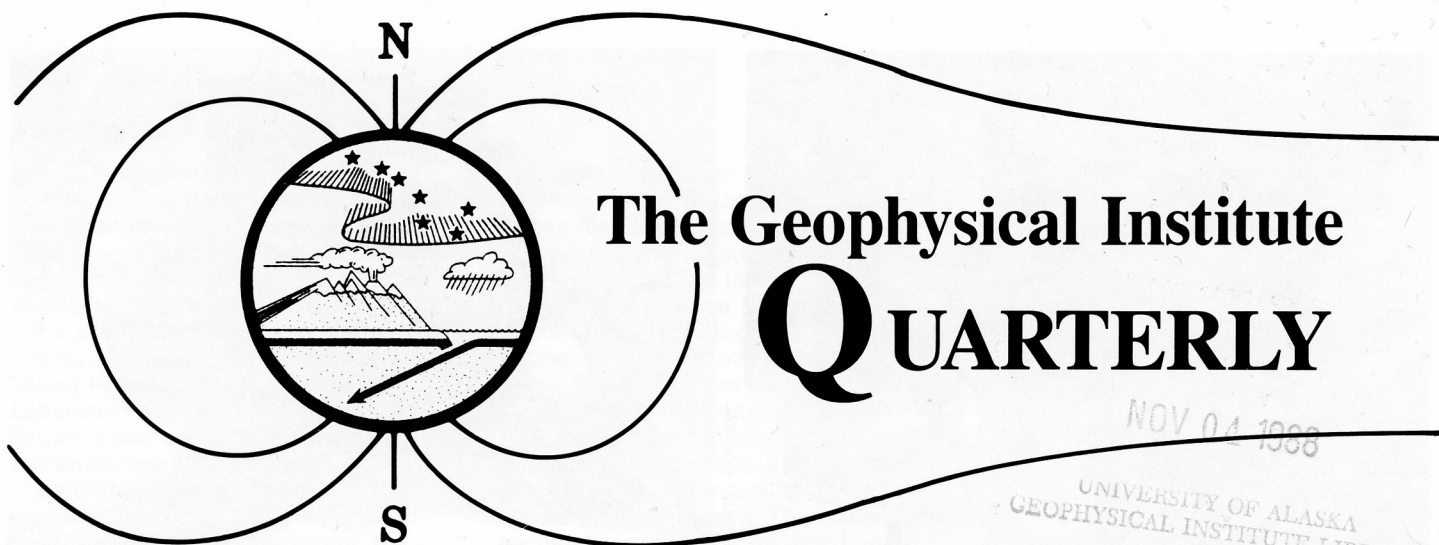




Volume 7, Number 1

October 1988

Geophysical Institute dedicates SAR facility

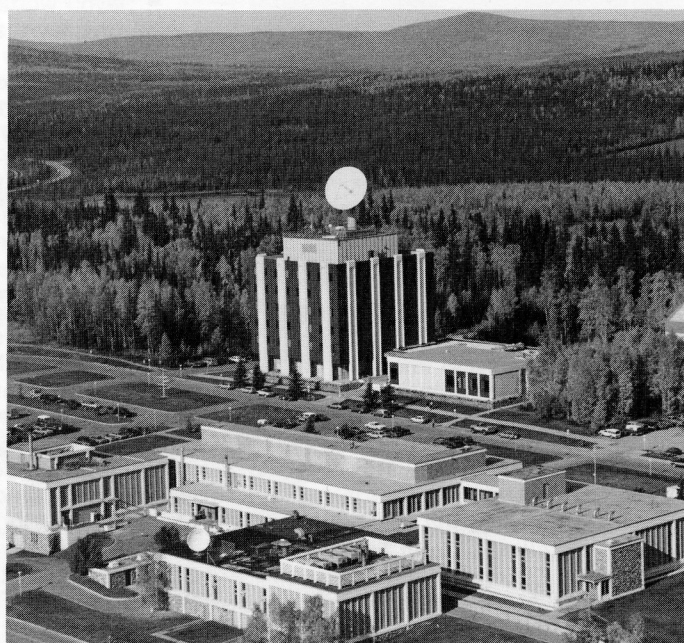
Perched on a 27-foot pedestal atop the Elvey Building, a 10-meter satellite dish now waits for the first signals from a new generation of satellites equipped with synthetic aperture radar (SAR).

The receiving antenna is part of the \$20 million Alaska SAR Facility (ASF) funded by the National Aeronautics and Space Administration. In the 1990s, ASF and two other receiving stations will, for the first time, provide nearly complete satellite coverage of the Arctic. The other locations are at Kiruna in northern Sweden and near Ottawa, Canada. The Geophysical Institute houses the ASF facility and is contracted through the University of Alaska Fairbanks to operate it for NASA.

"This is the only facility of its kind in the United States," said ASF project manager Gunter Weller. "Its state-of-the-art systems will involve the University of Alaska in decades of future space-based research."

On September 22, 150 people attended an institute program to dedicate the new facility. Representing the institute were Weller and Director Syun-ichi Akasofu.

continued on 3



The 10-meter satellite dish.

Institute opens doors to Fairbanks community

More than 1700 people visited the institute when doors were opened October 7-9 for a community open house. A month of hard work preparing for the event was rewarded by the community's positive response.

"Thanks for sharing!" sums up most of the comments received from visitors who took time to evaluate the event in writing. "I'm inspired and intrigued with all the research going on here...a great idea," wrote one guest; "...you did an excellent job displaying material and discussing it in an accessible way..." wrote another; "have this again," wrote many.

GI PHOTOJIM COCCIA



Charlotte Rowe shares a "Make-a-Quake" seismogram with open house visitors.

continued on 2



GI PHOTOJIM COCCIA



GI PHOTOJIM COCCIA

Open house

continued from 1

After a campus day on Friday, faculty and staff were on hand all day Saturday and on Sunday afternoon for the event. Everyone was enlisted beforehand to spruce up the building, update displays, and otherwise prepare.

Members of each research group planned and presented aspects of their science: auroral imaging, earthquakes and seismology, ozone and air pollution, ice coring, remote sensing, analyzing satellite images, and radio waves from space. The Geo Data Center presented an Alaska image quiz. Coordinating presentations were Tom Hallinan, John Miller, John Davies, Bill Stringer, John Olson, Katie Martz, Martin Jeffries, and Glenn Shaw.

Visitors were greeted at the door and a narrated slide show welcomed guests with an overview of the institute. The library was open and guests were free to embark on self-guided tours of the building.

Above left, systems engineer Larry Sweet shows young guests the SAR facility control room; at right, Katie Martz conducts the Alaska Image Quiz; below, Jeanne Hume welcomes visitors.

"What a great way to get kids interested in science," wrote one guest, and kids there were. Helium earth balloons were a hit with the younger set, and apparently with many adults—more than 1800 were handed out.

Penelope Dufseth of Technical Services coordinated the affair. Serving on the organizing committee were Tom George, Jim Burton, Stan Schwafel, Merritt Helfferich, Neta Stilkey, Doreen Fitzgerald, Debbie Coccia, Jeanne Hume, Tom Hallinan, and Syun Akasofu.



GI PHOTOJIM COCCIA

Geophysical Institute Quarterly

The quarterly is published as a public service by the institute. Subscriptions are available free on request. Contact:

Special Publications Office
Geophysical Institute
University of Alaska Fairbanks
Fairbanks, Alaska 99775-0800
Telephone: (907) 474-7863

Contributors: Special thanks to Evelyn Trabant and Jim Coccia, GI PhotoGraphics Dept.
Editor: Doreen Fitzgerald

The University of Alaska provides equal education and employment opportunities for all, pursuant to applicable state and federal laws.

Runcorn appointed to Chapman Chair

Beginning in January, the Sydney Chapman Chair at UAF will be filled by Keith Runcorn, who was recently appointed to that position by the UA Board of Regents. Runcorn is an expert on the physics of the earth, moon, and planets. Known for his contributions to geophysics and astronomy, he was named a Fellow of the Royal Society in 1965. The society's first president was Sir Isaac Newton, and membership is reserved to honor British scientists of distinction. Runcorn has authored or co-authored more than 20 books.

"With the award of this chair, we will be attracting to this university one of the leading, if not the leading, geophysicist in the world in the area of paleomagnetism and plate tectonics," wrote UAF Chancellor Patrick O'Rourke in his letter of recommen-

dation. "The appointment of professor Runcorn will bring the university one of the outstanding scholars in the world's scientific community."

The Chapman Chair was endowed by the Alaska Legislature in 1983, to honor geophysicist Sydney Chapman. He was the first scientific director of the institute, serving here in the 1950s and 1960s. The chair was first held by Syun-Ichi Akasofu, who is now director of the institute.

Earlier this year, Runcorn retired from the University of Newcastle upon Tyne in the United Kingdom, where he served as head of the school of physics. While holding the Chapman Chair, he will conduct research at the Geophysical Institute, teach UAF classes, and present seminars at university campuses and high schools throughout Alaska.

SAR facility dedicated

continued from 1

Participants from UAF were Patrick O'Rourke, chancellor; Luis Proenza, vice chancellor for research; and Fred King, director of facilities, planning, and construction. The State of Alaska was represented by the governor's science adviser, Henry Cole. Hal Theiss of NASA Headquarters and Young Park of the Jet Propulsion Laboratory spoke for NASA. Robert Gruen represented Scientific-Atlanta, the antenna's manufacturer.

Satellites have an important role in research involving remote and inaccessible regions. In the future, the scope of such studies will be substantially extended by a new generation of sophisticated satellites. Equipped with SAR, they are capable of operating at night and seeing through clouds.

For now, ASF will track existing satellites as a facility performance test and operational exercise for UAF scientists and technicians. Full operations will begin with the launching of the European Remote Sensing One satellite (ERS-1).

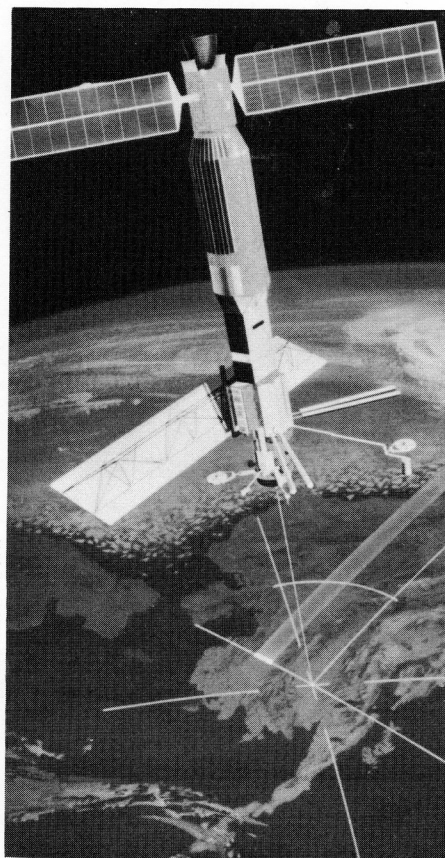
"ERS-1 is an all-weather, day and night satellite," said John Miller, ASF

operations manager. "It can operate under most conditions, and it produces high-resolution images." Sophisticated computer and processing systems at the institute will convert and analyze the satellite signals. The resulting images should delineate features on earth's surface as small as 20 meters in diameter.

Although the science funds for ASF came from NASA's oceanography branch, the system will provide information useful for land-based studies as well. The data can be used for research on distribution and behavior of sea ice; oceanographic fronts, eddies, and waves; glaciers and snow cover; geological structures; river and lake ice; permafrost; and vegetation.

Along with fundamental research into geophysical processes and phenomena, applied research of practical concern in Alaska will be carried out in such areas as monitoring sea ice in offshore petroleum areas, forest fires, and even volcanic eruptions. Wilford Weeks of the institute faculty is serving as chief scientist for the facility.

NASA JET PROPULSION LABORATORY



The SAR facility will receive and analyze data from synthetic aperture radar satellites similar to this one.

Image analysis facility aids shipboard research

When subsea geologic studies in the Chukchi Sea were threatened by heavy pack ice recently, scientists aboard the U.S. Coast Guard icebreaker Polar Star called upon the Geophysical Institute to help solve the problem.

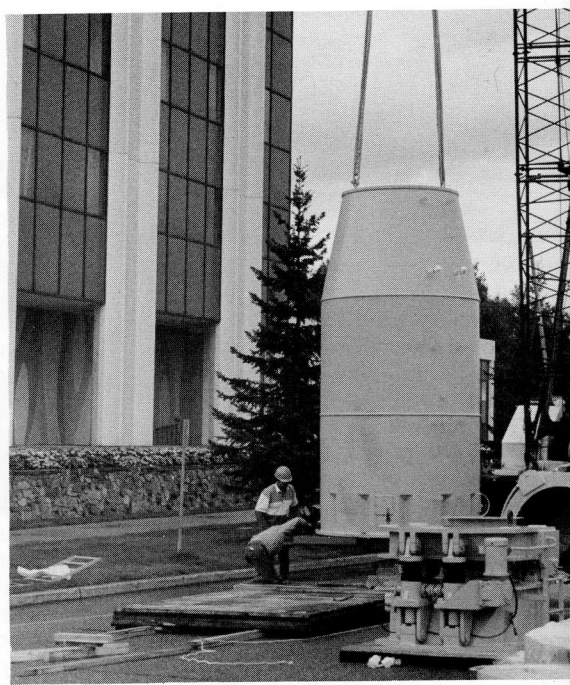
Institute researchers used the UAF image analysis facility to display satellite imagery of the sea west of Pt. Barrow. They then provided the ship with information needed to maneuver to less dense ice. On September 28, Dr. Arthur Grantz visited the institute to thank the people who had helped his work, and to discuss possible future cooperation. Grantz is a research geologist with the U.S. Geological Survey in Menlo Park, California.

"I received a radio telephone call from Grantz aboard the icebreaker on September 7," said Bill Stringer of the institute. "He and others from the U.S.G.S. were trying to conduct research on the geology beneath the sea floor, and very heavy pack ice was giving them severe trouble. They needed to know where they could work, and they were running out of



The Swedish Icebreaker Njord, built in 1969.

continued on 6

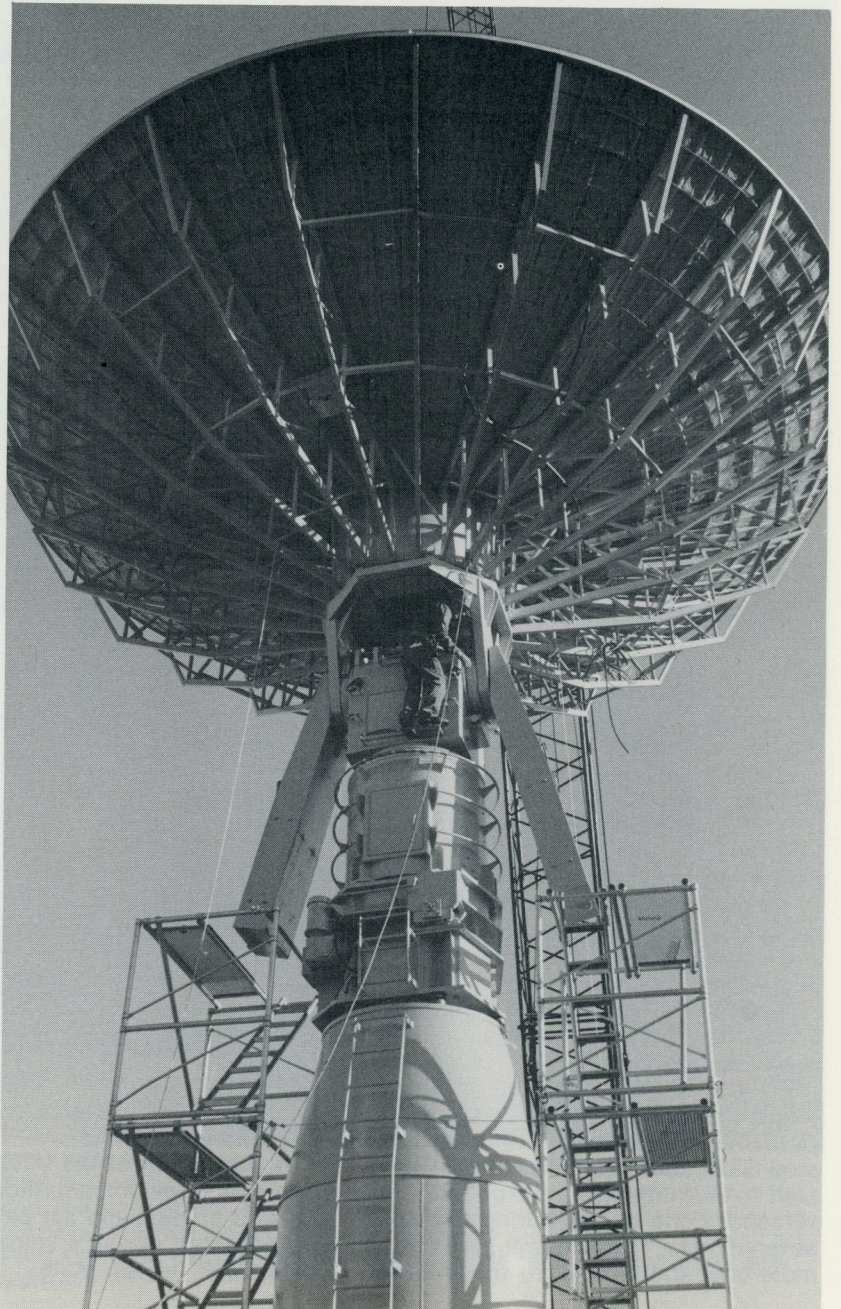


The big dish goes up!

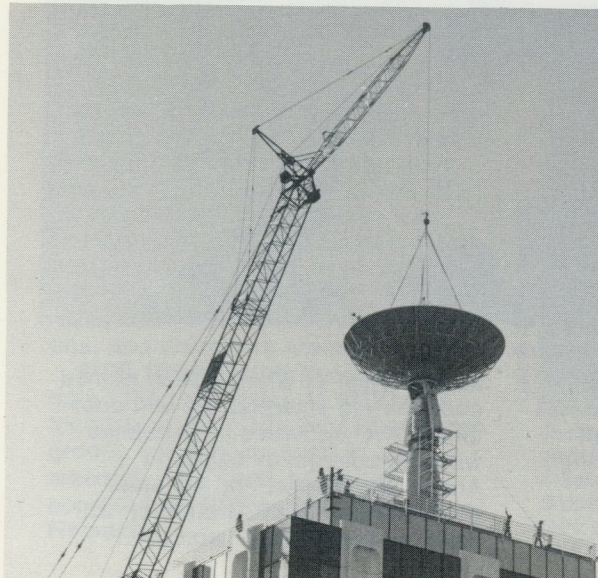




August 24, 1988: Alaska SAR Facility antenna installed.



photos by Evelyn Trabant



Remote Sensing

continued from 3

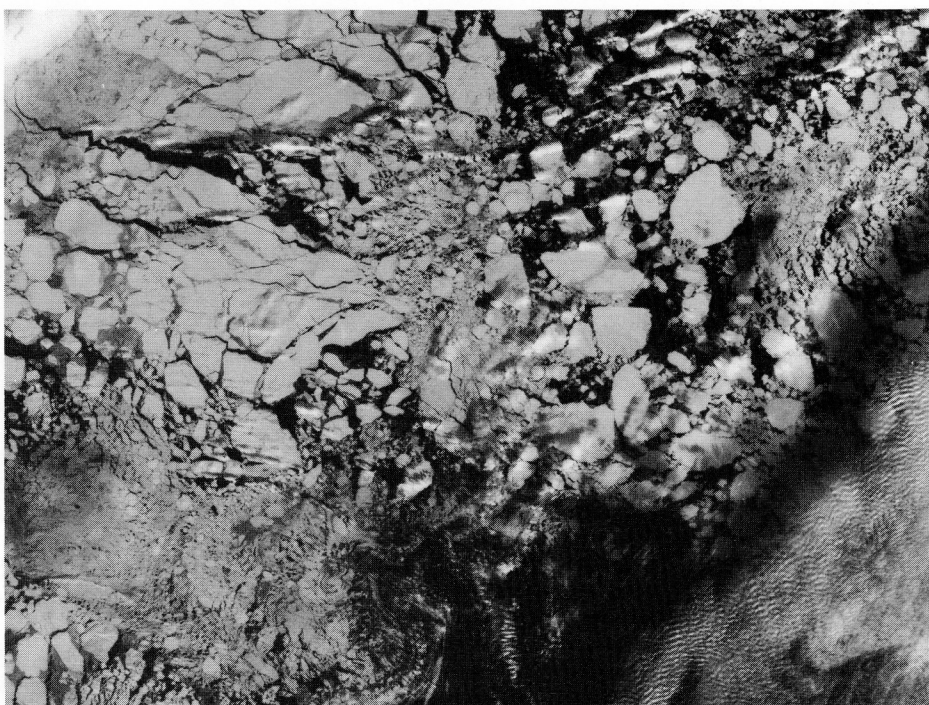
time." Stringer is an associate professor of geophysics who specializes in sea ice research and remote sensing.

Over the next two days, Stringer and coworkers Rick Guritz, Harold Garbiel, and Joanne Groves worked to process and analyze satellite imagery of the area to guide the icebreaker by radio telephone.

"We were able to provide the information needed by describing the ice and directing them to likely open areas where they could conduct their work," Stringer said. "It was a matter of scale. They couldn't see far enough, even with a helicopter, to get an idea of the ice pattern at a range of one or two hundred miles."

The UAF image analysis lab can analyze data from almost any satellite, once that data is in digital format. The satellite used in this case was the weather satellite familiar to pilots, but the lab has the ability to display its data on a greatly expanded scale. Digital data from the weather satellite was available from the Gilmore Creek Tracking Facility near Fairbanks.

The satellite imagery used in this case employs radiation that can be



A Landsat-4 image of sea ice in the Arctic Ocean in October (10-20-86). The location is 80 miles northeast of Barrow, Alaska.

stopped by clouds, but the UAF Geophysical Institute is at work on a radar-image system that eventually will operate in all weather conditions.

"We're primarily organized to teach and do our own research work here," Stringer said of the remote sensing laboratory, "but it's satisfying to be

able to support other projects when the need arises."

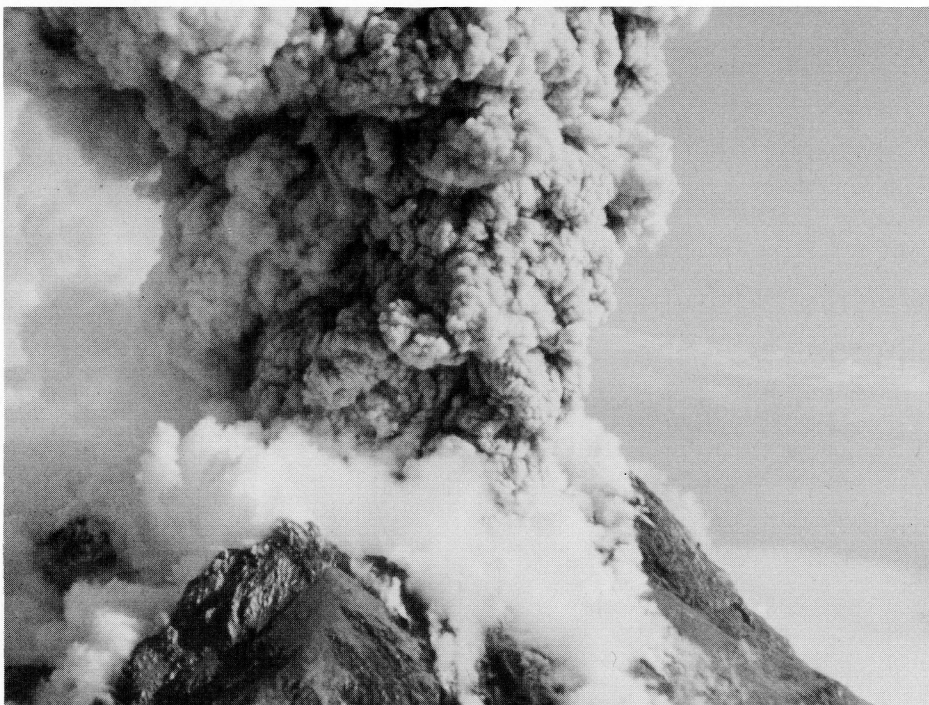
Satellite imagery is used for research on sea ice, forestry, flooding, geology, mining engineering, transportation corridors and a variety of other topics related to the earth's surface.

AVO funded

A new Alaska Volcano Observatory will help scientists monitor Augustine and other hazardous volcanoes in the state. Linked by a computer network and conducting cooperative field studies, laboratories in Alaska, Washington, and California will participate in the observatory program. It is a joint project of GI, the Alaska Division of Geological and Geophysical Surveys (ADGGS) and the U.S. Geological Survey (USGS).

The disruptive 1986 eruption of Augustine Volcano, the fourth in this century, led Alaskan volcanologists to seek state and federal funds to create the program. It will allow them to keep a closer watch on some of the more dangerous volcanoes in the state, particularly those in the Cook Inlet region, and to conduct hazard-reduction studies. They are concerned for the safety of individuals, towns, and aircraft.

"This is a first major step toward reducing the risk to people posed by Cook Inlet's four active volcanoes," said GI Director Syun Akasofu. "We plan to instrument the dangerous volcanoes one by one during the next several years. The AVO will also promote cooperative work by these three



JUERGEN KIENLE

The 1986 eruption of St. Augustine volcano.

agencies on volcanoes and related earthquake problems."

Thomas Miller of the USGS will coordinate the volcano monitoring and AVO studies and act as spokesperson during a volcanic crisis. John Davies, state

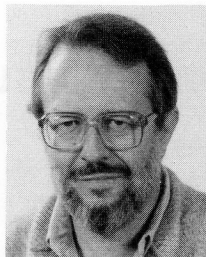
seismologist at GI, has been named coordinating scientist. He will coordinate AVO activities in Fairbanks with the emergency center in Anchorage. Robert Forbes, state geologist and ADGGS director, will serve as the ADGGS liaison.

In the news...

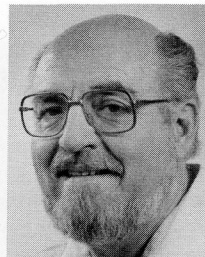
Contributions cited

Wilford Weeks, professor of geophysics and chief scientist of the Alaska SAR Facility, has been selected for the highest honor of the International Glaciology Society (IGS). He will receive the Seligman Crystal to mark his contributions to glaciology. The award is given to acknowledge unique contributions that significantly enrich this field of study. Weeks, who specializes in the geophysics of ice in the sea, has been active in polar region research for 33 years. He has been particularly interested in interactions between growth conditions, ice structure, and ice properties. He is currently working on the application of remote sensing techniques to studies of ice dynamics; numerical simulations of aspects of ice gouging and ice property profiles; and statistical aspects of pressure ridges, internal structure, and composition of sea ice masses. Weeks is a member of the U.S. National Academy of Engineering and has been president of the IGS. He is jointly employed with Cold Regions Research and Engineering Laboratory.

GI PHOTOS/JIM COCCIA



Wilford Weeks



Robert Hunsucker

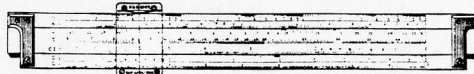
Fulbrights awarded

A Fulbright Distinguished Lecturer grant was awarded to **Lou Lee** for an August visit to the Institute of Space Research near Sao Paulo, Brazil. Lee lectured on flux transfer events and auroral dynamics and collaborated with Brazilian space physicists on several research problems in space plasma physics. Librarian **Judie Triplehorn** was awarded a Fulbright Scholarship for a three-month sabbatical to the Scott Polar Research Institute in Cambridge, England. For the remainder of her sabbatical, she is doing library research in Ottawa, Canada and Reston, Virginia. She returns to the institute next July.

Joan Soutar is serving as GI librarian during Triplehorn's absence.

Engineers applaud

The 1988 Engineer of the Year award has been presented by the Alaska Section of the Institute of Electrical and Electronics Engineers (IEEE) to **Robert Hunsucker**, professor emeritus of physics and electrical engineering and a senior consultant at the institute. The award recognized Hunsucker's scientific achievement and the attainment of international standing in research and teaching of high-latitude radio propagation and ionospheric physics. He has been especially interested in gravity wave sources and propagation in the ionosphere.



Deborah Coccia



Shelia Finch

Support staff honored

A Support Staff Excellence Program was established this year by GI Director **Syun-Ichi Akasofu** to recognize outstanding contributions by the employees whose work supports research programs and personnel. Receiving the first awards, presented in August, were **Deborah Coccia**, a drafter III in the Photo-Graphics Department and **Sheila Finch**, word processing supervisor. Coccia has been producing technical illustrations and graphic arts materials at GI since 1977. Finch, a GI secretary since 1979, was appointed supervisor of word processing services in 1988. Support staff are nominated for the honor by peers and supervisors. Winners receive cash awards and certificates of appreciation. The names of those recognized by the program will be recorded on a permanent plaque in the Elvey Building.

Centennial alumnus

GI Director **Syun-Ichi Akasofu** was named UAF Centennial Alumnus this year by the National Association of State Universities and Land-Grant Colleges. In celebrating its 100th anniversary, the organization selected one outstanding graduate from each of its 125 member institutions. Akasofu, who received his doctorate from UAF in 1961, has earned a global reputation for his studies on the aurora, the interaction of charged particles with geomagnetic storms, and interpretation of polar geomagnetic substorms.

Sporting news



GI staff contributed to a fund that helped send graduate student **Eric Breitenberger** to the National Cycling Championships and Olympic Tryouts in July. Finishing 100 of 183 cyclists in the 40 kilometer individual time trial, Breitenberger described the experience as a "great (and humbling) experience." He is a student in atmospheric sciences. He qualified for the U.S. National Bicycle Federation Competition in Spokane Washington by completing a 40 kilometer race in 55.00 minutes, a course record.



GEOPHYSICAL INSTITUTE
University of Alaska Fairbanks
C.T. Elvey Building
Fairbanks, Alaska 99775-0800

Nonprofit
Organization
U.S. Postage
PAID
Permit No. 2
Fairbanks, Alaska
99775

NOV 04 1988
UNIVERSITY OF ALASKA
GEOPHYSICAL INSTITUTE LIBRARY