The Antarctic Sun

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Eclipse 2003

Polar solar phenomena

By Kristan Hutchison, Peter Rejcek and Brien Barnett
Sun staff

Wearing paper sunglasses and bulky parkas, Antarctic workers stepped outside on their lunch break to watch the sun and moon align Monday.

On a continent with 24-hour summer daylight, most people at the National Science Foundation research stations took time to watch the rare solar eclipse, an event that won't recur in Antarctica until 2021.

"It's the closest thing we're going to have to a sunset in a while," said Dave Scherer, a carpenter at McMurdo Station.

At Amundsen-Scott South Pole, McMurdo and Palmer stations, people shared glasses, filters, X-ray film, welders goggles and other improvised devices to safely look at the sun. Without protection, looking at the sun would burn through the retina of a person's eyes.

"This is your world. Take a look," said McMurdo X-ray technician Lori

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Photo by Peter Recjek / Special to The Antarctic Sun

People working at the South Pole watch and photograph the solar eclipse reflected in the ceremonial pole marker Monday.

Particle researchers learn from sun's fury

By Brien Barnett
Sun staff

Solar storms like the ones coming back for round two this week can knock out communications and send astronauts at the space station scurrying for cover, but for those who study cosmic rays, extreme solar events can be exciting.

Why might somebody rejoice over something as violent as a coronal mass ejection, which seems painful just to read? Solar storms, like the ones John Bieber of the University of Delaware studies, offer opportunities to learn and, perhaps, help satellite operators and communications companies prepare for the inevitable torrent of solar radiation that follows extreme solar events.

A professor at the university's Bartol Research Institute, Bieber is the principal investigator for a project called Spaceship Earth, a network of neutron monitors that detect particle showers from cosmic rays and solar events. Neutron sensors at McMurdo and South Pole are part of the 11 sites in the Arctic and Antarctic that collect data on the effects of cosmic rays and solar activity.

"The more large geomagnetic storms we have the more we can get a handle on how useful this network will be for space weather predictions," Bieber said.

The goal is to study cosmic rays originating far outside our solar system. Cosmic rays are accelerated in the Milky Way galaxy and even outside it by supernovae, neutron stars and black holes. Cosmic rays

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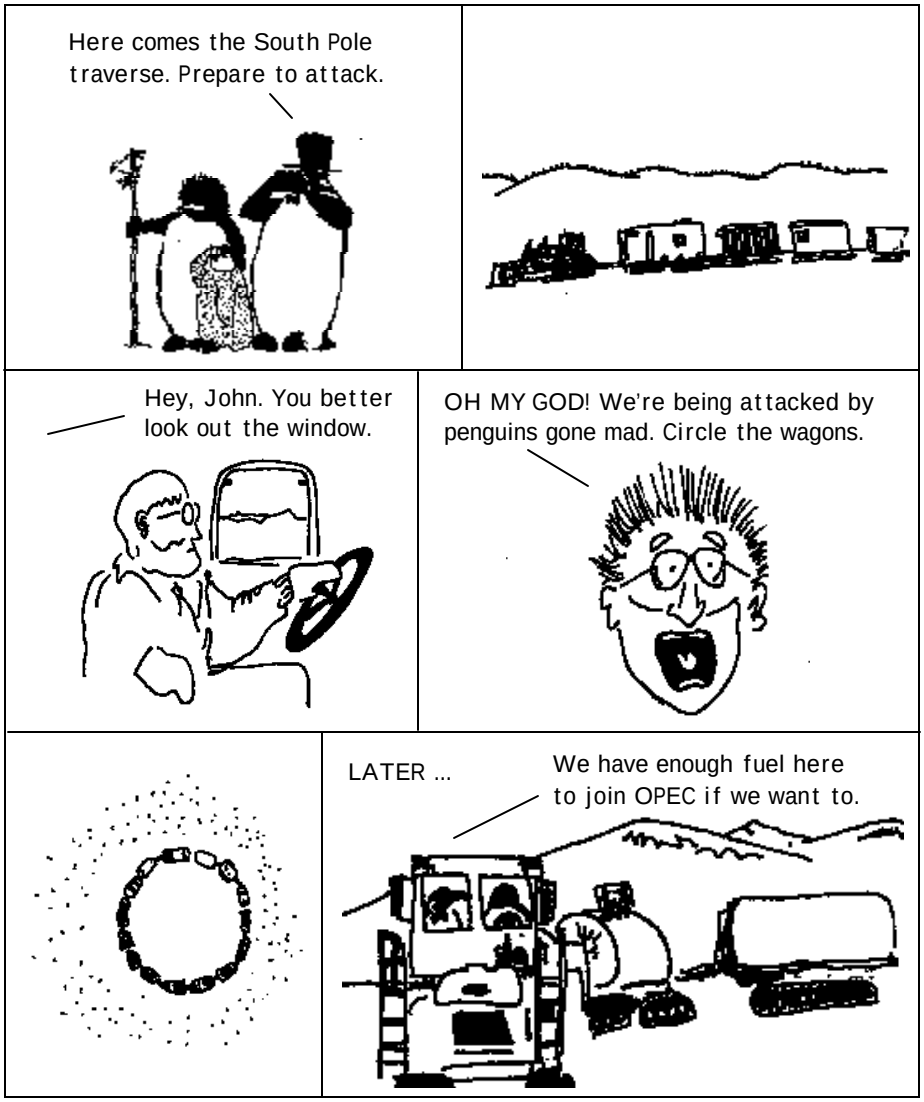
QUOTE OF THE WEEK

"I work for a teaching university. They like me to be home once in a while." *- an astrophysicist*

INSIDE

Ross Island Chronicles By Chico



Cold, hard facts

Antarctic ladies' firsts

- **First woman ashore:** Caroline Mikkelsen, wife of a Norwegian whaling captain, landing on the eastern coast Feb. 20, 1935.
- **First women to spend a year here**: Edith Ronne and Jennie Darlington in 1947-48 on Stonington Island near the Peninsula.
- **First woman to do research:** Prof. Marie V. Klenova, a Russian marine geologist, in summer 1956 aboard the Russian icebreakers Ob and Lena and at Mirny.
- **First women at the South Pole:** geochemist Lois Jones, Terry Lee Tickhill, Eileen McSaveney, Kay Lindsay, reporter Jean Pearson, and New Zealand biologist Pam Young in 1969.
- **First American woman to head an Antarctic research station:** Dr. Mary Alice McWhinnie in 1974, after working on US research ships from 1962 to 1972.

Sources: The New Explorers by Barbara Land and Colin Bull.

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Web address: www.polar.org/antsun

Matt Davidson

"We can't send it ASAP. We only send it USAP, which means you'll get it ... whenever"

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are also produced by the Sun during coronal mass ejections, which are storms of matter and energy unleashed by the sun

From the cosmic rays, researchers learn more about the origins of the universe and cosmic ray traffic patterns. Studying the effects of what Bieber calls "energetic" solar storms, may help researchers better understand and predict space weather.

The solar flares that blasted the planet at the end of October were among the largest on record and got Bieber's attention. He said the project's monitors picked up new information that may help scientists learn more about how to predict solar flares.

The coronal mass ejection of Oct. 28 blew directly toward Earth and Bieber said it had some peculiar characteristics, namely that it was focused, lasted a long time and had an unusually wide energy spectrum.

The event began with a large spike in radiation observed only by the monitor in Norilsk, Russia.

"It was basically a narrow beam of particles," Bieber said. "Only a station that is viewing in the correct direction will see the spike."

A second large spike was picked up 30 minutes later in McMurdo.

Bieber noted that the event took almost a full day for the particle shower to subside. Typically, events last only a few hours.

"It was the first time that events of this sort were detected since the year 2000 when Spaceship Earth became fully operational," Bieber said.

"The more large geomagnetic storms we have the more we can get a handle on how useful this network will be for space weather predictions."

- John Bieber

He said the shower would have continued much longer except the ejection reached Earth and swept away the stream of particles. When an ejection hits Earth the neutron monitors typically notice a decline in cosmic rays of about 4 percent or less. The Oct. 28th ejection dropped the peg some 20 percent.

Data collected during the so-called Bastille Day Event of July 2000 led to a paper concluding that the sun flung particles past Earth that were pushed back twoard the Earth by the magnetic fields, leading some of the detectors to notice the particles before others.

How did Spaceship Earth's monitors know this? The answer lies in the straightforward instruments, called neutron monitors, used to track cosmic rays.

Cosmic ray particles emanate from deep space and fire through it at nearly the speed of light (just under 300,000 km/s). As the rays pass through space, some follow a twisting and bending path along magnetic fields to reach Earth.

These primary particles arrive at Earth and many of them collide with molecules in the atmosphere to release what are called secondary particles, including protons, neutrons, pions, muons, electrons and photons. If the primary ray is strong enough, these byproducts can rain to the ground and sometimes they pass through one of Spaceship Earth's monitors.

The monitors themselves are rectangular. The shell is composed of white polyethylene sheets. Inside, lead rings form three tunnels. A poly liner is inside the tunnels. Within the liner are the detector tubes, which are the heart of the system. The stainless steel tubes are filled with boron trifluoride gas. A thin wire runs down the center of the tube through the gas and connects to an amplifier.

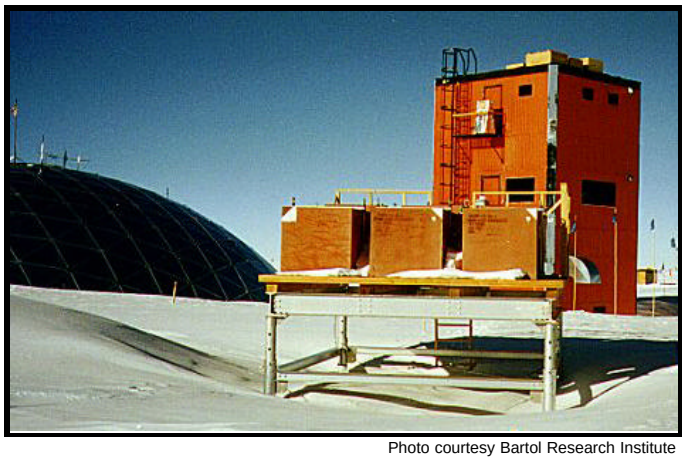

Photo courtesy Bartol Research Institute

Boxes containing neutron detectors sit outside Skylab next to the dome at South Pole station. Additional monitors are located inside Skylab. The monitors detect cosmic ray showers and give scientists data about space weather.

When a boron atom in the gas absorbs a neutron, the resulting boron isotope is unstable and disintegrates with a release of energy. This energy causes an electric current in the central wire, which is what the computer records as a hit.

The scientists then study the data to learn more about the rays and hope to recognize signs that will improve solar weather predictions.

The data also set baselines for basic research of sun activities and particle shower dynamics. Papers and analysis are available for download at Bieber's Bartol's Website and Bieber anticipates publishing further papers on the October events in the next six months.

Bieber noted another interesting change has been occurring at the South Pole neutron monitor over the last 40 years or so. The monitor there has showed a decrease in cosmic rays of 8-10 percent. Until last year, Bieber said researchers wrote it off as being an effect of the harsh environment at the Pole.

After talking with some other people who study cosmic ray variations, Bieber said he's now not sure what the variation means. He and others are reviewing data from the monitor to try to ascertain what the trend may indicate and he plans to discuss it during the December meeting of the American Geophysical Union in San Francisco.

For a related story, check the issue of Nov. 9 in the Antarctic Sun archive online at www.polar.org/antsun

Featured National Science Foundation funded research:
A-120-M/S, principal investigator Dr. John W. Bieber of the University of Delaware, Bartol Research Institute
http://www.bartol.udel.edu/~neutronm/
Other related links:
http://www.bartol.udel.edu/~neutronm/catch/sse2.html: a short tour of Spaceship Earth
http://previ.obspm.fr/previ/links_en.html: Links to more information about neutron monitors and data

Perspectives

Burke family works, plays together

By Katy Burke

Now I know how my parents must have felt when they watched me take my first steps. I was bursting with pride as I watched them come off of the C-141 and take their first tentative steps onto Antarctic ice.

Actually, I wasn't positive it was them until I read the name tags on their coats. I had never had to pick them out of a sea of red coats, black pants, and white bunny boots before. Even though I couldn't see their eyes through the program-issued 100-percemt ultraviolet protection sunglasses, I knew they were as big and bright as the sun itself as they staggered in wonderment toward Ivan the Terra Bus.

With every step they took, they got farther and farther away from their life of retirement in Colorado. They left behind two other children, a grandchild, friends, pets, a home, comforts, freedom and routine, all to get a glimpse of life on the ice. For five years they'd been hearing my stories and they wanted to see for themselves this place at the bottom of the Earth. I was in awe of their faith, courageousness, and sense of adventure.

I helped them arrange their room in Building 201, then showed them my room in 208 and giggled to myself because my room was better than theirs. I pointed out the important buildings around town; their work centers, 155, and the bars, showed them how to go through the food line in the galley, and how to separate their trash. I told them some things that every new person should be told: walk carefully on the ice, do not start or listen to rumors, and don't hook up with anyone the first week. Then, I stood back and watched as they acclimated.

There was a period of adjustment, as there is any time a person starts a new life. They were tired. It's difficult to go from not working at all to working 54 hours a week. I know because I come back here from semi-retirement every year. They missed the conveniences of the real world. We can all relate to that. My Dad has said repeatedly, "If only there was a Home Depot here." My Mom hasn't said it, but I know she is thinking, "All I want to do is curl up by the fireplace with my cat on my lap and watch 'Antiques Road Show.'" They have struggled with the challenges of learning their new jobs, a utility division apprentice and shuttle driver; something they haven't had to do in about 20 years. I am accustomed to changing jobs every few years, but for my parents, this was a new experience.

Photo courtesy of Katy Burke

Linda, Jim and Katy Burke are spending this summer season together at McMurdo Station. Linda and Jim came out of retirement to work on the Ice together this year.

Despite all of this, they are adapting very well and have immersed themselves into the community. My Dad volunteers and washes pots in the kitchen every Sunday and is training for the marathon. My Mom is taking a class for credit and is on a bowling team. I love it that every few days someone approaches me and says, "Your Dad is so cute! He always has a smile on his face." Or, "Your Mom is incredibly sweet. She drove me around all day and we had the best talk." It's like receiving progress reports from schoolteachers who do nothing but praise them.

I have been asked repeatedly, "What is it like having your parents here?" The answer is simple; it's great. It was odd in the beginning to see my Dad walk through the dining hall or run into my Mom in the store. My first reaction was always that of surprise and, "What are you doing here?" That has passed and now I am simply happy and comforted by the fact that we are all on the same continent. I like being part of a family on the ice. I think it's cute that people have nicknamed us "the Iceburkes." And just this week as the three of us filed out of the building to go to dinner, looking like Adelie penguins headed out to the open water for a feed, my coworker Myrna Gary said, "Oh look! Burke, Burke, Burke."

It's an incredibly unique bonding experience. How many other people's parents would understand the jargon: "I had such a busy day! After I stretched and attended the safety meeting at MCC, I had to finish my QA, EH&S, and metric reports. After that I did comms on HF with Pole at Mac Relay in 165. Then I heard the kiwi herc from Cheech boomeranged at PSR so I had to cancel the bag drag. After lunch in 155 I chatted with some beakers in Highway 1 and then stopped by Rec to ask about the next Delta trip to Cape Evans. In the afternoon I helped shuttles transport pax to LDB at Willy. We got back right before they called a Condition One for all locations. I'm exhausted!"

around the continent

SOUTH POLE

A happy campin' we go

By Troy Wiles
Pole correspondent

A dozen people went to Happy Camper School at South Pole last week. The group was led by Matt Szundy, an accomplished mountain climber and guide. Many people at McMurdo know Szundy, and some have had the privilege of being tutored in alpine camping by the 30-year-old who hails from Girdwood, Alaska. He has climbed several peaks including Denali (6,193 m) in Alaska, Ama Dablam (6,855 m) in the Himalayas, and Aconcagua (6,959 m) in Argentina.

Szundy led us off the beaten path, beyond the end of the skiway. Camp was pitched in the white expanse known as the Antarctic Plateau using anchor techniques such as the T-slot, or deadman, along with the trucker's hitch knot. Our comfort from the wind was assured when we built a large ice block wall carved from the frozen ice cap. The wall was placed no higher than the tent and at a distance of approximately 1.2 m, which is the approximate height of the tent. Next came warm drinks of cocoa and apple cider to help fight off the chill of the - 40 C. A Scott tent tripled as a kitchen, sauna, and general warm-you-up hut.

When camp was set and secured, many of us trekked to the old LC-130 that now has been claimed by drifts of snow. Others trekked a short distance beyond the camp to get a feel for what early explorers had to endure. In open expanse, the sastrugi appeared endless. The air sparkled with millions of tiny ice crystals as the rest of us were protected by a brilliant yellow halo.

Some happy campers stayed behind to maintain the camp and prep for bed. Most slept in Scott tents or Tiros mountain tents, but two brave souls, "Mountain Eagle" Miller and Nick Salava, chose to sleep outdoors under the washed out stars.

Photo by Troy Wiles / Special to The Antarctic Sun
Instructor Matt Szundy wields a snow saw.

During the debriefing, there were several recurrent themes. We all had cold moments, but were generally warm. We all slept off and on. And there were some of us who wished they had brought a pee bottle. We all agreed that the experience was worth repeating and though no one expects it, we got some know-how that could be used in an emergency. A big thanks to Szundy for sharing several cold weather camping strategies to keep spirits up.

It was a beautiful sight. No, not the camp. Nor the ice wall. Not even the warm beverages served first thing in the morning. Yes! The tracked vehicles coming to take us home. We packed up and rode back to the station all smiles. We enjoyed a hearty breakfast and most of us casually drifted away to our warm, tiny spaces throughout the South Pole station for a well-deserved nap.

Also, this week National Geographic arrived just in time to document the solar eclipse. They will be spending nine days documenting life here at the South Pole. It is season one of a three-season venture that will culminate in a one hour special on PBS in 2007-2008.

Photo by Troy Wiles / Special to The Antarctic Sun
South Pole happy campers pose in front of their snow wall. The wall cuts down on the wind.

PALMER

Recyclers in the system

By Kerry Kells
Palmer correspondent

While the recent influx of pack ice prevented sampling some days this past week, its presence provided surface samples rich in bacteria for Hugh Ducklow's group. Our two researchers currently on station, Lauren Rogers and Mary Turnipseed, collect samples of water to study bacterioplankton ecology. They study the microscopic bacterial communities (nanoplankton and picoplankton) that live in the water column of the Arthur Harbor area near Palmer Station. These plankton are so small that they can only be viewed with a microscope under high magnification and are stained with a green dye. The scientists research the microbial component of the ecosystem as part of the Long Term Ecological Research project at Palmer Station.

Coordinating with the phytoplankton researchers, Rogers and Turnipseed travelled by Zodiac out to Stations B and E at about the same time to collect their samples. Because bacteria and phytoplankton are interdependent, this study is linked with the phytoplankton study. They take water samples from four different depths at these stations. The water samples are then brought back to station so they can run different experiments that study bacterial activity and preserve samples to count the number of

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the week in weather

McMurdo Station
High: 27F / -3C Low: 5F / -15C
Wind: 25 mph / 40 kph
Windchill: -33F / -36C

Palmer Station
Not Available

South Pole Station
High: -29F / -34C Low:-45F / -43C
Wind: 9 mph / 15 kph

TRACER passes test

Photo by Brien Barnett /The Antarctic Sun

Scientists and balloon technicians monitor the hang test of the telescope known as TRACER at Williams Field near McMurdo. Dietrich Muller, principal investigator and professor at the University of Chicago, said the test went well. He said the team found a few minor things they will correct for the launch of the Transition Radiation Array for Cosmic Energetic Radiation telescope. It will be deployed on a long duration balloon sometime in December, depending on weather. TRACER is designed to detect high energy particles from the galaxy.

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bacteria cells.

In the radiation laboratory, Rogers and Turnipseed run experiments with the radioisotope tritium. They add low-level radioactive amino acids to the sample seawater, giving sustenance to the bacteria, and then let the bacteria incubate at –0.5 C for 6 hours. After 6 hours, they kill the bacteria and wash the sample of the excess amino acids that were not incorporated into the bacterial cells. An instrument measures the radioactive emissions from the nucleic and amino acids that were used by the cells to make DNA and proteins, respectively. The instrument gave a large signal for the surface water collected recently near the pack ice. This signal indicates the surface water was full of healthy bacteria.

The food web is a cyclical process. The phytoplankton are eaten by the herbivorious zooplankton. Both the phytoplankton and zooplankton excrete dissolved organic material—which the bacteria feed upon—into the ocean's system. The bacteria are the recyclers; they convert the dissolved organic material into inorganic material which the phytoplankton require to live. Without bacteria in the oceans, dissolved organic matter would not be converted and the sustenance for phytoplankton would be lost from the food web. While bacteria are an unseen force in the Southern Ocean, they have a profound effect on the chemistry of the water. Without the presence of bacteria—the recyclers in the system—the Southern Oceans would not be able to support life.

National Science Foundation funded project featured in the story: B-045-L/P, Hugh Ducklow, Virginia Institute of Marine Sciences.

Continental Drift

What's the one comfort you brought to the Ice that you can't live without?

"Flannel sheets."
Tim Kramer,
Palmer solid waste technician from Dubuque, Iowa, second season

"Charmin toilet paper."
Floyd Washington,
South Pole maintenance supervisor, from Manassas, Va, fifth season

"My pillow from my bed and my pillowcase because I knew no matter how hard and uncomfortable my bed was, I'd be okay if I had my pillow."
Janet Myers, McMurdo janitor, from Chillicothe, Il, first season

Penguins check in to ranch

Above, wild emperors are curious animals. Several walked up to the Penguin Ranch to check it out. Below, Katsufumi Sato from the Japanese Institute of PolarResearch takes notes on penguins wearing dive recorders at the Penguin Ranch.

Story and photos by Kris Kuenning
Sun staff

It was a typical evening at the Penguin Ranch. Tucked up in one of their colorful huts, 15 miles out on the sea ice, the researchers were eating dinner when a sudden ruckus erupted outside.

"We heard a loud commotion," said Paul Ponganis, a researcher from the Scripps Institution of Oceanography. "When we went outside, all our birds were on one side of the corral and there were four birds on the other side looking in."

The team opened the gate and the four curious emperor penguins waddled right in and made themselves at home.

"Emperor penguins are naturally curious," Ponganis said. "I always say if you want to take photos of them, the best thing to do is to park your snowmobile and wait."

Back at the ranch, the volunteers adapt to the routine easily. "These ones are not breeding, they're just out to feed."

The two holes at the Penguin Ranch allow penguins to dive and fish. Because there are no other holes within their swimming range, the penguins always return to the corral.

Emperor penguins dive like no other birds. Holding their breath for as long as 22 minutes, they can reach depths of 500 meters in their search for squid and fish.

Ponganis has been studying the diving abilities of emperor penguins since 1987.

"We're studying how they dive as deep and as long as they do and what changes occur in the body."

Ponganis and the team at the Penguin Ranch are interested in how the penguins manage oxygen stores within the body during a dive, and how they tolerate the pressure of the deep ocean. Understanding these adaptations in penguins may provide clues for understanding more about human physiology.

Ponganis splits his time between research and medical anesthesiology. After doing a PhD in marine mammal biology, he became a medical doctor too.

"Physicians in diving medicine are always fascinated because the birds aren't affected by rapid pressure changes," Ponganis said.

Looking at changes in the blood and tissue, Ponganis is observing patterns that may be relevant to treating patients.

"Cellular mechanisms which allow penguin tissues to tolerate low oxygen levels could be relevant to preservation of organs for transplantation and how to optimize an organ for transplantation. That could stem from our research," Ponganis said.

In past years, research at the Penguin Ranch has focused on body temperature, and heart rate. Investigators have learned that emperors maintain normal body temperature throughout the dive. Their resting heart rate is 60-70 beats per minute (bpm).

"That goes up to 180-200 just before they dive," Ponganis said. "You can see them kind of charging up, loading up with oxygen."

When the penguin dives, the heart rate drops rapidly to 100 bpm and then gradually reduces to a level near 20 bpm, much lower than humans could tolerate. The slower heart rate allows the bird to process oxygen more slowly during the dive.

"As soon as the bird hits the surface, (the heart rate) pops back up to around

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Photos by Kris Kuenning / The Antarctic Sun

Photo by Brien Barnett / The Antarctic Sun

Katsufumi Sato from the Japanese Institute of Polar Research with the swim measurement device he is testing at the Penguin Ranch this year. At left, emperor penguins hang out inside the corral at the ranch.

Penguin

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200," Ponganis said.

Just like in humans, oxygen is stored in the blood, lungs and muscle. But unlike humans, where most of the oxygen is in the lungs, penguins store about half the oxygen in their muscle, 25-30 percent in the blood and the remaining 25-30 percent in their lungs. The more oxygen an animal stores in its blood and muscle, the less the heart has to work to deliver it to the rest of the body.

"The way the oxygen is distributed in the body is one of the key mechanisms to help them dive deep," Ponganis said.

This year, a little device designed in Japan will help researchers understand more about how the penguins behave underwater. The miniaturized recorder, commissioned by the Japanese National Institute of Polar Research, logs information while the penguin is swimming underwater. A record of stroke frequency, acceleration and swimming speed shows how efficient a penguin is at swimming. It also gives clues to underwater behavior – how much gliding a penguin does and what happens differently in shallow and deep dives.

These recorders are being tested at the Penguin Ranch by Katsufumi Sato and Yoshiaki Habara for future release on free-ranging penguins at Cape Washington. Yoshi watches the penguins dive and records which of the two holes they used and how long they were underwater.

"The ranch is a perfect place to test equipment," Ponganis said. "We can get so many more detailed measurements here that we can then apply to a more remote situation."

The Penguin Ranch is also a good place to study behavior. For the last three seasons, a National Geographic Crittercam video camera has allowed researchers to see what the penguins are feeding on.

"Crittercam is only used in the ranch situation because we only leave it on the bird for one hour," Ponganis said.

Another device, a finger-sized Japanese camera, is being evaluated at the ranch for possible use at Cape Washington. This would allow researchers to see what the penguins are eating during their foraging trips to sea.

Live underwater penguin viewing is possible with the Penguin Ranch's observation tube, which allows researchers to climb below the 2.5 meters of ice and watch through windows.

In the milky blue-green water, emperors finally look like birds. Agile and graceful, they spread their wings in full flight and zip through the water with a speed that mocks their slow, awkward land movement.

The studies provide a more complete understanding of emperor penguin biology – how and why they dive so deep and how they capture their prey. Understanding how much and what type of food they catch will be key to understanding emperor penguins' role in the Antarctic ecosystem and to their long-term conservation.

Just as happily as they came, the research subjects will waddle off when the corral is taken down in mid-December.

"It's like 'thanks for the fish, we're off,'" Ponganis said.

Featured National Science Foundation funded research:
B-197-M, principal investigator Dr. Paul Ponganis of Scripps Institution of Oceanography

Composite photo by Ethan Dicks / Special to The Antarctic Sun

Photo by Amanda Betz / Special to The Antarctic Sun

Scot Jackson and Paddy Douglas watch the solar eclipse at the South Pole wearing eclipse sunglasses. At top, a composite photo of the sun moving in front of the moon taken through a filter at the South Pole.

Photo by Kris Kuenning / The Antarctic Sun

Susan MacGregor looks through a square of welding glass at the solar eclipse from Hut Point, outside of McMurdo Station.

Eclipse

From page 1

Johnson, as she passed out strips of exposed film for people to look through. "I became the most popular person there for a while. I was like the pied piper of X-ray."

About 150 viewing glasses — not unlike 3D glasses handed out in movie theaters, but with nearly opaque lenses instead of the funky red and green ones — were handed out in the South Pole dining hall the morning of the solar spectacle.

"I got up to make sure I got sunglasses," said Dave Tashner, a carpenter on swing shift. Attempts to use pinhole viewers at McMurdo Station didn't work though, probably because there were high clouds. Other than that, the weather at South Pole and McMurdo held out for the eclipse. Skies were blue at the South Pole and the temperature was –39 C, with a windchill of –51 C.

"Being at the South Pole is pretty unique. Seeing an eclipse at the South Pole is doubly fun," said Al Baker, RPSC Science Support coordinator, who organized a viewing of the eclipse at the Balloon Inflation Facility near Cargo.

Hours before the event, electrician Mountain "Eagle" Miller was already devising how and where he would get his eclipse pictures. "I want to get the eclipse with part of the station behind it," he said, carrying a half-torn pair of viewing glasses he planned to use as a filter for his camera.

At Palmer, Dave Ensworth brought filters from welders goggles to the dining area. They also used the telescope to project the eclipse onto the ceiling.

"Even though it was only about 65 percent, it was quite spectacular," wrote Cara Sucher. "It was a cloudy, nasty day, but just as the eclipse began, the sun broke through – and just after, the cloud cover came back."

Looking up from the bottom

While the moon's shadow made a dark swath across East Antarctica, it did not quite reach the three U.S. research stations. The 230 workers and scientists at South Pole station watched the moon cover 87 percent of the sun. Polies gathered at the ceremonial pole where a National Geographic crew filmed the event. Others viewed the near total eclipse from the Balloon Inflation Facility or the warmer confines of the new elevated station.

"It looks like a giant lemon cookie someone took a bite out of," observed Rudy Haberl at the South Pole as the moon first began to creep across the sun.

The effect, while not the complete darkness that perpetually shrouds the station during the winter months, was both

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A LanChile Airbus passes over the South Pole after the eclipse. The Sky & Telescope chartered flight made two passes. "This was almost as exciting as the eclipse itself. We never see commercial airliners down here!" wrote photographer Scot Jackson from the Pole.

Photo by Kristan Hutchison / The Antarctic Sun

Dining Attendant Heather Rowland, from Girdwood, Alaska, watches the solar eclipse through a strip of exposed X-ray film at McMurdo Station.

Photo by Brien Barnett / The Antarctic Sun

Bryn Clark, foreground, and Farin Wilson, observe the solar eclipse through special lenses outside the Crary Laboratory at McMurdo Station. Observation Hill, the site of Scott's Cross, is in the background.

Eclipse

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eerie and awe-inspiring.

"It looks like nature gave the sun a black eye," said Tom Piwowarski.

Normally a total eclipse like Monday's is a rare opportunity for scientists to study the sun's corona, the outermost region of the solar atmosphere.

"It's about the only time you can see the corona, because the sun's so bright you can't see it," Baker said.

This time polar science took a backseat to pleasure, since most of the astronomical equipment is in summer maintenance.

Unofficially, Pole scientists at AS/TRO (Astronomical Submillimeter Telescope/ Remote Observatory) in the Dark Sector were going to take a peek and see what they could find.

"We might as well take some data," said Nick Tothill, winter scientist-in-residence. "We might get a couple of interesting bits."

After the eclipse, South Pole workers continued to watch the sky, as a LanChile Airbus jetted overhead. The jet was carrying 63 tourists on a 14-hour round-trip flight from Punta Arenas specifically to see the eclipse.

"It was fabulous. We flew into totality at an altitude of 38,000 feet and at that altitude, were above the vast majority of Earth's atmosphere," said Kelly Beatty, executive editor for Sky and Telescope magazine. "When we got into the shadow the sun's corona was dazzlingly bright, much brighter than is usually seen at ground level."

Sky and Telescope had donated 150 eclipse glasses to the South Pole to allow people there to watch safely.

From the air, the eclipse watchers could see the shadow of the moon sweep over them "like a wall of darkness from left to right," Beatty said. The elliptical shadow was 630 km by 150 km. Most of the passengers had seen previous eclipses and one man had seen 23 full solar eclipses.

"It is probably the most profound and spiritual natural phenomena that exists," Beatty said. "Once you've seen one, you get hooked."

After the eclipse, the jet went over the South Pole at 2,500 feet, and then circled Vinson Massif on the way back to Punta Arenas.

"The serenity of the scene there belies the fact that there's so much activity going on all the time," Beatty said.

McMurdo's viewpoint

The moon's bite of the sun was smaller at McMurdo, where about 1,000 people

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Photo by Brien Barnett / The Antarctic Sun

Farin Wilson, left, Jen Blum and Matt Charnetski watch the solar eclipse through special lenses on the loading dock outside the Crary Lab, McMurdo.

"It is probably the most profound and spiritual natural phenomena that exists."

-Kelly Beatty

Right, Trent Kunze keeps Gretchen Brown warm as they watch the solar eclipse in front of the McMurdo clinic Monday.

Bottom right, James Battaglia attempts to view the eclipse through a makeshift cardboard pinhole viewer.

Photos above and below by Kristan Hutchison / The Antarctic Sun

Eclipse

From page 10

had the opportunity to see about 75 percent of the sun disappear. People were in a good mood, telling jokes, laughing, and recalling previous eclipses they'd seen in other parts of the world.

"I definitely wanted to be here. I've only seen one other eclipse," said Tom Cohenour, who was photographing the eclipse from Hut Point, where Robert Scott first wintered in Antarctica in 1902.

For electrician's apprentice James Battaglia, the event was a chance to reflect on our place in the universe.

"Most human beings give very little thought that they're standing on a spinning planet flying through space," Battaglia said. "The eclipse gives me perspective."

The march to the peak seemed steady and slow, as the moon rolled across the upper half of the sun's face.

"It looks like Pac Man," said Joe Yarkin on his way to lunch.

By noon the moon blocked the top three-quarters of the sun, leaving a smiley face in the sky. The temperature had dropped noticeably, from –5.8 C to –7.4 C in less than an hour.

"You can feel that little bit of the sun gone now," said Damien Henning.

The actual moment of the zenith felt as if the shadow was suspended for a moment.

"I guess 24 percent of the sun is still pretty bright," Allisha Ochs said.

Though it was still daylight, the tone of light was more silver-gray than gold.

"It is kind of eerie, the light out here," said Michele Doane.

Then the moon began to race off the face of the sun as the clouds moved in.

Three minutes later, clouds obscured the eclipse to the point it was no longer visible through filters or the naked eye, but by then nearly everybody was ready to go inside and warm up. Most were satisfied by the polar solar show.

"This made the season worth it," said Farin Wilson, a general assistant from Tucson, Ariz. who works at Crary Lab at McMurdo Station.

Profile

Palmer's Wendy Beeler cooks up comfort

By Kristan Hutchison
Sun staff

Wendy Beeler's face reacts to ingredients when she's just talking about them, as if even the thought has a flavor.

Her hands pour and mix in the air as she gives out a recipe. That intuitive understanding of food is a good trait for the head chef at Palmer Station.

"She is a wizard of a cook," said Palmer Station manager Joe Pettit. "She can make so many things out of almost nothing, it's amazing."

Beeler had been back on station only a few hours when she donned a colorfully printed apron and began mixing and shaping dough for bagels. Though they can get store-bought bagels, Beeler likes to make them fresh for just the right combination of chewiness.

Bagels are a staple, but Beeler's specialty is Indian food, the spicy delicacies her parents used to make on special occasions in memory of their years together in the Peace Corps in India. She can also crank out the cream pies when needed, usually for Palmer's traditional birthday pie-in-the-face.

Beeler's value on the station goes well beyond food. Since so many social events and holidays center around food, she's one of the spontaneous social organizers on a station too small for a recreation department. She looks for excuses to celebrate – birthdays, ship arrivals and departures, a married couple who after 20 years researching in Antarctica are able to be at Palmer together for the first time.

"I plan my season by the parties that we have," Beeler said.

Currently she has three little pigs waiting to be roasted for the next big event, and plans to make the station, the *Laurence M. Gould* crew, and the Long-Term Ecological Research science team each responsible for one piglet. Her enthusiasm is infectious, drawing people into the kitchen to help.

"(Wendy's) a very key community member here at Palmer, well-liked and well-respected," Pettit said. "One of the things I like about Wendy is just her exuberance for life."

Beeler first learned of the Antarctic program waking people up for their flights in Christchurch, sometimes morning after morning. In 1991, she was working as the night porter at Pavlova's, a backpackers lodge next to Bailie's Bar where many people stayed on their way to McMurdo or South Pole stations.

Photo by Kristan Hutchison / The Antarctic Sun

Wendy Beeler's Spicy Hot Wings

To half a cup Tabasco sauce, add equal parts powdered chili, cumin, curry and salt until it creates a thick paste. Coat chicken wings and let them sit overnight, then bake until cooked and crispy.

"There's people you give 12 wake up calls in a row," Beeler said.

She started to ask them about where they were going and how she could get a job there too. She was recently out of college, having earned a degree in international studies from American University in Washington, D.C. For 16 months she'd been traveling around the world. Antarctica appealed to her as the next stop.

The next year she was hired as a shuttle driver at McMurdo and the wakeup calls were for her, but she knew even then she wanted to see more. She wanted to find a way to go to the other stations and see the Antarctic winter, so between austral summers she got a job cooking at huts in the White Mountains of New Hampshire. The effort paid off when she was hired as the second cook for Palmer Station in 1994.

Since then she's cooked for field camps on Shackleton Glacier and at Siple Dome and wintered as a baker at McMurdo Station and as a cook at the South Pole. On one of her flights back from the Pole the plane developed a 30-inch hole.

"We were about an hour out on our way back to McMurdo when there was this big bang," Beeler said.

The temperature inside the plane suddenly dropped and a cold breeze blew through the cabin. The crewmembers grabbed their oxygen masks and the plane began a swift controlled descent. For a few minutes Beeler imagined what she would do if they landed on the Antarctic Plateau. She was ready to set up a tent, get a stove running and start melting snow to make water. None of that was necessary, since the plane was able to turn around and land back at the South Pole.

She returned to Maine thinking she was done with Antarctica. Then the call came three summers ago that the Palmer cook had broken his foot and couldn't deploy.

"As soon as I was offered this job back I realized it wasn't just filling in for the season," Beeler said. "I love cooking, but this one has more than just cooking. Palmer's so small I get to do more of the planning."

One of her favorite memories is from 2000, her first year back. The second cook, Jennifer Tabor, taught pie baking 101 for the station. Everyone made their own crust and pie, so there were 22 pies for 30 people at dinner.

"There's this great photo of everyone holding up their own pie. I just love this place at moments like that," Beeler said.

When her father died in late October, there was no way for Beeler to get home in time for the funeral. She realized Palmer was the next best place to be.

"In some ways, this place is the most supportive thing, because in the real world you probably end up alone if you're having a hard day," Beeler said. "But here, people understand if you're going to cry for a while and they come in and do dishes so you can get out of the kitchen."

Now she's considering taking another break from the program. At 36, she has 5.4 acres of land and other ties binding her to Bar Harbor, Maine, where she'd like to spend a bit more time. This summer she did some catering there with other cooks she met in Antarctica and she also worked with the concessionaire for Acadia National Park.

But Palmer is a hard place to leave.

"I really love this job," Beeler said. "I really can't imagine one I'd love better."