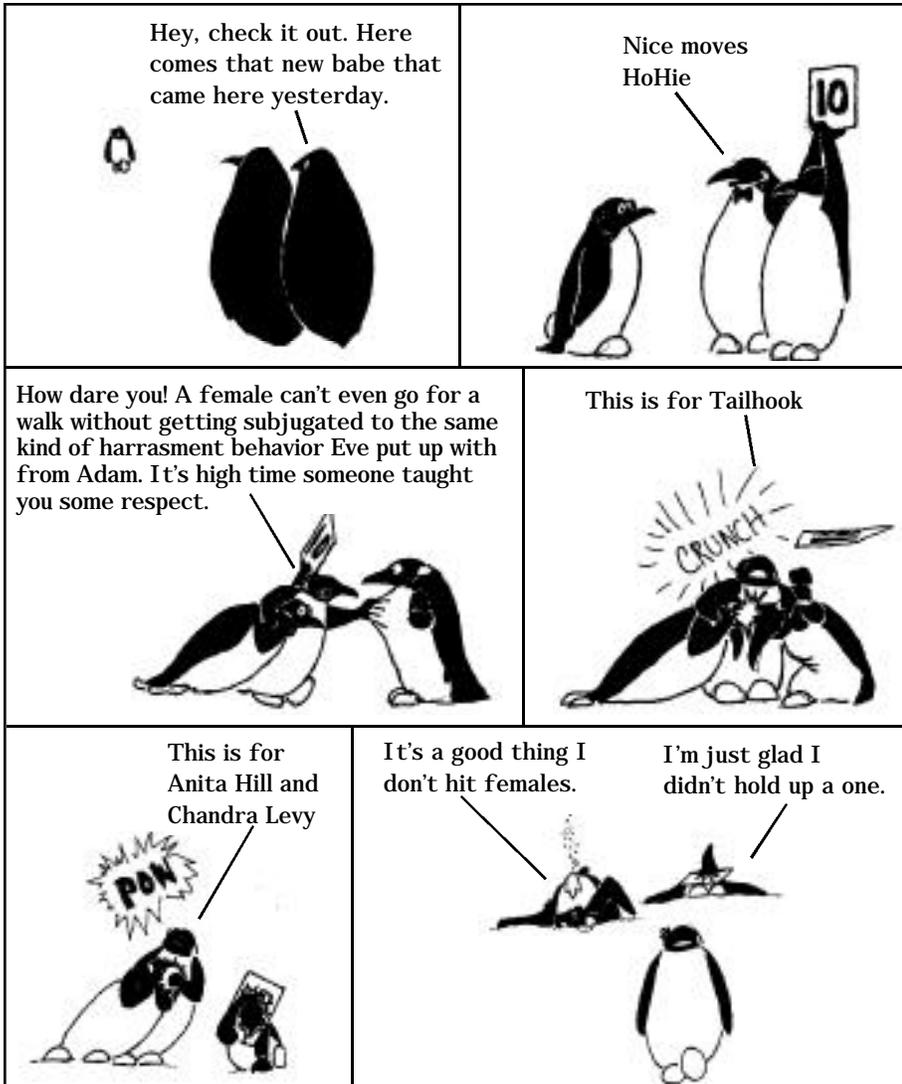
Quote of the Week

"Presumably there's something very sexy and attractive about a male blowing bubbles."

- Researcher regarding seal mating behavior

Ross Island Chronicles

By Chico



Cold, hard facts

Weather

Lowest temperature ever recorded in Antarctica: **-129F (-89.5C), Vostok Station, July 21, 1983**

Warmest temperature: **59F (15C), Vanda Station, Jan. 5, 1974**

Lowest temperatures at McMurdo, South Pole and Palmer stations, respectively: **-59F (-50.5C), -113F (-80.6C), -24F (-31C)**

Warmest temperatures at McMurdo, South Pole and Palmer: **49F (9.4C), 5F (-15C), 48F (9C)**

Number of locations in Antarctica with a mean temperature above 0F (-17.8C) during any month of the year: **0**

Highest recorded wind velocity in Antarctica: **199mph (327km/h), Dumont d'Urville, July of 1972**

Wind chill factor if continent's strongest wind was blowing on its coldest day, according to new and old indexes, respectively: **-256F (-160C), -60F (-51.1C)**

Sources: NOVA, USA Today, Rice University, SCAR

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Antarctic explorers

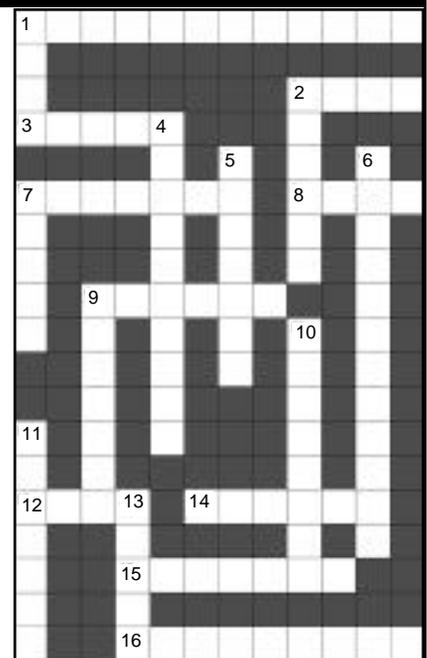
answer on p. 6

Across

- 1) First to set foot on continent
- 2) First to fly over the Pole
- 3) First to sail alone to Antarctica
- 7) First to raise Japanese flag on the Ice
- 8) First to cross the Antarctic Circle
- 9) Leader of the most unhappy expedition
- 12) Discovered this sea near McMurdo
- 14) Among the trio to first reach magnetic Pole
- 15) First professional photographer on Ice
- 16) First to cross the continent

Down

- 1) Made first confirmed mainland landing
- 2) Confirmed a great mass of land on the Ice
- 4) Will always be known for his endurance
- 5) Sealed a latitude record that lasted nearly 90 years
- 6) Led first mainland winter expedition
- 7) Took the silver in the South Pole race
- 9) Made first flight to Antarctica
- 10) Won the biggest prize in the explorers' sweepstakes
- 11) Navigated the James Caird to South Georgia Island
- 13) Supervised building of South Pole station



Safe from Anthrax



By Mark Sabbatini
Sun staff

It may seem strange to say there's little to worry about when postal workers are wearing latex gloves to sort mail and top-rank officials are debating the merits of placing respirators around McMurdo Station.

But Antarctic officials say they generally aren't overly concerned as they enact a number of government-mandated precautions resulting from a scattering of anthrax cases in the United States. Seventeen cases were reported as of Friday, with four deaths resulting from the illness.

Signs alerting people to watch for suspicious mail and making contingency plans in case one or more people get infected are part of the preventative measures sought by federal officials. Putting a realistic perspective on the situation is another goal.

"They also said the chance of anthrax coming down here is pretty slim, but we all need to take up precautions," said McMurdo Postmaster Christine Hush, who is getting daily e-mails from the U.S. Department of Defense, military postal officials and the United States Postal Service about the situation.

Response plans to deal with suspicious substances are being assembled by health and other officials at Antarctic stations. Elements include deciding how to respond to situations of varying severity, limiting access to areas where contamination may have occurred, establishing a quarantine area if people become infected and ensuring proper safety equipment is available.

McMurdo's current emergency response plans already incorporate most of the precautions sought by Raytheon Polar Services Company, said Gerry Katz, physician advisor for RPSC, who is leading the effort to design the plan at the station.

Hush said postal workers are being encouraged to wear respirators in addition to gloves when handling mail. Louise Mercier, postmaster at the Amundsen-Scott South Pole Station, stated in an e-mail she is taking similar precautions.

"I wear gloves and a mask while sorting



Photos by Mark Sabbatini/The Antarctic Sun

Cathy Burns, left, and Claire Steffens sort packages at the McMurdo post office Friday.

and distributing letter mail," she wrote. "In the past, several folks would help when the mail arrived. Now I have asked everyone to wait for the 'all call' saying it's been sorted and can be picked up. Mail is still fun to receive and send. It's just a bit more complicated these days."

Those at Palmer Station sending packages north are being urged to make sure the contents are well-documented so they aren't considered suspicious, wrote Station Manager Bob Farrell in an e-mail. He noted "there is no real concern here that we will be affected," but RPSC's policies have been reviewed with those handling the mail.

Hush said mail goes through plenty of examination by the time it reaches McMurdo - including inspections in San Francisco and Christchurch, New Zealand - but McMurdo postal employees and those receiving mail still need to be careful.

The USPS is urging people to look for suspicious items on packages such as oily stains or crystallization on the wrapper, strange odors, lack of a return address and

excessive tape or string. McMurdo residents who suspect a package may contain hazardous material are being told not to open, shake or bump it. Isolate it immediately and call the station firehouse for further assistance.

"Basically, if you're unaware of what you're receiving it's best not to open it," Hush said.

Those sending mail are also being urged to take precautions so their letters and packages don't fall into the suspicious category.

"We've instructed people to try to use return addresses for even their letter mail, not their postcards," Hush said. "This way it won't delay the process of the mail."

The broader plans for dealing with a biological attack go beyond suspicious mail to include possibilities such as aerosol contamination, terrorist threats and suspicious people. Some policies are not finalized and are likely to be reviewed by RPSC and federal health officials in the U.S., but a number of general principles

See Anthrax on page 4

Anthrax

From page 3

are in place at McMurdo.

If an incident is reported, the dispatcher calls the fire chief, who determines if it is a "normal" situation such as a suspicious package or one requiring an emergency response such as a possible biological agent, Katz said. If a threat exists, the plan calls for officials to seal off a contamination site encompassing the location where the person encountered the substance, the nearest sink and the nearest phone.

"Hopefully if it's a dorm it's a small area," he said. "If it's an area outside where there's not a phone it's a much larger area."

Those suspected of contamination would be isolated, with Hut 10 set up as a quarantine area if necessary, Katz said. He said McMurdo is also planning to establish "safe areas" by installing sinks in areas likely to be targeted and may add phones at some locations to reduce the potential size of areas needing to be sealed off.

A number of questions remain, including how to keep the general population at McMurdo up-to-date on emergency response procedures. National Science Foundation Representative Dwight Fisher said there is a great deal of employee turnover due to the seasonal nature of most jobs.

"Doing all this (planning) is one thing," he said. "Making sure people are aware of what we've done ... how do we ensure everyone is knowledgeable of the protocol?"

Coming up with policies that reflect how people are likely to react is also critical, several officials said. For example, it



A volunteer at McMurdo's post office wears latex gloves as she sorts mail Friday. Workers at all three U.S. Antarctic stations are taking extra precautions following a number of anthrax cases in the mainland U.S. Those receiving mail are also being told to watch for suspicious packages.

may not be possible - or advisable - to require that a person who suspects they may be contaminated remain sealed off at their location, even though movement risks spreading a contaminant.

"Anormal person is not going to stay in their room," Katz said. "They're going to get out and get to the nearest sink and call for help."

Ensuring there is proper equipment and knowledge of its use if an attack occurs also may not be an easy task.

For example, putting up additional respirators around a station isn't necessarily a solution because they need to be properly fitted for individuals, said Mike Salasek, RPSC's environmental, health and safety coordinator. Otherwise they will likely be ineffective because the seal won't be airtight, giving the wearer a false sense of security.

"You can't just give somebody a respirator and say they're protected because that's not the case," Salasek said.

RPSC and federal health officials in the U.S. will likely review a final version of the plan, Katz said. Salasek said those reviewing the plan need to have realistic expectations when determining if McMurdo is properly equipped, given its

remote location and available equipment.

"We have limited capabilities here and the precautions we take need to be based on those capabilities," he said.

Similar preventative measures have been taken at the South Pole, Mercier wrote. Medical, safety and managerial employees have been made aware of the safety concerns about anthrax and have met to discuss how to respond to an incident.

"Naturally, we sure hope we are all safe here on Antarctica," she wrote. "You never really know for sure, so you do need to be prepared."

Antarctica's chilly climate and remote location won't be a factor if a contaminated object is sent from the U.S., since bacteria develop protective spores until reaching the right conditions to regenerate, Salasek said. But despite the concerns he raised, he said the possibility of a biological attack "is not a big issue" to him.

It's also not a huge concern for Will Silva, McMurdo's lead physician, who said the clinic isn't taking any extra steps beyond the "universal precautions" to avoid contact with body fluids that they normally follow to prevent the spread of infection. Still, he said, it's important to look at potential attacks seriously given the uncertainty of how people might react.

"My crystal ball is very cloudy," he said. "I don't know what would happen. I don't know how well any community can respond."

Continental Drift

What would you like most to do in Antarctica, even if it's impossible?



"Stop the war."
Nathaniel Curtis
Cargo handler at
McMurdo and South
Pole stations
from Stewart Island, NZ



"I would like to do what I did once in 1991, and that would be another trip in a Twin Otter to Mt. Hough."
Neil Conant
communications operator
at South Pole Station,
from West Virginia



"Spend an austral summer backpacking through the Dry Valleys."
Laura Hamilton
Painter apprentice
at Palmer Station
from Cortez, Colo.

around the continent

PALMER

Do blonde penguins really have more fun?

By Tom Cohenour
Palmer correspondent

The message on the white board simply said, "Blondie is back." Soon the buzz at Palmer was all about Blondie.

"She's 19 years old," said Chris Denker with the seabird component of the Long Term Ecological Research (BP-013-P). One of approximately 12,000 Adelie penguins within two miles of Palmer Station, Blondie is the only Adelie that is not black and white. Instead, as her name implies, her coloring is light brown and white. She's easy to spot so it's no wonder she's the most talked about individual bird in the area.

Torgersen Island is home to 23 colonies of Adelies representing some 4,000 birds. According to Denker, Blondie's colony comprises approximately 700. Her colony has gotten smaller over the years making the eggs and chicks more susceptible to being preyed upon by Skua birds. Adelies begin breeding when they are 3 years old and often produce two eggs each year.

"Blondie has successfully bred every year since 1985 except last year," said Denker.

"Her egg didn't hatch and a skua ate it," he added.

The *Laurence M. Gould* arrived at Palmer on Monday, Nov. 5, and appeared to have little difficulty in making its way through the ice pack. With the *Gould* came 11 incoming passengers who will be staying at Palmer for varying lengths of time. The departure of the *Gould* with 12 outgoing passengers on Nov. 8 carried the last of the winter over personnel. Of the 11 incoming passen-

gers, six will be conducting research on the Chemical Ecology of Shallow-Water Marine Macroalgae and Invertebrates (BO-022-O), one with the prey component of the Long Term Ecological Research (LTER) (BP-028-O), two with the seabird component of the LTER (BP-013-P), one with the phytoplankton ecology component of the LTER (BP-016-P) and one is an employee of Raytheon Polar Services Company. That puts the total current population of Palmer at 35. The maximum is 46.

Both ocean search and rescue (OSAR) and glacier search and rescue (GSAR) training began for new members recruited from the recently arrived summer personnel. The OSAR team conducted a review of survival caches on outlying islands, first aid and hypothermia treatment, and GPS use.

"As soon as the ice goes out we'll get the boats in the water and become familiar with the landing points on the various islands," said Jeff Bechtell, OSAR team leader.

The GSAR team held a similar orientation becoming familiar with rope use and knot tying, and equipment was issued to team members. According to team leader, Doug Fink, "We'll be conducting search and rescue training exercises on the glacier later in the season."



Photo by Rick Lichtenhan/The Antarctic Sun
Blondie, the brown penguin, with a more common black and white bird.



Photo by Tom Cohenour/Special to The Antarctic Sun
The Laurence M. Gould at dock at Palmer Station, where it arrived Nov. 5 with 11 passengers.

SOUTH POLE

Miss FEMC wins costume contest on Halloween

By Judy Spanberger
South Pole correspondent

The South Pole began swinging into its regular season this past week with warmer weather (temps only in the minus 30s and 20s!) and the beginning of several activities.

The Halloween costume party and dance was our first organized party of the season. The party was held in the summer camp lounge, which was colorfully decorated mostly with skua'd items. It seemed



Photo from Judy Spanberger
Miss FEMC, aka Dean Klein.

most of the community made it out there at one point to enjoy dancing to our own live band, Funky Town, conversation, or just looking at all the costumes. A costume contest was held and the winner was Dean Klein as Miss FEMC. Lots of fun and no one got hurt!

Another first was our first science lecture of the season. Dr. Chris Martin, National Science Foundation station science leader, recapped science at the pole and spoke specifically about the accomplishments of each group over the winter. He also showed some great slides of winter auroras.

The Construction and Operation departments went to three shifts working round clock. Very good progress has been made on the new station. It's been fun watching the station emerge from its winter coat as the ops folks clear away mountains of snow from around the buildings. Easier walking around too with the sastrugi getting flattened out.

the week in weather

McMurdo Station

High: 34F/0.9C Low: -5F/-20.5C
Wind: 53 mph/85 kph
Windchill: -59F/-51C

Palmer Station

High: 33F/0.8C Low: 14F/-10C
Wind: 58 mph/93 kph
Precipitation: 1.9 inches/4.8cm

South Pole Station

High: -6F -22C Low: -40F/-40C
Wind: 31 mph/50 kph
Windchill: N/A



Perspectives Perspectives

Goodbye to the backwater jewel

By Mark Williams
Communications Technician, Palmer

At the time I write this I am a single-digit midget. I'm two days away from leaving Palmer Station after spending almost seven months here as the winter-over Senior Communications Technician. I have mixed feelings that I'm sure anyone who's spent time on ice knows well. I can't wait to get out of here; I can't wait to order what I want at a restaurant that isn't laced with garlic; I can't wait to be able to drive a car; I can't wait to drink palatable coffee; I CAN'T WAIT to hold my wife again.

At the same time I'm dreading leaving my home, my tiny little spot in the Antarctic that I've grown to love.

Palmer Station is not the city that McMurdo is. We don't have television (THANK GOD!), we don't have a good telephone connection, we don't have a fire department, multiple bars or a radio station, and we don't have a thousand people. We don't have the prestige that South Pole has either, even though we share a few of the hardships as far as cargo limitations and communications. We're just a small, tight community of great friends with some important physical science being done.

I found it VERY hard to watch my fellow winter-overs leave and this summer crew, double in size, arrive last month. It drove me crazy that I had a roommate again; that I simply couldn't get to the coffee pot because of all the people; that when I came out of the shower in the morning there was someone waiting to get in; the noise the new people made. When you go from 19 to 36 overnight, it's hard. This is my home!

The summer crew are all so loud, they all move so quickly, they point out little things as problems that we'd begun to ignore. They had tanned faces and complained bitterly about the Internet connection. Fresh blood was hard to deal with, yes it was. I can't just go into the TV lounge any more and pop in a DVD. The furniture had been moved, there was a sign-up list for the movie, the bar was full every night and there was actually a line at

I'll miss looking out the window and seeing things that only 19 other people on Earth had the possibility of seeing that day

meal times.

I watched with great amusement as the summer crew dressed as if they were trekking to the Pole by dog sled every time they went outside in weather that I consider downright balmy. I watched with even more amusement as they complained about the weather: "When does the snow go away?" and "does it always blow this much?"

I watch with disdain while they pull the shades down because the sun is too bright for them - I myself vowed to never, as long as I was at the station, deprive myself of the direct sun after the three months of twilight that we had during the winter. Just last night I heard a complaint that the sun was keeping someone awake at 9:45 p.m. If only they knew what it was like to have two hours of twilight at lunchtime as their only "sun." Much more than Pole or McMurdo, I know, but I believe worse because it was just a tease. The sun was there, but it just wouldn't show itself or give us good light.

Anyway, I sit here with two days to go before I leave my home to go home. I've met wonderful people spending short deployments here at Palmer Station and I've grown to love most of my fellow winter-overs. There are some I will keep in touch with, some I won't, but most I hope to see again in my lifetime.

I can't help but think, being the short-timer here, that there are things I wanted to do but didn't; learning to play cribbage is one. But you may know what I mean - seven months is a long time to spend at

Palmer Station, as small as it is. But those seven months I wouldn't trade for anything I could think of on Earth.

I miss my wife, my kids and my cat. I will miss dearly the sound of elephant seals squabbling with each other and even - yes, I'll say it - the smell of penguin guano and elephant seals. I'll miss my fat little sheathbill buddy who visited every day during the winter. I'll miss the sight of giant petrels making the every other day 50-knot winds child's play. I'll miss looking out the window and seeing things that only 19 other people on Earth had the possibility of seeing that day. I'll miss the glacier. I'll miss the islands around station. I'll miss the penguins that have just begun to return. But most of all I'll miss the people here, even those noisy, pushy summer people.

So, I leave Palmer Station to cross the Drake Passage aboard the Lawrence M. Gould with mixed emotions. Will I be back? I certainly hope so. Would I do it again? You bet! Was it hard? At times it sure was. Is it like McMurdo or South Pole? Thank goodness it is not - it's just Palmer Station, the backwater, forgotten jewel of the USAP that plods along. It's home and I'm sorry to be leaving it.



Chill

From page 1

day now has an effective temperature rating of minus 32F (-35.5C), for example, compared to minus 45F (-42.7C) on the old index.

The old index was based on studies during the 1940s by Antarctic explorers Paul A. Siple and Charles F. Passel, who measured the amount of time it took a pan of water to freeze and calculated the rate of heat loss due to wind and temperature. But scientists have long questioned the validity of the findings, and U.S. and Canadian officials formed a group in October of 2000 to update the index.

"This is a more scientifically accurate index based upon human beings who were subject to laboratory testing," said Jim Lee, chief of the fire and public weather services branch for the National Oceanic and Atmospheric Administration (NOAA). Volunteers with temperature sensors attached to their faces stood in either a wind tunnel or a climatic chamber as researchers blasted them with cold air, according to NOAA's Web site.

Light winds actually result in colder effective temperatures than previously thought, according to the revised index, but warmer readings occur whenever winds approach 10 mph (16 kph) or more.

The difference gets more pronounced until winds reach about 50 mph (80 kph), after which the old index is not considered valid. A quirk in the old formula actually causes warmer temperature readings as wind increases beyond 60 mph (96 kph).

A temperature of 20F (-6.7C) and winds of 8 mph (13 kph) at McMurdo Station on Wednesday afternoon resulted in nearly identical wind chill readings of about 8F (-13C) with either index. At the Amundsen-Scott South Pole Station, a temperature of minus 20F (-29C) and winds of 18 mph (29 kph) resulted in estimated wind chill readings of minus 47F (-44C) on the new index and minus 64F (-53C) on the old one.

U.S. research stations in Antarctica are still using the old index as weather officials here await word from the National Science Foundation on whether it will switch to the new index, according to Dar Gibson, senior meteorologist at the South Pole station. He noted the stations may be considered international and not required to alter their formula because the U.S. did.

"It's not that important to us here in the weather office because it's not an official measurement," he wrote in an e-mail message Wednesday. "It's more of a novelty really, I think the folks who work outside here every day will feel just the same whether we have a new wind chill calculation or not."

The new index was calculated with North America in mind, but Lee of NOAA said he doesn't believe unique aspects of Antarctica's climate - including unusually dry air and reflective heat from icy surfaces on sunny days - should significantly skew calculations here.

Ted Dettmar, lead field instructor for the Field and Safety Training Program at McMurdo Station, said it's possible some differences might show up.

"Because the air is so much drier down here it doesn't have the same kind of bite that a cold wet wind would have," he said. "I would think if scientists came up with a wind formula for wind chill here it would actually be warmer temperatures here than comparative temperatures in the U.S."

A major feature of the new index, Lee said, is a "time-to-frostbite" index which lists the minimum time a person's skin can be exposed to the elements before being at-risk of freezing. The times start at 30 minutes for situations when the effective temperature is near minus 20F (-20C) and drop to five minutes for some situations when the reading is -48F (-44C), although there is considerable variation depending on actual temperatures and wind speeds.

Wind Chill Index - Old vs. New						
Temp.	20F	10F	0F	-10F	-20F	-30F
	old/new	old/new	old/new	old/new	old/new	old/new
Wind						
5	16/13	6/1	-5/-11	-15/-22	-26/-34	-36/-46
10	4/9	-9/-4	-22/-16	-34/-28	-46/-41	-58/-53
15	-4/6	-18/-7	-31/-19	-45/-32	-58/-45	-72/-58
20	-10/4	-24/-9	-39/-22	-53/-35	-67/-48	-81/-61
25	-14/3	-29/-11	-44/-24	-59/-37	-74/-51	-88/-64
30	-17/1	-33/-12	-49/-26	-64/-39	-79/-53	-93/-67

Old formula: $WC = 0.0817(3.71V^{0.5} + 5.81 - 0.25V)(T - 91.4) + 91.4$
 New formula: $WC = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$
 T=temperature V=wind velocity

Frostbite times (new index only): 30 min. 10 min. 5 min.

"In the past the researchers did not have this," Lee said. "Based upon this information, we can provide that to the public and they have a better knowledge of how long they can stand out exposed to these hazardous elements before they get to a potentially life-threatening situation."

But the new index isn't perfect either.

Most significant for those in Antarctica are the frostbite calculations for the most extreme conditions on the chart. They appear to overestimate how long a person can be exposed without risk, Dettmar said.

"For instance, they say at 45 below zero (-43C) and a 60 mph (96 kph) wind, that's in the five-minute frostbite category, and anyone who knows anything about wind and cold down here knows that the wind is going to freeze you a hell of a lot faster than five minutes," he said. "Down here we know if it's cold and you're face into it, it doesn't take long for white patches (indicating frostbite) to show up."

Lee said the frostbite calculations are divided into at-risk exposure times of 30, 10 and five minutes for the sake of simplicity.

"We don't, in the United States at least, get down to minus 45 degrees Fahrenheit with 60 mph winds, even in Alaska," he said. But he said "there's a lot of validity" to Dettmar's observation and the actual frostbite time in such circumstances is likely less than five minutes.

The index may also undergo revisions next spring when the impact of solar radiation is added, taking into account whether skies are sunny, cloudy or partly cloudy. Lee said the current index was released now because the changes are not expected to be significant and officials wanted to make the time-to-frostbite index available as quickly as possible.

Dettmar said his outdoor training program will tell people about the new wind chill calculations, but he doesn't expect them to be a significant factor in the field. He said practical experience and watching others for signs of frostbite are what he primarily relies upon.

He said some people are more susceptible to frostbite than others because of factors such as previous exposure, restricting blood flow through smoking or drinking, living in warm climates and genetic factors. Another major consideration is how well a person is outfitted.

"If you are absolutely dry all the way through to your underwear you're going to be able to put up with colder temperatures than if you've sweated at all," Dettmar said.

The updated index, if officially implemented, also isn't likely to alter anyone's perceptions at the South Pole about whether they are at-risk for frostbite, Gibson wrote.

"That's sort of a constant state here," he noted, "regardless of what the scroll in the galley says about wind chill."

Ozone

From page 1

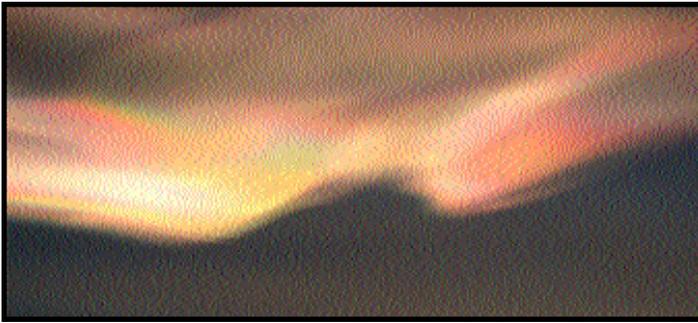


Photo by John Sale/Special to The Antarctic Sun

Nacreous clouds light up in the spring sky over McMurdo Station.

Ozone occurs in the upper stratosphere when oxygen absorbs solar UV radiation, thus providing Earth with protection from harmful UV rays. In the Southern Hemisphere, UV rays broaden their reach and touch the Antarctic as they penetrate the stratospheric ozone layer that they produced.

Ozone is one of several atmospheric layers located in the stratosphere 50,000 to 165,000 feet (15 to 50 km) above Earth. However, the chain of events that contribute to ozone destruction begins much lower in the troposphere, the atmosphere nearest Earth where weather occurs and humans travel. Only Mt. Everest climbers venture nearest the upper boundary of the troposphere at some 29,000 ft.

The ozone hole, or the destruction of stratospheric ozone, begins with the release of household and industrial chemicals, known as Chlorofluorocarbons (CFCs), CFCs are man-made chemicals found in aerosols and carbon dioxide from burning coal and oil emissions, or from the past use of chemicals found in air conditioners, refrigerators and foam-blowing agents. The chemicals cannot decompose and become well-mixed in the troposphere in less than a year. In about two to five years, they diffuse into and spread throughout the stratosphere, giving them long atmospheric lives.

"It's your mother's hairspray," said Marwitz. "It took 20 to 30 years to come down here and fuse up into the stratosphere."

Aerosols and other household and industrial products generated in the lower troposphere have a long journey to the Southern Hemisphere, yet their role in ozone destruction is dependent upon other climatic factors.

The cold Antarctic winter temperatures of minus 120 F (-80 degrees C) provide another key ingredient for ozone holes: cold weather. According to the Environmental Protection Agency (EPA), the air in the stratosphere cools and begins circulating to the west, which isolates the air over Antarctica and creates a polar vortex. The isolated air is unable to mix with ozone-rich oxygen and blocks heat entering the vortex, prolonging cold temperatures.

Cold upper-atmospheric temperatures then produce ice clouds or Polar Stratospheric Clouds (PSCs). These clouds are also known as nacreous clouds. Those who see the clouds describe them as one of the most beautiful sights of Antarctica.

"Nacreous clouds appear as if God has stroked them with a brush dipped in mother-of-pearl," McMurdo e-mail administrator Lee Parker wrote in an e-mail home to friends.

However, it is on the surface of these clouds the pastel-colored industrial pollutants from Earth are transformed from relatively unreactive chemicals into chlorine forms that are highly reactive with ozone, leading to ozone destruction.

"Ozone sets up its own destruction when it cools the stratosphere," said Marwitz. "Ozone radiates long wave radiation, which cools the stratosphere over Antarctica."

However, it isn't just the cooling of the Antarctic winter that

destroys ozone. Instead, the annual wakening of the sun in late August seals the fate of ozone.

"The final ingredient is UV light," said Marwitz.

As the sun awakens and burns through ozone, the chlorine from the frozen, man-made particles is converted into chlorine monoxide. This sets off a chain reaction thinning the ozone layer in the stratosphere.

By October, the PSCs have disappeared; the sun shows itself 24 hours a day and the ozone levels begin to dip. Therefore the most active time to study to ozone is in the austral spring and late winter, when ozone loss begins.

This year, as in previous years, a team of four arrived in Antarctica to make PSC particles observations and collect data that can help scientists determine factors that influence annual loss and recovery of ozone. In late August, the researchers joined the winter-over science technician, who was trained in instrument preparation, balloon-launching techniques and data acquisition. Over the winter, the technician collected and recorded mid-winter stratospheric measurements and data for the scientists to study later.

While on the Ice, the science team studied the size and concentration of particles in PSCs by using balloon launches. They were able to study the characteristics such as the formation and evolution of PSCs in conjunction with measurements taken by another researcher, Alberto Adriani, using the Light Detection and Radar (LIDAR). It was a tag-team operation: Adriani would detect the PSCs using the LIDAR and inform the others, who would launch a balloon.

A total of 39 small and large balloons were launched about every three days. The airborne balloons allowed them to collect vertical atmospheric profiles of ozone and polar vortex on almost a daily basis.

"Last year was the biggest ever for the ozone hole," said Marwitz. "This year the size of the ozone hole is slightly less, but the timing of its development was delayed by about a week."

According to the National Oceanic and Atmospheric Administration (NOAA), the ozone hole peaked this year at about 26 million square km, about the size of North America, which is smaller than previous years.



Photo by Jeff Scanniello/Special to The Antarctic Sun

At right, pearly nacreous clouds hang above a Spryte, silhouetted in the sunrise. Though beautiful, the clouds are part of the process which destroys ozone and creates the ozone hole.

Breakers From page 1

"We think they'll use more fuel probably than a normal year," Fisher said.

The fast ice now extends to more than 74 miles (118 km), with no sign of breaking up, Chiang wrote. The farthest the fast ice has been recorded before was 46 miles (74 km).

The unusual amount of ice is the result of a state-sized iceberg, B-15, which is protecting the ice from winds and currents that would normally break it up, said Christi Montgomery, liaison for the National Ice Center in Washington, D.C.

"We basically see that as a direct result of B-15 orientating itself north and south right up against C-16 which is rotated and pushed right up against Ross Island," Montgomery said. "(The ice is) looking pretty thick. It's going to be pretty difficult for Operation Deep Freeze. They're going to run into some ice they haven't really experienced yet."

The average ice edge over the past 20 years has been 25 miles (40 km) out, according to Chiang. Some years it's been as little as 6 miles (9 km), Montgomery said.

The Polar sister ships can each cut through ice up to 6 feet (1.8 meters) thick. Beyond that the breakers must back and ram to bash their way through ice up to 21 feet (6.4 meters) thick. The sea ice they'll face this year currently ranges from 9 feet 5 inches to 4 feet 5 inches (2.9 to 1.3 meters) thick. Montgomery doesn't expect the ice to thin much, "not enough to really make a big difference."

The extensive sea ice is enough of a concern that the McMurdo Field Safety Training Program set up 15 monitoring stations to measure ice depth, temperature and snow cover along the possible ice breaker path from the ice edge to McMurdo Station.

Normally the icebreaker is able to lead supply ships through the Ross Sea to McMurdo by the second week in January, but this year the National Ice Center predicted the shipping channel won't be ready until about Jan. 20.

By working together the dual icebreakers may be able to speed that up. The *Polar Star* left Seattle Nov. 1 on her way south to McMurdo, wrote Commander Brown in an e-mail. The *Polar Star* will be taking her time getting here. She will make three port calls to pick up fuel, equipment and scientists. Along the way the scientists will be installing instruments, testing the water, and taking biopsies from whales. The *Star* should meet the ice edge about Dec. 28, Brown wrote.

The *Polar Sea* is in the shipyard now, and won't be ready to sail until early



Photo by Mark Buckley/Special to The Antarctic Sun

Ted Dettmar measures the depth and temperature of the ice near the edge. The McMurdo Field Safety and Training Program set up 15 monitoring stations along the possible ice breaker path.

December, according to Brown. The *Polar Sea* will cruise straight to Antarctica and should catch up with the *Polar Star* at the ice edge by early January.

It's the second time the sister ships have been sent to Antarctica together. Both the *Star* and *Sea* were in the Antarctic in 1995, but for a different reason.

"I was on *Sea* at the time, and we got the late call to go South to assist *Star* due to major engineering problems from a newly installed engineering operating console," Brown wrote. "Although the ice was out to 43 miles that year, the second-greatest in over a decade, ice wasn't the primary reason in bringing the *Sea* down."

Bringing two icebreakers to Antarctica was common before the *Polar Sea* and *Star* were built in the late 1970s. They were the first Coast Guard icebreakers capable of cutting the way to McMurdo on their own, Brown wrote.

The reason for the extra ice this year is two large icebergs, C-16 and B-15, holding the sea ice in and blocking the winds and currents that usually push it out. When B-15 broke off the Ross Ice Shelf in March 2000 it was the largest floating object ever measured, a chunk of ice the size of Connecticut weighing about 2 billion tons (1.8 billion tons) and measured about 4,250 square miles (11,007 square km). It's now been chipped down to the size of Delaware.

"(B-15) is so large that it's really set up a current around itself," Fisher said.

In normal years the sea ice thins and breaks out of the Ross Sea in an hourglass pattern, as winds coming off the glacier

and ice shelf push the ice out, Montgomery said.

"You sort of have temperature and current eating away at the ice from both sides," Montgomery said. "But this berg is upsetting the whole flow."

The icebergs are also compressing the sea ice, holding it against the continent so it can't float away. Nor is there much hope of the icebergs moving any time soon, Fisher was told by a researcher studying B-15. Similar bergs have stayed in the Weddell Sea for 10 years.

"It will not move from where it's at until it breaks up," Fisher said he was told.

B-15 stretches lengthwise from Beaufort Island to Franklin Island. The islands keep the berg from floating in front of McMurdo Sound.

"As described, it was like two big defensive linebackers with their arms locked trying to go through a door," Fisher said. "When they let go they'll be able to get through."

Even if B-15 does move, it may not solve the problems. There's a chance it could drift in front of McMurdo Sound.

"As the (sea) ice comes out there's a potential that B-15 could float out of there," Montgomery said. "What direction and what way are up to it. It's the size of Delaware, so it can pretty much go where it wants."



Profile

By Kristan Hutchison
Sun staff

Top man *at the* bottom



Photo courtesy of Special to The Antarctic Sun

Capt. Dwight Fisher inspects rooms as commander of the Naval Support Force sometime between 1987-89.

Dwight Fisher's career has been driven by failure, but for him it's been the road to success.

Fisher's first two failures brought him to Antarctica and the third led to his current position as National Science Foundation representative, overseeing McMurdo Station on alternate years.

That wasn't how Fisher planned it. In college he applied for the Navy's nuclear engineering program. That was failure number one. The nuclear engineering program turned him down. Disappointed, Fisher took flight training instead and liked it so much he stayed in the Navy. He flew P-3's, a surveillance aircraft in the Navy's anti-submarine warfare division, for 16 years and his goal became to command his own squadron.

"My greatest failure in my life turned out to be something that changed my life," Fisher said.

In 1982 Fisher was offered a squadron, but not flying P-3's. It was with Antarctic Development Squadron 6 (VXE-6), a squadron of LC-130s. He felt he was being sent to the end of the Earth.

"I didn't want to come here. I hardly knew anything about the mission," Fisher said. "I tried to get out of it."

Then he began to hear from his predecessors that the Antarctic assignment might not be so bad. Once he came to Antarctica he was caught in its spell.

"I've never experienced more exciting flying than I did here," said Fisher, who flew all over the continent. "You would just literally take your airplane to a place no one's ever been before and land this big airplane on a glacier."

Fisher rose quickly, from operational officer to executive officer to commanding officer in three years. He set a new goal for himself, to become a captain and retire from the Navy after 30 years. Fisher became a captain, but didn't make it the 30 years.

The Navy was downsizing in the early 1990s. By then Fisher was working as the Department of Defense liaison to the NSF, with an office in the NSF's Washington, D.C., headquarters. Fisher figured he'd be asked to retire early, so he resigned after 26 years in the Navy and applied for an opening at the NSF.

"I got this job and I've never been happier," Fisher said.

When he's back in the United States, Fisher is the deputy head of the Polar Research Support Section, overseeing a \$180 million budget. Though it's a serious job, he often reminds his co-workers to lighten up. In meetings, at parties, even in church, Fisher can be counted on for a quip or two, adding levity when appropriate.

"I like to be funny to the point that it's probably a fault," he said.

At home his wife keeps him in line, Fisher said. Not so on the Ice, where Fisher has spent half a season every other year making sure the science plan is followed at McMurdo Station.

Being away from his wife and three children, now all grown, was the one hard part of coming to Antarctica, Fisher said. As a

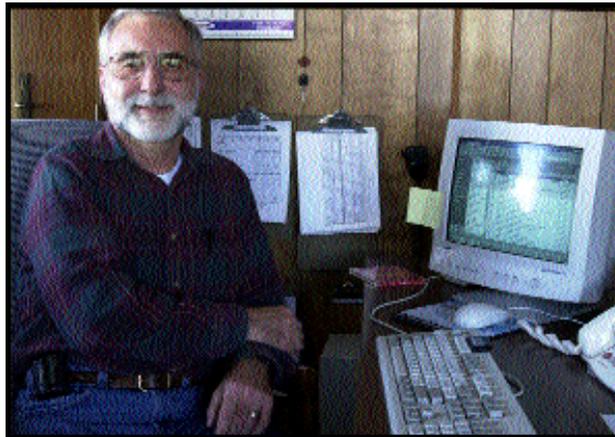


Photo by Melanie Conner/The Antarctic Sun

Dwight Fisher now, in the seat of power at McMurdo Station.

member of McMurdo Toastmasters, Fisher often spoke about the challenges of the seasonal separations, said Judy Goldberry, who led the group.

"He was very relaxed and informal," Goldberry said. "People always came away from his speeches feeling like a part of his family."

Fisher comes off as relaxed and informal in general. He's comfortable with his position in charge, having led people for most of his Navy career.

"He is the most clear-thinking, even-keeled, responsible, kind person and he adores the (Antarctic) program," said Sarah Krall, the lead helicopter technician. "I would go to him for anything with anything."

Fisher won Krall's respect when he was a Navy captain. She was in McMurdo operating an experimental hovercraft, which floated over the ground on a cushion of air. But she and the other hovercraft driver were being asked to do things they knew were unsafe.

"Our bosses were telling us to do it anyway," Krall said. "Dwight pulled us aside and said 'Hey, you stick by your guns, there's been enough cowboying on this continent and there are pieces all over to show for it.'"

Making the tough calls is part of Fisher's job as NSF representative. He decides what cargo takes priority and which passengers get bumped. Though he's here representing the NSF to make sure the science plan is accomplished, his background in the support forces gives him a balanced perspective. Fisher figures he's sided with the support staff as often as the scientists in disputes.

"I have to be concerned about everybody playing together in the sandbox," Fisher said.

Years of experience taught him not to overreact to situations.

"I used to worry about everything," Fisher said. "As I matured I stopped worrying about things I couldn't do anything about."

Along the way he's gained the respect of most everyone who knows him, said John Sherve, manager of New Zealand operations for Raytheon Technical Services International.

"He's pretty well loved by everyone that works with him," said Sherve, who's also known Fisher since his Navy days. "He's always been great; a straight shooter, clear thinker, in my opinion."

Fisher's next big goal is to retire from NSF, in October 2002 if the stock market goes up, later if it goes down. Either way it will be before his next biennial deployment.

This time Fisher hopes he succeeds in meeting his goal. He and his wife Mary plan to travel, visit their children and grandchild, and spend more time volunteering at soup kitchens and through the Knights of Columbus. Perhaps Fisher will also have more time to tell schoolchildren the secret of his success.

"Don't worry about failures in your life," Fisher tells them. "You can take adversities and turn them into positives."