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A New Auroral Record

Hundreds of shimmering auroral displays were recorded this winter by the unblinking eye of an all-sky camera inside a new automated observing station near Eagle, a small Alaskan village on the south bank of the Yukon River about six miles west of the Alaska-Canada border.

For six months, all visible auroras within an 870-mile field-of-view of the remote station were captured by the fisheye lens of a computer-controlled video camera. The resulting video footage composes the most complete continuous long-term data set of the aurora ever made.

The only other uninterrupted record of nightly auroral activity was taped during a relatively short three-month period 26 years ago, and has been used by scientists for basic auroral research since.

The new footage is expected to reveal patterns of auroral movement and other information previously unavailable to researchers.

Institute Professor of Geophysics Tom Hallinan, who spearheaded the drive to open the remote station, said the footage already is being analyzed by scientists in the Los Alamos National Laboratory in New Mexico.

Los Alamos scientists, who cosponsored the project, plan to compare the footage to data obtained from a satellite in synchronous orbit hovering over the equator.

Solar particles following magnetic field lines that pass through that satellite's path reach the earth about half way between Delta and Eagle, where the particles create auroras over Interior Alaska.

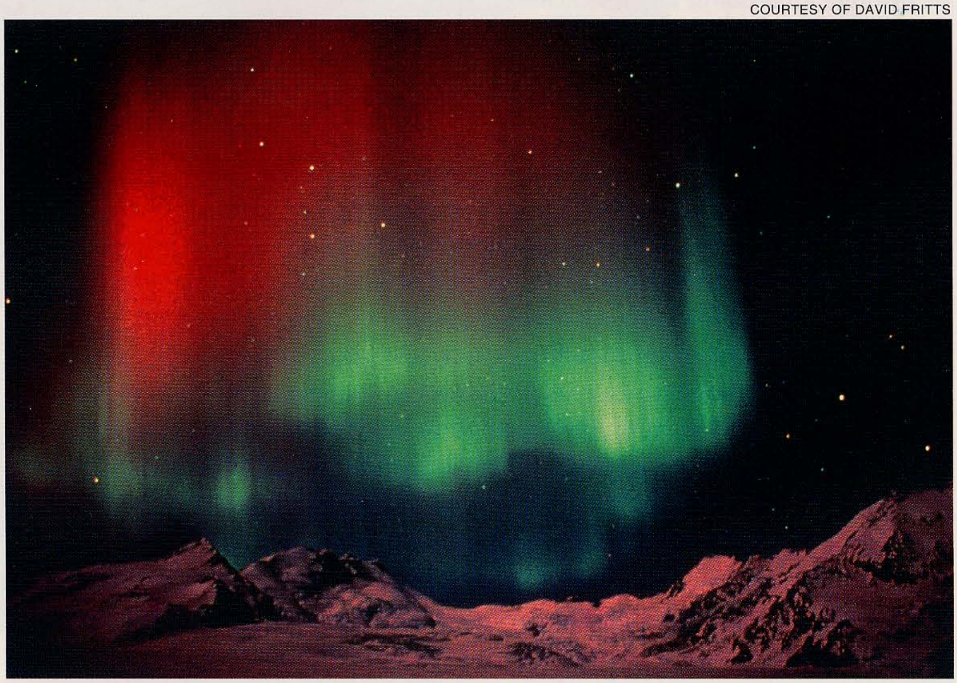
By comparing data obtained on the same night from ground and space, scientists can measure the particles creating a particular auroral display along with the resulting light that emits from it, Hallinan said.

Collecting data from the automated station in Eagle also has served as a "dry run" for researchers planning to participate in NASA's Fast Auroral Snapshot Explorer satellite program next year, a mission designed to gather comprehensive information about the aurora from space, ground, and air. The FAST satellite, which is scheduled for launch into polar orbit this summer, will send information about the aurora from space directly to Poker Flat Research Range, where scientists will collect auroral information from at least five automated ground observing stations in the Arctic.

NASA also plans to charter a plane equipped with all-sky cameras to fly directly under the aurora while the FAST satellite flies directly over the display. Hallinan and institute Professor of Geophysics Hans Nielsen are scheduled to film auroras aboard several of the research flights over Alaska.

Hallinan hopes to keep the 8-by-12 foot trailer housing the all-sky camera in Eagle operational through the summer. The automatic station also contains instruments deployed by institute professors of physics Roger Smith and John Olson. Smith is measuring high-altitude winds and temperatures, and Olson measures variances in the earth's magnetic fields.

COURTESY OF DAVID FRITTS



Northern Lights—*Geophysical Institute scientists are tracking auroral displays from earth, sky and space in a renewed effort to understand the shimmering phenomenon.*

The scientists also supply local schools with data students can use in the classroom. For example, Eagle high-school student Michelle Hinckley is using data from the station to figure out the connection between magnetic disturbance and auroral currents for a science fair project. "She's quite enthusiastic," Smith said. ✦

INSIDE THIS ISSUE

Monitoring a Natural Chemical Reactor

Instruments sensitive enough to detect traces of gold and other heavy metals in the air will be installed in a new Climate Change Monitoring Station at Poker Flat Research Range this spring.

The 50-foot trailer outfitted to serve as a housing unit for the station was hauled out to the range this winter. At least 10 instruments will be set up inside the remote lab in March, soon after the sun returns to create a host of chemical reactions in the troposphere, which extends from ground level to about six miles high.

Institute Professor of Physics Glenn Shaw likens this area of the atmosphere to a natural chemical reactor. "The arctic atmosphere is a like a big retort or container that fills up in winter with gases that change in spring to chemical smog," Shaw said.

Trace chemicals and compounds in the air that have built up as a result of man's polluting activities will be measured in addition to greenhouse gases, such as carbon monoxide and carbon dioxide and methane, thought to be culprits of global climate change.

The effects of worldwide warming are expected to appear in the Arctic first, and many of the changes will be evident in the polar atmosphere, which Shaw describes as a natural laboratory.

"Chemicals in arctic air are easy to monitor because the polar atmosphere is relatively simple: it contains a stable air mass underlain most of the year by an ice surface, with no large trees around to inject chemicals in it, no dust storms, and no polluting industry nearby," Shaw said.

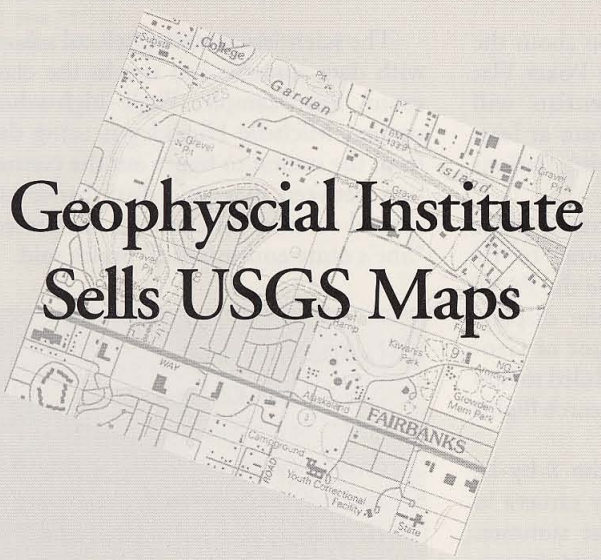
EVELYN TRABANT

Climate Check—*Graduate student Tove Svendby checks a solar tracker used to measure atmospheric gas from the Geophysical Institute roof. A similar instrument will be housed in a new Climate Change Monitoring Station this spring.*

Against the relatively clean polar backdrop, chemicals in the air tend to stand out, particularly those that are foreign. The study will begin just before the appearance of arctic haze, a polluted mass of air that comes to Alaska after being produced in industrial areas of Eurasia.

Shaw established the station with Associate Professor of Chemistry Dan Jaffe, and Assistant Professor of Chemistry Richard Benner. Jaffe hopes to determine how pollution affects ozone in the troposphere, and Benner will measure sulfates.

Their goal is to understand the arctic system, the chemical reactions that occur within it, and the climatic consequences that result from those reactions. The instruments at the station can monitor the air in real time, and many of the measurements will be instantly cabled from the range to the institute for analysis. ✦



Geophyscial Institute Sells USGS Maps

Since March 1, U.S. Geological Survey maps of Alaska have been sold from within the institute's GeoData Center, a public browse facility for high-altitude photography, which sells satellite images of the state.

The institute agreed to assume the map sales last year after the federal government announced it would close the USGS map outlet within the federal building in downtown Fairbanks as a cost-saving measure.

The USGS outlet, which had been open since before statehood, closed on February 28. It sold about 100,000 maps annually to a variety of customers ranging from miners, mushers, trappers, skiers, tourists, and school children, to state and federal agencies managing or protecting Alaska's resources.

The GeoData Center will maintain essentially the same stock of maps as the federal USGS store, except that it will not offer wholesale quantities, due to inadequate space within the institute for storage. Wholesale purchases will be handled out of the USGS Denver office.

USGS officials said they chose to open the store within the Geophysical Institute to enhance research opportunities in earth sciences at UAF, and to serve the central Alaska community. ✦

A Near-Space Vegetable Garden

A rocket carrying vegetable seeds that will grow in the spring gardens of elementary school students shot through the aurora after being launched from Poker Flat Research Range in February.

The seeds were secured among more than 800 pounds of instruments designed to record small-scale weather in the upper atmosphere and to measure light emitting from a brilliant auroral display. After flying more than 150 miles high, the seeds and the instruments descended under parachute to the Brooks Range, where they were recovered by helicopter.

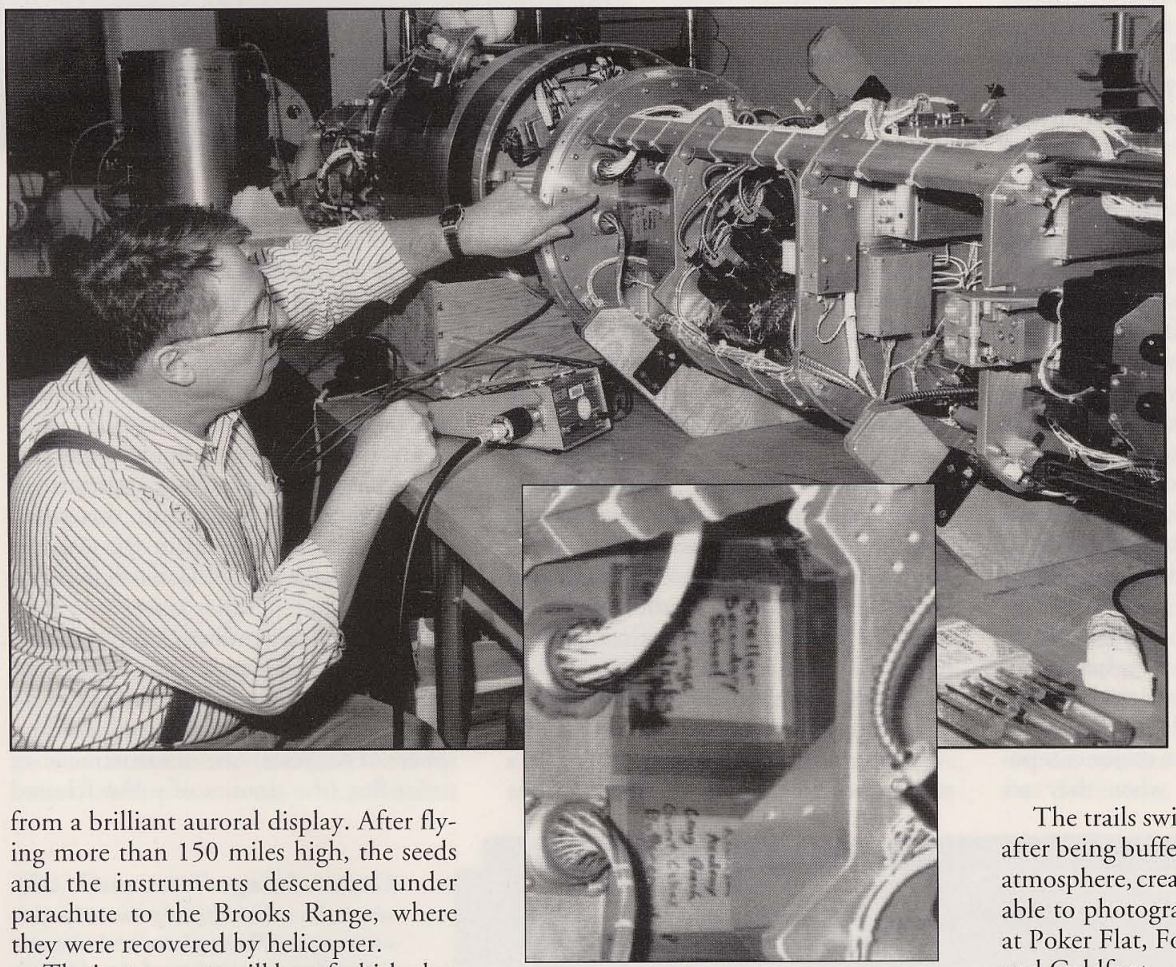
The instruments will be refurbished to fly again and the seeds will be planted by elementary students around the country participating in the Wisconsin Fast Plant curriculum, a school program that incorporates the use of fast-growing plants to teach children about agriculture.

The rocket was one of four to fly from Poker Flat this winter; three more are scheduled for launch from the range this summer in June and July.

Information about weather in near-space gained during the rocket flight in February will be used by scientists who operate and design satellites and other extraterrestrial systems, according to Andrew Christensen, principal investigator for the rocket experiment and director of the Space and Environment Technology Center at the Aerospace Corporation in California.

"Just like farmers want to know if it will rain before they plant seeds in a certain field, scientists want to know about weather patterns in space so they can design satellites appropriately," he said.

EVELYN TRABANT



The seeds snuggled in next to Christensen's rocket experiments belong to elementary students in Alaska, California, Ohio, and New Hampshire.

The children plan to find out if seeds that have flown in a dry, vacuum-packed compartment through high-energy particles in the aurora will grow differently than those that stayed on the ground.

"This is a bonafide experiment," Christensen said, "and the first time it's been attempted."

Geophysical Institute Research Assistant Professor of Geophysics Neal Brown had been trying for years to get scientists to fly the fast-growing seeds on a rocket launched from Poker Flat, but the scientists were understandably hesitant to endanger their high-cost experiments.

Christensen was convinced to enclose the seeds in his payload by three of his grandchildren. Their classrooms selected a virtual garden variety of seeds for the launch, including beets, peas, squash, cucumbers, carrots, lettuce, and radish.

Christensen's seed-carrying rocket was launched amid the brilliant fanfare of a chemical-release rocket commandeered by Clemson University Professor Miguel Larsen from South Carolina.

Larsen's rocket, launched moments before its predecessor, released luminous blue-green chemical tracers on its way up through the aurora and on its way back to earth. The two trails persisted for about 10 minutes each, and were visible from Fairbanks and all locations north of the Brooks Range and east to the Canadian border.

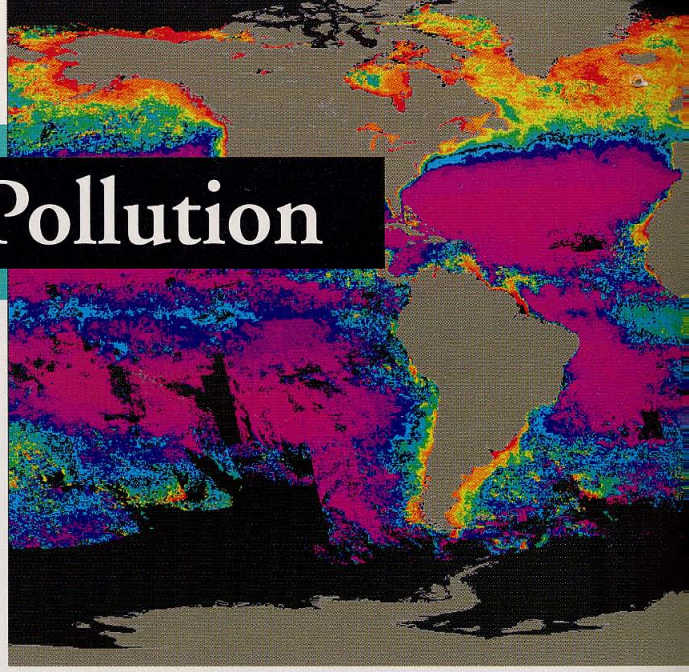
The trails swirled into coil-like designs after being buffeted by winds in the upper atmosphere, creating images scientists were able to photograph from ground stations at Poker Flat, Fort Yukon, Arctic Village, and Coldfoot.

Similar photographs from previous missions helped researchers identify a narrow band of wind about 65 miles above the earth composed of fluid in the atmosphere that blows at speeds up to about 600 knots.

That wind, which is similar in concept to the jet stream, is created by electrical currents in the aurora. It can affect the orbits of satellites and interfere with long-range radio transmissions. ✦

Rocket Seeds—*Geophysical Institute Research Assistant Professor Neal Brown secures labeled packets of vegetable seeds from elementary students inside a rocket payload containing about 800 pounds of instruments.*

Natural Air Pollution



A sensitive instrument used by wineries, breweries and the petroleum industry to detect sulfur recently helped institute researchers formulate new theories about sources of chemicals in the atmosphere.

The sulfur-detecting instrument was designed by Geophysical Institute Assistant Professor of Chemistry Richard Benner while he was finishing his doctoral thesis at the University of Denver, and patented shortly thereafter.

The instrument, which can detect sulfur in air and in liquid, has been sold commercially to breweries and wineries, where it is used to measure sulfur compounds that create distinctive tastes in beverages, and to petrochemical companies, where it is used to track sulfur released during the cracking process involved in turning crude oil into gasoline.

"I developed the instrument solely because I knew it would be useful for atmospheric studies and, by serendipity, it turned out also to be good for commercial purposes," Benner said.

Sulfur, one of the basic building blocks of life, can be harmful when released into the environment. Sulfur particles can cause a haze of air pollution dense enough to hinder visibility; they are a major component of acid rain, and, when they are propelled into the upper atmosphere, they are partially responsible for the destruction of the ozone layer. "When you are standing on the rim of the Grand Canyon, or looking across the Alaska Range on a clear day, but you can't see a thing through the haze, you are looking at particles mostly made up of sulfur," Benner said.

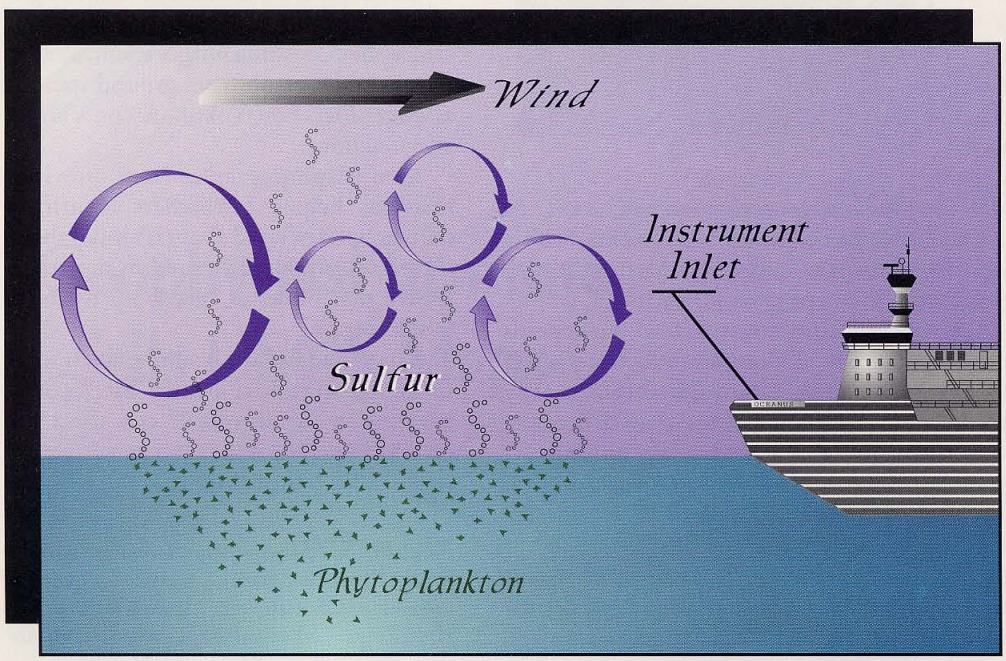
Sulfur particles also can change the properties of clouds, making them more numerous and more reflective of sunlight. Global climate change theorists suspect that reflective clouds may stop some of the sun's heat from reaching the earth and affect the dynamics of global warming or cooling.

Recently, Benner's sulfur-detecting instrument has been used to challenge theories about the source of sulfur in the atmosphere. Current theories hold that about half of the earth's airborne sulfur is derived from man-made sources, such as fossil fuel combustion or power-plant emissions, and that about half is derived from natural sources.

Benner's data seems to indicate that a much greater amount of sulfur in the atmosphere is released naturally than previously believed. His research indicates that up to two-thirds of the sulfur in the earth's atmosphere may be released through natural sources, and that a major portion of that sulfur may come from the ocean. Natural sulfur also can be released through land bogs and volcanic eruptions.

His theory centers around a study performed for six weeks in the summer of 1992, when the instrument was taken aboard a research vessel in the Atlantic Ocean, near the Azore Islands off the coast of Portugal.

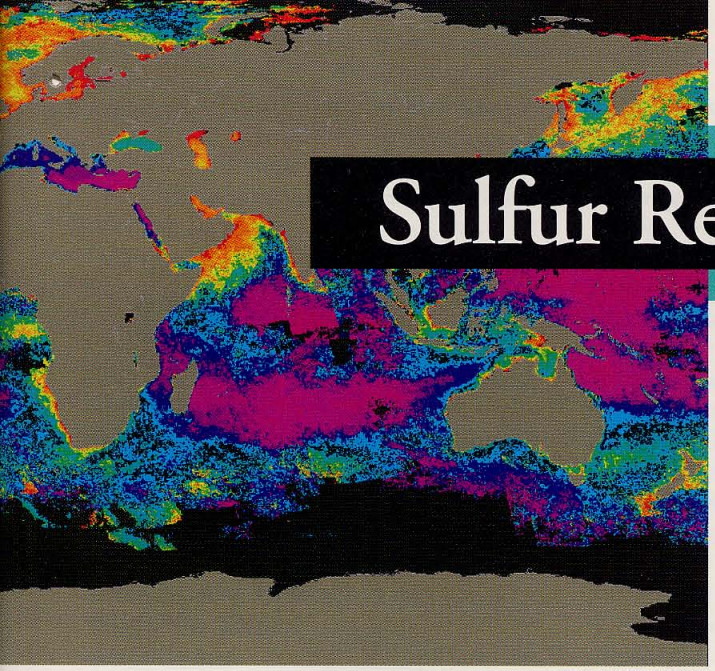
Scientists determined long ago that phytoplankton, microscopic plants in the ocean, release dimethylsulfide into ocean water and release sulfur into the atmosphere. For years, the measurement of sulfur flux (the amount of sulfur released



DEBORAH COCCIA

Ocean Image—*The satellite image above, shows the biological productivity of the earth's oceans. The purple and pink hues mark areas of low concentrations of plant life in the ocean, while the yellow and orange hues show highly productive areas. Northern oceans, which are among the most productive on earth, may be responsible for releasing to the atmosphere large amounts of natural sulfur. Sulfur particles can change the properties of clouds, and affect global climate.*

Measuring Sulfur—*The diagram at left illustrates how Geophysical Institute scientists measured sulfur released from the ocean aboard a research vessel in the Atlantic Ocean. As wind blew past the sulfur-detecting instrument on deck, a sensitive sensor measured, each second, sulfur concentrations that had been mixed by eddies of air swirling above the water. Sulfur is released by phytoplankton in the ocean.*



COURTESY OF NASA'S GODDARD SPACE FLIGHT CENTER

Sulfur Released by the Ocean

from the ocean to the atmosphere) has been accomplished indirectly.

Scientists who have been unable to directly measure sulfur flux from the ocean, extrapolated this calculation from measurements of dimethylsulfide in ocean water and of the wind speed above the water. These indirect measurements form the basis of most currently held theories on the amount of sulfur released to the atmosphere.

Using his sulfur detector, Benner was able to make the first ever direct real-time measurements of sulfur in the air above the ocean surface. The measurements, which were made once every second during the six-week study, allowed Benner to gain new insights into the behavior of sulfur gases in the marine environment that were unavailable prior to his experiment. Collecting data each second also enabled Benner to measure turbulence, which is the main mechanism for mixing sulfur in the air.

Generally, high concentrations of sulfur can be found in air close to the ocean surface, while lower concentrations can be found at higher elevations. Eddies of air that blow in circular patterns above the ocean surface mix these concentrations, making flux measurements quite complicated.

Benner was able to use these eddies to his advantage. His sulfur detector is the first instrument capable of measuring the concentration of flux created by the mixing action of the eddies.

"We determined the flux by measuring how much sulfur was going up in the eddies and how much was going down," Benner said.

Sifting through these different concentrations to find out how much airborne sulfur is being released from the ocean involves a series of complex calculations, which were performed by Clara Jodwalis, a doctoral graduate student in atmospheric chemistry. Using a mathematical process known as the Fourier Transform, Jodwalis determined sulfur flux from the Atlantic Ocean near the Azores.

The process took nearly two years to complete. Jodwalis spent the first six months preparing the data. Only data obtained while the instrument was pointed straight into the wind and when the boat was not rocking too much was acceptable. For correlation purposes, Jodwalis also needed information about wind speed, and air and sea temperatures during periods of sample collection.

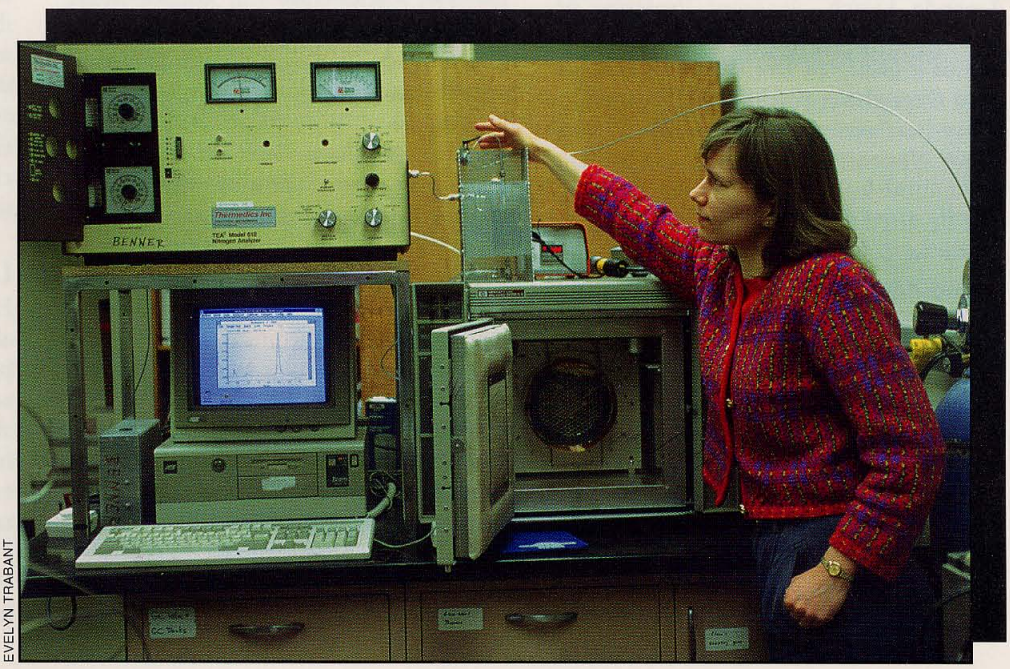
From the sample, Jodwalis determined that the amount of sulfur escaping from the ocean off the coast of Portugal appears to be significantly higher than previously believed.

The results also seem to indicate that there may be significantly more sulfur in the atmosphere released from natural sources than previously believed, and that northern oceans, which are among the most productive on earth, may be major sources of the planet's natural sulfur.

Satellite pictures and biological studies indicate that the Gulf of Alaska contains some of the highest dimethylsulfide ever measured, which is why Benner hopes to use the new instrument to measure sulfur flux there soon. ✦

The Fourier Transform—*Clara Jodwalis, a doctoral graduate student in atmospheric chemistry, used a mathematical process known as the Fourier Transform to determine sulfur flux from the Atlantic Ocean. The results of the intensive process, which took nearly two years to complete, seem to indicate that there may be significantly more natural sulfur in the atmosphere than previously believed, and that the Gulf of Alaska may be among the planet's major contributors.*

Chromatograph—*Jodwalis uses a gas chromatograph, pictured in the lower right corner of the photo at right, to separate sulfur compounds, and a sulfur-detecting sensor, upper left, to measure the varying amounts of different sulfur compounds she obtained from a sample gained during a recent research project. The adjoining computer graphically displays the peak amounts of sulfur released from the ocean.*



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GI NOTES

Congratulations

Associate Professor of Physics **Davis Sentman**, Professor of Geophysics **Eugene Wescott**, Project Engineer **Daniel Osborne**, and the team of NASA/UAF scientists, pilots and technical specialists who captured the first color video footage of Sprites and Jets received the Laurel Award from *Aviation Week and Space Technology* magazine in January. Sprites and Jets are spectacular flashes of light reaching up to about 60 miles above thunderstorms.

Professor of Geophysics **Glenn Shaw** recently was elected to a four-year term with the Polar Research Board, established by the National Academy of Sciences in 1958 to provide independent advice to the federal government on matters of science and technology affecting public policy on environmental quality, natural resources, and other issues in polar regions. The board assists federal agencies in the development and maintenance of strong programs in polar research that promote national interests and international opportunities in the Arctic and the Antarctic.

Amanda Lynch, Assistant Professor of Atmospheric Science, has been selected as one of a group of five women scientists from throughout Alaska to be featured in a five-part series on the Alaska Public Radio Network. APRN plans to prepare five-minute segments on each scientist that will be aired on the *Alaska News Nightly* broadcast in August.

The scientists also will be featured on five fifteen-minute segments to be aired on public radio stations throughout the state. Those segments later will be compiled on cassette and distributed along with a curriculum guide to school districts in Alaska by the Department of Education.

Robert Hunsucker, a senior consultant and professor emeritus, was selected from a nationwide pool of candidates to be the new editor of *Radio Science*, an international bimonthly journal that publishes papers on all aspects of electromagnetics. Hunsucker was appointed to the four-year position by the American Geophysical Union.

Hunsucker also is an associate editor of *The URSI Bulletin*, a magazine published by the International Union of Radio Science.

In January, Hunsucker became a Life Fellow of the Institute of Electrical and Electronics Engineers, Inc., a status reserved for those who have had a long association with IEEE, and who have contributed knowledge through years of professional experience.

Welcome

Roger Hansen joined the institute as State Seismologist and Research Professor of Geophysics this fall. He earned his B.S. ('75), M.S. ('77) and Ph.D ('81) degrees in geophysics from the University of California at Berkeley. Before coming to the institute, Hansen most recently worked at the University of Colorado physics department, at the U.S. Air Force Technical Application Center at Patrick AFB, Florida, and at the Norwegian Seismic Array near Oslo, Norway.

His duties at the institute include operating the seismic network for the state and evaluating seismicity and earthquake-hazard potential.

Prior to his arrival, Hansen specialized in seismology studies to discriminate between earthquakes and nuclear blasts, and on seismic-hazard analyses. Hansen is a member of the Seismological Society of America and the American Geophysical Union.

Florence Lee joined the institute as a test engineer for the Alaska Synthetic Aperture Radar Facility. Lee earned her B.S. degree from Fujen University in Taiwan ('73), and an M.S. in mathematics from the University of Texas at Austin ('79).

Before joining the institute, Lee worked as a system engineer at the Taiwan National High Performance Computing Center, as a programmer analyst for El Paso County in Colorado Springs, as a software engineer at Intel in Portland, Oregon, as a system analyst for Mobil Oil in Dallas, Texas, and as a programmer analyst at Cray Research in Minneapolis, Minnesota. At the institute, she will assist with a major software upgrade of the ASF.

Ned Rozell joined the institute as a part-time science writer/proposal developer, replacing the part-time position held by Carla Helfferich. He earned a B.A. degree from UAF in journalism with a minor in English ('90), with extensive course work in natural resources management.

Before coming to the institute, Rozell worked as a park ranger at Yukon-Charley Rivers National Preserve, as a wildlands firefighter in Alaska, and as an oil recovery technician during the Prince William Sound oil spill. He also owned a lawn care business, for which he wrote a successful grant proposal to compost grass clippings.

Ice Tools

Unique tools designed by institute researchers to cut and study sea ice were used to help the Fairbanks Ice Festival this winter. Electronic Technician **Bill Zito**, Senior Research Consultant **Lew Shapiro**, and Machinist **Ned Manning** helped festival volunteers excavate 100,000 pounds of ice needed for sculpture contests from a frozen quarry off Peger Road.

Zito used an underwater remotely controlled vehicle with a 150-meter umbilical cord to help volunteers observe the excavation process, clear ice formation, and other activity occurring under the ice in the freshwater quarry. The $50,000 submersible unit contains underwater cameras that sent images from under the ice to a television screen on the ice surface.

Shapiro and Manning cut blocks from the ice with a large, motorized, robotic chain saw designed at the institute to cut through sea ice off the coast of Barrow.

Lecture Series

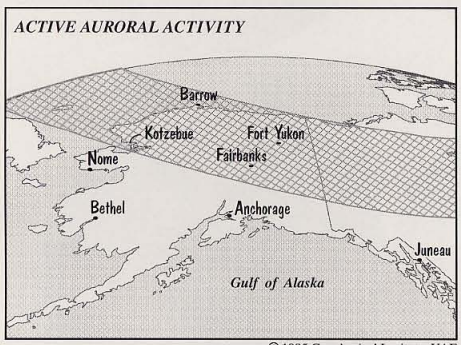
Eight professors gave free public lectures about their research this winter in Fairbanks and in Anchorage. The after-dinner seminars, presented in terms understandable to all ages, covered a variety of topics including the aurora, mountain ranges, earthquakes, glaciers, volcanoes, continental drift, and even arctic dinosaurs.

An average of about 150 people attended each lecture, despite winter's often inclement weather. The Geophysical

Institute co-sponsored the Fairbanks series with the Noel Wien Library, and the institute joined the Alaska Science and Technology Foundation and the Alaska Public Lands Information Center to present the series in Anchorage.

Auroral Predictions

Weekly predictions about auroral activity over Alaska were established in March by Institute Director **Syun Akasofu** and Poker Flat Research Range Scientific Director **Chuck Deehr**. The predictions and accompanying diagrams, depicting low to high auroral activity throughout the week, are based on data gathered from a worldwide network of magnetometers by Programmer Analyst **Li-her Lee**.



Service Awards

The following institute employees recently passed yearly milestones of service:

Five years—Paul Bundschuh, Rick Danielson, Jim Desrochers, Bob Grove, Chris Larsen, Paul Layer, Judy Martsolf, Don Rice, Mitch Robinson, Charlotte Rowe, Donna Sandberg, Wei Sun and Dan Weimer.

Ten years—Keith Echelmeyer, Greta Reynolds and Roger Smith.

Fifteen years—John Benevento, Patricia Collins, Rick Guritz, Joan McInerney, Johni Meshell and John Olson.

Twenty years—Kate Barr and Cynthia Weatherby.

Twenty-five years—Kristina Ahlnaes and Tom Osterkamp.

No Space Academy

The Alaska Space Academy, a week-long summer camp operated by the institute, which for two years brought space down to earth for students, will not open this summer due to a shortage of funds. Funding for the camp comes from a variety of sources including private and corporate donations, the camper $250 tuition charge, and educational contributors such as the Geophysical Institute, Alaska Space Grant, and the UAF College of Natural Science. The camp is expected to open again in 1996 under the new name, Alaska Space Ventures.

New Arctic Research Institute

A new institute at UAF that promotes closer cooperation between university scientists and federal and state agencies selected Professor of Geophysics **Gunter Weller** to be its first director. The new Cooperative Institute of Arctic Research or CIFAR (pronounced "See Far") is funded by the National Oceanic and Atmospheric Administration and is collocated with the UAF Center for Global Change and Arctic System Research, which Weller also directs.

As the latest of eight interdisciplinary partnerships in the U.S. to be forged between individual universities and NOAA, CIFAR will work closely with NOAA's Pacific Marine Environmental Laboratory in Seattle on atmospheric research, environmental assessment, tsunami prediction, fisheries and sea ice research, climate dynamics, and numerical modeling.

Weller also recently was elected to the rank of Fellow by the American Association for the Advancement of Science, the largest federation of scientists in the world. Each year the council elects members whose efforts on behalf of the advancement of science or its applications are scientifically distinguished. Fellows were honored at the AAAS national meeting in Atlanta, Georgia, in February.

International Agreement

An international agreement between branches of the Japanese and the American governments to study global climate change, the destruction of the ozone layer, acid rain, and other problems with the earth's environment was signed on January 24 at the Geophysical Institute.

The signing of the agreement by Communications Research Laboratory Director General **Kazuyoshi Yoshimura** with the Japanese Ministry of Posts and Telecommunications, and Environmental Technology Laboratory Director **Steven Clifford** with the National Oceanic and Atmospheric Administration of the United States, enables scientists from both countries to study the middle atmosphere using an array of Japanese instruments which are scheduled to be transported to Poker Flat Research Range during the next two years. The agreement was made about two weeks after Policy Director **Jack Gibbons** with the Office of Science and Technology in the Whitehouse met with Japanese Minister **Tanaka** to confirm the high-priority ranking of the international research project.

Farewell to Morna Mellor

Former supervisor of the Geophysical Institute's Computer Resources Center, **Morna Mellor**, left the institute in fall 1994 after 23 years of service to accompany her husband, Jack Mellor, who accepted a new job with the Bureau of Mines and Reclamation in Lake Berryessa, California.

Mellor was first hired at the institute in 1970, as a data processing assistant with the data processing center.

She left the institute in 1972, returned to the data processing center as a scaling assistant and keypunch operator in 1973, and was promoted to the position of Computer Resources Center supervisor in 1987.

Mellor is responsible for the design, development and implementation of the accounting system used in the institute's business office.

Shake Table

To offset potential problems caused by earthquakes in Alaska, Machine Shop Supervisor **Larry Kozycki** is designing a small-scale kitchen on a large six-foot-square shake table that can demonstrate the effects of earthquakes at different magnitudes. When complete, the project will be taken to schools and used as a demonstration tool during public lectures. ✦

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Kathy Berry—Editor and Writer
Cheryl Katje—Publications Assistant
Deborah Coccia—Graphic Artist

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A Unique Brand of Video

Researchers who want to produce high-quality videos of hard-to-picture phenomena can use the new Visualization Laboratory on the second floor of the Geophysical Institute to analyze and display data.

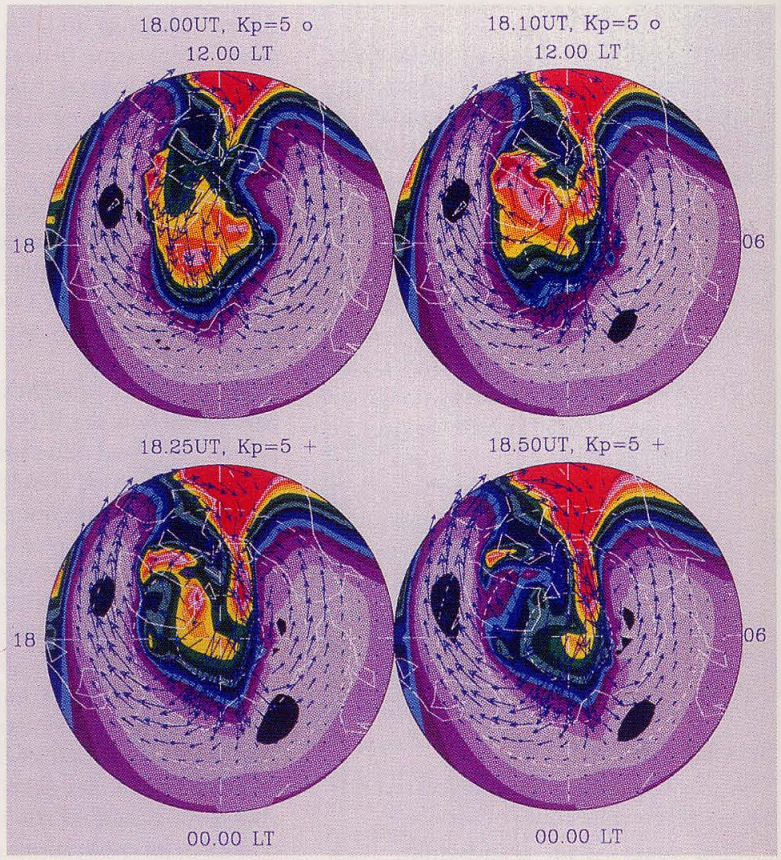
VHS versions of the colorful videos produced in the lab also can be used for demonstrations to colleagues, for display at conferences, or for school presentations.The lab contains an Onyx server and four Indigo workstations provided by the Arctic Region Supercomputing Center and is managed by Assistant Professor of Atmospheric Sciences Amanda Lynch.

Graduate student Sergei Maurits, who was one of the first to produce a video at the Visualization Lab, uses the colorful animation to help demonstrate the progression of electron density in the ionosphere. As a space physics doctoral candidate, much of Maurits' research is accomplished on the computerized workstation in his office. The video enables him to show his work to colleagues who live outside Fairbanks.

The memory available with the video server in the lab also allows Maurits to produce long, high-resolution animations that aren't possible on his workstation. The animated model of polar-region ionospheric plasma density and dynamics Maurits produced at the lab is composed of more than 1,000 still frames, for example, while his powerful workstation can animate only up to 200 frames at once.

Using the advanced techniques available at the lab, Maurits is able to stop or slow down the animation when he wants to explore data in detail, a technique that has enabled him to trace the origin of numerous ionospheric features. "It provides a new dimension in the understanding of time-dependent processes," he said.

Mastering the use of the Visualization Lab takes time, but the rewards are great. "I've found it invaluable for my work," said Lynch, whose research includes global climate change modeling. Lynch, Senior Systems Analyst Rick Guritz, and geophysics doctoral graduate student Craig Searcy are available to provide user training and access to the lab. ✦



Electron Density—*Space physics doctoral student Sergei Maurits produced this colorful animation to help demonstrate the progression of electron density in the ionosphere in the new Visualization Laboratory on the second floor of the Geophysical Institute.*

GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks
903 Koyukuk Drive
P. O. Box 757320
Fairbanks, AK 99775-7320