NOAA REPORT

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Study in Alps Should Improve Mountain Weather Forecasts in U.S.

—Barbara McGehan, Keli Tarp and Jeanne Kouhestani

A "cooperative spirit" is how NOAA researcher Marty Ralph characterized the camaraderie that developed between scientists from eight different nations during a scientific study of wind and precipitation over the Alps that began in September and continues through mid-November.

Ralph of NOAA's Environmental Technology Laboratory in Boulder, Colo., and over a dozen other NOAA scientists joined colleagues from France, Switzerland, Austria, Italy, Germany, Great Britain, Canada and the United States in the Mesoscale Alpine Project, making it the largest weather research project ever conducted in Europe.

And, according to Ralph, they all managed to get along and make some interesting discoveries in the process.

Wet-MAP, Dry-MAP

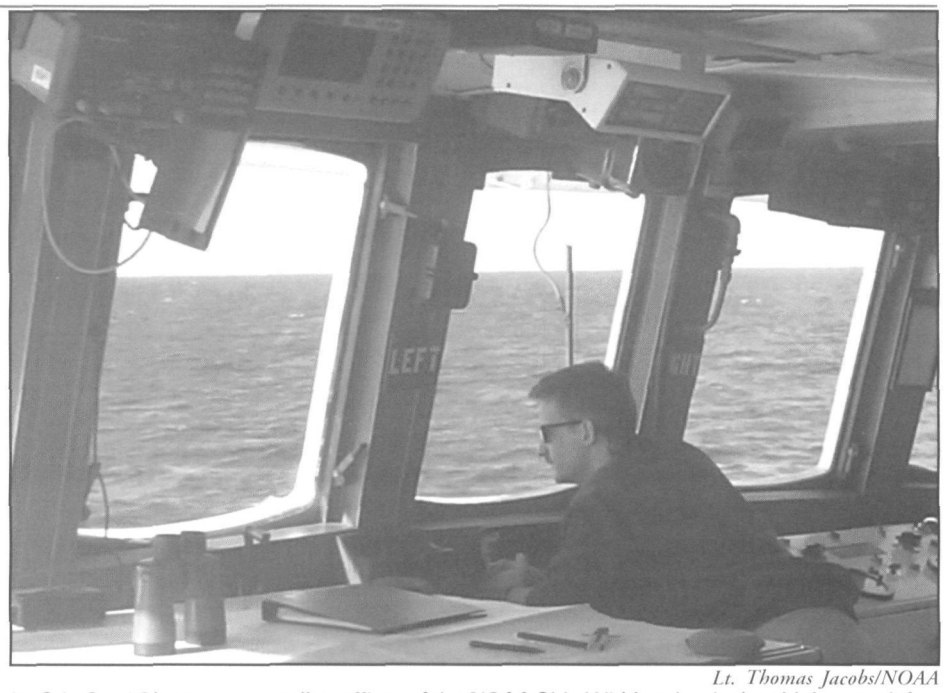
The project, called MAP for short, was divided into "wet-MAP" and "dry-MAP" activities.

Wet-MAP studied how wind flowing over the mountains affects precipitation and flooding.

Dry-MAP studied how mountains produce clear-air turbulence and damaging surface winds.

Researchers expect the data to

continued on page 6



Lt. Thomas Jacobs/NOAA

Lt. Cdr. Gerd Glang, commanding officer of the NOAA Ship Whiting, leads the ship's search for wreckage of Egypt Air Flight 990, which crashed off Nantucket Oct. 31. See the December NOAA Report for more.

NOAA Ship *Ronald H. Brown* Completes Round-the-World Climate Research Cruise

After a year-long voyage that spanned the globe, the NOAA Ship *Ronald H. Brown* returned to Seattle, Wash., Oct. 23 with discoveries that will bring scientists closer to understanding the natural and human-made forces that help drive the world's climate.

"The scientific success of this voyage was the number of small pieces to the larger climate puzzle that were obtained," said Eddie Bernard, director of NOAA's Pacific Marine Environmental Laboratory in Seattle.

"The scientists studied areas of open ocean that had not been studied before in such detail, which we hope will give us answers to the many questions we have about how natural and human-made forces affect our climate and, ultimately, the way we live. During the voyage, we also deployed instruments that will provide real-time data for better weather and tsunami forecasts," Bernard said.

Researchers discovered that the Indian Ocean's monsoons have effects that are similar to the El Niño events in the tropical Pacific, but that monsoons and El Niño are not always linked, as previously believed.

In another experiment, preliminary findings show that air pollutants dramatically impact the Indian Ocean region, which previously had not been studied.

continued on page 4

Workforce Surveys Reveal Dedication From Kodiak to King Salmon

—David Nettleton

My hand went up fast and high when asked of my interest in facilitating Survey Feedback Action meetings in Alaska. Eskimos, snow, tundra, bears and eagles sounded fun. The meetings would go well, I was sure. Hundreds of similar meetings had been conducted across NOAA, with employees sharing concerns with one another in an effort to improve their NOAA work life.

David Nettleton/NOAA

Staff of the Weather Service forecast office in Kodiak, Alaska, include (left to right) Dwight Tribble, Pauline Clark, Richard Cortney, Gary Ennen and John Selman.

Rich Przywarty briefed me as he headed to his position as the director of the National Weather Service's Alaska region. After a few inane questions, he informed me, "If you think you're going to drive to these places, think again." He pointed out three main highways, explained that Alaska was three times the size of Texas and pointed out that there were limited flights but plenty of weather. Thankful for this new knowledge, I pieced together an itinerary to Barrow, Kotzebue, Nome, Kodiak, Bethel, McGrath and King Salmon. Seven sites over ten days!

Through the next eight days, the itinerary was threatened by mechanical difficulties, canceling one flight, with other near cancellations due to high winds and rain in Kodiak and a low cloud ceiling in Barrow. As one of the reservation clerks at Alaska Airlines informed me, "If you travel Alaska this time of year, you should understand our weather—and subsequent delays in your schedule." If there is one place the National Weather Service is needed, it's in a state three times the size of Texas, with some of the world's most extreme temperature variations.

With luck, and some rearranging, all meetings were conducted. Employees at each location came in off shift or stayed past their just finished shift. They did this with no grumbling, but a maximum use of coffee. No matter what time we met, the coffee was flowing. They spoke honestly of their desire to improve services to the customer. The meetings were typical of many other NOAA survey meetings. Although the confidentiality of these meetings doesn't permit sharing specific concerns, certain aspects of life in Alaska are worth noting.

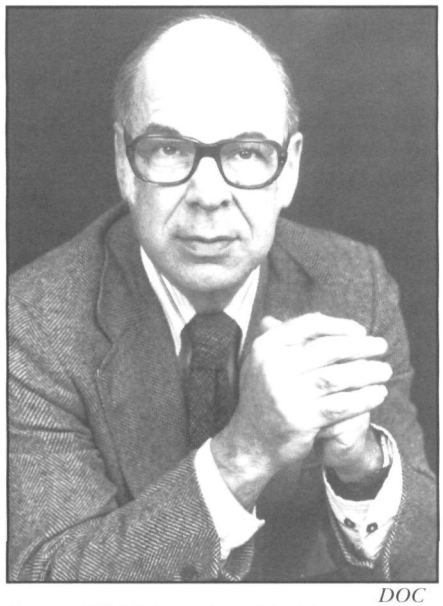
The Weather Service forecast offices in Alaska are islands in the wilderness. There are hundreds of miles between some towns. Resources are scarce or expensive. Gas is $2.30 a gallon in Kotzebue. Sodas from a machine are a dollar. When winter's freeze comes, travel and deliveries of goods by water stop. You rely on planes for supplies; and as I learned from Alaska Air, you should expect delays.

In relative isolation, three to five individuals staff Alaska's forecast offices on a 16- or 24-hour basis, with customers constantly calling on the phone or walking through the door. These pilots, mariners and hunters who depend on the forecasts are community members they'll be bumping into down the street. As the officer in charge in Bethel, Pete Garrison, stated, "Bush pilots aren't shy about letting you know when your forecast was wrong."

Because of the operational nature of their work, our meetings would break often for the mission and customer. Throughout the day, the staff briefed pilots, answered the phones, radioed out forecasts and released balloons.

In McGrath, a number of pilots came in concerned about the weather. Though it appeared sunny and pleasant, meteorological technician Ralph Morgan

continued on page 8



DOC

Former NOAA Associate Administrator George S. Benton

Former Associate Administrator Benton Dies

—Robert M. White

George S. Benton passed away Oct. 16 at the age of 82, after a remarkable career in meteorology and associated sciences. He is known to the NOAA family as a former Associate Administrator, but George Benton was much more than that. He was a brilliant leader in academia and in government.

I first encountered George Benton in 1950 when I was given charge of enlisting the help of the leading atmospheric scientists in the nation in conducting research of interest to the Air Force.

George was a young man at the time, having just acquired his doctorate in meteorology from the University of Chicago during its most creative days under the leadership of Carl Gustav Rossby. There he had met and married his wife, Charlotte, also a meteorologist. Together they left for Johns Hopkins University in 1948. It was at Johns Hopkins that I met George. He was recognized as one of the most creative atmospheric scientists, and I signed him up as an Air Force performer.

There are few major changes in meteorological science and services that have occurred during the past half century in which George Benton was not deeply involved. He, along with Tom Malone and Werner Baum (also recently deceased and a former Deputy Administrator of ESSA, NOAA's predecessor organization) and others, participated in the formulation and establishment of the National Center for Atmospheric Research in Boulder, Colo. He was a key official in ESSA at the laboratories in Boulder. He spent three years as Associate Administrator of NOAA during the period 1978 to 1981.

He was very active in meteorological affairs and became President of the American Meteorological Society in 1969 and 1970. In short, George Benton led many of the advancements that were taking place as weather forecasting changed from an art to science.

His interests extended beyond the borders of the United States. He was the U.S. Permanent Representative to the World Meteorological Organization. He sought to bring that organization abreast of the modern trends in meteorology. He was instrumental in consummating working relations between China and U.S. officials and was instrumental in building cooperation between the two countries.

George could be found wherever there was action and excitement in meteorology. His advice and counsel were sought after as modern meteorology took form. He will be greatly missed from our ranks, but he leaves behind him a legacy of leadership in the atmospheric sciences and services enviable for its breadth.

Iris Harris/DOC

This year's recipients of the Walter B. Jones Memorial and NOAA Excellence Awards for Coastal and Ocean Resource Management, recognized Oct. 21 in Washington, D.C., are (left to right) Les Hodgson, Brownsville, Texas; Daniel Hudgens, Univ. Mass.; George F. Crozier, Dauphin Island (Ala.) Sea Lab; David H. Shull, Univ. Mass.; Tracy Hart, Univ. Maryland; David A. Hart, Wisconsin Sea Grant/Univ. Wisconsin; Jill Fegley, Univ. Maine; David Robinette, N. Carolina State Univ.; Catherine M. Wannamaker, N. Carolina Sea Grant/N. Carolina State Univ.; Leonard Kapahulehua, Kihei, Hawaii; Alexis Duvall, Houma-Terrebonne Chamber of Commerce, Houma, La.; Alven Brent Nunez, Cameron Parish Police Jury, Cameron Parish, La.; Linda Shead, The Galveston Bay Foundation, Galveston, Texas; George Le Boeuf, Cameron Parish Police Jury. (Not pictured: Christopher Nietch, Univ. S. Carolina, and Steve Goldbeck, the San Francisco Bay Conservation and Development Commission.)

Focus On...

Terry Gregg/NOAA

Peter Webster (center) of the University of Colorado launches a balloon carrying a calibration sphere in the Bay of Bengal in July during the Joint Air-Sea Monsoon Investigation Experiment. The sphere is suspended several hundred meters above the surface of the water and tracked by the NOAA Ship Brown's Doppler radar.

Terry Gregg/NOAA

During deck operations in the Gulf of Alaska, ordinary seaman Reggie Williams, able bodied seaman Lisa Glover, general vessel assistant Herb Watson and able bodied seaman David Owen (pictured left to right) deploy a tsunami warning buoy.

The NOAA Ship *Ronald H. Brown*

In its just completed 12-month round-the-world climate research cruise, the NOAA Ship *Ronald H. Brown* covered more than 55,000 nautical miles, visited nine countries, deployed five new real-time observational buoys in the North Pacific and hosted 250 scientists from more than a dozen nations and 50 scientific organizations in six major climate research projects.

Much of the data collected was from areas of open ocean, where little or no data had been available until now. These data have the potential to significantly improve the computer models that scientists use to make more accurate short- and long-term climate predictions and help policy-makers make well-informed decisions.

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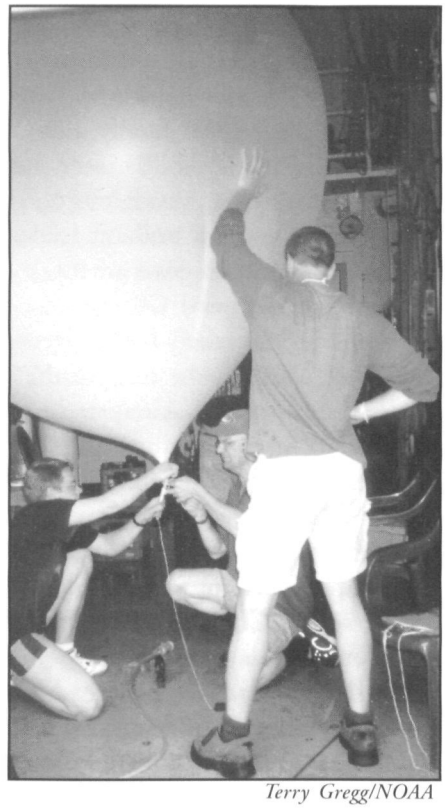


Terry Gregg/NOAA

Scientists prepare a radiosonde for launch aboard the NOAA Ship Brown during the Indian Ocean Experiment.

Circling the Globe for Science

continued from page 4

The two-year-old *Ronald H. Brown*—equipped with the most impressive array of atmospheric and near-surface oceanographic sensors ever assembled on a ship—represents a new era in ship design and capabilities, providing researchers with one of the most technologically advanced floating laboratories in the world.

The ship carries a Doppler radar, similar to those used by the National Weather Service on land, and has the capability to take simultaneous ocean and atmospheric measurements—essential to the study of sea-surface and atmospheric coupling and its effect on climate.

"An around-the-world cruise is a benchmark in any ship's history, particularly when it occurs early in the ship's career," said Capt. Roger L. Parsons, NOAA Corps, who commands *Ronald H. Brown*.

"Any long deployment is both physically and logistically demanding while at the same time exciting," Parsons said. "This year was no exception. Although a number of *Ronald H. Brown's* crew are veterans of previous NOAA circumnavigations, all aboard share in the satisfaction of knowing that they played a pivotal role in broadening man's understanding of the global climate, and in the ground-truthing of several scientific theories and technologies."

Ronald H. Brown, its twenty crew members and four NOAA Corps officers are homeported in Charleston, S.C.

—Jeanne Kouhestani and Jana Goldman

Lt. Mark Boland/NOAA

Scientists in the Aerosol Characterization Experiment aboard the NOAA Ship Brown.

Ronald H. Brown Ports of Call Around the World

Panama. Cape Town, South Africa. Port Louis, Mauritius. Male', Maldives. Diego Garcia. Singapore. Darwin, Australia. Republic of Nauru. Kwajalein, Marshall Islands. Pearl Harbor, Hawaii. Dutch Harbor, Alaska.

Terry Gregg/NOAA

Scientists aboard the NOAA Ship Brown who crossed the Equator for the first time are initiated into the Order of Neptune.

MAP

continued from page 1

improve computer weather and climate models that help predict the timing and effects of these events. MAP may also lead to better interpretation of information provided by the NEXRAD radar network in the mountainous western United States.

"We expect NOAA to benefit a great deal from the pooled resources and extensive scope of this massive project, which probably will never be duplicated," said Jim McFadden, P-3 program manager and chief scientist with NOAA's Aircraft Operations Center in Tampa, Fla.

"The Alps form a manageable natural research laboratory for the study of wind flow over mountains. The knowledge we gain from this study will be directly applicable to our own mountain meteorological research effort in this country and lead to improved forecasts of deadly flooding events in the coastal mountains of California, Oregon and Washington," he said.

The NOAA P-3 aircraft is being used in the wet phase of MAP to study precipitation convection and storm areas. Best known for penetrating the eyes of hurricanes, the P-3 is a flying meteorological station and one of only three research aircraft in the world equipped with Doppler radar.

NOAA scientists have used the unique capabilities of the P-3 in previous experiments to study severe convective storms that sometimes produce tornadoes in the central United States as well as land-falling storms and their interaction with steep coastal terrain.

Scott Sandberg/NOAA

The NOAA lidar van in the Wipptal Valley south of Innsbrook, Austria.

Ralph flew in the National Center for Atmospheric Research Electra, which is similar to NOAA's P-3. He sat in the cockpit and coordinated communications with a ground-based operations center that used radar to direct the plane into the right areas.

"We were trying to sample cloud particles, using special probes attached to the aircraft that use optical technology to photograph particles," Ralph said. On one occasion, the operations center rerouted the aircraft back through a line of storms. "It was a pretty bumpy ride, definitely tough on the stomach," Ralph said. But "the P-3 is a remarkable tool, and to see it in action was something I won't forget."

Scientists from NOAA's National Severe Storms Laboratory provided expertise in the design and execution of aircraft flight plans involving multiple research aircraft, as well as analysis of airborne Doppler radar data.

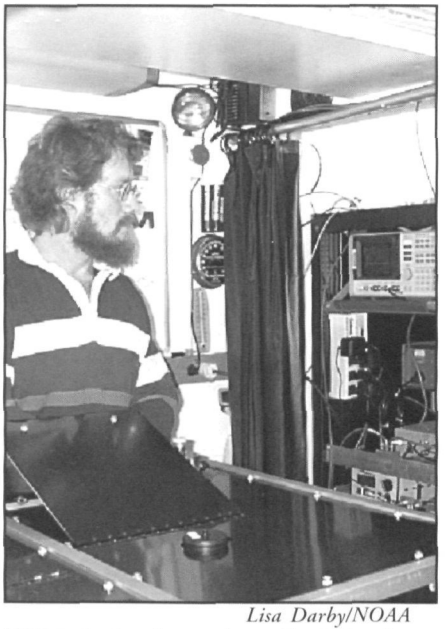
In cooperation with researchers from the University of Oklahoma and Princeton University, NSSL scientists directed the use of a portable "Doppler on Wheels" radar, known for its close-up studies of tornadoes.

The DOW provided direct measurements of precipitation intensity and winds within several Alpine valleys that are too deep to be well sampled by radar-bearing aircraft flying overhead.

Both the P-3 and DOW data were used in conjunction with European ground-based radars.

The cooperative nature of the project allowed U.S. scientists to

continued on page 7



Lisa Darby/NOAA

NOAA electronics engineer Scott Sandberg adjusts the Environmental Technology Laboratory's TEACO2 Doppler lidar.

MAP

continued from page 6

gain a greater understanding of an important meteorological problem at a much lower cost than would be required for a project based in the United States, according to organizers.

"While the Alps are half a world away from North America, our involvement in MAP represented a good deal for U.S. taxpayers," said Brad Smull, a research meteorologist with NSSL in Seattle, Wash. "Our unique contributions in observation of severe weather systems using Doppler radar-equipped aircraft were leveraged by a great deal of complementary equipment and expertise offered by our colleagues in Europe."

ETL scientist Mike Hardesty concurred, saying, "It is actually much cheaper to deploy U.S. observational tools such as the lidar, the Doppler on Wheels, and the P-3 aircraft to Europe than to duplicate the measurement network for a North American based study."

In the wet-MAP phase of the project, scientists studied rain events that take place over Italy resulting from the lifting and funneling of warm, moist air that moves northward into the Alps from the Mediterranean and Adriatic Seas.

Localized flash floods resulting from such events cause serious property damage and loss of life in the Alps, particularly in Italy, and gaining a better understanding of just how and why these episodes occur should lead to improved forecasts.

In Dry-MAP, scientists studied downslope windstorms—often referred to as "Foehn" events in Europe—a wind phenomenon that occurs quite frequently in the Rockies as well as in the Alps.

continued on page 8

New Radar Technology Research Funded

—Keli Tarp

The Department of Defense has allocated $10 million to locate a test version of what could become the nation's newest generation weather radar system, called SPY-1, at NOAA's National Severe Storms Laboratory in Norman, Okla.

NOAA researchers in Norman will be testing SPY-1 technology for upgrading the radar currently used by the National Weather Service, known as WSR-88D.

SPY-1, not an acronym, is a phased array radar originally developed by Lockheed Martin to support tactical operations aboard U.S. Navy ships. It uses multiple beams and frequencies controlled electronically that allow it to scan the atmosphere six times faster than the WSR-88D radar.

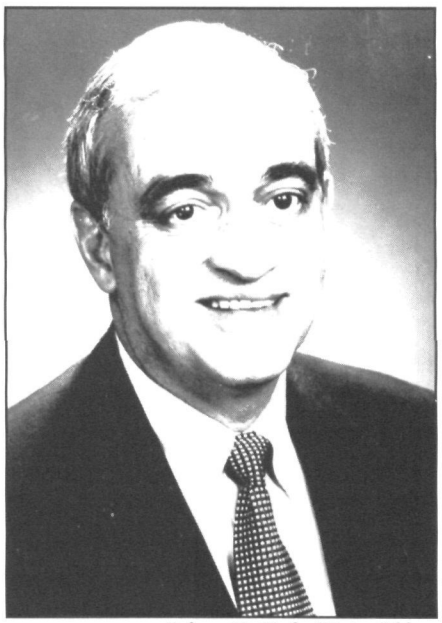
"Phased array radar, which uses Doppler radar technology, will provide a full three-dimensional picture of the atmosphere," said NSSL deputy director Doug Forsyth. "This radar could ultimately allow weather forecasters to increase the average tornado warning lead time from the current 12 minutes to as much as 22 minutes."

SPY-1 could lead to the replacement of the WSR-88D, the radar currently used by NOAA forecast offices across the country.

The DOD funding was proposed by Reps. J.C. Watts, Jr., and Jim Saxton in the wake of the May 3 tornadoes that hit Oklahoma and Kansas.

"If the May 3 tornadoes have taught us anything, it's that more advance notice is critical to saving lives during life-threatening weather," Rep. Watts said.

"Any time we can give people more time to seek shelter or avoid life-threatening weather we will save lives," he said. "I believe it is well worth it to invest in projects such as this."



Robert H. Taylor/Univ. Okla.

"The project is the result of a unique federal, private, state and academic partnership. Bringing it to Norman reinforces our position as the center for weather radar research in the nation," said NSSL director Jeff Kimpel.

Additional funding and equipment for the $24.3 million project are being provided by NSSL, the NEXRAD Operational Support Facility in Norman, the U.S. Navy, Lockheed Martin, Oklahoma Regents for Higher Education and the University of Oklahoma.

Nearly 30 years ago, NSSL researchers began developing what became NEXRAD, a system of 158 Doppler radar sites throughout the world used by the Departments of Commerce, Defense and Transportation.

Development of the new radar for use by weather forecasters could take as long as 10 to 15 years, Kimpel said. The initial stage of the project would be to create a testbed facility in Norman, which is expected to be completed by the end of 2001.

Mary Glacken is the new Deputy Assistant Administrator for Satellite and Information Services.

John G. Boreman, Jr., director of the National Marine Fisheries Service Northeast Fisheries Center, has won the 1999 Meritorious Service Award from the American Fisheries Society for "individual loyalty, dedication and meritorious service to the society throughout the years."

News Briefs

The NOAA Web home page (www.noaa.gov) was the most-visited government Web site in September, receiving 2.6 million non-repeat visitors, topping the number two site (usps.gov) by nearly 1 million hits and the number three site (nasa.gov) by over 1 million hits.

Jamison S. Hawkins is the new director of the Services Division of the National Weather Service Office of Meteorology, replacing Richard Przywarty, who is the new Alaska regional director.

Rear Adm. Evelyn J. Fields was named "Woman of the Year" by the Maryland Federation of Business and Professional Women's Clubs, Inc., Oct. 24, receiving a citation from Maryland Governor Parris Glendening recognizing her "significant contribution to furthering the status of women in business and the active leadership roles taken in advocating for the betterment of your community and the great state of Maryland."

MAP

continued from page 7

They also studied clear-air turbulence caused when atmospheric gravity waves, which are formed as air flows across a mountain, break at high altitudes where commercial aircraft are often affected. The research aircraft data were combined with unique measurements from a Doppler lidar deployed by the Environmental Technology Laboratory to measure airflow around the mountains in the absence of clouds and precipitation. In one situation, the lidar measurements obtained during an October Foehn event showed that wind speeds were actually higher on the valley floor than at mountaintop levels.

Scientists hope that such measurements will confirm the promising results of computer weather forecasts and aid in developing better forecasts of damaging surface winds and clear-air turbulence.

Workforce Surveys

continued from page 7

explained to me that the one way back to Anchorage, Rainy Pass, was socked in for the second straight day, and nobody was going back until it cleared. This was indeed borne out by the number of hunters at the lodge's breakfast table the next morning. It was like sitting with twelve Indiana Joneses. I've never seen so many guns and antlers!

In each meeting, the staff noted that teamwork was essential and that the small staff size wasn't conducive to disagreements. As James Assid in Barrow said, "You can't afford not to have teamwork in the Alaska bush."

Perhaps proximity to one another accounts for part of it. In all but two cases, these employees live on the same compound or share common walls of a duplex or quadraplex. Twenty-four hours of your coworkers. You can't escape them when you go home; they're your neighbors.

In all but a few cases, they live next door to the office or just a few minutes walk away. For longer distances, they drive snow machines or four-wheelers. They work shift work, often many days straight. They are required to live in government housing with government furniture. They can have difficulty getting referrals from their primary care doctors, as most of the time these doctors are in Anchorage. And they can't take a snow day; this "D.C. phenomenon" was the brunt of several good natured teases. They figured if they took off snow days in Alaska, they'd have half the year off.

Nobody expects overnight change, especially those NOAA employees in the remote regions. But while there are many differences between my workplace in NOAA offices in Silver Spring and in the NOAA offices I visited in Alaska, it was clear that the focus of employees is consistent: improving operations for the public. And this after all is the ultimate object of the survey feedback action process for all dedicated public servants.

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