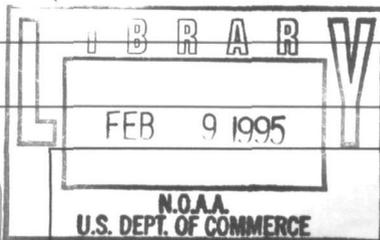


NOAA REPORT



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U.S., Indonesia Agree to Collaborate on Climate Research

Officials of NOAA and the National Institute of Aeronautics and Space of Indonesia will collaborate on climate research, marking the culmination of three years of negotiations between the two countries. The memorandum of understanding was signed by Dr. Harsono Wirjosumarto, Chairman of the National Institute of Aeronautics and Space, and NOAA Administrator Dr. John A. Knauss in a Washington ceremony.

This Is a True Story: A man attempting to row a 9-foot rowboat from San Francisco to Japan was among the five SARSAT rescues recorded dur-

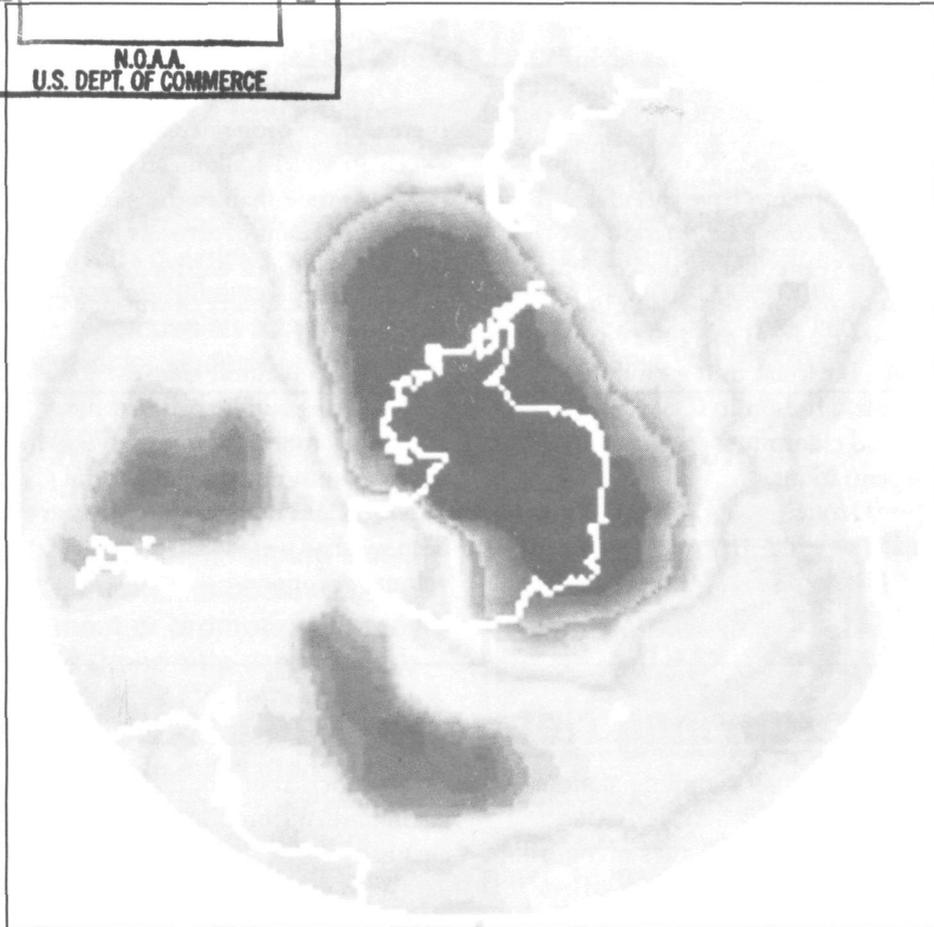
NEWS BRIEFS

ing mid-October. He was forced to give up his quixotic quest when an approaching storm set high winds and rough seas in his path. Luckily, he was carrying an emergency radio beacon, whose signal was picked up by a NOAA satellite. He was picked up by a merchant vessel—960 nautical miles southwest of San Diego.

Top Russian Scientist Visiting U.S.:

A top scientific leader of the former Soviet Union, Guriy Ivanovich Marchuk, has begun a three-month sabbatical visit to the NOAA research laboratories in Boulder, Colo. Marchuk, president of the old USSR Academy of Sciences, will renew a decades-long scientific association with Dr. Joseph O. Fletcher, director of NOAA research laboratories. The major thrust of Marchuk's visit to the Boulder laboratories will be on dynamics of climate change which

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The ozone hole (dark area at center) over Antarctica on August 3, one of the earliest and largest spring depletion of ozone ever recorded at the South Pole. The infrared image was taken by NOAA-12, a polar orbiting satellite.

Early South Pole Ozone Hole at Lowest Level Ever Seen

Ozone levels measured over the South Pole early last month were the lowest ever recorded, NOAA scientists have found.

This comes on the heels of an earlier NOAA report that the annual spring depletion of protective ozone over Antarctica is occurring earlier

and with greater intensity this year than in previous years.

Samuel Oltmans of NOAA's Climate Monitoring and Diagnostics Laboratory in Boulder, Colo., said the total ozone concentration in the column of air above the laboratory's

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Largest Antarctic Ozone Hole Recorded

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scientific station at the South Pole, as measured by a balloon-launched ozonesonde on Oct. 12, was 105 Dobson units. The previous lowest total ozone concentration, about 120 Dobson units, occurred in 1987 and again in 1991, he said.

Oltmans and NOAA colleague David Hofmann have speculated that the greater ozone destruction last year and this year could be the combined effect of volcanic aerosols in the atmosphere from the 1991 eruptions of Mt. Pinatubo in the Philippines and Mt. Hudson in Chile, as well as elevated chlorofluorocarbon (CFC) concentrations.

'Zero Ozone'

"There is zero ozone between 14 and 17 kilometers [nine to 11 miles]

altitude above our station," Oltmans said. NOAA scientists believe emissions of CFCs and bromine compounds have caused the greatest ozone depletion at this level in the atmosphere each austral springtime during the past decade.

Oltmans also pointed out that there is more ozone depletion between 10 and 14 kilometers (7 to 9 miles) altitude than in the past, probably a result of aerosols from volcanic eruptions enhancing the destructive capability of chlorine at those altitudes.

Human and Natural Causes

Oltmans said he believed the record low total concentration was the result of both human and natural activities, and that it would not have been reached were it not for the volcano eruptions.

Researchers at NOAA's South Pole observatory launch ozonesondes—instrument packages which measure ozone concentrations at various levels and radio the data back to earth—every three days, weather permitting.

Ozone depletion over the Antarctic has been recorded by NOAA this time every year since 1986. Normally the minimum readings are seen between about the 6th and 10th of October. This year the depletion began earlier than in previous years, and was of greater intensity.

Balloon Probes Report Low Levels

Oltmans said balloon-borne instruments are showing ozone values about 15 percent lower than last year at this time when record low amounts for September were recorded.

A balloon probe on Sept. 14 showed ozone values of 170 Dobson units, compared with values of close to 200 Dobson units on Sept. 12, 1991. A team of NOAA scientists at the South Pole is launching ozonesonde instruments every three days, weather permitting. Scientists with NOAA's National Environmental Satellite, Data and Information Service are also acquiring satellite imagery of the area for analysis.

Levels 'Impossible to Predict'

It is not possible at this time, Oltmans said, to predict what the lowest ozone values will be this season, but there is some possibility the values will be lower than in 1987 and 1991, the record low years.

A layer of ozone encircles the Earth, shielding life forms from damaging solar ultraviolet radiation. Since 1985 deterioration of the layer over Antarctica has been observed, believed destroyed by chlorine in the stratosphere stemming from man-made CFCs used for such purposes as refrigerant, and foaming and cleaning agents on Earth. □

Air Sampling Network Expanded

Three new air sampling stations have been added to NOAA's global network of sites monitoring concentrations of climate-affecting gases in the atmosphere, for the first time obtaining data from the interior of the European continent.

Pieter Tans of NOAA's Climate Monitoring and Diagnostics Laboratory in Boulder, Colo., said the new stations have been established near K-puszta, Hungary; Heinaey, Iceland; and on a ferry operating between Gdynia, Poland, and Karlskrona, Sweden. NOAA works with scientists worldwide collecting air samples of concentrations of carbon dioxide, methane and carbon monoxide. The samples, collected from a variety of sites, are analyzed at the agency's Boulder laboratories where

natural fluctuations in the gases are distinguished from human-induced changes.

With the new stations, there are now 37 land-based installations, two on ships in the Pacific Ocean, one on a vessel in the South China Sea, and one on the Poland-Sweden ferry.

Most of the land-based stations are in continental coastal locations or on islands in the major oceans. There are inland stations in the former USSR, China, the United States—near Boulder—and now Hungary.

The network has been in operation for 25 years and, according to Tans, has become significantly more important now that human activity may be contributing to possible global atmospheric warming. □

Boulder Lab Gives Kids a Taste of Technology

Do research and education go together? For Boulder Valley teachers, Beverly Meier and Elisa Passarelli, the answer is a resounding yes.

This summer, NOAA's Forecast Systems Laboratory (FSL) in Boulder hired the teachers to develop science activities for middle and high school students. During their month-long stint at FSL, the teachers agreed that what they enjoyed most was "working alongside the scientists."

"It was so intellectually stimulating and inspiring, I went home exhilarated every day," exclaimed Meier. Elisa Passarelli agreed. "Everyone was just great to us," she said. "I found it a personally rewarding experience to be at NOAA this summer. I learned so much and I can't wait to share it with the students." Both teachers agreed that during the school year teachers don't have the time to develop their creative ideas and put them into practice because they are simply too busy. 'Student Activities in Meteorology'

By the end of their stay at FSL, the teachers came up with nine activities based on current research and technology at the NOAA facility. They called it SAM—Student Activities in Meteorology. The activities include everything from air pollution to Doppler radar and were designed to be integrated into a teacher's regular science, math, or health curriculum.

"Students are more interested in new technology, new ideas and are more apt to concentrate and learn things that are on the cutting edge," said Meier. SAM will be tested and evaluated by the Boulder Valley School District and by selected teachers throughout the country this year.

At the same time the science curriculum was being developed, FSL



Boulder Valley teachers Beverly Meier and Elisa Passarelli work on FSL's advanced meteorological workstation, developing weather activities for their students. FSL's Barbara McGehan looks on.

was also holding classes for K-12 teachers from Boulder County. The teachers were enrolled in "Introduction to the Atmosphere," a class in basic meteorology taught by FSL's Director, Dr. Sandy MacDonald. "I felt we needed to do something to support teachers in their efforts to teach weather and climate, and to help improve the state of science education," MacDonald said.

Poster Invited Teachers

To begin with, MacDonald developed a colorful poster inviting teachers to take a weather class for two weeks during the summer. Arrangements were made with the University of Colorado so teachers could obtain credit.

The class was taught like an introductory college-level meteorology course—but with a few differences. One of the most important was that in addition to the lectures and textbook, MacDonald had an advanced meteorological workstation in his lab, which displayed a variety of current weather information. When he talked about satellite pictures or

forecast models, he could bring them up on the workstation and illustrate his point with current data.

Weather Experiments

A local teacher, Robert Croft, assisted with the course by doing various weather experiments that illustrated the weather concepts MacDonald taught. These experiments could then be taken back to the classroom and adapted for particular grade levels.

Field trips to the Denver Weather Service Forecast Office, a Doppler radar site, and COMET (Cooperative Program for Meteorological Education and Training) were arranged for the teachers, and by the end of the second week, some teachers were already giving weather briefings.

"It was a wonderful opportunity for us to not only learn a lot from the lectures and field trips, but also to experience how meteorologists look at the data and make a forecast," said teacher Samantha Blickenstaff. "And then, the best part was to try doing it

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has become a matter of global concern.

National Disaster Awareness Day: Dr. Elbert W. Friday, NWS assistant administrator, appeared on The Weather Channel on Oct. 16 as part of the cable network's programming for National Disaster Awareness Day, a United Nations-sponsored effort. Other participating organizations included the U.S. Geological Survey and the American Red Cross. Dr. Friday was also a guest on the Larry King radio program on Oct. 3, focusing on weather service modernization.

Hurricane Hunters to Move to Tampa: The NOAA Aircraft Operations Center in Miami will move to MacDill Air Force Base by next year, it was announced early last month. The lease on the AOC's current home

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at Miami International Airport expires Dec. 31. Among the NOAA aircraft affected by the move are the P-3s, or hurricane hunters, which fly into hurricanes to take readings that cannot be obtained from the ground.

Pacific Marine Mammal Strandings: NMFS biologists have reported an abnormally high number of stranded marine mammals during a routine search of the Columbia River and outer Pacific Coast. Twenty-three dead marine mammals—18 harbor seals, four harbor porpoises and one rough toothed dolphin—have been collected and transported to the National Marine Mammal Laboratory for examination. The causes of death have not yet been determined, and regional NMFS enforcement agents are currently investigating, along with state officials.

Breaking Ice: The Navy/NOAA Joint Ice Center is providing ice analysis and forecasting support for the Nathaniel B. Palmer, a new National Science Foundation icebreaker. □

S.C. Bay Named New National Estuarine Research Reserve

More than 9,000 acres of wetlands and open waters in Georgetown, S.C., have been designated as a NOAA National Estuarine Research Reserve.

The North Inlet/Winyah Bay Reserve lies within the 17,500-acre Belle W. Baruch Foundation wildlife refuge, established permanently for conservation and research. Managed by State University

The reserve will be managed by the Baruch Institute of the University of South Carolina, recognized for its work on estuaries and ecology.

North Inlet has been the focus of most of the institute's research for the past two decades.

The institute will conduct programs to educate the public about the reserve and the National Estuarine Research Reserve System to promote better understanding and appreciation of estuaries and other coastal systems.

The North Inlet/Winyah Bay Reserve becomes one of 21 reserves around the country, totalling more than 400,000 acres, that are part of nationally protected estuarine areas managed for research and education. □

Exxon Valdez Symposium Slated for '93

Results of the scientific studies of the Exxon Valdez oil spill will be revealed as part of a symposium to be conducted in Anchorage, Alaska, on February 2-5, 1993.

Topics to be considered include injuries to both resources and services related to the spill and associated activities. Participation is only limited by scientific merit. Attendance by individuals interested in hearing the

presentation and participating in general discussions is encouraged.

The symposium is sponsored by the Exxon Valdez oil spill trustee Council members, including NOAA, U.S. Department of Agriculture, U.S. Department of Interior, and several Alaska state offices.

For further information on registration and accommodations contact Brenda Baxter, Symposium Coordinator, University of Alaska-Fairbanks, Alaska Sea Grant College Program, Fairbanks, AK 99775, phone (907) 474-7086, FAX (907) 474-6285. □

Boulder Teachers Hone Skills at Lab

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ourselves using state of the art equipment."

By the end of the course, all of the teachers were enthusiastic weather buffs anxious to use their new knowledge in the classroom. "If we can make meteorology exciting for teachers and help them to understand it better, then I feel they will take it back to the classroom and get the students enthused about science and about learning," MacDonald said.

—Barbara McGehan □

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NOAA NOW



November 1992

New Education Project Features NOAA Information

NOAA is a heavy contributor of information to a new environmental education project, which could be used by educators and students alike.

The Canadian Space Agency (CSA) and Canadian Centre for Remote Sensing (CCRS) are in the final stages of completing Geoscope, an anthology of information on human interaction with the environment, contained in two computer CD-ROM disks.

Geoscope is a computer-based storehouse of information which allows the easy access to a wealth of environmental data such as maps and satellite imagery. Users are able to analyze Geoscope's colorful graphics by studying the easily retrievable data on which they're based.

CSA and CCRS have spent more than \$3 million (Canadian) to develop Geoscope. Making it all the more potentially popular is that it can be run even on a limited IBM-compatible computer, with at least a "286" microprocessor and 512,000 bytes of memory. When ready for sale in February 1993, Geoscope, which will sell for \$200, will offer secondary level educators a cost-effective and student friendly medium that contains a large volume of NOAA data. Of

course, the package requires a CD-ROM disk drive, which cost between \$200 and \$500.

A companion activities booklet for students is being

considered for Geoscope. One stumbling block remains—only 20 percent of America's schools have CD-ROM drives.

For more information, contact NOAA Educational Affairs, 1825 Conn. Ave. NW, #627, Washington 20235 □

NOAA Takes Lead in Commerce for 1992 Combined Federal Campaign

Whether it's helping cancer patients obtain treatment or promoting literacy to those who cannot read, the 1992 Combined Federal Campaign provides funds to more than 1,800 organizations—each with the mission of helping those in need.

The CFC campaign is an avenue through which thousands of government employees voluntarily express their concern for others. This year, Commerce employees intend to raise \$2 million as part of the overall CFC campaign effort—with NOAA having the honorable tradition of coordinating the Commerce Department's response.

With nearly 14,000 employees, NOAA is in a



unique position to make a difference to those truly in need. To make it easy to give, the CFC allows payroll deductions for charitable contributions. The 1992 campaign, which runs through December 15, will help millions of more people.

"The people we are helping are our families, our friends, and ourselves," said Commerce Department Campaign Coordinator Tom Maginnis. "Your contribution will make a real difference in

continued on next page

Monterey Bay Sanctuary Manager Named

Commander Terry D. Jackson has been named manager of the new Monterey Bay Marine Sanctuary, a 5,400-mile "underwater national park" off California's central coast.

Jackson began his career in NOAA when he was commissioned as an officer in the NOAA Corps in 1973. Since 1990 he has been deputy director of the agency's Pacific Marine Environmental Laboratory in Seattle.

Following his officer training in 1974, Jackson was assigned to Seattle where he served aboard three NOAA ships, the *MacArthur*, *Surveyor* and *Miller Freeman* conducting surveys off Washington and Alaska. He has also seen duty in La Jolla as part of a research team assessing porpoise stocks.

Naval Postgraduate Degree

In 1981, Jackson moved to Monterey to attend the Naval Postgraduate School, from which he received his master's degree in management in 1983. He received a Bachelor of Arts in biology from the University of California, Santa Barbara, in 1973. Before his most recent Seattle assignment, Jackson served as

executive officer aboard the *Surveyor* and *Miller Freeman*.

Largest Sanctuary

The Monterey sanctuary, the largest of the eleven man-

NWS Observer Wins Eponymous Award

Seventy five years ago, Woodrow Wilson was president, Lenin had just overthrown the Czar, Babe Ruth was still pitching for the Boston Red Sox—and Earl Stewart began taking readings for the National Weather Service at the age of 14.

He hasn't stopped yet.

Stewart, 90, is the first of the 10,500 cooperative weather observers to reach 75 years of service, giving the Weather Service readings on temperature, rain and other aspects of the weather in his home state of Oregon. Stewart was awarded, what else, the Earl Stewart Award, to be given to cooperative weather observers who have reached 75 years with the program. He has been

aged by NOAA, was designated in ceremonies Sept. 21. It encompasses some of North America's most biologically diverse waters and is home to an expanding population of sea otters, whales, seals, fish and sea birds. □



NWS assistant administrator Dr. Joe Friday (r.) presents cooperative weather observer Earl Stewart with the award that was named after him. Stewart's wife looks on.

taking observations longer than any other observer.

He was given the award in ceremonies in Eugene, Ore., last month. □

1992 CFC Campaign

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people's lives."

Contacts

For more information, contact your NOAA line office CFC coordinator:
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NESDIS: Kent Hughes 202/606-4618
NMFS: Stanley Chanesman 301/713-2325
NOS: Le Baer 301/443-8938
NWS: Jim Travers 301/713-1706
OAR: Terry Schaff 301/713-2465 □

Ed. Affairs Runs Teacher-at-Sea Program

In the October NOAA Report, a story about the three-year-old NOAA Teacher at Sea program, featured a Seattle High School teacher. The Teacher-at-Sea program, which allows teachers to participate in the research of NOAA scientists, and take shared experiences back to the classroom, is coordinated by NOAA's Office of Educational Affairs.

For further details concerning the program, contact Joyce Gross, Office of Educational Affairs, 11400 Rockville Pike, Room 105, Rockville, MD 20852; phone (301) 443-8031; Fax(301) 443-3955. On the West Coast, contact Judith Sohl, Office of Educational Affairs, 7600 Sand Point Way N.E., Seattle, Wash. 98115-0070; phone (206) 526-6622. □

National Oceanic and Atmospheric Administration

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