Geophysical Institute QUARTERLY

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Spectacular Flashes Recorded Above Thunderstorms

Hundreds of spectacular red and blue flashes that occur above thunderstorms were recorded for the first time on color video by Geophysical Institute professors this summer.

The unusual flashes occurred over intense thunderstorms in the Midwest between June 28 and July 12 during a NASA-sponsored investigation into the phenomenon. To capture the flashes, Principal Investigator Davis Sentman and Professor Eugene Wescott, co-director of the project, used special low-light-level cameras aboard two jet aircraft flown out of Oklahoma City.

"The video footage we received far exceeded our expectations," Sentman said. "The flashes look like the fourth of July, like roman candles with fountains."

Last year, Sentman and Wescott were able to capture 19 of the flashes on black-and-white video. Prior to that expedition, scientists had limited evidence the flashes existed. During their recent excursion, the professors were able to record more than 24 hours worth of flashes and to examine their color and speed for the first time.

They also were able to measure the position and altitude of the flashes by using the aircraft for triangulation and improved camera systems designed by Geophysical Institute Project Engineer Daniel Osborne. The flashes appear in two distinctly different forms, which the professors call sprites and blue jets. Sprites are blood red flashes that appear with bluish tendrils dangling from the bottom of some. These flashes, which last only a few thousandths of a second, extend from above storm clouds up to about 60 miles high, reaching the bottom of the ionosphere.

DANIEL OSBORNE

Sprite—*Hundreds of these unusual red flashes were recorded for the first time on color video this summer.*

Radio recorded noise coinciding with the sprite flashes makes a distinct "pop" when played back through a speaker, a sound that differs from normal lightning discharge signals.

The sprites also have been recorded on a TV spectrograph, which will be analyzed to determine their atomic and molecular source. Since they are associated with thunderstorms and lightning, the scientists suspect sprites may be a form of electrical discharge.

Blue jets are flashes that appear in narrow beams, sprays, fans or cones of light which give off a blue or purple hue.

"To the eye, they resemble material ejected from a high explosive source, the tracks of atomic particles, or rays in a cloud chamber," Wescott said.

Pilots and others have reported seeing blue or green columns of light above thunderstorms for years, but Sentman and Wescott were the first to capture them on video. They recorded about a dozen blue jets over an intense storm in Arkansas on June 30.

The jets appeared to originate at the top of storm clouds and then to travel upward to an altitude of about 20 miles.

They occurred at various angles at speeds ranging from 20 to 60 miles a second, which is well above the speed of sound, but far below that of light or radio waves.

The scientists coordinated their observations with other groups in Fort Collins, Colorado, Pennsylvania State University, and Stanford University, where researchers made video and radio-wave observations from the ground. The aircraft were leased by UAF from Aero Air, Inc., in Hillsboro, Oregon. ✦

INSIDE THIS ISSUE

Last Launch of the Season

EVELYN TRABANT

The last launch of the 1994 rocket season at Poker Flat Research Range flew 97 miles high through a daytime aurora to measure nitric oxide, a chemical scientists suspect may destroy ozone.

After a short flight, the rocket payload landed downrange near Flat Creek in the White Mountains, where it was retrieved by aircraft. The instruments within the payload are scheduled to be launched from the range again next summer by University of Colorado Professor Charles Barth, the scientist in charge of the mission.

Although a minor species in the atmosphere, nitric oxide is an efficient radiator in the infrared, which makes it a key regulator of temperature in the thermosphere. When transported to lower altitudes, it can destroy ozone.

Past experiments have proven that densities of nitric oxide concentrations in the lower thermosphere vary greatly.

The solar launch in June flew through high concentrations of nitric oxide. Barth hopes to send the payload through low concentrations of nitric oxide next summer.

Scientists expect the two-part experiment will help them identify the reason for periodic high concentrations of nitric oxide, and help them find the source of its variation in density. ✦

Donated Dome

A metal dome used by Geophysical Institute researchers for nearly half a century was donated this summer to a local astronomy organization that teaches star-gazing classes to children in the Fairbanks North Star Borough school district.

The dome, which measures 21 feet in diameter and stands 13 feet tall, was the first large aperture optical observatory permanently housed in Alaska.

The large unit was removed with cranes from the top of the Chapman Building, which was constructed with federal funds in 1950 to house the Geophysical Institute before it moved into the C.T. Elvey Building on the university's west ridge.

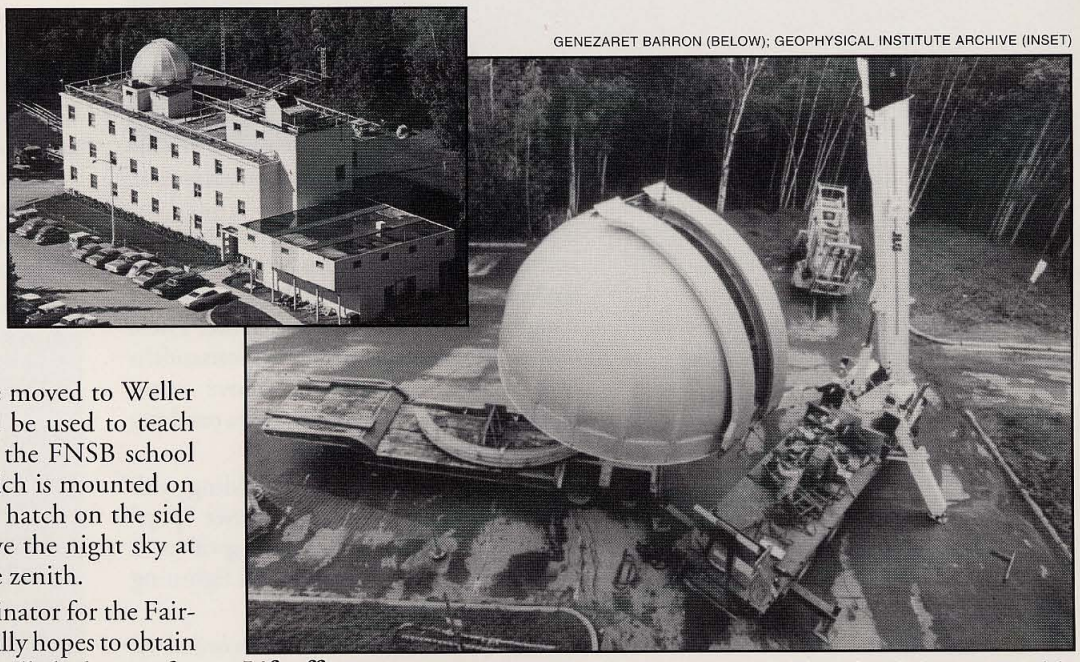
The Fairbanks Astronomical Unit used a flatbed trailer to move the dome from the Chapman Building to a site on Chena Hot Springs Road for temporary storage.

After funding is obtained to build a concrete foundation, the dome is scheduled to be moved to Weller Elementary School, where it will be used to teach astronomy programs throughout the FNSB school district. The unheated dome, which is mounted on rollers so it can rotate, contains a hatch on the side that opens so students can observe the night sky at any angle from the horizon to the zenith.

Martin Gutoski, project coordinator for the Fairbanks Astronomical Unit, eventually hopes to obtain funding to purchase a remote controlled telescope for the site so students will be able to pull up real-time images of the stars on their computers. The dome, which originally contained a 12-inch reflector telescope, was used for scientific observation until about 1964; from it institute scientists made history by being the first to sight Sputnik, the world's first earth-orbiting satellite launched by Russia in 1957.

The original 12-inch telescope was donated to the Fairbanks Astronomical Unit in 1989, after lighting from surrounding buildings and parking lots nearby decreased viewing conditions, making the telescope unusable for research observations. Since then, the instrument has been used for classroom demonstration. The dome was removed by A & A Roofing, a local business under contract to the University of Alaska to reconstruct 30 roofs on the Fairbanks campus during the next three years. ✦

GENEZARET BARRON (BELOW); GEOPHYSICAL INSTITUTE ARCHIVE (INSET)



Lift off—*The first large aperture optical observatory permanently housed in Alaska was removed this summer from the top of the Chapman Building, the original home of the Geophysical Institute.*

Instruments Detect Radiation in the Air

Dangerous levels of radiation in the air over Fairbanks can now be detected instantly, thanks to the installation of two automatic monitors set up outside the Geophysical Institute by officials from the Los Alamos National Laboratory in New Mexico.

The monitors, which measure temperature, humidity, wind direction and speed as well as levels of gamma radiation, were installed in front of and on top of the institute's eight-story C.T. Elvey Building this summer.

The tall, silver and blue monitors resemble air sampling stations temporarily set up here and throughout the state two years ago by the Alaska Department of Environmental Conservation.

Back then, officials feared the dumping of nuclear waste into the Arctic Ocean by the former Soviet Union would taint air in Alaska. Fortunately, no sign of increased radiation was detected.

However, state officials and many scientists believe weather patterns could still bring radioactive air to the Arctic. Among them is Geophysical Institute Professor Glenn Shaw, who helped discover Arctic Haze, a form of air pollution generated by industrial sources in northern Europe and Asia that is transported to Alaska by air flowing across the poles.

Shaw has conducted radiation and arctic pollution monitoring throughout the state since the mid 1980s. In April 1986, shortly after the Chernobyl nuclear reactor accident occurred in Russia, Shaw measured radioactive particles in the air over Fairbanks, Valdez, and Barrow. Unusual weather patterns caused most of the radioactive cloud from that accident to miss the Arctic, but Alaskans may not be as lucky in the future.

Using the monitors installed this summer, radiation levels can be determined instantly. Each monitoring station contains a large digital display which reveals radiation levels in real time. This information is sent by satellite directly to a data base in the Los Alamos laboratory, where it is made available for Internet access, and can be obtained daily by computer users around the country. In the institute, the readings are displayed in real time on terminals outside the director's office.

After a winter of testing to see how the solar- and battery-powered instruments hold up under harsh subarctic conditions, the new monitors will become part of an early warning system known as NEW-NET, or the Neighborhood Environmental Watch Network, sponsored by Los Alamos, the Environmental Protection Agency, the U.S. Department of Energy and the Desert Research Institute in Nevada.

NEW-NET was designed to provide the government and the public with immediate access to all kinds of environmental information. A pilot NEW-NET program already is underway in the western U.S., where data is collected by satellite from 120 monitoring stations, like the ones installed at the institute.

"These stations are meant to be part of the community," said Jim Ogle, a network program manager at Los Alamos. "They are set up so anyone can see a readout display of surrounding conditions." Ogle hopes NEW-NET will soon be incorporated into school classrooms and community education programs.

The digital displays attached to the monitors outside the institute indicate that radiation levels in Fairbanks have been consistently low this summer. Any significant rise in radiation would be reported immediately to ADEC, which would warn the public.

After their winter trial, Los Alamos scientists hope to offer the portable, automatic units for distribution around the Arctic. They also hope to fit the instruments with devices to monitor other hazardous materials and air pollution in Alaska.

Shaw eventually hopes to use the monitors to track chemical air masses at the North Pole, for example. When he looks to the future, he even sees the lightweight monitors measuring pollutants on top of fragile areas in arctic pack ice, after being transported there by submarine. ✦

EVELYN TRABANT

NEW-NET —*Professor Glenn Shaw adjusts an arm of a new radiation monitoring device set up in front of the institute this summer. Radiation levels in the surrounding area are instantly displayed on a digital panel attached to the instrument.*

Tracking Air Pollution Around the Globe

Ozone Trail—*The adjacent computer image was gleaned from a three-dimensional model used by scientists to predict how and where air pollution travels around the globe. The red, orange, and yellow bands superimposed on the map of the Northern Hemisphere show areas of high concentrations of ozone, a chemical produced in smog that can cause breathing difficulties and lung damage. The image indicates that ozone produced on the east coast of the United States can be transported by winds across the Atlantic Ocean to Europe, and that ozone produced in Asia can be transported across the Pacific Ocean to California.*

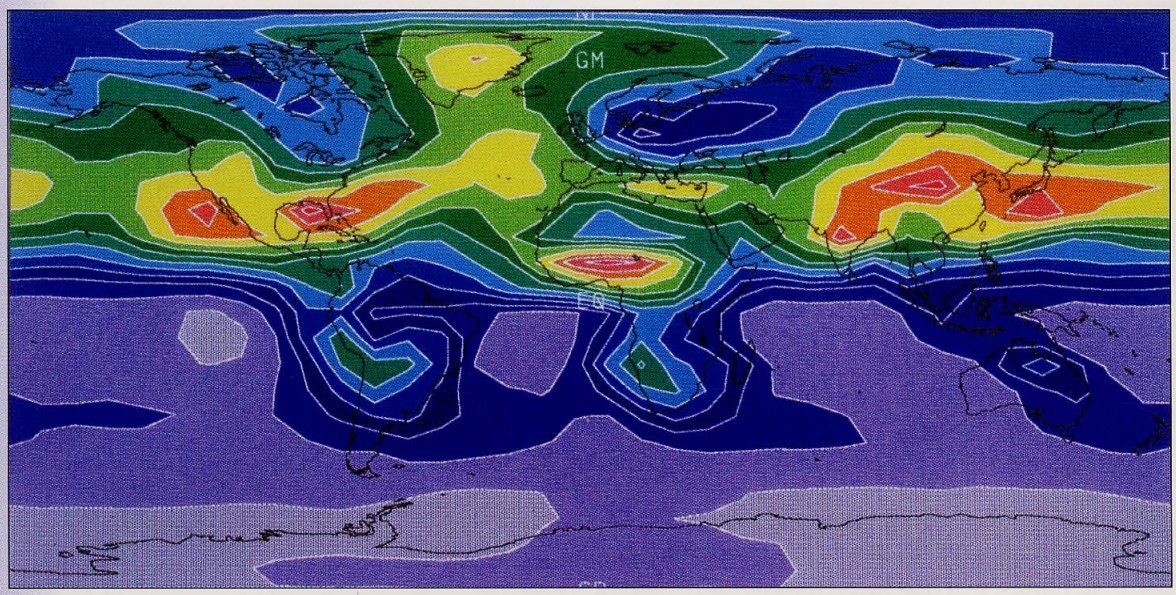


IMAGE CREATED BY TERJE BERNTSEN, A DOCTORAL CANDIDATE FROM THE UNIVERSITY OF OSLO IN NORWAY

Air pollution generated in Asia may contribute to smog in Los Angeles, California, and air pollution from the east coast of the United States may contribute to smog in Europe, according to a three-dimensional computer model developed by Professor of Geophysics Ivar Isaksen at the University of Oslo in Norway.

The model, which uses colorful imagery to track tainted air around the globe, helps scientists find hot spots indicating where different pollutants originate, and then predict where the toxins will travel.

Dan Jaffe, an associate professor of chemistry at the institute, worked with Isaksen and other modelers in Norway during an 11-month sabbatical that concluded in July. Jaffe's research helped verify that predictions made by the global chemical transport model agree with actual observations.

"A global model is most relevant for understanding the long-term implications and consequences of past and future emissions," Jaffe said. "However, before the model can be used it must be evaluated against known physical principles and experimental observations." To evaluate the model, Jaffe analyzed air in the troposphere, which extends from the earth up to about 10 miles high, and he studied observations previously recorded in published reports, which included his own data from the Arctic. Overall, he used 20 different points of data collection in the northern hemisphere taken at various places during alternate seasons.

Jaffe's studies focused mainly on four types of chemicals found in air pollution around the globe: nitrogen oxides and hydrocarbons, which are produced by fossil fuel combustion; and ozone and PAN (peroxyacetylnitrate), which are produced by chemical reactions in smog.

When present in the air in high concentrations, all of the chemicals can cause difficulty breathing and lung damage; when dispensed in the form of acid rain, the pollutants can kill crops and other vegetation.

The computer model works by dividing the atmosphere into dozens of boxes. The horizontal grid of the earth is represented by 24 boxes (from north to south), 36 boxes (from east to west), and then nine layers of boxes stacked in the vertical. Within each box, chemical reactions and emissions are simulated for a specific geographic area of the earth. Superimposed over the air pollutants are their interactions with winds, chemistry, sunlight, and rain, which vary according to the season.

In all, the chemical scheme used in the model includes 49 components and 101 reactions. Trace gas concentrations are calculated every 30 minutes, and meteorological data is updated every four hours.

By analyzing the reactions within each box, the computer model can predict where pollutants will travel, how they will be transported, where they will be released as acid rain, where they might interact with sunlight or other chemicals to create new reactions, and where their impact is highest on global climate.

According to the model, the most polluted air in the world hovers over Europe, the east coast of the United States, and East Asia, where air pollution has doubled within the past 10 years. The model also shows localized areas of pollution, including heavy chemical emissions over areas being burned in Africa and South America. ✦

Finding Heat in the Arctic Ocean

The combination of more than 350 satellite images into one colorful display results in a clear picture of the Arctic for Rob Wade, a scientist with the Data Active Archive Center of the Alaska Synthetic Aperture Radar Facility.

Looking at the series of multicolor stripes criss-crossing the display's black background, Wade can determine where and how much of the earth's heat is being lost through the Arctic Ocean.

Generated from data sent to earth by the polar-orbiting ERS-1 satellite on three consecutive days, the massive display covers a huge 2100-by-2100 km area which encompasses the Beaufort Sea, Point Barrow, Banks Island, the Bering Strait, and the Canadian archipelago.

The stripes indicate the path of ERS-1, which obtains strips of high-resolution imagery 100 km wide. ERS-1 carries synthetic aperture radar, which can obtain data at night and through all kinds of weather, conditions that limit the usefulness of many other kinds of satellite-borne remote sensing systems.

While SAR can detect even the finest sea ice characteristics, it can not detect heat. SAR signatures also can contain ambiguities that make it difficult to distinguish between rough open water and thick ice, a critical distinction when interpreting heat flux.

"Thick ice covering the Arctic Ocean acts like a thermal blanket to keep heat in, especially when it's covered with snow. It can reduce the amount of heat released by 100 to 1000 times depending on how thick it is," Wade said. "By contrast, open water or thin ice gives off a tremendous amount of heat."

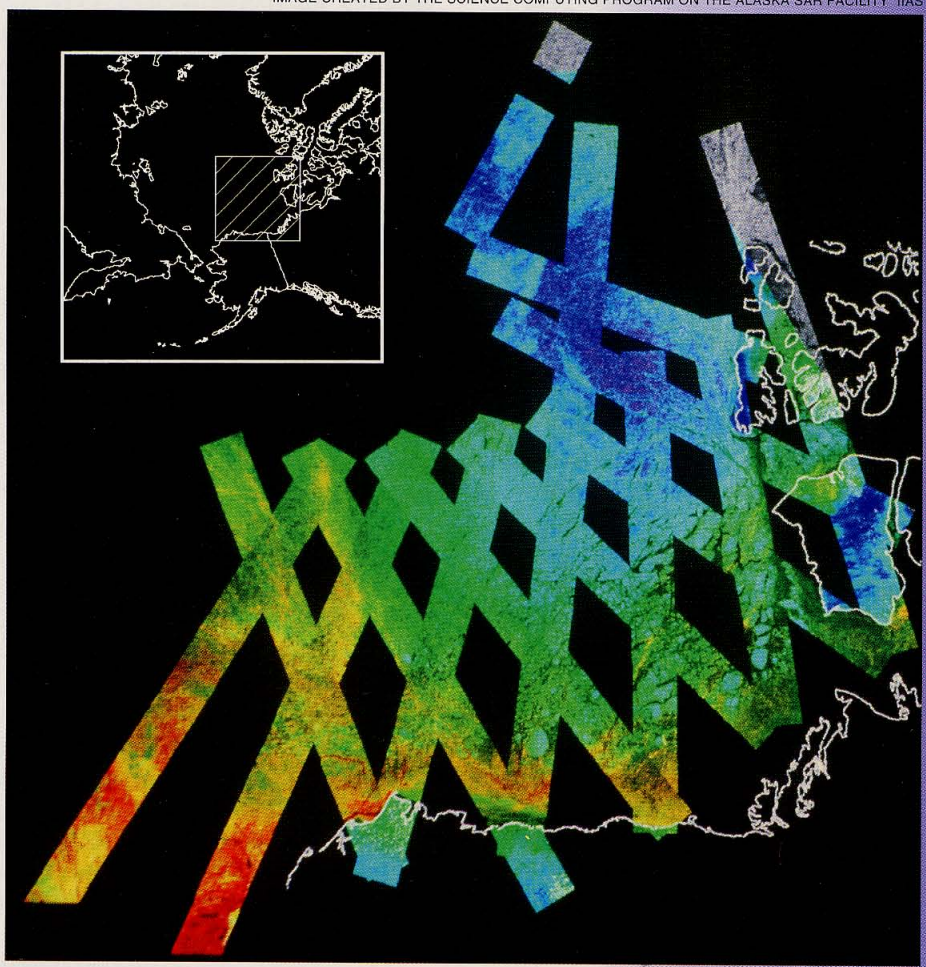
Heat loss is expected at the poles, where the earth loses much of the warmth it gains from the sun at the equator. After being transported to the Arctic by air masses or by sea currents, heat is released through open water and leads, or cracks, in sea ice covering the Arctic Ocean.

According to Geophysical Institute Professor of Geophysics Willy Weeks, the earth's entire meteorology and oceanography are driven by this interchange between the hot tropics and cold poles.

To make the display more useful, Wade supplemented the SAR images with data supplied by a satellite-borne Advanced Very High Resolution Radiometer. AVHRR can measure the temperature of the sea ice surface, but has very coarse resolution. Together, the two kinds of data give scientists the information they need to determine specifically where heat is emanating from the Arctic Ocean. "Wade's technique allows us to make an overall assessment of heat loss from the Arctic in a general way," Weeks said. "In very large regions, it's extremely difficult to tell how much heat is getting through the ice on average because even if you drill a hole in one area, you never know what is happening right around the next ridge."

Wade is writing proposals for funding to create as many of the large multidimensional displays as he can during the next three years so he can develop a climatology of the Arctic that will be applicable to global climate change models. ✦

IMAGE CREATED BY THE SCIENCE COMPUTING PROGRAM ON THE ALASKA SAR FACILITY IIAS



Overlap—*More than 350 SAR images and an AVHRR image were combined to create the display above, which shows heat emanating from the Arctic Ocean during three days in March. Red indicates the warmest areas; blue areas are coldest. Wade says the display may indicate that heat is emanating from thinner ice and open water in the southwest corner of the image, while in the northeast corner, thicker ice acts as a thermal blanket to keep heat in. His analysis is consistent with measurement and circulation patterns in the Arctic Ocean.*

GI NOTES

Congratulations

Long-term Service

The following Geophysical Institute employees were recognized for their many years of continuing service at the university: five years—**Dolores Baker**, **Doug Christensen**, **Roberta Greenlee**, **Walter Rutherford**, **Ray Ward**, and **Rose Watabe**; 15 years—**Michael Cogan**, **Janet Dalrymple**, and **Lou-Chuang Lee**; 20 years—**James Burton**, **Morna Mellor**, and **Dan Osborne**; 25 years—**Neal Brown**, **Hans Pulpan**, **Gunter Weller**, and **Helga Wilm**; 30 years—**Dan Swift**.

Awards and Honors

The UAF Alumni Association named **T. Neil Davis**, a 1961 doctoral graduate in geophysics and Poker Flat Research Range's founding director, as UAF's 1994 Distinguished Alumnus. Davis received the award at the alumni reunion luncheon and awards ceremony in July. Criteria for the award include specific meritorious service on behalf of the quality and advancement of the University of Alaska, distinguished accomplishment in business or professional life, and distinguished human service in community affairs.

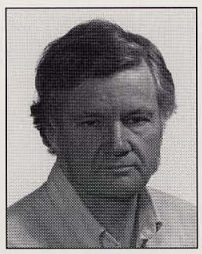
Nettie LaBelle-Hamer, who recently received her Ph.D. in space physics, won an "Outstanding Student Paper" award at the 1994 Spring American Geophysical Union meeting in Baltimore. Her paper on space plasma was entitled "Magnetic Reconnection in the Presence of Sheared Flow." Her work will be featured in the national publication *EOS* this fall. LaBelle-Hamer is employed as a user services specialist with ASF.

Fellowships

Institute Director **Syun-Ichi Akasofu** congratulated Professor Emeritus **Carl Benson** on his election to Fellowship in the American Geophysical Union in December 1993. The award will be presented at the AGU meeting in San Francisco this December.

Research Associate Professor **Martin Jeffries** also was congratulated this summer for his election as a Fellow of the Arctic Institute of North America. Martin has been a member of AINA since 1981.

Retirement



Professor of Physics **Dan Swift** retired in June. Swift's career as a geophysicist was launched concurrent with Sputnik in 1957 when he entered graduate school at MIT. His first interaction with the Geophysical Institute was in 1958, when he worked as a staff member at Lincoln Laboratory. Swift's project involved the transmission of VHF radio waves from UAF's west ridge, which were received at the lab in Massachusetts.

He joined the Geophysical Institute in 1963 as an assistant geophysicist; Swift was the first person hired by Keith Mather, the new institute director at that time. By 1972, Swift was a full professor of physics. The majority of his work has been in the numerical simulation of space plasmas.

Swift has been a dedicated and versatile teacher over the years; he introduced several new physics courses into the curriculum, served as mentor to graduate students, and developed the Summer Intern Program, initiated in 1987. Swift was bestowed with emeritus status at the seventy-second UAF Commencement.

New Antenna

An agreement with NASA to fund a new antenna to be installed by fall 1995 on UAF's west ridge was signed this summer by Chancellor **Joan Wadlow**, NASA's Ground Network Division Director **Robert Hornstein**, and Director of NOAA's Office of Satellite Data Processing and Distribution Division **Helen Wood**. Also attending were ASF Project Director **Carl Wales** and institute Professor of Geophysics **Willy Weeks**.

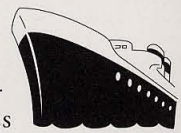
The antenna will receive data from the Advanced Earth Observation Satellite, which will carry a suite of sensors to monitor global change and to aid in local and international resource management. ADEOS, scheduled to be launched by the Japanese government in February 1996, is designed to explore the environment.

Computer Visit

U.S. Vice President **Al Gore** visited with Geophysical Institute staff this summer—if only by computer. Gore received a demonstration of the Earth Observation System Data Information System at NASA headquarters in June. EOSDIS was developed to provide easy access for researchers and others interested in information about the earth's environment.

The Alaska Synthetic Aperture Radar Facility, which receives data from polar-orbiting satellites, is one of a network of eight data centers around the nation that makes information available to earth-science data users through the EOSDIS program.

Learning on Ice



Research Associate Professor of Geophysics **Martin Jeffries** has extra company on his research trip to Antarctica this fall. Jeffries' sea ice project was selected to participate in two NSF-sponsored programs: the Young Scholars Program and the High School Teacher Enhancement Program.

A science teacher from Connecticut and a student from Arkansas were chosen this summer from a nationwide pool of applicants to participate in Jeffries' project, which involves investigating sea ice properties in the Amundsen and Ross seas aboard a 300-foot icebreaker.

Stephanie Cushing, a UAF undergraduate student, also will help the researchers, who will spend much of the two-month journey working on ice floes.

The data gained during the cruise will help scientists assess global climate change.

Earthquake Instruction

Teachers from around Alaska learned about earthquakes, seismological observation, data collection and data analysis during a three-day, one-credit continuing education course this summer conducted by Deputy State Seismologist **Charlotte Rowe** with the Alaska Earthquake Information Center.

The 500-level "Teacher Seismology Workshop" was attended by 10 teachers from Petersburg, Huslia, Kodiak, Dutch Harbor, Anderson, North Pole, and Fairbanks.

Participants devised lesson plans using seismology to enhance their math and science curricula. The plans will be the first of a growing collection soon to be made available to teachers statewide.

Welcome

New Employees

David Bailey joined the Geophysical Institute as a research programmer in atmospheric sciences. He holds an M.S.C. in oceanography (University of British Columbia, '93) and a B.S. in math (University of Waterloo, '91). He works for Assistant Professor Amanda Lynch on an atmosphere-ice-ocean modeling project using the Arctic Region Supercomputing Center's Cray Y-MP.

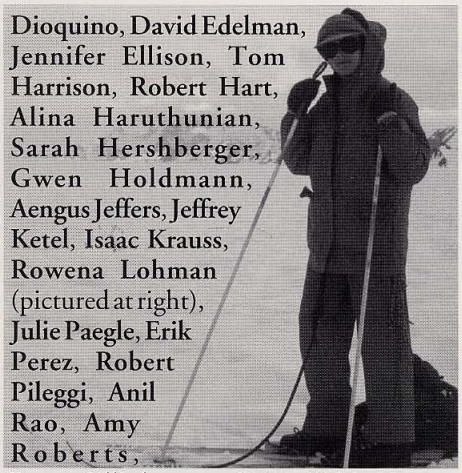
Richard Collins joined the institute as research faculty in space physics. Collins came to the institute after completing his Ph.D. in electrical engineering at the University of Illinois, where his research focused on laser radar (Lidar) measurements of the atmosphere in Antarctica. Collins also holds an M.S. in electrical engineering (Case Western Reserve, '88) and a B.E. in electronic engineering (University College, Dublin, '86).

Victor Filyushkin joined the institute as a research associate in atmospheric science. He holds a Ph.D. in plasma physics and chemistry (I.V. Kurchatov Institute of Atomic Energy and Moscow Institute of Physics and Technology, '82). His current research includes atmospheric radiative transfer and photochemical and cloud boundary layer modeling. With Professor of Physics Knut Stamnes, Filyushkin works on the Atmospheric Radiation Measurement Program; he will be the principle investigator on an NSF-funded project to study arctic stratus clouds.

Richard Marlin joined the institute as the RADARSAT development coordinator for the Alaska Synthetic Aperture Radar Facility. He holds a B.S. degree in electrical engineering and an engineer-in-training certificate (UAF, '79). Marlin helped design and install the control system for ALCOA Aluminum's new 100-inch-wide rolling mill in Davenport, Iowa. Before ALCOA, Marlin worked as a sales and applications engineer for Eagle Signal, a manufacturer of programmable electronic control systems and traffic signals.

Summer Interns

Working under faculty supervision, 24 undergraduate students got hands-on research experience this summer as interns. Participating in the program were **Jared Abraham**, **Stephen Ahlgren**, **Joe Beach**, **Russell Brandt**, **Aimee Burns**, **Priscilla Dioquino**, **David Edelman**, **Jennifer Ellison**, **Tom Harrison**, **Robert Hart**, **Alina Haruthunian**, **Sarah Hershberger**, **Gwen Holdmann**, **Aengus Jeffers**, **Jeffrey Ketel**, **Isaac Krauss**, **Rowena Lohman** (pictured at right), **Julie Paegle**, **Erik Perez**, **Robert Pileggi**, **Anil Rao**, **Amy Roberts**, **Laura Silliphant**, and **Erin Whitney**.



CRAIG LINGLE

Two "Research Experience for Undergraduates" grants helped support the interns. Professors of Physics **Roger Smith**, **Dan Swift** and **Glenn Shaw** secured a grant from the NSF Division of Atmospheric Sciences; Associate Professors of Geophysics **Doug Christensen** and **Paul Layer**, and Professor **David Stone** got funds from the NSF Division of Earth Sciences.

Community

Fair Enough

Associate Professor of Library Science **Judie Triplehorn**, Adjunct Professor of Seismology **John Lahr**, and USGS Geophysicist **Bob Hammond** joined forces with the Goldstream Valley Lions, the Red Cross, the Alaska Cooperative Extension, the Alaska DGGS, and the USGS to set up an earthquake-preparedness booth at the Tanana Valley Fair. More than 1100 people stopped by the exhibit to pick up information and to discuss the reality of a major earthquake hitting Fairbanks or North Pole. Nineteen GI employees volunteered to staff the booth.

Meanwhile, across the Aurora Pavilion, a remote-controlled underwater television vehicle set up by Electronic Shop Supervisor **John Benevento** and Electronic Technician **Bill Zito** attracted hordes of people to the university relations booth, which featured the Geophysical Institute and the Alaska Space Academy.

Journals Sent

Russian scientists writing manuscripts often have been impeded by a lack of current information because their institutes are unable to afford scientific journals. In response to this dilemma, the Geophysical Institute joined other research institutes worldwide by providing spare copies of publications to their Russian neighbors. Professor of Physics **Roger Smith** and Associate Professor of Library Science **Judie Triplehorn** recently sent spare issues of the *Journal of Geophysical Research, Space Science Reviews*, and *Geophysical Research Letters* to the Institute of Cosmological Research in Yakutsk.

Geo Growth

Contributions to the Geophysical Institute Endowment Fund have reached almost $40,000. A reception honoring the generous donors was held in August. The fund was established two years ago to help the institute maintain a financial edge in the face of decreasing state revenues.

DAVID SANCHES

Geophysical Institute Director Syun Akasofu is surrounded by a flock of floozies during Golden Days.

Faculty and staff who joined in the annual Golden Days celebration at the institute this summer contributed $800 to GeoCare, a fund set up to help institute employees facing personal disasters, such as illness, fire, or death, when no insurance is available. GeoCare granted two awards this year.✦

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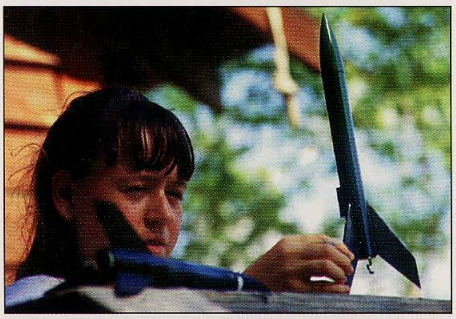
Popular Space Camp Expands to Three One-week Sessions

Counselors at the Geophysical Institute's second Alaska Space Academy camps taught kids about math and science by sending them on hypothetical missions this summer.

While learning about mapping, students searched for lost researchers on a hostile planet, and while exploring the environment, students created a biosphere so they could live in unknown worlds. They also searched for alien life which looked suspiciously like lake trout and built and launched their own rockets.

This year the Alaska Space Academy expanded into three one-week camps: two at Lost Lake, 50 miles southeast of Fairbanks; one at Elks Lake near Palmer.



EVELYN TRABANT

EVELYN TRABANT

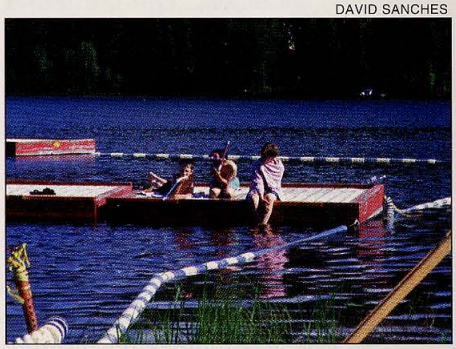
More than 220 sixth through ninth graders attended the camps, where they were instructed by a volunteer staff of teachers and counselors from around the state under the direction of Research Assistant Professor of Geophysics Neal Brown.

Parents joined the students during tours of Poker Flat Research Range, where they watched camp-built rockets get launched.

Many of the youths came to space camp from rural areas including Allakaket, Chalkyitsik, Circle, Dillingham, Galena, Glennallen, Huslia, Kaktovik, King Cove, Lake Minchumina, Sutton, and Tok. Others came from Whitehorse and Mayo in the Yukon Territories and from as far south as Portland, Oregon, and Stockton, California.

Next year, the Alaska Space Academy will expand to include a special training camp for science teachers. While learning methods for instructing students in an outdoor setting, teachers will earn continuing-education credits. Later, they'll practice these methods at one of the space camps for students. ✦

DAVID SANCHES



Studying Science—*Suzanne Taylor (far left) inspects a rocket at space camp in July. A team-built, high-powered rocket (center) was launched during a tour of Poker Flat Research Range. Campers (far right) relax after constructing an underwater habitat project.*

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