



Scientists traverse East Antarctica for ice cores

By Peter Rejcek
Sun staff

Antarctic science requires many different methods in the pursuit of knowledge about the seventh continent and its place in the global ecosystem. The deeply browned face and ruddy cheeks of Paul Mayewski tell a story of scientists who understand the value of spending extended time in the environment they study.

“That’s very important,” said Mayewski, the director of the Climate Change Institute at the University of Maine. “It allows the scientists to develop, not just a scientific explanation, but an intuition about what the environment is like. That’s what we do: we’re interpreting the environment. If you don’t live in it, spend a lot of time in it, it’s very hard to do.”

Mayewski and colleagues from three other institutions completed a month-long overland traverse of a short stretch of East Antarctica in mid-January as part of the United States component of the International Trans Antarctic Scientific Expedition (ITASE). Twenty nations comprise ITASE, a cooperative effort to describe and understand Antarctic environmental change

See ITASE on page 8



Photos by Dan Dixon / Special to *The Antarctic Sun*



Above, Brian Welch operates the ITASE deep radar system during the group’s traverse of East Antarctica. The ITASE tractor train, left, began the journey from Taylor Dome this season.

Water, water everywhere



Peter Rejcek / *The Antarctic Sun*

Open water returns to the Cape Royds Adélie penguin rookery. The calving of giant icebergs in 2000 kept the sea ice from blowing out of McMurdo Sound. The ice caused a significant decline in the colony’s population because of the great distance from Cape Royds to the ice edge. The icebergs are now gone.

Evans makes historic return to Mount Vinson

By Steve Martaindale
Sun staff

Looking back 40 years, John Evans tells the story that conquering Antarctica’s tallest peak was made possible through a decision based on a nation’s pride. Looking back less than four weeks, he tells the story of an attempted re-conquest that came down to swallowing one’s individual pride.

Evans was the chief scientist on a 10-man expedition.
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Quote of the Week

“I don’t know why I’d ever question a DA.”

– Woman receiving advice from dining hall attendant.

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Lightning strikes

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At the ice edge



Photos by Peter Rejcek / The Antarctic Sun



The annual sea ice loosened its grip on Ross Island a little this summer, with open water reaching about 6 miles from McMurdo Station. This has allowed marine animals to gain easier access to the area, such as orca and minke whales spotted near the ice edge.

Cold, hard facts

Mount Vinson

The mountain is located **about 750 miles from the South Pole**.

It is about **13 miles long and 8 miles wide**.

Its summit sits **16,066 feet above sea level**, making it Antarctica's tallest mountain.

The mountain was named after **Carl Vinson**, a U.S. Congressman from Georgia who was a key supporter of funding for Antarctic research.

Mount Vinson is also called **Vinson Massif**. The word massif is taken from French and refers to a large mountain or compact group of connected mountains that form an independent portion of a range.

Mount Vinson is part of the **Sentinel Range**, a large Antarctic mountain range that stretches out 115 miles long by 15 to 30 miles wide.

Source: wikipedia.org, Geographic Names of the Antarctic

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Level 1 Comix

Matt Davidson



American, Kiwi visitors get up close to research

A 50th anniversary celebration for Scott Base drew visiting dignitaries from New Zealand and the United States, which share a close relationship in the Antarctic partly due to the proximity of the countries' two main stations.

In addition to attending the celebration on Jan. 20 at Scott Base, the American delegation – which included National Science Foundation Director Arden Bement – toured the science and support facilities at McMurdo Station and visited several scientists in the field.

The other Americans in the party included William McCormick, U.S. ambassador to New Zealand and Samoa, along with two members of the U.S. State Department, Claudia McMurray, assistant secretary of the Bureau of Oceans and International Environmental and Scientific Affairs, and Glyn Davies, deputy assistant secretary of East Asian and Pacific Affairs.



Photos by Peter Rejcek / The Antarctic Sun

Scientist Bruce Marsh, kneeling, describes his work to Bement, center, and McMurray while the rest of his science team looks on at right. Marsh is studying planetary magmatism in the McMurdo Dry Valleys. His group creates three-dimensional maps to assist in their research.



Manager of USAP Science Field Support, Brian Johnson, far right, explains how his department operates to a group of New Zealand and American dignitaries in front of the Berg Field Center on Jan. 20. New Zealand Prime Minister Helen Clark, center, looks on.



Crary Science and Engineering Center supervisor Cara Sucher gives a tour of McMurdo Station's main science building to, from left, McMurray, Clark, her husband Peter Davis and Davies on Jan. 20.

Scientist Andrew Fountain, left, provides commentary about the ecosystem of the McMurdo Dry Valleys to Bement during a helicopter ride that included visits to several field camps on Jan. 21.



Nigel Watson, executive director of the New Zealand Antarctic Heritage Trust, gives the visiting American delegation a tour of the restoration work under way at Ernest Shackleton's historic hut at Cape Royds on Jan. 21.

Network uses radio waves to log lightning

By Peter Rejcek
Sun staff

Scientists creating a network to triangulate and pinpoint lightning strikes around the world are using a very narrow band of radio waves to detect the phenomena over long distances.

The small network of very low frequency (VLF) receivers includes stations in the Antarctic, including at Palmer Station. VLF generally refers to radio frequencies in the range of 3 to 30 kilohertz.

Stanford University graduate student Ryan Said is building the lightning detection and geo-location network as part of his Ph.D. thesis for the VLF Research Group, one of several groups in the Space, Telecommunications and Radioscience (STAR) Laboratory, a research team within the Department of Electrical Engineering at the university. Umrans Inan is the director of the lab and the principal investigator for the lightning triangulation program.

Every lightning strike generates a strong electromagnetic pulse, according to Said. He takes the recorded radio pulses created by an individual lightning strike from three or more geographically separate receiver stations to triangulate its location, he explained.

“So, with our receiver at Palmer, another receiver in Alaska, and a third receiver in Indiana, I can detect and triangulate most lightning activity in the United States,” he said during e-mail and phone interviews. “At Palmer, with the incredibly quiet noise environment, we can detect most cloud-to-ground lightning flashes as far as Canada.”

Pinpointing lightning strikes is not new. The U.S. National Lightning Detection Network, operated by a commercial business called Vaisala, uses more than 100 ground-based sensors to monitor lightning continuously across the continental United States. The system is used for everything from air traffic control to help with forecasting severe weather.

But such a ground-based, high radio frequency network cannot cover the distance across oceans, Said pointed out. “That’s where the VLF content shines because it can travel these great distances and allow us to geo-locate regions of the globe that aren’t easily accessible by close-range receivers.” He is still tweaking the accuracy and efficiency of the system and will publish the final results by June 2008.

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. As the ice particles within a cloud grow and interact, they collide, fracture and break apart. The smaller particles tend to acquire a positive charge, while the larger particles acquire a negative charge.



Courtesy of Ryan Said / Special to *The Antarctic Sun*



Courtesy of NOAA

These particles then separate. The upper portion of the cloud acquires a net positive charge, and the lower portion of the cloud becomes negatively charged. This separation produces enormous electrical potential both within the cloud and between the cloud and ground. Eventually the electrical resistance in the air breaks down and a flash begins.

The network also offers further opportunities for atmospheric research, according to Said.

“From a scientific research standpoint, lightning strikes are a source of several interesting physical phenomena, and having a database of lightning strike locations and times will aid in the investigation of these phenomena,” he noted.

One such phenomenon is called an LEP event – lightning-induced electron precipitation. A small portion of the energy created by a lightning strike as it travels along the Earth’s ionosphere “leaks” into the region of space that’s closest to the planet, the magnetosphere, which is dominated by the Earth’s magnetic field. In the magnetosphere, high-energy particles from solar winds bounce back and forth between the northern and southern hemispheres like ping pong balls, trapped by the magnetic field.

However, some of the leaked energy

Above, Ryan Said kneels by an array antenna near Palmer Station in 2004. Said’s network of very low frequency receivers uses the electromagnetic pulse generated by a lightning strike to triangulate the strike’s location.

from the lightning strike that travels along the ionosphere (which exists along the inner edge of the magnetosphere) will interact with these trapped particles, essentially driving them deep enough into the atmosphere to cause the LEP event. In some limited cases, the lightning geo-location system can detect the electron precipitation.

More receivers are planned for the network. Another VLF Research Group graduate student, Andrew Gibby, will travel to the Antarctic Peninsula later this year to install a parallel antenna and data receiver at Vernadsky Station, in coordination with the Ukrainian National Antarctic Program.

The network already includes stations in Antarctica, Alaska, California and Indiana – enough to provide coverage across North and South America as well as the eastern Pacific Ocean. International partners include Israel, though the establishment of a global geo-location network is out of the scope of his project at this time, according to Said.

“With a few stations we can geo-locate in a huge region at a relatively low cost,” he said. “Global coverage is a long-term goal.”

NSF-funded research in this story: Umrans Inan, Stanford University, www-star.stanford.edu.

around the continent

PALMER

Royal visit at Palmer Station

By Kerry Kells

Palmer correspondent

Palmer received an important visitor on Jan. 20 – Her Royal Highness, Princess Anne, the only daughter of Queen Elizabeth II and Prince Phillip, Duke of Edinburgh. The princess was visiting Palmer Station for the first time.

Princess Anne, patron of the United Kingdom Antarctic Heritage Trust, was on an eight-day tour of the Antarctic Peninsula aboard the British Royal Navy's HMS *Endurance*.

The princess' stops included the British Antarctic Survey's year-round Rothera Station; the Ukrainian Station, Vernadsky; Palmer Station and several historic sites in the area.

Accompanying the princess were her husband, Rear Adm. Timothy Laurence of the British Royal Navy; Jane Rumble of the Foreign and Commonwealth Office; Philippa Foster Back, chair of the UK Antarctic Heritage Trust; Capt. Nick Lambert of the *Endurance*; the helicopter crew and a Royal Navy photographer.

This is the second visit to Antarctica by Princess Anne, including her visit to Ross Island in February 2002 for the 100th anniversary of Robert Scott's arrival in McMurdo Sound.

The Antarctic Heritage Trust researches and seeks to preserve the Ross Island historic huts at Hut Point, Cape Evans and Cape Royds, among other sites.

Princess Anne was given a tour of Palmer Station. A reception rounded out the visit, after which the princess and her husband departed the station.

There were plenty of other visitors over the last week as Palmer's tourist season remained in high gear.

Some of the cruise ships sent passengers for tours of Palmer Station and some received off-shore lectures.

We began the week hosting eight pas-



Christina Hammock / Special to *The Antarctic Sun*

Penguins jump from the water as they swim in front of Palmer Station on Jan. 22.

sengers from the motorized yacht *Whale Song*. This was followed by a cruise ship, the *National Geographic Endeavour*, which had been chartered by members of the World Presidents' Organization. These individuals had all been presidents or CEOs of a business before they were 40 years old.

On Jan. 18, the cruise ship *Ushuaia* visited Palmer Station. The following day, the sailing yacht *Le Sourire*, with mostly French-Canadian passengers, arrived for a quick tour of the station. The *Rotterdam* stopped near station that afternoon and members of the community went out to the ship to give presentations.

On Jan. 16, the R/V *Laurence M. Gould* came within sight of Palmer Station again while taking high-density gridline measurements for the Palmer Long Term Ecological Research project.

Krill researcher Alex Lowe and our

boating coordinator went out to meet the LMG with a specially equipped Zodiac to assist in sampling along the grid for the day.

Palmer rounded out the week with a sunny day and low winds on Sunday, perfect for boating.

SOUTH

Film festival highlights week

By Susannah Coates

South Pole correspondent

Don't blink! You might miss something. Despite the end of the season rapidly approaching, stuff is still happening at Pole.

The new IceCube Lab has begun operation. The 10-meter-wide mirror of the

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the week in weather

McMurdo Station

High: 45 F / 7 C

Low: 19 F / -7 C

Max. sustained winds: 31 mph / 50 kph

Min. wind chill: 7 F / -14 C

Palmer Station

High: 47 F / 8 C

Low: 33 F / 0 C

Max. sustained wind: 20 mph / 32 kph

Melted precipitation: 1 mm

South Pole Station

High: -12 F / -24 C

Low: -24 F / -31 C

Peak wind: 21 mph / 34 kph

Max. physio altitude: 3,160 m

Continent From page 5

South Pole Telescope is in place, and its 218 panels positioned and calibrated to within a fraction of a millimeter.

Station operations continue apace. Planes have brought about 8 million pounds of passengers, fuel and cargo to station this season. On Jan. 20, the South Pole was 1,175,698 pounds ahead of schedule.

This is a record-breaking year for flights, with 202 arriving before Christmas, compared to the next biggest season in 1998-99 with 153.

While stuff comes and stuff goes, some things stay. Traditions carry on, providing continuity from year to year, and this week saw one of the highlights of summer – SPIFF! The South Pole International Film Festival is amateur movie-making at its finest.

The premiere of this season's SPIFF submissions was Jan. 20.

Well before the dining hall cleaned up from dinner at 7:30, "campers" were staking out tables and settling in for the long haul. Some chatted and others broke out cards or dominos. Spirits ran high as attendees awaited the film festival to begin at 9 p.m.

At last, the windows were blocked with cardboard, the lights turned down and the volume turned up. It's fortunate we had a microphone for the emcees, otherwise no one would have been able to hear them over the enthusiastic cheering and whistles of the gathered masses.

It began with a spoof of a spoof.

- "Bouncing Round the Pole" was an inspired take-off of an "extreme trampoline" mockumentary from the Banff Film Festival shown earlier in the season at McMurdo and subsequently at Pole.

- "Ring-Tailed Lemur" proved to be an excellent and informative look at this rare,

and until now, thoroughly elusive resident of the polar plateau.

- "Ursus Maritimus" chronicled the havoc and mayhem wreaked by a polar bear arriving on station, and the adventures of the hapless "Not So Great White Hunter" called in to remedy the problem.

- "Airdrop" was a wonderful montage of still photography and movies taken the day of the first C-17 airdrop on continent.

- "Turkey Dance" revealed a strange family tradition of our lovely safety guru, Lynette Stauch.

- "Chasing Cars" showcased Forrest Banks' cinematographic acumen as he presented a story completely out of order, in which all the pieces made sense at the end.

- "Most Wanted" was a guessing game for the audience, as unidentified Polies revealed not-so-widely-known facts about themselves.

- "Zebragone" took us on a rather surreal tour of the station and its inhabitants.

- "Fat in the Saddle," a sastrugi Western, made use of the Conestoga wagons that one of the science groups actually uses.

- "Shark Attack" was a chilling tale of horror unleashed because we dug too deep.

- "Real Men Wear Speedos" ... well, that's rather self-explanatory, is it not?

- "Hotel California" chronicled what really went on in the 27-bunk dorm room at McMurdo Station when it was filled with en route Polies for several weeks, earning the nickname, Man Camp.

- "SPANFF" took a well-rounded look into extreme puppet sports.

- And finally, "The Secret Life of Bunny Boots" revealed what we have long suspected about the curious abundance of this breed of footwear.

The film festival served as a nice distraction as we headed into another week of preparing the station for the rapidly approaching winter and the last flight of the summer on Feb. 17.

SHIPS

NBP

Compiled from reports by Jim Dolan
Marine projects coordinator

The *Nathaniel B. Palmer* began the week continuing its study of geological features of the seabed around the Adare Trough in the Ross Sea. On Jan. 18, weather reports indicated a large storm moving in, so the crew decided to put some distance between the *NBP* and the westward moving storm by steaming east.

But the plan to escape the weather by retreating was met with ice conditions that forced a re-evaluation of the course, and the *NBP* returned west to the Adare Trough.

Wind and rough seas again increased the following day and deployment of scientific equipment had to be abandoned. By the end of day, winds were blowing at a steady 40 mph, and the seas were rocking the *NBP* with steep 15-foot swells.

On Jan. 20, the winds again increased in strength and held steady throughout the day. The *NBP* remained in stand-down for two days until better weather arrived on Jan. 22, and scientific operations resumed.

LMG

Compiled from reports by Andrew Nunn
Marine projects coordinator

The *Laurence M. Gould* continued on its Palmer Long Term Ecological Research cruise this week, serving as the platform for a wide variety of science.

The ship dropped off a group of bird researchers on Avian Island on Jan. 20. The team transported to the island via Zodiac once the *LMG* was near the shore.

The birders will remain on Avian Island for five to six days to take a census of the birds as well as conduct a number of other scientific studies.

Continental Drift What Antarctic science interests you and why?



"The social sciences."

Richard Lamanna
McMurdo Station
recreation coordinator
Seattle, Wash.
second season



"The sub-glacial lakes are really interesting to me. You never know what kind of (little) monsters we could discover down there. It's like finding a microbial Sasquatch!"

Alex Lowe
Palmer Station
krill field team leader
Seattle, Wash.
first season



"Anything having to do with climate change. If we don't study it, some people will never believe humans are causing it and can fix it!"

Charlie Redell
South Pole Station
kitchen materials person
Seattle, Wash.
first season

Air Force gets thrill from Hillary's visit

By John Henzell

Special to the Sun

McChord Air Force Base pilot Lt. Col. Greg Pyke has flown countless trips to Antarctica, but nothing prepared him for the cargo he had the honor of carrying on his final mission Jan. 18.

Pyke learned that Everest conqueror Sir Edmund Hillary was due to return to Antarctica to celebrate the 50th anniversary of the New Zealand base he built there. Then the Tacoma, Wash.-based C-17 pilot learned that he had been chosen for the privilege of taking the 87-year-old adventurer on what is expected to be his final trip to Antarctica.

"I've been doing this for a while. I've got over 50 missions to Antarctica, but I've lost count," Pyke said.

"This is my last flight before I retire from Antarctic missions. When they heard Ed Hillary was going to Antarctica, my squadron commander said I'd be flying it, and I should pick the guys I wanted to fly with."

Hillary, it turns out, has a sizeable fan club at McChord Air Force Base, which includes Pyke. Competition for the other places on the flight deck became fierce.

"One of them was an instructor coming down here. He's a big mountaineer, and he's read all Hillary's books," he said.

"So when he found out Hillary was going to Antarctica, he called and said he'd do anything to get on that flight – anything – to see him and meet him. He just couldn't believe it."

The flight included New Zealand Prime Minister Helen Clark, who also visited the flight deck.

Pyke said it was an honor and a privilege to chat with the first man to climb Everest and the first man to drive to the South Pole.

Hillary said visiting the flight deck was a highlight.

"It was quite exciting. I've been on flight decks in other parts of the world but not here," he said.

Hillary returned the favor by signing books, copies of the New Zealand \$5 note – which carries an image of Hillary, the only living person other than Queen Elizabeth II to have appeared on New Zealand currency – and even the front page of the Christchurch newspaper that featured a photo of Hillary.

Pyke's co-pilot, Lt. Col. Lane Seaholm, said the experience would be one of his favorite flying memories.

"What an honor to meet him and what a nice guy," he said. "He's a legend and what a privilege it is to meet someone like that."

"We've got lots of fans of his back at McChord Air Force Base. People who



John Henzell / Special to *The Antarctic Sun*



Peter Rejcek / *The Antarctic Sun*

Above, Sir Edmund Hillary (left) sits in the cockpit of a C-17 aircraft with aircraft commander Lt. Col. Greg Pyke and co-pilot Lt. Col. Lane Seaholm (obscured). Hillary came to Antarctica last week to observe the 50th anniversary of the founding of New Zealand's Scott Base.

Left, Hillary descends onto the ice at Pegasus White Ice Runway on Jan. 18, with New Zealand Prime Minister Helen Clark behind him.

didn't get on the flight gave us books for him to sign. We also had him sign the \$5 note. He was just wonderful about it."

Seaholm plans to frame the signed front page, to be flanked by photos of Hillary on the flight deck.

As the jet approached the ice runway, Hillary and Clark accepted an invitation to return to the flight deck to watch Pyke land on the ice runway for the final time in his career.

Afterwards, Hillary stepped gingerly onto the frozen sea ice that serves as a summertime runway for the American and New Zealand stations, a huge smile breaking out across his face.

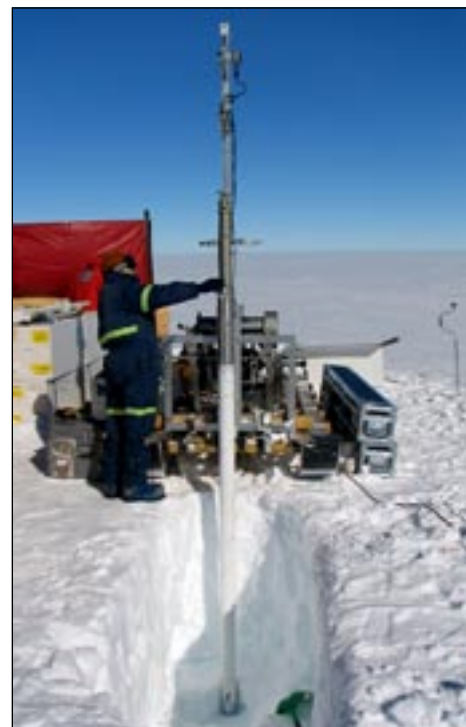
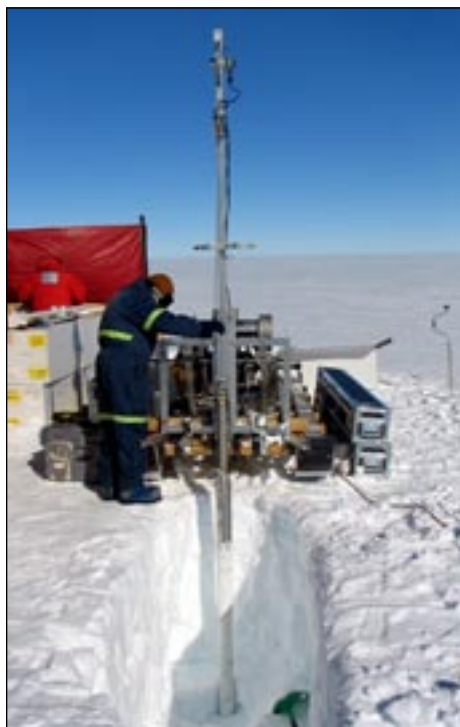
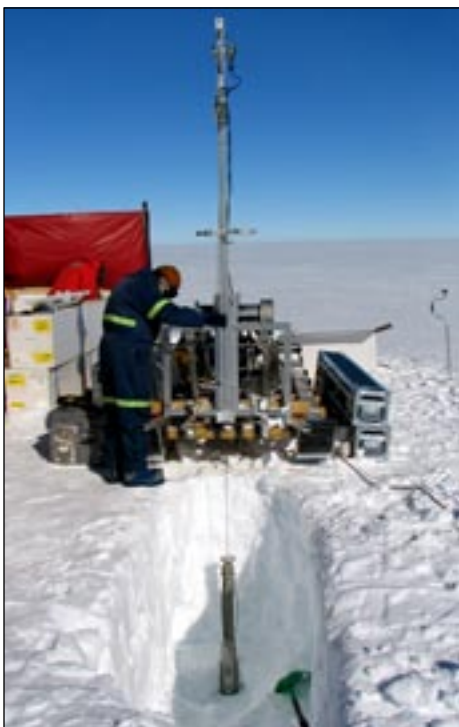
"It feels great. I can hardly believe it," he said. "It's a great thrill to come back and to see all the old mountains."

Asked if he had envisioned returning to Antarctica 50 years after building the first Scott Base, Hillary laughed and replied, "I didn't even know I was going to be here after 50 years."

Despite landing in one of the most isolated places on earth, Hillary emerged from the jet to face a phalanx of cameras and journalists, who had accompanied him and the New Zealand prime minister for the visit.

Once he had completed media interviews, a tracked snow vehicle ferried Hillary to New Zealand's Scott Base, where he settled into a lounge chair with a cup of tea and declared he was "ready to not do anything."

John Henzell is a reporter for The Press in Christchurch.



Photos by Dan Dixon / Special to *The Antarctic Sun*

The series of photos on this page and the next show driller Mike Waszkiewicz operating the Eclipse three-inch ice core drill and pulling a core out of a snow pit. The ITASE team took four deep cores of 100 meters in depth along its traverse route.

ITASE after continent's recent climate record

From page 1

in a regional and global context over the last 200 to 1,000 years.

They can reconstruct the climate and atmospheric conditions by collecting samples and data through a variety of methods such as drilling ice cores to 100 meters, using ground-penetrating radar that peers to the bedrock underneath the ice sheets, and mapping the topography of the surface with high-precision GPS.

The program's overarching goal is to develop a baseline of data about Antarctica's climate to help interpret whether future changes around the continent are part of a natural pattern or anomalies caused by human influences as the global climate changes, according to Mayewski.

"Our goal, along with all the other ITASE countries, is to put together a reconstruction for climate in at least the last 200 years," he explained, "... if not back to a thousand years, and use that to understand how the system operates and to determine whether the changes that are occurring now are unique."

The timelines are not arbitrary. The 200-year timeframe encompasses a period when the human fingerprint from pollutants should begin to show itself in the chemistry of the ice cores. The relatively brief time period also lends itself to easier dating of the layers of the ice cores, which scientists read like tree rings. For example, researchers can identify sulfate

concentrations from the major eruption of Indonesia's Mount Tambora in 1815.

"This means we can calibrate our records back to that," Mayewski said.

And in the last millennium, there have been documented natural climatic cycles of warmer and colder periods. The scientists want to characterize these natural variations to determine if future climate anomalies are analogous to the past or not.

Down to a quadrillion

The Antarctic continent is far from being one huge, homogenous ice cube. ITASE scientists have found from their first series of traverses from 1999 to 2003 across West Antarctica great variability in snow accumulation rates as well as some of the reasons behind that variance. They determined precipitation in the interior of the continent is relatively stable but also identified some regions of the Antarctic that may be on the verge of dramatic change.

"It's an immense place, and there's a lot of variability. It's so dynamic it may not be that easy to tell how much it's going to change," said Mayewski, the principal investigator of the 13-person team that traveled on sleds and farm tractors – two Caterpillar Challenger 55s – across 460 kilometers of snow and ice.

"This place is potentially a bellwether for what's happening in the whole planet," he added.

The group started the scientific traverse on Dec. 13 from Taylor Dome, an elliptical ice ridge that rises about 2,400 meters above sea level. Its equipment had been left at Taylor Dome following a logistics traverse from the South Pole during the 2003-04 austral summer season.

Dan Dixon, an ITASE veteran, also participated in the South Pole to Taylor Dome journey, collecting ice cores from East Antarctica along the 2,500-kilometer route. A doctoral student from the Climate Change Institute, Dixon researches past Antarctic climate using ice core chemistry.

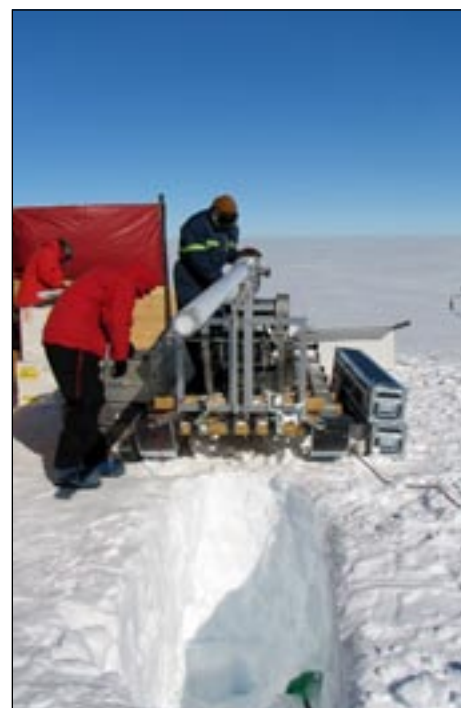
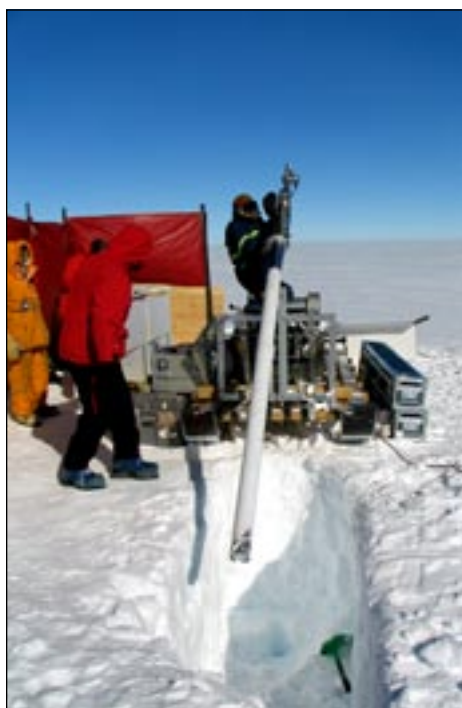
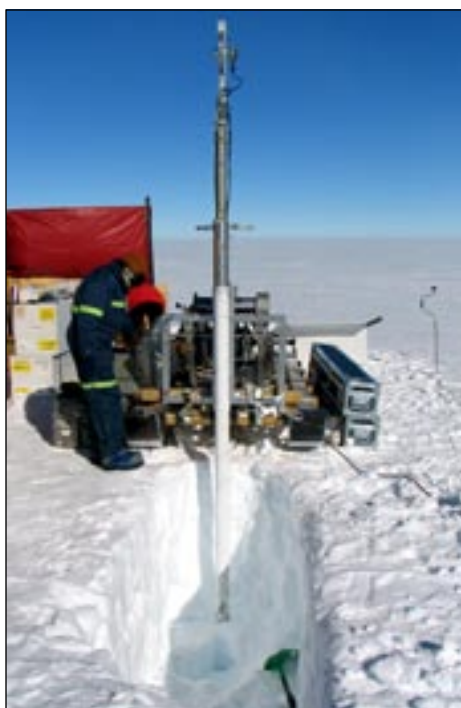
Lab analysis of the cores has revealed the start of anthropogenically introduced chemicals such as lead, although increased levels of pollutants such as nitrate and sulfate, which are very high in the Northern Hemisphere, are not yet rising over Antarctica. Advances in lab analysis allow Dixon and others to make chemical measurements of the atmosphere in the ice cores down to one part per quadrillion.

"We're almost down to atoms," Dixon said.

Down to the bedrock

The team also uses several different types of radars for its work on the ice sheet. One is ground-penetrating radar that looks at the upper 15 meters of ice. It is used primarily for operations – snooping out crevasses. The radar is attached to a 10-meter-long

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Photos by Dan Dixon / Special to *The Antarctic Sun*

The series of photos on this page and the previous show driller Mike Waszkiewicz operating the Eclipse three-inch ice core drill and pulling a core out of a snow pit. The cores will tell the team something about the climate history of Antarctica up to a thousand years ago.

East Antarctica more dynamic than first thought

From page 8

boom in front of a PistenBully that rides at the head of the heavy traverse train.

“This is a critical piece of safety equipment for the team as crevasses, cracks in the ice, can be so large here that the trains could literally be swallowed up,” wrote Lora Koenig on the team’s online journal while it was at Taylor Dome preparing for the traverse. Koenig, a doctoral student at the University of Washington, is interested in how space-borne satellites monitor snow properties over ice sheets. During the traverse, she also used high-frequency radar to penetrate the top meter of snow to image grain size, stratigraphy and thermal conductivity. She will compare those measurements to models of microwave remote sensing data of the ice sheet to determine the accuracy of the latter.

Another radar penetrates about 100 meters, the same depth of the deepest cores the team took this season. Finally, deep-penetrating radar can see down thousands of meters to the sub-glacial bedrock. The radar operated continuously and picked out details of the bedrock the scientists had not seen before, as well as the existence of a couple of small, sub-glacial lakes.

“We’re interested in understanding, from this radar, the ice dynamics,” Mayewski said. Based on data from previous ice cores, the team can use the radars to find certain reflectors in the ice that it can date to a certain time period. The scientists then calculate the changes in snow accumula-

tion while dragging the radar along the traverse route.

Brian Welch from St. Olaf College in Minnesota operated the deep radar system, which trailed behind on a separate sled at the end of one of the two tractor trains. The instrument can detect whether water sits between the top of the bedrock and the bottom of the ice sheet. That’s important for understanding ice flow: the ice moves faster if it’s not frozen to the bedrock.

“At Byrd Glacier, the bedrock is really, really bright,” said Welch, who accompanied the ITASE team on three previous traverses of West Antarctica. “That means there’s water down there. If there’s water there, the ice can start flowing much faster.

“[East Antarctica] looks a lot more like what you would expect if you were doing seismology in sand dune areas than what you would expect to see in East Antarctica,” he added. “East Antarctica is a much more dynamic place than we thought it was.”

Down to the core

Gordon Hamilton is another ITASE member with previous Antarctic field experience in the program. A research associate professor at the Climate Change Institute, Hamilton studies the topography of the ice sheet to understand how it affects the speed of the wind across the surface, a factor in the transportation and accumulation of snow. He also uses high-precision GPS to create a detailed map of the sampling areas.

“For understanding the ice core record, we have to know what the surface slope is from where the cores are [taken],” Hamilton explained.

In a related ITASE project, Hamilton revisited previous traverse sampling sites near the WAIS Divide field camp in West Antarctica with graduate student Leigh Stearns. The surveys will help the researchers calculate ice flow velocities and determine rates of ice sheet thickness change.

Another one of Hamilton’s research goals is to understand the contribution of ice sheet melt to sea level rise. Satellite imagery can determine thickness but not density, hence the need for the ice cores.

His graduate student, physicist Dan Breton, built an ice core density analyzer that the team uses to image the ice cores during the traverse.

The density gauge uses low-energy gamma rays to determine the ice density, not unlike a bone density scan that uses X-rays to determine density by the absorption of the beam. Each density test on a one-meter-long sample can take upwards of 45 minutes to complete.

The first-year Ph.D. student said he had a relatively short time to assemble the instrument and looks forward to making some tweaks before next year’s field season, which is scheduled to end at South Pole.

“It’s really been a scramble to design it, engineer it, fix everything that didn’t

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Courtesy of Val Carroll / Special to The Antarctic Sun

The original members of the American Antarctic Mountaineering Expedition pose for a photo on their return to McMurdo Station on Jan. 17, 1967. Pictured are (standing from left) John Evans, Dick Wahlstrom, Nick Clinch, Barry Corbet, Pete Schoening, (kneeling from left) Charley Hollister, Sam Silverstein, Brian Marts, Bill Long and Eiichi Fukushima. The 1966-67 expedition made the first ascents of Antarctica's four highest summits, including Mount Vinson, Mount Tyree, Mount Shinn and Mount Ostenso, along with two other peaks.



Val Carroll / Special to The Antarctic Sun

John Evans, 68, sports a busted lip and a sun-scoured face shortly after his return to Denver, Colo., from attempting to summit Antarctica's highest peak 40 years after becoming one of the first people to do so as part of an American science expedition.

Mount Vinson '66 climb sparked interest in Antarctica

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dition in December 1966 that became the first to summit Mount Vinson, the 16,066-foot-tall crown of the Sentinel Range in the Ellsworth Mountains, located between the Antarctic Peninsula and the South Pole.

He and three other members of the original team – Eiichi Fukushima, Brian Marts and Sam Silverstein – had an opportunity last month to repeat the climb of Antarctica's tallest mountain. Silverstein was never able to acclimatize and withdrew from the base camp before the ascent began. In addition, two other original climbers were represented: Bill Long's son Brooke and Pete Schoening's daughter Lisa.

The team moved on to high camp and made their assault on Christmas Day. Evans, 68, summed up the result without sugar-coating.

"Well, we didn't make the summit and the reason why, I guess, is because we just didn't have enough juice," he said.

Things had progressed incredibly well before the altitude and the climb took their toll, he said by phone from the Denver office of Raytheon Polar Services Co., where he coordinates special science projects.

"I remember feeling more than good, feeling just super," he said. "This was Christmas Day as we were starting out and I was thinking, 'This is so cool; we're

finally doing this after all this time, and on the way down, I'm going to sing Christmas carols because I can get my breath.'

"But then, it just wasn't working out, and I wasn't going very fast. ... It just took us forever. I don't think any of us – certainly not myself – realized just how slow we were going. It was hugely disappointing."

He was quick to compliment guides Timothy Hewette and Patricia Soto Borquez from Antarctic Logistics & Expeditions, a commercial venture that escorts adventure tourists to Antarctica and which sponsored the anniversary trip.

"The facts of the matter are that we weren't really going very well," he said, adding that Hewette gave the team members adequate opportunity to achieve the summit before coaxing them into retreating to camp. Things turned out differently 40 years ago, as was well documented in a feature article in the June 1967 edition of National Geographic magazine.

Making history

The existence of the Sentinel Range was not even known until the mountains were seen and photographed on reconnaissance flights of U.S. Navy aircraft from Byrd Station in January 1958, according to the United States Board on Geographic Names. Evans said photographs were printed in an international mountain climbing publication in the early 1960s.

"All of a sudden," he said, "mountaineers worldwide ... saw the pictures and read the write-up about the mountains in the Sentinel Range and little mental light bulbs started going on all over the world: 'Now, wouldn't that be cool to get in there and do it.'"

Numerous individuals and groups tried to put together expeditions to climb Vinson. Evans was a charter member of one of those groups, whose proposal to the National Science Foundation (NSF) was denied in early 1966. But as other countries started talking about sponsoring such a climb, it kindled official interests in the United States.

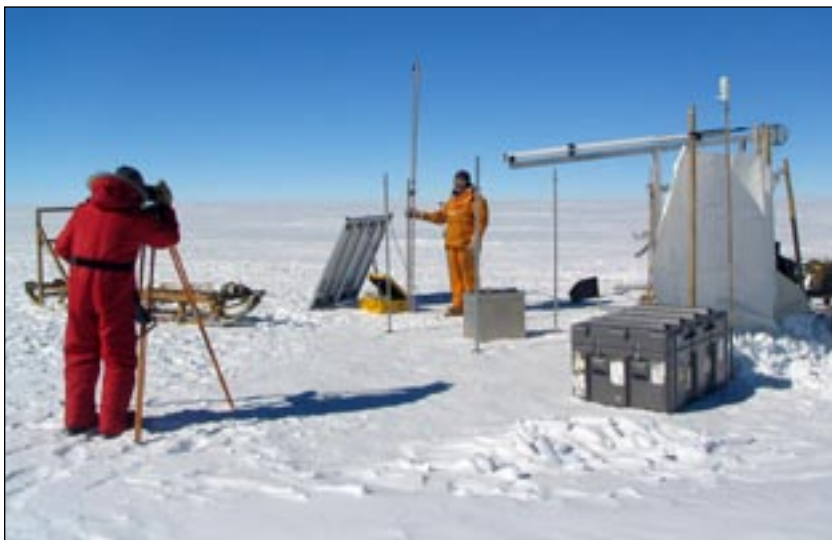
He said it was apparently decided that, in view of all the work the U.S. Antarctic Program had invested in the continent, "Wouldn't it be a shame if, after all this, some other country came in and planted their flag on the top of the highest peak?"

Meanwhile, Evans had returned from a summer job at McMurdo Station to continue working on his graduate degree in geology at the University of Minnesota. Late in October 1966, the expedition was given a tentative green light, thanks in part to a partnership between the NSF and the National Geographic Society, which ultimately agreed to provide funding.

"I was totally surprised that funding came through," he said. "But once it did I

See TYREE on page 11

South Pole next stop for ITASE in 2007-08

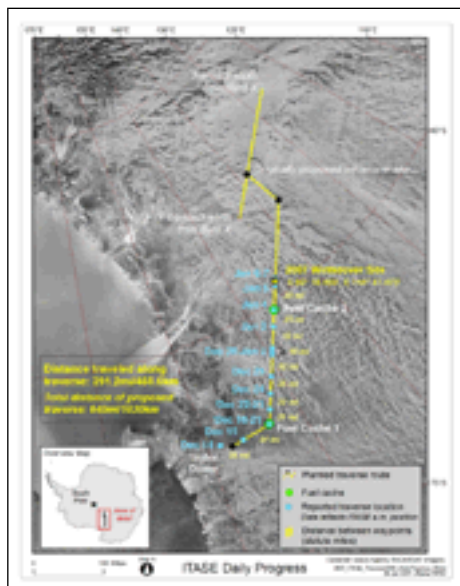


Photos by Dan Dixon / Special to *The Antarctic Sun*

ITASE scientist Gordon Hamilton, left, takes a survey reading to determine the rate of snow accumulation on the East Antarctic ice sheet.



Welder Edgar Vega makes a visit from McMurdo Station to Taylor Dome to help repair ITASE equipment before the traverse began.



Courtesy of Jess Walker / Special to *The Antarctic Sun*

A GIS map shows the ITASE traverse route from Taylor Dome. A late start prevented the team from completing its goal of 1,030 kilometers.

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work and get it ready to go,” he said of the homemade density analyzer.

This was Breton’s first season in Antarctica. Expecting temperatures on the polar plateau in at least the negative 40 degrees Celsius range, he built a large, insulated wood box to hold all of the electronics for the density analyzer. It turned out the austral summer was not so harsh, and Breton’s equipment overheated. He had to drill holes in the box to provide ventilation.

“Until you have a firsthand knowledge of what it’s really like [here],” he noted, “it’s difficult to design instrumentation that’s really fit for what you’re doing.”

Down for next season

Andrei Kubatov said that ITASE is not only a unique platform for science but an excellent opportunity for teaching young scientists in the field.

“It’s very important,” said Kubatov, a research assistant professor with the Climate Change Institute whose work revolves around how volcanic eruptions force climate change.

Mayewski likened the experience to an apprenticeship. “We like to think we’re producing field savvy scientists who can take care of themselves really well in these extreme environments and understand how to have a good time and do a lot of good science,” he said.

For Koenig, the University of Washington graduate student, the traverse got her out from behind a computer screen and into an environment where “every day was different.”

“I usually look at ice sheets from a satellite,” she said.

Next year, the ITASE team will have to cover far more ground to reach the South Pole from where it left its equipment and vehicles. Several other countries are also doing ITASE traverses next year in conjunction with the International Polar Year, according to Mayewski.

“There’s plenty more to learn in East Antarctica,” Mayewski said. “Every year the program gets better and better.”

NSF-funded research in this story: Paul Mayewski and Gordon Hamilton, Climate Change Institute at University of Maine, www2.umaine.edu/USITASE.

Tyree still tops Vinson climb for proudest moment

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wasn’t surprised that I made the cut. I was doing a lot of climbing at the time, and besides, I was the only one who had actually worked in that range.”

However, he was caught off-guard, he said, when, “to my surprise and horror, I was drafted to be the chief scientist.” With the help of his advisor at school, he put together a research proposal in one day and air-mailed it to the NSF to meet a last-minute deadline.

“Fortuitously, the very oldest rock exposure in the entire Sentinel Range is right at the base of Vinson,” Evans said. Sampling

this outcrop became a part of the research proposal which also included collecting other rock samples and taking other measurements. The proposal was accepted.

What they found when they arrived was a relatively easy ascent to the summit of Vinson, the highest peak, but they also climbed several others that were “way more interesting from a mountaineering standpoint.”

The 15,919-foot Mount Tyree was and remains a significant challenge.

“The second-highest peak on the continent is the real deal,” Evans said. “Two of us luckily got to the summit of that ...

and there have been only seven people in the history of the world that have stepped on that one, as opposed to thousands on Vinson.”

Some of those thousands of people, who spend large sums of money to attempt Antarctica’s tallest peak, helped make clear to Evans the historic nature of his initial climb.

During the anniversary trip, he said his team met many travelers from other groups who asked to have their photos taken with Evans and the others.

“I never felt like such a hero in my life,” he said.

Profile Scientist revisits Antarctica

By Steve Martindale
Sun staff

A business card can sometimes tell a lot about a person, more than just name, rank and phone number. Take the card handed out by Bill Sladen.

The first thing that catches one's eye is the artwork, a silhouetted image of a person in an ultralight aircraft, followed by seven long-necked birds in flight. It lists the Web site trumpeterswans.org.

Then one notices the name: "William J.L. Sladen, M.D., D.Phil." At the bottom of the card, it is noted that he is a professor emeritus at Johns Hopkins Medical Institutions.

In the middle is his contact information ... to one side. On the other side is complementary information for Environmental Studies at Airlie, a division of the International Academy for Preventive Medicine.

At 86 years old, Sladen would be promptly forgiven for handing out cards that say, "Retired – No Job – No Worries," but a quick conversation gives the impression that he has no interest in slowing down, especially while visiting the continent he first saw just shy of 60 years ago.

A noted ornithologist, he is at McMurdo Station for the first time since 1970 (though he sailed the Weddell Sea for his 80th birthday) to complete something of a circle in his work with Adélie penguins.

From 1959-1970, Sladen conducted an ongoing study of penguins at Cape Crozier and Cape Royds. An avid photographer, he filmed "Penguin City," which was broadcast on CBS and BBC TV.

During the last two years of his study, he was assisted by graduate student David Ainley, who resumed the penguin studies a couple of years after Sladen left and has maintained them since. Sladen's most recent trip to the Ice was to assist filmmaker Lloyd Nales with a new film, "Penguin Science," about Ainley's work. Sladen says

they are updating his original film for the International Polar Year, which begins in March.

Early days

Sladen says there were two stages to his Antarctic career. The first was set by him initially pursuing a medical degree in his native England during World War II.

"Being a medical man," he says, "I got the job [in the Antarctic] and then I was able to do the biology I most wanted."

His first year in Antarctica began in the 1948-49 summer as part of the Falkland Islands Dependency Survey, now called the British Antarctic Survey.

"For the British, I was medical officer and biologist – amateur biologist, because I didn't have a degree in biology – and photographer." His group put in at Hope Bay on the very tip of the Antarctic Peninsula.

"It ended up with a lot of tragedy," Sladen says. "I started my penguin work, and the colony was about a mile from our hut. I lived in a Scott polar tent there. One day, I came back in a blizzard and found the whole hut blazing. Actually, it was a tragic fire. The rest of our team was out surveying by dog sledge, and we lost [scientists Oliver Burd and Michael Green] on that occasion. I was by myself in a tent for about two or three weeks."

He spent the next year at Signy Island in the South Orkneys. He did research on penguins those two years that earned his doctorate in zoology at Oxford. He also researched upper respiratory bacteria and pathogens in his teammates to finish the requirements for his second medical degree.

Then came the event that set the second stage of his Antarctic experience. He received a Rockefeller Fellowship to come to the United States in 1956, and he got involved in the first stages of the U.S. Antarctic Research Program.

"At that time, I helped establish the first bio-medical pro-



Peter Rejcek / The Antarctic Sun

William J.L. Sladen, right, shows Sir Edmund Hillary where he signed a book when the conquerer of Mount Everest visited Sladen at Cape Crozier years ago. The two octogenarians – Sladen the scientist and Hillary the explorer – revisited Ross Island recently.

gram of USARP and, of course, a study of the Adélie penguins at Cape Crozier," he says.

Sladen says that they placed identification bands on 5,000 young penguins each year at Cape Crozier in order to build a population of known-age birds.

"Actually, we made the first banding in 1959 with Navy help from the icebreaker *Staten Island*, but started seriously in 1960. That continued until 1970, when I did my last season there." The close monitoring that goes with the program is quite interesting, he says.

"If you know these birds as individuals, it's really fascinating, absolutely fascinating," he says. "The older birds come back each year and tend to keep their original mates. The 'divorce rate' in the younger birds is about the same as in America. That is why we called it 'Penguin City.'"

To the Arctic

In the late 1960s, Sladen also spent time in the Arctic, studying swan and goose migration, as he studied the South Polar skua in Antarctica.

In 1975, he was invited to Wrangel Island in Siberia, where Russian snow geese breed. They

winter in British Columbia, Washington or California.

His work teaching migratory routes to young geese, cranes and swans earned him a footnote in pop culture as well when he served as wildlife consultant to the popular 1996 movie, "Fly Away Home."

As in the fictionalized movie story, his program has used ultralight aircraft, as well as ground-based methods, to teach routes to birds. Unlike many smaller birds that migrate instinctively, birds such as the trumpeter swan must be taught migration routes. Sladen says that once these orphaned birds, whose parents have died or become unable to fly, are led from their breeding grounds to winter nesting areas, they find their way back and will repeat the course the next year.

Currently, he's seeking funding to test a hypothesis that the birds can learn the routes passively. The plan involves suspending caged birds underneath a dirigible type of airship and traveling the migration route. Such a procedure would be much safer for humans and less expensive, he says.

Maybe there's room at the bottom of his business card.