



# New finds in Dry Valleys indicate ancient tundra



By Peter Rejcek  
*Sun staff*

Flannel shirts and jeans – or perhaps a light fleece – may have been the norm in the McMurdo Dry Valleys of Antarctica about 14 million years ago.

Fossil records and glacial history in an area of the western Olympus Range near Mount Boreas indicate that during the middle of the Miocene epoch (about 14 million years ago) climatic conditions were warm and wet enough to support plant and insect life, according to a team of scientists that returned this season to continue its research.

The story began when Adam Lewis, a post-doctoral fellow at Byrd Polar Research Center at The Ohio State University, traversed a roughly 100-square-kilometer area of the Olympus Range several years ago while working on his doctorate. His thesis involved fleshing out the glacial history of eight valleys between various mountain peaks.

“In the process of doing that, I discovered these lake deposits,” explained Lewis shortly before he headed into the field via helicop-

**See CLIMATE on page 9**

Peter Rejcek / The Antarctic Sun

*Allan Ashworth picks through a pile of shale looking for fossils and other evidence of a tundra environment that he and others believe disappeared in the McMurdo Dry Valleys about 14 million years ago.*



**See related story on page 8**

## Blowin' in the Wind

### USAP looks to harness alternative energy for McMurdo, South Pole

By Steve Martaindale  
*Sun staff*

Everything in Antarctica, it seems, is about preserving the environment, minimizing the human footprint on the frozen continent.

Considering what it takes to produce electricity with diesel-powered generators, the idea to incorporate wind power may seem to be a no-brainer, but things are not always that simple on the Ice.

“Normally, you would think that going green, going renewable, would trump everything else, but in our case that’s not true,” said George Blaisdell, operations manager in the Office of Polar

Programs for the National Science Foundation. However, he added that small wind generators are in use at the Black Island communications facility and some field camps.

Blaisdell trimmed the issue down to four elements and applied each to McMurdo Station and Amundsen-Scott South Pole Station, the only sites currently being considered for large scale wind power.

- Wind regime: McMurdo has a “reasonably good” regime for producing wind power while South Pole is “very marginal.” However,

**See ALTERNATIVE on page 11**

### Quote of the Week

“So, are you originally from McMurdo?”

— A gentleman making small talk with a woman at the local coffee house.

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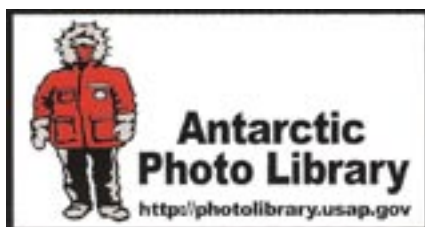
## Digging back 70 million years



James E. Martin / Special to *The Antarctic Sun*

*Fossil remains of a remarkably intact juvenile plesiosaur were excavated from this Vega Island site off of the northern tip of the Antarctic Peninsula. Read more about the find in an upcoming issue of The Antarctic Sun.*

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## Cold, hard facts

### USAP on Ice

Approximate U.S. Antarctic Program (USAP) budget for fiscal year 2006: **\$318.51 million**

USAP percentage of the National Science Foundation budget: **5.09**

Peak USAP population in the Antarctic at any given moment: **1,600 on land, 300 on ships**

First U.S. scientific presence in Antarctica: **James Eights, 1830**

Approximate number of USAP personnel entering and leaving Antarctica and the ships over the course of the summer: **3,000**

Approximate number of scientists and their support staff working in Antarctica each year: **>800**

Numbers from 1947's "Operation Highjump," the largest single expedition to Antarctica: **13 ships and 4,700 personnel**

Source: National Science Foundation

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### Level 1 Comix

Matt Davidson



# A guide to Antarctic phenomena

Text and layout by Steven Profaizer

## nacreous clouds

**Best USAP station for viewing this event:** McMurdo

**Description and cause:** Nacreous clouds are rare, colorful clouds in the stratosphere that can form in the extreme cold of polar winter. They are also known as mother of pearl clouds and polar-stratospheric clouds (PSCs).

These clouds can form 15 to 25 kilometers above sea level when the temperature in that region of the atmosphere falls to negative 78 C or colder.

Because of their high altitude, nacreous clouds are illuminated by the sunlight from below the horizon and are seen before dawn or after dusk.

“The colors you’re seeing in these clouds are a refraction effect,” said Glenn Grant, South Pole research associate who has worked at all three USAP stations through 10 contracts on the Ice. “The light is entering the ice crystals, bending around and splitting up just like a prism.”

### Interesting facts:

- The beauty of the clouds does little to reveal the damage they can propagate. The clouds are a conducive environment for chemical reactions begun by pollutants in the air that result in damage to the ozone layer.
- Winter residents at McMurdo were treated to an unusually strong display of nacreous clouds in August.



Chad Carpenter / Special to The Antarctic Sun

## fata morgana

**Best USAP station for viewing this event:** McMurdo

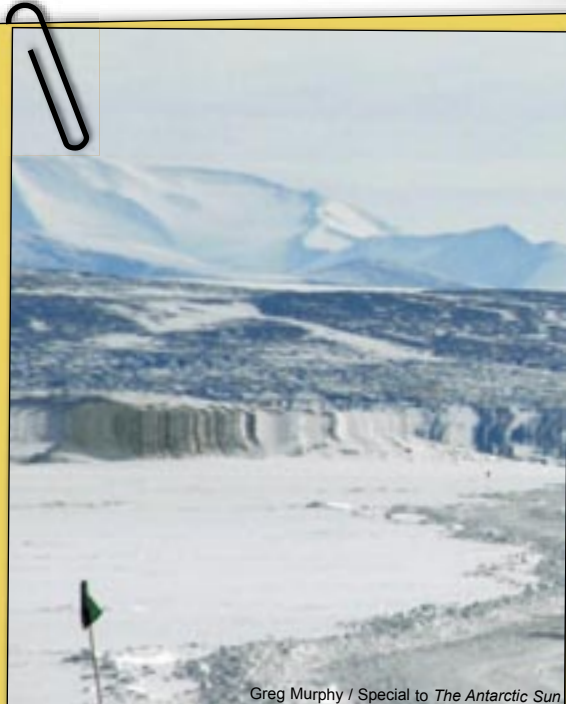
**Description and cause:** Fata morgana is a complicated mirage that creates stretching and towering distortions of a scene that may also be inverted and magnified. It is caused by adjacent layers of air with different temperatures.

“When you have two different temperature bands of air, they have different densities,” Grant said. “The colder air is denser than the warmer air above it. As light passes through different densities it will bend and refract the light like a lens. The mirage changes as you watch it because the air is moving.”

Grant’s favorite characteristic about this effect is that it can magnify what’s behind it. He said he was once looking out toward Williams Airfield from New Zealand’s Scott Base, and it looked like the airfield was about half a kilometer away when it was actually about eight kilometers from that location.

### Interesting facts:

- Fata morgana is considered a superior mirage because it appears above the object it distorts. A highway mirage, wet-looking spots seen on roadways, is an example of an inferior mirage because it appears below the sky it is reflecting.
- Fata morgana is the Italian translation of “Morgan le Fay,” referring to a sorceress of Arthurian legend.



Greg Murphy / Special to The Antarctic Sun

# A guide to Antarctic phenomena

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## aurora australis

**Best USAP station for viewing this event:** South Pole

**Description and cause:** Auroras are moving wisps of color that appear in the night sky. They are created by charged particles ejected from the sun interacting in the Earth's atmosphere.

"The sun spews out all kinds of stuff," Grant said. "It would never pass an EPA inspection."

One of the types of particles it hurls at the Earth is electrons. And as they approach the planet, they get swept into Earth's magnetic field. "If you think of the Earth as a gigantic bar magnet," Grant said, "the electrons are pulled to the north and the south poles of the magnet, which is what makes the Earth's poles so good for seeing auroras."

As the electrons travel through the atmosphere, they smash into air molecules and excite the atoms, which then give off a glow, much like the way a neon sign works.

### Interesting facts:

- Auroras appear along a hollow oval pattern near both magnetic poles. The frequency of auroras at a given place corresponds to its location in respect to the auroral oval. The South Pole station is just inside the Southern Hemisphere's oval; McMurdo is far inside the oval; and Palmer very far outside the oval.

"Of all the time I've spent at Palmer," Grant said, "I've never seen an aurora there, and I've looked. I've looked hard."



Chris Danals / Special to The Antarctic Sun

## sun dogs

**Best USAP station for viewing this event:** South Pole

**Description and cause:** Sun dogs appear as bright spots in the sky to either side of the sun. They are created by light refracting in airborne ice crystals that have formed from water vapor.

"The ice crystals [that create sun dogs] are all pretty much the same shape," Grant said. "If they are falling horizontally, like a leaf or a piece of paper, the sun enters the edge of the crystal, refracts around inside like a prism and bounces out at a different angle."

Because the crystals are the same shape, light that enters the crystals from the sun exits each crystal in the same way. This causes sun dogs to always appear at the same angle – 22 degrees to the sun.

### Interesting facts:

- Sun dogs are just one of dozens of effects caused by the refraction and reflection of light due to ice crystals in the air. Different ice crystal shapes and orientations cause different effects, including sun halos and sun pillars.

- All of these effects can happen at night as well. "You can have moon pillars, moon halos, and ... I guess they'd be called moon dogs," Grant said.



Troy Wiles / Special to The Antarctic Sun

# around the continent

## PALMER

### Penguins flock to Palmer

By Kerry Kells

*Palmer correspondent*

The research and supply vessel *Laurence M. Gould* returned to Palmer Station this week for an overnight port call. Three new arrivals moved in and five people departed. The new arrivals include team members to Principal Investigator (PI) Maria Vernet's phytoplankton component group, PI Langdon Quetin's krill group and PI Bill Fraser's seabird ecology group. The event was celebrated with a pizza dinner as beautiful weather greeted the *LMG* at Palmer.

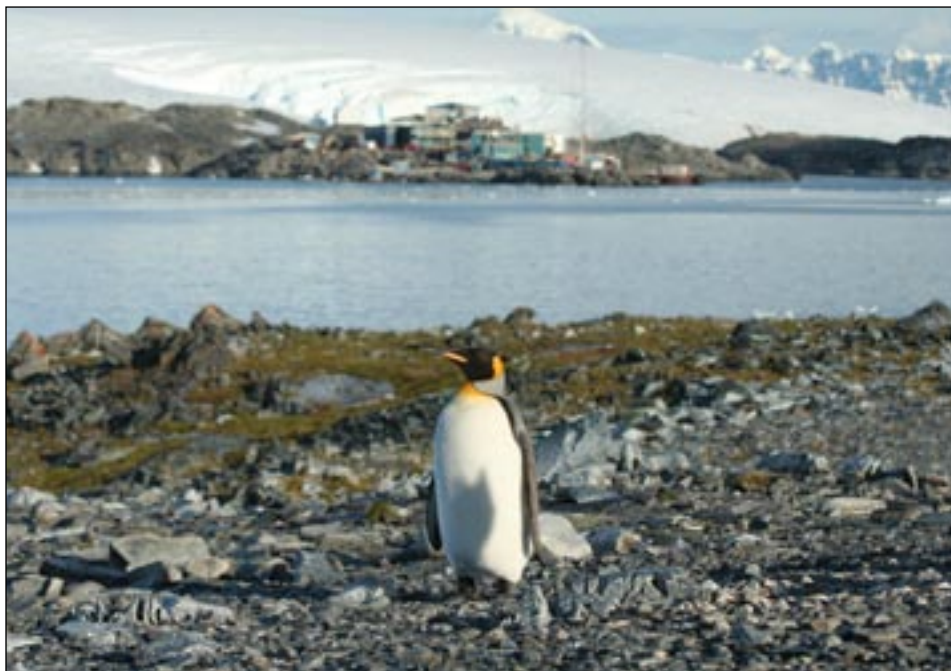
This week we had several penguin visitors to the station. Adélies and chinstraps wandered up on the rocks on Palmer's Gamage Point, giving the community many photo opportunities. Minke whales made a brief appearance off station just to the north in Arthur Harbor last Sunday.

A king penguin was spotted on Torgersen Island. A king penguin at Palmer Station is quite a rare sight; one or two make an appearance about every five years. The closest king penguin breeding colony is at King George Island, but juveniles have been known to wander extensively from their colonies.

The seabird ecology researchers (the birders) continue to visit various islands for their work on the three species of the *Pygoscelis* penguins, which is the genus that includes Adélie, chinstrap and gentoo penguins.

The birders reported that the first Adélie penguin chicks began hatching on Torgersen Island and other parts of the study area. A walk through the colonies is greeted with the soft "peeping" of a few new chicks. Meanwhile, the chinstrap and gentoo penguins continue to incubate their eggs.

The birders reported the arrival of blue-eyed shag (cormorant) chicks at the colony on Cormorant Island. The collection of skua-eaten penguin eggs continues at



Curt Smith / Special to *The Antarctic Sun*

*A king penguin stands on Torgersen Island, located across the water from Palmer Station, on Dec. 11. This species of penguin is a rare sight in the Palmer vicinity.*

Biscoe Island. Research begins on South Polar skua nesting ecology on Shortcut Island, among the work with some of the other birds in the Palmer study area.

Krill researcher Quetin reported that his team has collected several thousand krill in the last few days of transects by Zodiac in the vicinity of Palmer. Our aquarium tanks have also acquired some new underwater wildlife in the form of sea urchins, sea stars, limpets, small amphipods, numerous sea squirts and two fish. All other researchers with Long Term Ecological Research projects continue their sampling in the vicinity of Palmer Station.

Arthur Quinn presented a lecture to the community this week. Quinn is here with David Ruth, a sculptor funded by the National Science Foundation's Antarctic Artists and Writers Program. Quinn is an expert on glue and adhesives and spoke about the types of adhesives he manufac-

tures, including a new type of glue that works underwater and one that will work at negative 30 degrees Celsius.

Quinn and Ruth are at Palmer for a month to capture and translate sea ice textures into glass sculptures. Ruth will take the molded samples back to the United States and begin glass sculptures inspired by the floating ice sculptures he saw at Palmer Station.

## SOUTH POLE

### C-17 to air drop cargo this week

By Charles Redell

*Special to the Sun*

As the middle of summer begins to bear down on Amundsen-Scott South Pole Station, the residents' thoughts are begin-

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### the week in weather

#### McMurdo Station

High: 39 F / 4 C

Low: 12 F / -11 C

Min wind chill: -6 F / -21 C

Max sustained wind: 25 mph / 41 kph

#### Palmer Station

High: 43 F / 6 C

Low: 29 F / -2 C

Max sustained wind: 35 mph / 57 kph

Melted precipitation: 1 mm

#### South Pole Station

High: -15 F / -26 C

Low: -28 F / -33 C

Peak wind: 17 mph / 27 kph

Max. physio-altitude: 3,237 m

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ning to turn not to gingerbread men and Christmas presents but to a test air drop of cargo planned for Tuesday.

The drop will take place about three miles from the skiway and will consist of four platforms rigged with parachutes designed to slow the descent of the cargo and keep the platform upright upon landing. Four teams – each consisting of Pole logistics staff members and one New Zealand Defense Force rigger – will recover the loads. Two U.S. Air Force observers will also be on the ground acting as drop zone commander and safety officers.

In the meantime, the station's three volunteer firefighting teams and one volunteer trauma response team are training for an upcoming mass casualty incident drill, which will test their skills and abilities to treat a large number of emergency victims. Anticipation is running high as members look forward to the chance to put their skills to use without having real casualties.

The South Pole is never without an opportunity to unwind and this week was no exception. All the standard activities, including volleyball, basketball and dodgeball for all three shifts, took place in the station's new gym while documentary film night, sci-fi movie night and game night took place in various lounges.

## SHIPS

### LMG

Compiled from reports by Herb Baker  
*Marine projects coordinator*

The *Laurence M. Gould* headed south from Punta Arenas, Chile, for Palmer Station on Dec. 6. The deteriorating weath-



Rich deLucia / Special to *The Antarctic Sun*

*A C-17 aircraft sits on the sea ice runway in McMurdo. A similar aircraft will be used for a cargo air drop at the South Pole this week.*

er in the Drake Passage the following day didn't impede any scientific sampling, including a conductivity, temperature and depth (CTD) cast.

The trip south also included some reconnaissance work for an upcoming science event at Illiad Glacier that will take place aboard the *Nathaniel B. Palmer*.

After stopping at Palmer Station on Dec. 10, the *LMG* headed to Lapeyriere Bay to look for a possible Zodiac landing site and camping area. No suitable landing sites were found in the bay. The ship began its return trip north across the Drake Passage after this brief stop.

### NBP

Compiled from reports by "Skip" Owen  
*Marine projects coordinator*

The *Nathaniel B. Palmer* headed north toward Lyttelton, New Zealand, after its rendezvous with a helicopter from McMurdo Station last week at the edge of the Ross Ice Shelf. During the return trip

to port on Dec. 6, it conducted a deep CTD cast to 4,200 meters, among other tests.

The vessel made surprisingly good progress north in lighter than anticipated ice conditions on Dec. 7. Imagery had indicated relatively dense pack ice ahead but the crew found that not to be the case and the vessel was well out of the pack ice by the next day.

Winds increased from the northwest on the 9th, but the ride home remained comfortable. The crew began shutting down some experiments, with the last of the deck incubators eventually coming off-line.

Strong winds continued the next day, with gusts of more than 90 kilometers per hour, forcing the *NBP* to modify its course more to the northeast to put the seas behind the vessel. The ship altered course again on the 11th and slowed to 11 kph to allow for easy access to the back deck as the crew moved some equipment and materials around.

The vessel reached port on Dec. 15.

## Continental Drift What was your last job?



**"Selling shoes at the outlets in Maine."**

Kelly Knight  
McMurdo Station  
retail materials person  
Kingston, Wash.  
eighth season



**"Cooking hardy meals for hungry sailors on a 134-foot brigantine, sailing up and down the West Coast."**

Shawn Strange  
Palmer Station  
sous chef  
Oxnard, Calif.  
first season



**"Maintenance supervisor for Helen Newberry Joy Hospital in Newberry, Michigan."**

Robert S. Powell  
South Pole Station  
maintenance coordinator  
Newberry, Mich.  
first season

# Aghion documentary wonders: Does the Antarctic reality measure up to the dream?

By Peter Rejcek  
*Sun staff*

Anne Aghion seemed a little restless as she took a seat at a table in the McMurdo Station Coffee House, a popular meeting place for card games and cappuccinos. She hung up her purplish, puffy ski jacket, which sports a patchwork of duct tape on one shoulder – a typical Antarctic repair job in a place where clothes simply seem to deteriorate over a short period of time.

The passage of time was particularly on Aghion's mind that day. The documentary filmmaker would leave a few days later for a field camp in the McMurdo Dry Valleys, a nearby ice-free area where a number of researchers go to study everything from geology to glaciology. For about seven weeks, she would sit in the back pocket of a small research group searching for fossils in the geological shadows of long-vanished lakes. The visit would comprise a major segment of her film.

She and her two crewmembers, Richard Fleming and Sylvestre Guidi, had been at McMurdo Station since Winfly, when several flights arrive in August to prepare for the busy austral summer, which begins in early October. Aghion said it was important for her to arrive early, and she specifically requested to arrive at Winfly when she submitted her grant proposal to the Antarctic Artists and Writers Program.

"Winfly was important because it seemed like it was going to be more laid back, and it turned out to be," she said. "I wanted to see the station waking up."

During the six weeks of Winfly, the crew set up shop in the Crary Science and Engineering Center, in a lab-cum-studio, to conduct interviews that soon earned the room an ominous nickname – the "interrogation room." She also focused her lens on the only Winfly science group, a team studying ozone depletion led by Jennifer Mercer.

The small Winfly community offered her an opportunity to acclimate and begin fleshing out the film – though Aghion is purposefully vague when plied for details.

"I'm curious to know what drives people here and what keeps them coming back," was as specific an answer she would provide.

The long winter slumber is certainly over now, as the station population swelled to nearly a thousand in the first few weeks of October. For Aghion, the



Allan Ashworth / Special to *The Antarctic Sun*  
*Anne Aghion, Sylvestre Guidi and Richard Fleming, from left to right, spent about six weeks in the McMurdo Dry Valleys documenting scientists Allan Ashworth and Adam Lewis for a film they are making for the Sundance Channel.*

change of pace seemed a bit overwhelming, as familiar faces got lost in the wave of new arrivals.

It was time to find the "peaceful, beautiful, removed" Antarctica she first discovered more than a decade ago when she jumped on a ship from Chile and cruised around the Antarctic Peninsula. In the intervening time, she has produced three very different films that focused on how people recover after cataclysmic events, including two on post-genocide Rwanda. Her second film on Rwandan reconciliation, "In Rwanda We Say ... The Family That Does Not Speak Dies," won her an Emmy for Outstanding Informational Programming in 2005.

It would seem that two places could not be farther apart, figuratively and geographically. But Aghion insists there is a connection. "[Antarctica is] still a very particular situation that you have to adapt to and [to] find your own identity within the group and redefine the group dynamics as well."

One gets the sense that making a film itself is a small cataclysmic event for Aghion, who said it feels like each project takes several lifetimes to complete.

"When you finish a film, you're always a little depressed," she observed.

You would also imagine that doing a film in a sublime setting, away from the oppressive and dark themes of her earlier documentaries, would be a respite for a director. But Aghion has quickly learned something about Antarctica that others have come to know over the last century: the continent is unforgiving and brutal; the cold is numbing and the wind relentless.

"It's emotionally draining in a different way," she said of filming here. "I'm sure that the seven weeks we're going to be in the field will be emotionally draining."

A visit to the film crew's camp more than a month after the Coffee House encounter found Aghion, Fleming and Guidi in surprisingly good spirits, if somewhat dishevelled and sun scorched. What they've learned to call home is not much more than a couple of yellow pup tents and a larger tent that serves as mess hall, film studio and Aghion's bedroom – about the area of a walk-in closet. They share the campsite with a group of scientists led by Allan Ashworth and Adam

**See AGHION on page 10**

**"I'M SURE THAT THE SEVEN WEEKS WE'RE GOING TO BE IN THE FIELD WILL BE EMOTIONALLY DRAINING." — ANNE AGHION, FILMMAKER**

# WIDE OPEN

## Chance for discovery abounds in Antarctic

By Peter Rejcek  
*Sun staff*

Somewhere near the bent elbow of the Taylor Glacier in the McMurdo Dry Valleys, seven people gather in an expedition tent to make grilled cheese sandwiches well soaked in olive oil and to slurp instant soup out of Tupperware bowls.

It's something of a meeting of two tribes that share the same hunting ground. One group is dedicated to science, its members spending their days searching for tiny fossils in the hard, frozen ground to discover evidence of warmer days in the Dry Valleys. The other team is a three-member film crew that is staying nearly two months filming a documentary in the backcountry of Antarctica to find out exactly why scientists do what they do out here.

It's not necessarily a difficult question to answer, even for an outsider spending only a few hours on the ground. Scientists Allan Ashworth and Adam Lewis simply love their job – digging through the earth to discover new pieces to the geologic and climatic puzzle of Antarctica.

Their enthusiasm is obvious and contagious as Ashworth and Lewis lead a visitor through the rock-strewn landscape above the Taylor Valley floor. Ashworth delights in pointing out boulders obliterated by the wind, their mass reduced to a collection of pebbles with an obvious shape and uniformity. Lewis makes sweeping gestures and describes the direction of repeated glaciation here, more than a thousand meters above the valley floor.

"We're trying to complement each other," Ashworth had said during a previous interview.

Indeed, in the field, the two scientists prove to be a yin and yang of knowledge and humor.

Ashworth beckons his visitor to what appears to be a non-descript spot and drops to his knees, where he gently rakes his ice pick through a pile of shale. There:

*Scientist Adam Lewis likes to point out that his group remains in the field without the comforts of a fixed camp or a dedicated cook to prepare meals. Dishes are wiped clean with paper towels. It's a lot like back-country camping, though environmental restrictions ensure all waste is removed and human impacts are kept to a minimum.*



Photos by Peter Rejcek / *The Antarctic Sun*  
*Andrew Podoll and Kelly Gorz, undergraduate students under Allan Ashworth, are working on their own project to map the morphologies and topography of their study area in the McMurdo Dry Valleys using GPS with centimeter accuracy.*

he picks up a chip the size of a half-dollar and turns it over. Crude lines form a shape instantly recognizable even to a neophyte – a leaf, probably from some sort of alpine flora. At this point, the best guess is that the real leaf lived more than 14 million years ago, based on previous discoveries during last year's field season. (See related story on page 1.)

"I think we have been the first people to seek this out," Ashworth says when asked why something virtually sitting on top of the ground has gone unnoticed for so long. "This has major implications."

Lewis soon joins him at the shale pile, and the two begin picking through the rocks and fine sediment like two kids sitting down to make mud pies or shoot marbles in the dirt. It quickly evolves into a contest for who can find the biggest and best-preserved specimen.

"Ah, that's a nice one," remarks Ashworth, showing a highly detailed fossil no more than two centimeters long.

"That's not a fossil," kids Lewis.

Behind the two men, undergraduate students Kelly Gorz and Andrew Podoll from North Dakota State University patiently wait for their mentor and Lewis to finish so they can proceed with their own project. The two students are mapping the area's morphologies and topography with a GPS

unit that sports centimeter accuracy. The top of the unit sticks out of Podoll's backpack like a giant lollipop.

Normally those two slots on the science team would go to graduate students or other researchers, but Ashworth says he feels it's important to nurture science in students. The 62-year-old paleontologist is eyeing retirement in the next few years.

"I wanted two students who were fairly well along with their training," he explains. "Maybe they'll become their own PIs down here ... The NSF was very supportive of the idea of doing it."

Gorz and Podoll say they are still unsure where their careers may eventually take them. But Podoll is already following Ashworth's example in another side project: He maintains a blog ([www.humanedgetech.com/expedition/ant2006/](http://www.humanedgetech.com/expedition/ant2006/)) and corresponds with an eighth-grade class in Fargo, N.D., to help educate students younger than himself.

"These two are taking us under their wing and hopefully we can do the same for this younger generation," Podoll says of Lewis and Ashworth's guidance. "There is so little known [about Antarctica] that it opens the door wide open for exploration."

Tom Wagner, the NSF's manager of the Antarctic geology and geophysics program in the Office of Polar Programs, agreed that the Antarctic offers "blue sky" opportunities because so few areas have been picked over by paleontologists.

"Paleontology makes radical leaps forward by new discoveries in the field," he said. "Apart from Allan and Adam's exciting discoveries, Dr. Julia Clarke at North Carolina State University recently proved that modern birds coexisted with dinosaurs, ending one of the great debates in paleontology with hard evidence from a bird fossil found on an island just off of the Antarctic peninsula."



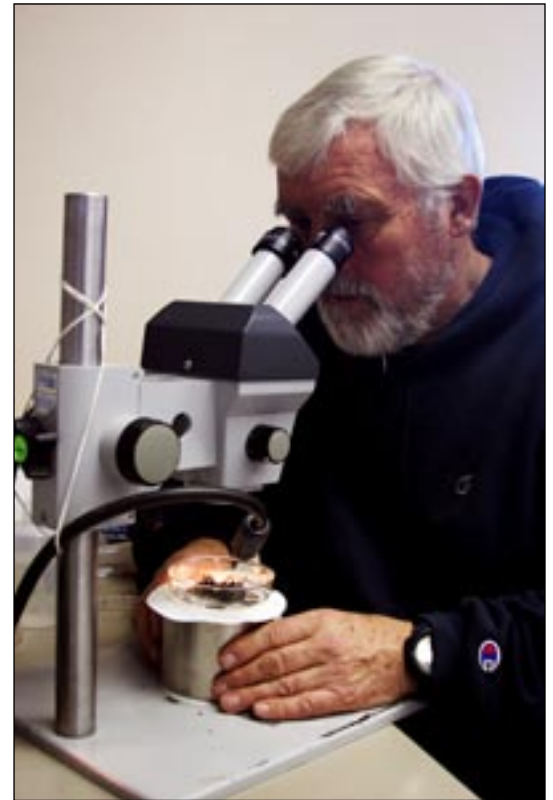




Peter Rejcek / The Antarctic Sun

Above, Adam Lewis clears a trench that unveils layers of sediment deposited in a long-vanished lake on a plateau above the Taylor Valley in the McMurdo Dry Valleys. Where there were lakes, there may have once been life, such as beetles and tundra-like vegetation. All such digs are later refilled to preserve the natural environment.

At right, it's not all about the adventure, dirt and freezing cold: Allan Ashworth in the Crary Lab examines fossils found during last year's field season at Mount Boreas. The team returned to Boreas this year and also searched for fossils in other locations.



Steven Profaizer / The Antarctic Sun

## Climate in valleys changed 14 million years ago

### From page 1

ter this season with Allan Ashworth, a paleontologist from North Dakota State University, and two undergraduate students, Kelly Gorz and Andrew Podoll.

Glacial retreat had created the lakes. But those ancient glaciers weren't your typical dry, frozen rivers of ice that flow through Antarctica today. Lewis and Ashworth say the glaciers that retreated from the valley floor were akin to those found in temperate climates, like New Zealand's Fox Glacier on the South Island.

The difference is an important one to help them prove a warmer climate existed 14 million year ago before conditions turned colder and drier. Today's Antarctic glaciers are like nearly flawless diamonds. Or as Lewis describes them: "These glaciers in Antarctica today are clean. They are solid ice all the way through. They have virtually nothing in them."

In contrast, temperate glaciers, like the Fox, slide along on a liquid base and constantly pick up rock and sediment like what would happen if you rolled a ball of glue across a floor littered with crumbs.

"They have sediment in them. They produce moraines," Lewis said.

A moraine is an accumulation of rock debris carried on or deposited by a glacier. The moraines created by these ancient glaciers were fairly large, Lewis said, so when the glaciers finally retreated, the

moraine would have trapped the melt water and formed the little lake in the Olympus Range where the scientists found a number of millimeter-sized fossils, including moss, diatoms, beetles and tiny crustaceans.

"The shape of the moraine is preserved, in part, on the surface," Ashworth said.

Moraines are made up of a fine material called till. Wind drives out the finer particles, but the large rocks and boulders remain, essentially retaining the shape of the moraine.

"How many places can you actually find a shadow of a moraine on a 14 million-year-old surface? There's no other place on Earth," Ashworth said.

However, if the warm and wet climate had persisted after 14 million years ago, erosion would have eventually worn away the rocks and the remaining lake sediments where the fossils were found. That never occurred.

"So something big happened in there," Ashworth explained. "The big thing that happened is that the climate changed in a completely different style." The Dry Valleys grew much colder and drier, snuffing out life in what the scientists postulate was a tundra-like environment before the deep freeze came. The climate shift acted like putting the landscape in a freezer, helping to preserve the sediments and fossils, though winds continue to erode the sediments.

"We're very fortunate to be seeing what's left of it because there was sediment of sands, gravel and bouldery till on top. [The surface has] been slowly deflating ... over time," Lewis said, adding that snow covers half the lake, which also helps preserve the fossil-rich site.

"Here we are in this landscape where chemical processes act so slowly that it's here for us to see," he said.

Now one of the tasks remaining for scientists is to understand how the fossils got where they are today. The continent has been isolated for more than 30 million years, since Antarctica broke apart from South America as the southern supercontinent Gondwana fractured and separated. For 15 to 20 million years after the breakup, those organisms had maintained a foothold on the continent until they essentially froze to death.

"Those fossils are descendents of organisms that have always been in Antarctica," Ashworth said. "The implication is that Antarctica couldn't have become really cold ... until after 14 million years ago."

The fossils the team has found are related to living organisms today in places like Australia and South America. Many of the organisms were previously unknown to exist in Antarctica, forcing biologists to reconsider the evolutionary histories of

**See CLIMATE on page 10**

## Aghion came to continent with no expectations

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Lewis.

Both scientists, veterans of primitive Antarctic camping, admitted they've been impressed by the hardness of the film crew. Ashworth said he didn't think the trio would last more than two weeks in the backcountry conditions.

"There's nothing prima donna about these guys," conceded Ashworth.

Lewis admitted to some misgivings about being paired with a documentary film crew during his team's entire field season. But, he said, the experience wasn't what he had expected. "We didn't think we would be that filmable."

For her part, Aghion remained coy about the direction of the film, which will air next year on the Sundance Channel, to coincide with the International Polar Year.

"I had an idea of where I want to be and where I want to look but I have no idea of what I'm going to find," she said. "That's the kind of film that I make. I let the filmmaking drive me [to] what it's going to be and not the other way around."

"In a way, I had no idea of what to expect," she added. "It's almost like I didn't want to have a precise idea of what I wanted to expect. If you have a pre-



Peter Rejcek / The Antarctic Sun

*Anne Aghion volunteers to cook a lunch of grilled cheese sandwiches for her film crew and Allan Ashworth's science team during a break from work in the McMurdo Dry Valleys. To see the life behind the science, Aghion and crew camped and lived alongside the researchers for nearly two months.*

cise idea, you can fall into preconceived notions, which is not good."

The question she originally posed on her Web site before she arrived here had wondered, "Does the reality measure up to the dream?"

It's still a question she's not prepared to answer.

"It's a little complicated. ... It's not

black or white," she said, pausing long in the struggle to articulate her experience thus far. "I haven't figured it out yet. I don't know if I will. I don't know if anybody has the answer."

*NSF-funded research in this story: Anne Aghion, Antarctic Artists and Writers Program, [www.anneaghionfilms.com](http://www.anneaghionfilms.com) and [www.livingantarctica.org](http://www.livingantarctica.org).*

## Climate change snuffed out ancient tundra ecosystem

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some of the organisms, according to Ashworth.

Dating the site back to 14 million years, based on the recovered volcanic ash, could also add yet another chapter in the continent's



Peter Rejcek / The Antarctic Sun

*Adam Lewis, left, and Allan Ashworth look for fossilized leaves on a plateau above the Taylor Valley, while undergraduate students Andrew Podoll and Kelly Gorz wait to trek back to camp.*

climatic history, a volume that seems to be under constant revision these days as scientists make new discoveries and develop new techniques for dating.

Lewis indicated that the fossilized lake site certainly indicates a turning point for plant and animal life in Antarctica as the climate shifted to colder and drier. "We might have the last survivors," he said, "that's the neat thing. After 14 million years ago, we can't find any more evidence of warmth, at least not here in the Dry Valleys."

Added Ashworth, "This is a big deal, because this is only the second place in Antarctica where fossils of this ... age have been found." The other place was the Beardmore Glacier, where Ashworth led a team that unearthed another long-vanished tundra environment. (See the Dec. 28, 2003, issue of *The Antarctic Sun*.)

The age of the fossils at the Beardmore site, however, are harder to pin down because of the absence of volcanic ash layer in the sediment deposits. Very different estimates for the Beardmore deposit exist, Ashworth said. Some indicate they could be as young as 3 million years while other estimates provide evidence that the fossils are as old as those found in the Dry Valleys. The conflicting interpretations are still being debated and studied.

"We don't know, at the moment, how this story is going to pan out," Ashworth said.

*Sun staffer Steven Profaizer contributed to this story. NSF funded research in this story: Allan Ashworth, North Dakota State University.*

# Alternative energy could mean a windfall for USAP

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the tremendous expense of getting fuel to the Pole may make the low winds there worth harnessing, according to a report by the National Renewable Energy Laboratory.

- **Foundation:** The volcanic rock at McMurdo is well-suited for placement of wind turbines, he said. The South Pole, again, is problematic because the towers would have to be anchored into the ice. "If we built a tower to put a wind turbine on, it has to be engineered in a bit different way," Blaisdell said. "It's not insurmountable, but it's very different than at McMurdo."

- **Real estate:** Room for towers at South Pole is not a problem, but there are few sites available at McMurdo.

- **Science:** The first three factors are important anywhere wind power is considered, but Antarctic stations present a particular challenge that may be the toughest of all. Any system must work alongside research efforts, which is an issue at both stations.

"The nature of the science projects that are going on at South Pole makes it the case that almost any kind of electromagnetic or electrical signatures from any kind of device interferes with something," Blaisdell said.

At McMurdo, he said that there is not much exposed rock and, "the best places in terms of wind regime are, of course, higher places and that's where we've got other kinds of electromagnetic-producing things."

Indeed, Arrival Heights is within sight of some of the best areas and it is an Antarctic Specially Protected Area to help maintain its status as an electromagnetic "quiet site."

## Going green?

In spite of the challenge in finding turbine locations that offer a good wind regime and that do not interfere with sensitive scientific research, the U.S. Antarctic Program, in a project led by Antarctica New Zealand (ANZ), is pressing on with a plan to install wind turbines at McMurdo.



*Matt Strine works in front of some of the massive diesel-powered generators that power McMurdo Station. The National Science Foundation plans to install wind turbines in the next few years to reduce the U.S. Antarctic Program's reliance on fossil fuels.*

"So, where are we?" Blaisdell said. "In McMurdo, we are doing investigations of the wind regime and the constructability from the standpoint of the strength and the amount of ice in the rock where these towers will be founded. We're doing that at several sites in the McMurdo area with the goal of having some towers come down with [the January 2008] supply vessel."

Once the towers have been installed and tested in McMurdo, he said, the possibility of adding wind turbines at South Pole may be considered.

One of the reasons for working with ANZ, in addition to taking advantage of Kiwi expertise in the field, is having some degree of redundancy.

"There will be tremendous amounts of similarity, if not identical wind turbines and towers throughout the development," Blaisdell said, "so that one type of training and one type of tools and parts are needed to maintain it."

While there is a possibility that one wind farm will be built to provide electricity to both stations, he said it is probable that the towers will be in more than

one location. Not only might that take better advantage of the limited real estate options but would likely result in shorter power lines and lower energy loss.

## The other green

Another reason for pursuing alternative forms of energy is the bottom line. Simply getting diesel fuel to Antarctica is an expensive proposition.

As Blaisdell drew the picture:

"Every kilowatt that we can produce from resources that are there – namely the wind – is a few gallons less of fuel that we need to purchase in Greece or Australia, put on a tanker, bring down to about 70 degrees south, have an icebreaker plow a path to drive that tanker into McMurdo, pump it off and store it in very large storage tanks because we can only fill them up once a year.

"Then, in the case of South Pole, fly to South Pole burning approximately one and a half to almost two gallons of that fuel to deliver one gallon there. So there's no question that this has a lot of economics advantages."

There is a precedent in

Antarctic wind generation and it has been a money-saver.

The Australian Antarctic Division installed two 300-kilowatt generators at its Mawson station in 2002 and they have been considered a "huge success," according to Jeremy Bonnice, infrastructure engineer with the division.

He said the turbines, which work in tandem with a diesel power station, have produced an average of 33 percent fuel savings per year.

The Mawson network is designed so that the diesel generators fill the gap left by the wind turbines, but the alternative energy is used first. Bonnice said that was a bit of a challenge in the beginning.

"From a technical point of view, there were several issues that were unique to our situation," he said, "the most demanding being the integration of the wind turbines with the existing diesel generators and using as much of the 'free' wind energy as possible."

He said they have continued "tweaking" the system since its installation to maximize fuel savings while minimizing power outages.

# Profile Getting it all on tape

By Steven Profaizer

*Sun staff*

There's a flurry of video cameras around Antarctica this season. The Discovery Channel, the Sundance Channel, NOVA – the National Science Foundation has brought them all here to capture images of the mysterious seventh continent.

One cameraman doesn't attract as much attention as the high-profile visitors but will prove to produce the most-watched footage among U.S. Antarctic Program participants.

Ralph Maestas works as the USAP multimedia producer, taping archive footage and editing USAP videos such as orientation, safety and training presentations.

Antarctica is the latest stop for Maestas during a diverse career set into motion by a song on the radio.

In 1992, Maestas was much like many recent graduates, college diploma in hand and no clear path in front of him. He had just graduated from University of Southern Colorado with a degree in mass communication and television production, and he was filled with a desire to really "do something" with his life.

He was sitting in a car with a friend one day discussing the next step in his life, when he hit a breaking point and half-jokingly made a decision.

"I said, 'The next song that comes on the radio is going to tell me what to do with my life,'" Maestas said.

And as The Animals sang out the words to "We Gotta Get Out of This Place," Ralph made up his mind to move away from his home in Colorado to Los Angeles and make a serious go at his career.

Maestas arrived in Los Angeles with only \$25 left to his name and started looking for work.

"It's pretty tough in L.A.," he said. "At some point not too long after I got there, I thought, 'This may not have been smart.'"

Within a few weeks, however, things started to come together, and Maestas began to weave together a career from a wide variety of jobs.

His first Los Angeles jobs were working as an extra in TV shows. He sipped milk shakes while the undercover Power Rangers talked about teen life and saving the world. And he donned a suit for a solo stroll down a hall on Unsolved Mysteries, as Robert Stack narrated part of the episode's story.

"I didn't act to act," Maestas said. "I did it because it was way fun."

A few summers later in Los Angeles, he joined the paparazzi and captured images of celebrities going about their lives "just to see what it was like."

And it didn't take him long to learn.



Steven Profaizer / The Antarctic Sun

*Ralph Maestas films from the back of a snowmobile driven by Mike Jayred at the WAIS field camp Dec. 8. Maestas is the multimedia producer for the U.S. Antarctic Program.*

"I felt like a cockroach," Maestas said. "And it was too much work, too many late nights."

He scored numerous shots of the Seinfeld cast during that summer and stumbled upon the opportunity in New Orleans to film Drew Carey in an embarrassing situation.

"I think I sold that one to Hard Copy," Maestas said. "So then [Drew Carey] ends up writing about it in his book and ended up talking about it in Jay Leno. It was funny to see that and be like, 'Man, I caused that.'"

When the piece was about to air on Hard Copy, the producers asked Maestas to go on the show and talk about the clip, but a scheduling conflict prevented him from making the appearance.

"They actually ended up having someone play me," he said. "It was pretty funny."

Most of his work in the City of Angels, however, was in advertising. He had been interested in TV commercials since he was a kid and found he really enjoyed that application of his skills.

"You could see what you were working on," Maestas said. "I'd go to bars to watch football games or whatever, and I'd see people's reaction to the television commercials that we produced. It was cool to see that response."

During his nine years in advertising, he worked with many high-profile directors, such as David Lynch and the Coen brothers, who produced commercials for the agencies with which he worked.

Just last year, he decided it was time for a fresh start as he felt his job growing stale.

"Something happens in advertising when the product starts to sell itself, advertising kind of plateaus, and there are no more really good ideas. They're just ideas that are safe," Maestas said. "I felt I was in a safe environment where I could do the same thing over and over every day and that would get me through and pay bills, but where's the satisfaction?"

And about a week and half after an Internet job search turned up a video position deploying to Antarctica, he was a full-time member of the USAP preparing for his first deployment.

Now in his second season, the 37-year-old Maestas is continuing his effort to upgrade the program's current video collection.

"That's part of the reason I wanted to come back," he said. "I wanted to keep building on what I started. I think I've built a pretty good foundation."

To retrieve the necessary footage for the new videos and the NSF's video library, his position requires him to travel around the continent more than most people in the program, but life as a cameraman isn't all glitz and glamour.

"A lot of the time I'm just looking through the little viewfinder, so staying on my feet is sometimes hard," Maestas said. "Today, I fell for the 17th time so far this season, and last season I was at 22. So I'm well ahead of the game, and I'll probably beat the 22."

He has also had to face some unique challenges working in Antarctica, such as the extreme cold making the videotape brittle and breakable if fast forwarded or rewound in the field.

"People will be like, 'Oh, let me see that,'" he said. "And then you let them see it, and they're like, 'Oh, that's cool. Let me see it again.' And you rewind and ... 'Oh no.'"

He has also learned how to thaw the cold reactions some people have toward being filmed.

"I've learned that I shouldn't come in and just start shooting like John Wayne," Maestas said. "I've found that I need to get into the community I'm filming first. If you just come in with your camera blazing, people are going to hate you. ... If you become part of the community, people will warm up to you."