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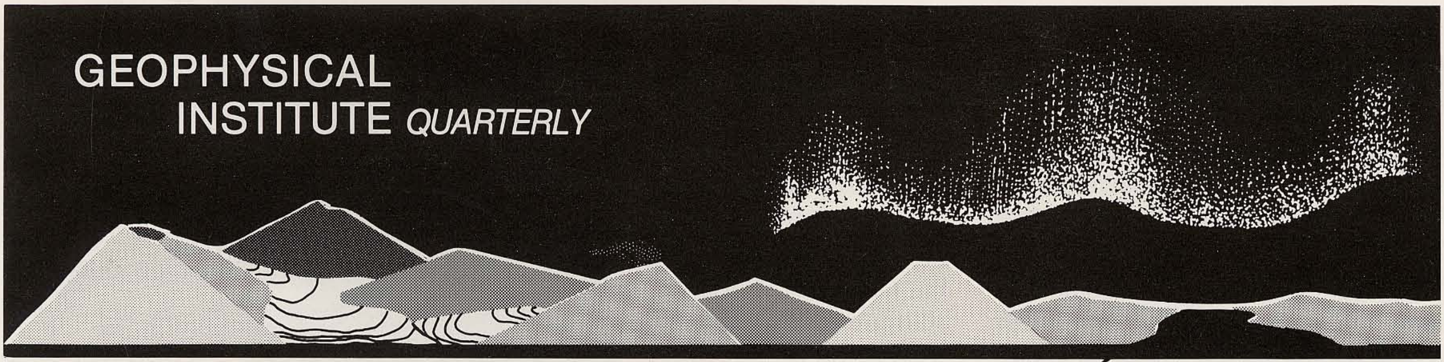


Vol. 12 No. 1 Fall 1993

Unusual Flashes above Clouds Captured on Video

Huge flashes of light that appeared above storm clouds and extended through the ozone layer into the upper atmosphere were captured this summer on videotape by Geophysical Institute professors Davis Sentman and Eugene Wescott.

The flashes occurred above a severe thunderstorm in the Midwest and were recorded using a special low-light-level all-sky camera aboard a NASA research aircraft flying nearby.

Since their documentation, the unexpected flashes have sparked national interest in a phenomenon most scientists previously did not know existed.

"For years, it has been believed that the area in which these flashes occur is quiet, calm, tame, almost boring," Sentman said.

He and Wescott suspected otherwise, and their suspicions were confirmed during their flight on NASA's DC-8 Airborne Laboratory. Flying near the thunderstorm at an altitude of about 40,000 feet, the team captured 19 examples of the flashes, which last for less than 1/30th of a second, and are estimated to be about 25 miles tall, 6 miles wide, and greater than 240 cubic miles in volume.

"In form, the flashes look like carrots or tall jellyfish," Wescott said.

One flash was recorded for about every 300 cloud-to-ground lightning strikes during the NASA mission, which flew over Kansas, Iowa, and Nebraska between 10 p.m. and midnight on July 8.

Since they are associated with thunderstorms and lightning, scientists suspect the flashes may be a form of electrical discharge. If so, they could present a danger to high-altitude planes. They also could be responsible for creating a host of chemical reactions in the upper atmosphere, including modifications of atmospheric ozone.

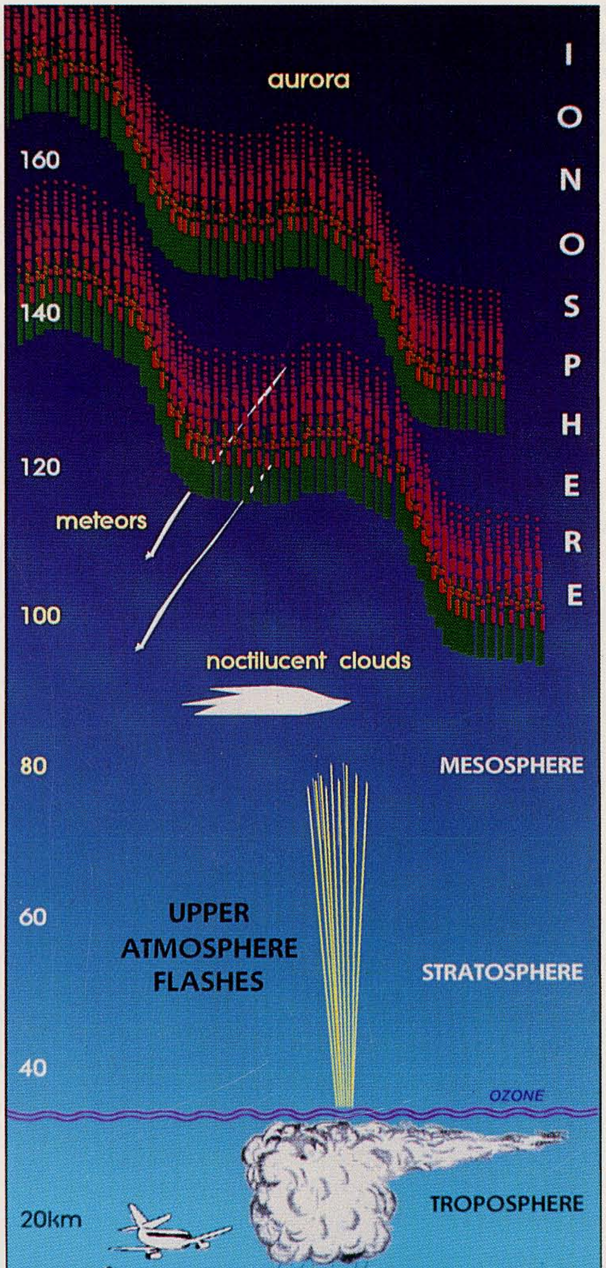
Other theories suggest the flashes could be glow discharges similar to light emanating from a neon tube, or possibly a more passive phenomenon involving the absorption of naturally occurring ultraviolet light or X-rays.

Interestingly, most flashes did not appear to come directly from the storm below. "There was usually a vertical gap between the clouds and the flashes," Wescott said.

Pilots and other skywatchers have reported seeing momentary flashes above thunderstorm clouds as early as 1886, but the reports were generally ignored by the science community because they were undocumented and unexpected. Sentman and Wescott's research

Continued on page 7

DEBORAH COCCIA / PHOTO-GRAPHICS



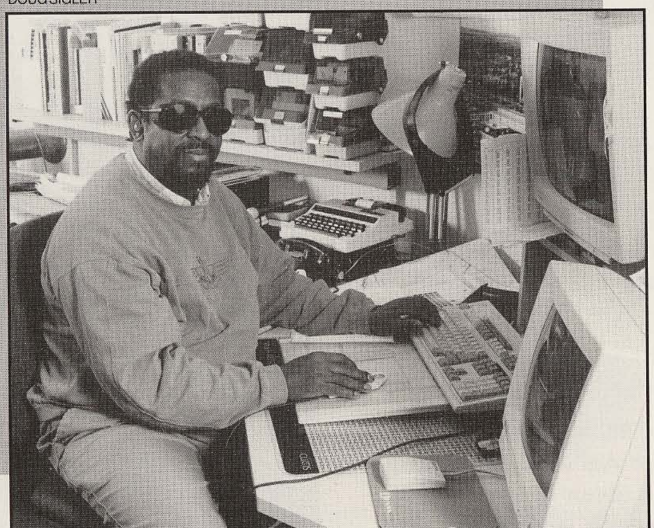
UNIVERSITY OF ALASKA FAIRBANKS

Helping Society See

Although his vision is impaired, Jim Burton has developed great insight into the hearts of people, especially those with disabilities.

As a man who once lived in a healthy body and is now dealing with Usher Syndrome, Burton has overcome handicaps in all areas of his life. As a result of the progressive disease, he's losing his hearing and eyesight, but not his passion for helping others.

DOUG SIGLER



Burton has been an active participant in federal and statewide service organizations for years. He's a member of the National Federation of the Blind and he served on an Alaska committee to implement the 1973 Disabilities Act.

Recently, he was appointed by Governor Walter Hickel to a two-year term on Alaska's Statewide Independent Living Council, a group charged with setting up guidelines to govern the operation and funding of "independent living centers," organizations that provide services for disabled people.

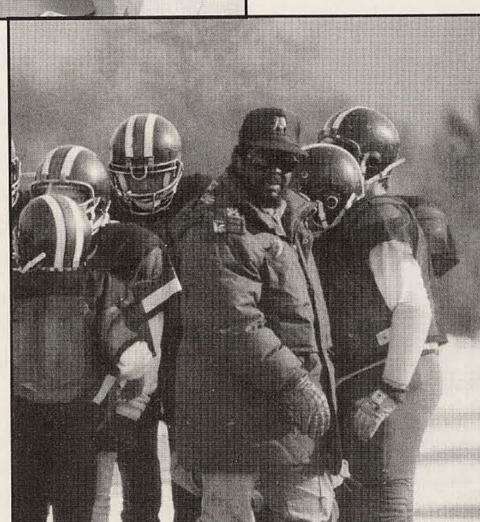
"In broad terms, the centers work to help remove physical barriers to transportation and access, and they help remove mental barriers with education," Burton said.

Although he wears hearing aids in both ears, is considered legally blind, and walks with a white cane at night, Burton is still able to volunteer in the local community. He has coached youth football teams in Fairbanks since 1981, and serves on the board of directors for the Fairbanks Youth Center.

In his spare time, he teaches classes at UAF's Downtown Center and he's writing a proposal to secure funds to train disabled people in computer-aided design drafting, his line of work. His aim is to help the newly disabled person get back into a job as quickly as possible.

As a computer drafting specialist with the Photo-Graphics Service Center at the Geophysical Institute, Burton uses software to help researchers draft and design tools associated with their projects.

"I work with anyone who has an idea," Burton said, "whether they want to design instruments the size of a briefcase or as large as a building."



DOUG SIGLER

Since he started work at the institute in 1973, Burton has helped professors design heavy equipment, an array of antennas, special tools for cutting ice, and even a rail system for a rocket launch at Poker Flat Research Range. He's reshaped architectural drawings to conform to requests and he's worked with the institute machine shop to create models and true-sized replicas of instruments needed for specific purposes. He's also created maps, graphs, and line drawings of existing structures for publication; he's currently producing a set of drawings of the observatory in Kaktovik so rocket scientists visiting Poker Flat can plan where to place their instruments without first visiting the remote site.

Burton works on the projects from a bank of computers in his shared office, which contains a clock that regularly broadcasts the time and is unusually dark to accommodate his sensitivity to light. Since his disease was diagnosed in 1987, his coworkers have made adjustments along with him.

"I've been lucky concerning the support I've received," he said. "Without the employer trying to make an effort, a newly disabled employee doesn't have a chance."

Nearly deaf since birth, he realized he also was losing his eyesight only six years ago. His family, which includes Hanne, his wife of 20 years, and his two sons, who are now college bound, helped him deal with the discovery. "When people become newly disabled, the whole family has to change its way of life," Burton said.

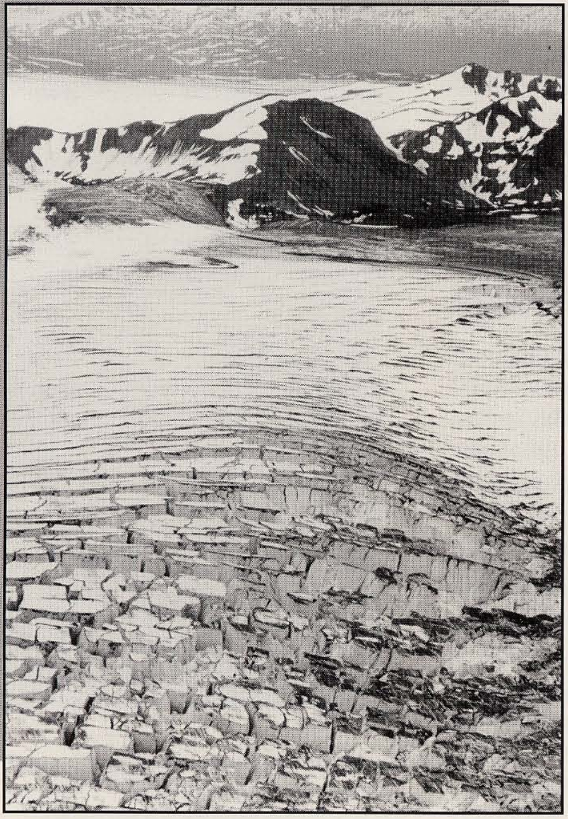
In learning to accept the things he's had to give up, Burton has gained the respect and admiration of the hundreds of people whose lives he's touched.

His life is a testimony to his passion.

"The main thing is to help all people, regardless of age or health, function fully in society as freely as possible," he said. ❑

Double Duty—*Jim Burton, who suffers from Usher Syndrome, works in the Photo-Graphics Service Center at the Geophysical Institute. He also volunteers for a variety of organizations, including Fairbanks Interior Youth Football.*

Monitoring Surging Glaciers from Space



The Bering Glacier, the largest in North America, descends 120 miles from high in the Chugach-St. Elias Mountains to a lake dotted with icebergs on the coast of southcentral Alaska. Within its rugged setting, the massive glacier and associated tributaries cover about 2,000 square miles.

After resting for more than two decades, the sleeping giant awoke last spring. In June, researchers discovered the beginnings of what has become a major surge, the sudden increase in movement of a normally slow-flowing body of ice. Sure signs of the surge—extensive fresh crevasses in previously unmarred regions of the glacier—were discovered by researchers flying over the site to remote camps for field work.

Scientists believe the Bering Glacier surges on a cyclic basis, once about every 20 years. Its last major surge started in 1965 and continued through 1967. Since then, only a small surge in 1981, which stopped soon after it began, has disturbed the river of ice.

All of the 204 surging glaciers in North America are found high in the ranges of southcentral Alaska and the Yukon Territory. Because they are relatively inaccessible, only one, the Variegated Glacier near Yakutat Bay, has been measured in detail throughout an entire surge cycle.

Glaciers traditionally are measured by field crews or monitored with aerial photographs, expensive methods that require extensive logistical support and can be weather dependent. A reliable alternative was needed, so when Geophysical Institute Research Associate Professor Craig Lingle suggested one, the National Science Foundation granted him $40,000 to try it out.

Lingle and graduate student Rob Fatland plan to monitor the Bering Glacier surge from space—using synthetic aperture radar images. The data used to produce the images will be acquired by the European Remote Sensing satellite, then processed by the Alaska SAR Facility within the institute.

Their research will be cheaper and less dangerous than monitoring the Bering Glacier by air or ground surveys, and, since SAR can see through clouds and darkness, their studies can continue regardless of the weather. Acquired from ERS-1, which orbits 490 miles high, SAR images also offer a more comprehensive view of the glacier than can be revealed in aerial photographs.

"With SAR, you have the advantages of being able to see the entire glacier," Lingle said, "and of being able to enlarge small segments of the overall image to examine parts of the glacier in great detail."

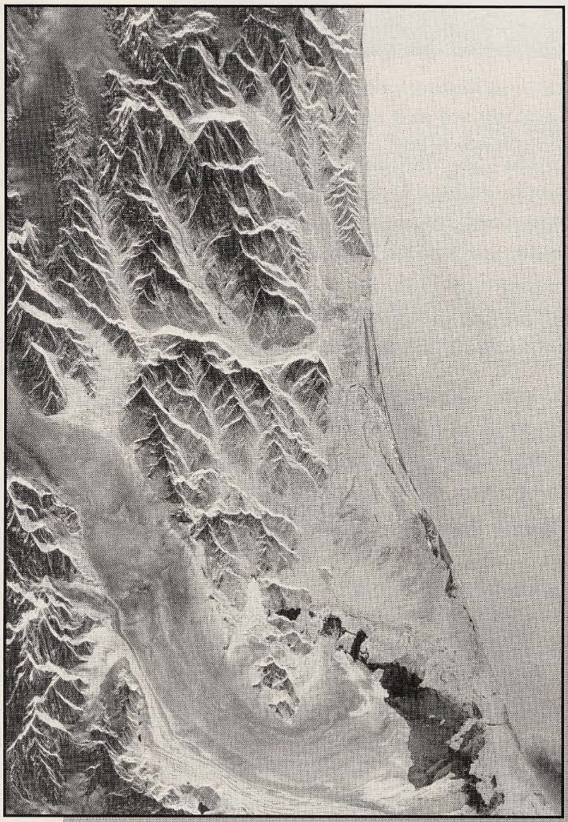
SAR images are digital, which means they can be manipulated and analyzed with computers. Unlike a photograph, SAR images don't lose detail when they are blown up for inspection; they retain their full resolution.

Digital SAR images also can be enhanced to bring out the glacier's unique features, such as fields of crevasses, and, because the images can be corrected for terrain distortion, researchers don't have to depend on getting the perfect aerial shot.

To measure the glacier's change in position and rate of movement, Lingle and Fatland intend to use techniques developed by researchers at NASA Goddard Space Flight Center to measure the velocity of large ice streams in Antarctica.

Using SAR imagery to monitor the Bering Glacier could revolutionize the study of hard-to-reach glaciers in North America. ❑

Ice Mass—*The Bering Glacier is shown in an aerial photo above and on a SAR (synthetic aperture radar) image below.*



Sea Ice Reveals Polar Differences

Some of the ice floes were no larger than an average-size living room and the swells of the sea underneath made them bounce and sway as the researchers worked on the frozen platforms.

The ice floes covered the surface of the Amundsen and Bellingshausen seas adjacent to Antarctica, and the ship that cruised through them was the first research vessel to venture into the area during winter.

The crew of 47 aboard the 300-foot *Nathaniel B. Palmer* included 11 scientists from around the world, led by Geophysical Institute Research Associate Professor Martin Jeffries, who was selected by the National Science Foundation to be chief scientist for the cruise. Professor of Geophysics Willy Weeks, Research Technician Kim Morris, and Research Assistant Tim Quakenbush also participated in the study.

MARTIN JEFFRIES

On Ice—*GI Research Technician Kim Morris drills into an ice floe on the surface of the Southern Ocean to pull out an ice core in the foreground while GI Professor of Geophysics Willy Weeks, Australian researcher Tony Worby, and Chris Fritsen, from the University of Southern California, measure ice thickness.*

The crew spent 37 days in the frozen area gathering nearly 150 meters of ice cores and other samples during a time when the sea ice was at its maximum extent and thickness. The last ship to venture into the area during similar conditions was the *Belgica*; its crew of explorers got frozen in for an entire year during an ill-fated journey in 1897-98. In the Antarctic, sea ice can grow and cover vast areas of open water in a matter of weeks at the onset of winter.

The purpose of the recent research mission was to find out as much as possible about the properties, structure and development of sea ice in that region; scientists measured its thickness, salinity, temperature, and crystal structure. The resulting knowledge will become one piece of an intricate puzzle used to assess change in the world's climate.

Sea Ice and Global Climate

Scientists already have presented evidence that the earth's climate has warmed and that average temperatures in the Arctic have risen this century. Of all the tools scientists have at their disposal to signal large-scale warming, sea ice is one of the most sensitive.

Sea ice, which forms primarily in the polar regions, is extremely responsive to temperature change. The warming of the earth's climate could dramatically reduce the amount of sea ice cover, and consequently affect a variety of climatic and oceanographic cycles.

When it forms, sea ice acts as a lid covering the Arctic and Southern oceans; it reduces the exchange of heat and moisture between the relatively warm polar seas and the cold polar atmosphere. This phenomenon affects temperatures and precipitation in the polar regions and contributes to atmospheric circulation and climate around the world.

Sea ice salinity also can affect circulation patterns in the world's oceans. As it grows, sea ice undergoes a distillation process; it contains only about one-tenth to one-half the amount of salt as ocean water. When it forms, cold dense brine, or salty water, is injected back into the polar sea. This dense brine sinks and contributes to the formation of bottom water, which drives the global ocean conveyer belt, a stream that transports water between oceans in the southern hemisphere and the northern hemisphere and back again.

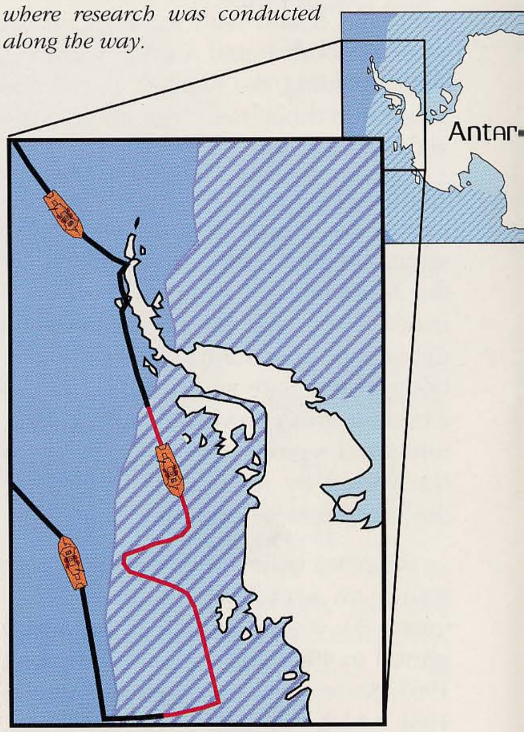
Scientists need to know what sea ice is like now before they can assess change. Sea ice in the Arctic has been studied since the 1940s, but detailed research of sea ice in the Antarctic didn't begin until the 1980s. And most studies there have been in one area, the Weddell Sea.

MARTIN JEFFRIES

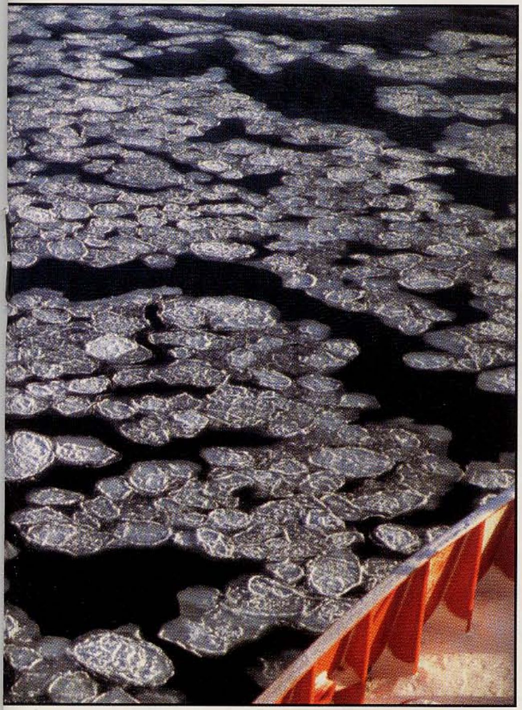
Pancakes—*Frazil ice crystals are herded together by wind and waves into pancakes, often found at the edges of the pack ice.*

Research Track—*A round-trip cruise from South America took the crew west of the Antarctic Peninsula. The red line shows where research was conducted along the way.*

DEBORAH COCCIA / PHOTO-GRAPHICS



Research Vessel—*The* Nathaniel B. Palmer, *a U.S. Antarctic research vessel, cruised for 37 days in the pack ice of the Southern Ocean. Researchers were lowered onto the ice in a basket attached to the ship's crane.*



Polar Differences

Jeffries' research in a different part of the Southern Ocean has led to several observations. For example, sea ice on either side of the Antarctic Peninsula appears to be of different thicknesses. After drilling more than 1100 holes, the crew determined that sea ice in the study area averaged about three feet thick (0.9 meters), which is about 50 percent thicker than sea ice in other areas of the southern hemisphere for which data are available.

MARTIN JEFFRIES

MARTIN JEFFRIES

However, even that doesn't come close to the thickness of sea ice in the Arctic, which can grow to about six feet, six inches (2 meters), the height of a tall man. Part of the difference in sea ice thicknesses at the poles lies in the different ways the ice forms in the southern and northern hemispheres.

In the Arctic Ocean, most sea ice grows in a relatively protected, land-locked basin, where the ocean is calmer than the stormy, turbulent open oceans surrounding Antarctica. Frazil ice, which contains small crystals and grows quickly, is common in the Antarctic, while congelation ice, which contains large, slow-growing ice crystals, is more common in the Arctic, where it may takes months to build up a thick ice cover.

During the winter, sea ice in the Antarctic appears to be warmer than sea ice in the Arctic. Sea ice temperatures during Jeffries' most recent study in the Antarctic averaged about -3° to -4° C, which is two or three times warmer than winter sea ice in the Arctic.

Jeffries attributes the warmer temperatures in the Antarctic to warmer air temperatures there, coupled with more snowfall and the frequent flooding of the sea ice surface with sea water. Freezing of the seawater-soaked snow forms "snow ice," which is uncommon in the Arctic but seems to be widespread in the Antarctic. To determine the amount of snow ice in the ice cores gathered during the recent research mission, Jeffries will send about 1000 water samples to University of Calgary Professor Roy Krouse for analysis of the stable oxygen isotope composition.

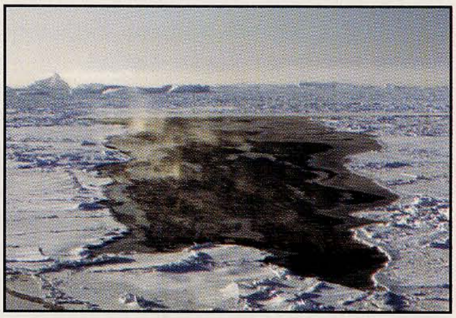
Some researchers have suggested that sea ice in the Antarctic is more saline than sea ice in the Arctic, but Jeffries' work did not reveal a noticeable disparity. Samples from his recent study showed an average salinity of about 6 parts per 1000, compared to the ocean's 33 parts per 1000. After one winter's growth sea ice is relatively salt free, but still not pure enough to drink. "It tastes horrible," Jeffries said. "Sea ice growth is obviously a distillation—not a purification—process."

Salt and Satellites

Knowing the salinity and temperature of sea ice is crucial when using synthetic aperture radar images to study sea ice in the Arctic and the Antarctic. Researchers have used spaceborne SAR to study sea ice since 1991; it's a valuable tool because it can see through clouds and darkness and provide continuous data for hard-to-reach places. SAR also is sensitive to liquid brine in sea ice, which varies with sea ice temperature. That means SAR images of the same sea ice at different temperatures can look quite different.

"Much of our present understanding of sea ice SAR signatures is based on investigations of sea ice in the Arctic," Jeffries said. "Since it is becoming apparent that the structure and properties of sea ice in the Antarctic are quite different from those in the Arctic, it's important to work to improve our understanding of sea ice in the Antarctic to minimize the likelihood of misinterpretation of SAR signatures."

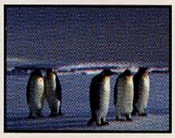
MARTIN JEFFRIES



Open Lead— *Openings in the pack ice are a source of heat exchange between the ocean and the atmosphere.*

Accurate measurements from the field always increase the understanding of research done at the office, especially research on climate change because it relies heavily on computer models for prediction.

"Computer models are driven by real-world data," Jeffries said. "The better the real-world data, the better the model. Incorrect results can occur when researchers assume a data set from one area is easily interchangeable with data from another area."



GI NOTES

Interior Secretary Bruce Babbitt, a geologist by training, visited the Geophysical Institute for several hours this fall as part of a 12-day tour through Alaska. While here, Babbitt visited about a dozen professors, including Director **Syun-Ichi Akasofu**, Deputy Director **Gunter Weller**, Associate Director **Merritt Helfferich**, Professor of Volcanology **John Eichelberger**, Volcano Seismologist **Steve McNutt**, Professor of Geophysics **David Stone**, Wadati Chair of Seismology Professor **Max Wyss** and Professor of Geophysics **Juergen Kienle**. The Interior Secretary later toured Denali National Park with Alaska Governor Walter Hickel.

Professor Emeritus **Bob Hunsucker** recently completed a chapter for the most current version of the *Review of Radio Science*, a book published every three years for the International Union of Radio Science by Oxford University Press. Hunsucker's chapter includes an update and a review of information presented in his book, *Radio Techniques for Probing the Terrestrial Ionosphere*, published in 1991.

A memorial service for **Terris Moore** was held in the Geophysical Institute Globe Room just before Thanksgiving.

UNIVERSITY RELATIONS COLLECTION

Moore, who served as UAF's second president from 1949 to 1953, died on November 7 at age 85. His funeral was held in Monson, Maine. Moore, who once served as an interim director for the Geophysical Institute, was better known as the "Flying University President" because of his enthusiasm for flying small planes and his piloting skills: he was a pioneer of high-altitude takeoff and landing techniques in mountainous and glaciered terrain. After leaving Alaska, Moore continued to serve on scientific panels for the Geophysical Institute. In 1987, he established the Terris and Katrina Moore Prize, presented annually for excellence in scientific research at the institute.

Dan Crevensten matched $1,200 in donations to the Geophysical Institute Endowment Fund after issuing a challenge to employees this fall. Crevensten, a former executive officer for the institute, donated the seed money to get the fund started. Contributions to the fund, which will be used for initiating new research, supporting graduate students, and purchasing equipment, totaled $28,194 in cash and pledges in November.

Dan LaSota, a microcomputer specialist with the Geophysical Institute, was elected to the Fairbanks North Star Borough Assembly this fall. LaSota said his chief concerns for the borough focus on education, environmental issues and diversifying the economy. LaSota came to Alaska in 1987 as a graduate student, earned his teaching certificate in secondary physics a year later, and has worked at the institute since 1989.

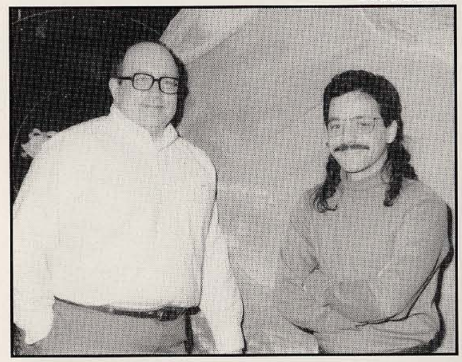
Scott Chesney joined the Geophysical Institute this fall as the new Network Manager with the Computer Resource Center. Prior to accepting employment at the institute, Chesney worked as a systems engineer in the Facilities Division of NOAA's Forecast Systems Laboratory in Boulder, Colorado. Chesney has more than 20 years of experience in electronics and systems support.

The Alaska Synthetic Aperture Radar Facility welcomed three new employees this fall. **Lyn McNutt** is ASF's new chief scientist; **Carl Wales** assumed the role of ASF's project manager, and **Norm Cushing** accepted a position as ASF's software design engineer.

Prior to accepting a job at the institute, McNutt worked as manager of the Earth Observation Program for the Canadian Space Agency; she has 18 years of experience working with SAR-related projects in Alaska and the Canadian Arctic. From the University of California, Los Angeles, McNutt received her B.A. in physical geography in 1972, and her M.A. in remote sensing in 1977. She continued her studies at the University of Washington in Seattle.

Wales came to the institute after retiring from the U.S. Navy, where he served for 27 years. During his last 11 years with the Navy, Wales worked as the officer-in-charge of an ice camp in the Arctic. From the Massachusetts Institute of Technology, Wales received a B.S. in mechanical engineering and a B.S. in ocean engineering in 1976, an M.S. in naval architecture and marine engineering and an additional degree in ocean engineering in 1982.

DOUG SIGLER



ASF Project Manager Carl Wales, left, and ASF Software Design Engineer Norm Cushing

Cushing joined ASF after working as a deputy project engineer for the Lawrence Livermore National Lab with the University of California. He has more than 10 years of experience working with different computer languages and software programs; in 1989, he received a United States Army Certificate of Achievement for demonstrating leadership and technical expertise. Cushing earned a B.S. in computer science from Northern Arizona University in 1985.

Professor of Physics **Lou-Chuang Lee** and Associate Professor **Antonius Otto** organized a four-day workshop at the institute on the magnetopause, the boundary between the magnetosphere and the solar wind which causes dayside auroras. More than 45 scientists from around the world attended the workshop, where papers were presented on a variety of topics, including plasma energy and transport, reconnection, effects of shear flow, and coupling to the ionosphere.

DOUG SIGLER

Previous Poker Flat Research Range directors Neal Brown, left, and T. Neil Davis

Expanding Technology

The Science Operations Center, one of the buildings to be constructed as part of the upgrade and modernization of Poker Flat Research Range, was dedicated to **T. Neil Davis**, in September.

Davis, the first director of the range, served the Geophysical Institute in many capacities from 1962 through 1982 including Professor of Geophysics, Assistant Director, Deputy Director, and Acting Director. Davis, a professor emeritus, currently serves the institute as a research consultant.

The T. Neil Davis Science Operations Center will contain the Geospace Environmental Data Display System, the first of its kind to display real-time information about the aurora and a variety of phenomena in the arctic polar regions. The system is composed of computers and instruments that will obtain data from satellites and remote ground-based stations throughout North America. The data will help scientists determine when atmospheric conditions are right for a rocket launch, and provide information useful for a variety of research projects at the range.

Ground was broken for the Science Operations Center shortly after the building was dedicated to Davis, and the facility is scheduled to be fully operational by January 1995.

Looking to the Future

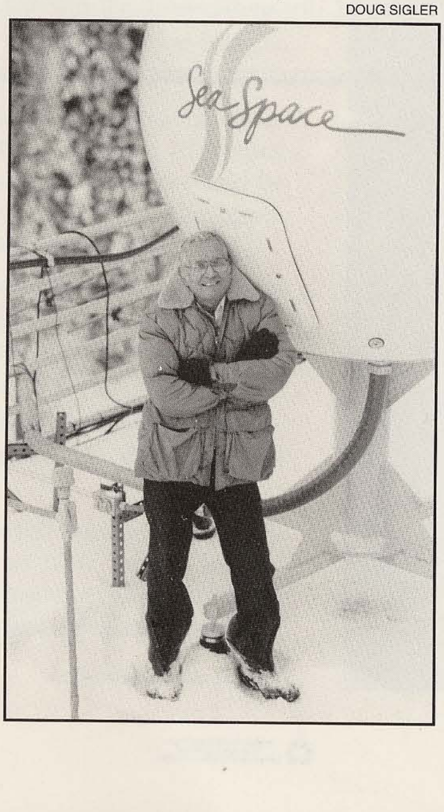
Former ASF Project Manager **John Miller** drew on past experience when he secured funding from NASA for the new receiving antenna recently installed on the roof of the Geophysical Institute. Miller, who retired in October after devoting 35 years to a career in remote sensing, knew the High-Resolution Picture Transmission antenna could be used for research projects throughout the university system.

The HRPT antenna receives data from three polar-orbiting NOAA weather satellites and is capable of producing black and white or color-enhanced images of the entire western Arctic many times per day. Already, it's been used to detect volcanic ash plumes in the lower atmosphere, to locate radio-collared animals, and to determine sea-surface temperature.

Miller's career in remote sensing began in 1959 when he helped design, construct, then manage the College Minitrack station, a ground station at Ballaine Lake used to track early earth-orbiting satellites. Miller also helped design, construct and manage a similar tracking station on Chena Hot Springs Road for the European Space Research Organization, which he managed until he was hired as the head of scientific services at the Geophysical Institute in 1971. The following year he instigated the development of a remote-sensing data center on campus to archive and analyze data from the first Earth Resources Technology Satellite, which eventually became known as Landsat.

Former ASF Project Manager John Miller secured funds for the new High-Resolution Picture Transmission antenna recently installed on the Institute roof.

DOUG SIGLER



Geophysical Institute Quarterly

This newsletter is published as a public service by the Geophysical Institute, University of Alaska Fairbanks. Free subscriptions are available on request from the Information Office, UAF Geophysical Institute, P.O. Box 757320, Fairbanks, AK 99775-7320. (907) 474-7863.

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Publications Asst.: **Jan Dalrymple**
Graphic Artist: **Deborah Coccia**

UAF provides equal education and employment opportunities for all, pursuant to applicable state and federal laws.

By 1979, Miller had begun experimenting with fast-delivery images transmitted to the institute by facsimile, and by 1983, he had helped secure funds from the Alaska Legislature to operate a Landsat quick-look program.

A year later, Miller was hired as the operations manager of the Alaska Synthetic Aperture Radar Facility, which is the only station in the U.S. to receive SAR data. In 1991, when operational systems for ASF were installed, Miller was promoted to technical director. For their hard work, he and the ASF staff were awarded Certificates of Appreciation from NASA in 1992. Later that year, he assumed the position of ASF project manager. After a suitable replacement was found, Miller retired; he now works for ASF part-time on a consulting basis. ❏

Unusual Flashes

continued from page 1

indicates that the flashes may not be as rare as previously thought.

Their interest in the phenomenon originally referred to as "upward propagating lightning" grew in 1989 when University of Minnesota researchers happened to record unusual illuminations on a video taken with a ground-based television camera.

Other upper atmospheric flashes also were incidentally recorded on videos rolling during space shuttle flights and were identified later by researchers with NASA's Marshall Space Flight Center. Sentman and Wescott's research was sponsored by NASA's Space Physics Division in the Office of Space Science, Washington, D.C. ❏

Looking Inside the Weather

A radar station that can give pilots critical information about winds in Alaska and will greatly improve the accuracy of weather forecasts around the state was installed in late August on the summit of Pedro Dome, about 15 miles north of Fairbanks.

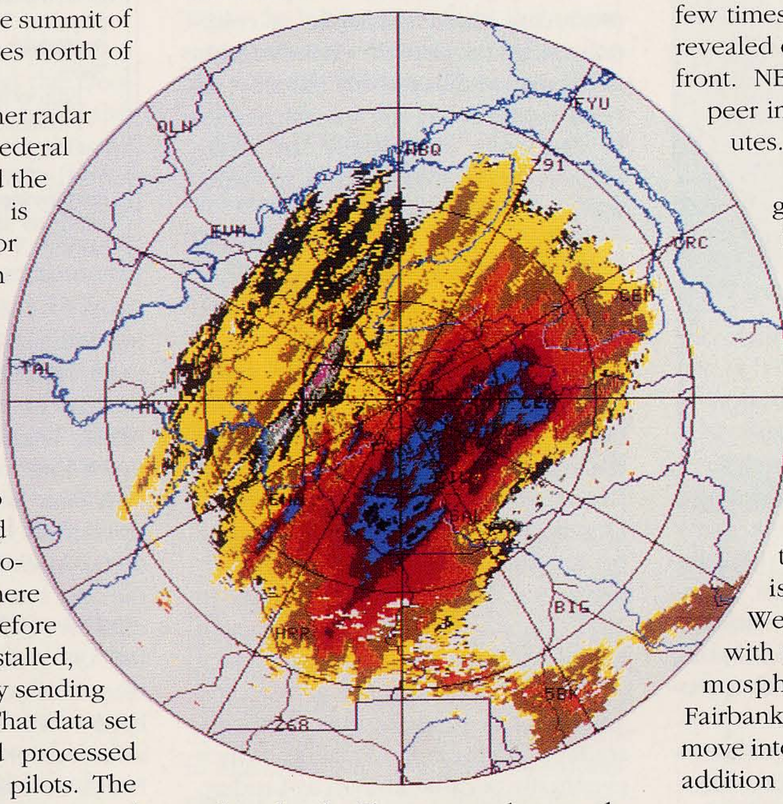
The new $2 million weather radar station, supplied by the Federal Aviation Administration and the National Weather Service, is the first of nine scheduled for Alaska. The stations, known as the Next Generation Weather Radar, or NEXRAD, contain instruments that can peer into clouds and detect atmospheric conditions never seen before.

The station on Pedro Dome can measure wind speed and direction and locate weather patterns anywhere within a 250-mile radius. Before the NEXRAD station was installed, forecasters gauged winds by sending up balloons twice a day. That data set was then transmitted and processed before it was available to pilots. The NEXRAD system gets real-time wind information every six minutes.

From its perch on Pedro Dome, the radar scans the atmosphere from several different angles, then sends back data to computers, which quickly display colorful, highly detailed computerized images of the weather. The images reveal even minute details; radar beams can detect snow, rain, hail, and ice crystals within clouds. The system also can detect swarms of insects and migrating birds. Using NEXRAD, weather forecasters can for the first time look inside arctic cold fronts, the advancing edges of those cold, dry air masses that form over the Arctic and bring snow and frigid temperatures to the Interior. Before the station was installed, forecasters had to rely on satellite images available only a few times each day. And those images revealed only the top layer of the arctic front. NEXRAD allows forecasters to peer inside the front every few minutes.

"We can now see processes going on within the heart of the front that, after 20 years as a forecaster, I had no idea were there," said Ted Fathauer, meteorologist in charge at the NWS forecast office in Fairbanks.

The system is expected to be a boon to meteorological and geophysical researchers as well as forecasters. The potential for coordinated research is one reason the National Weather Service wants to team up with the Geophysical Institute's Atmospheric Science Group. The Fairbanks branch of the NWS hopes to move into the C.T. Elvey Building's new addition by December 1996. ❑



***NEXRAD Image**—Snow was falling in most of the area indicated in red on this Fairbanks NEXRAD color-contoured reflectivity image taken at 5:23 p.m. AST on November 24, 1993. The radar shows considerable detail of snowfall intensity within 140 miles of Fairbanks.*

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