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NEWS RELEASES

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From Coast to Coast, FASTEX Is Probing Winter Storms across the Atlantic

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BOULDER--Powerful winter storms that strike the U.S. West Coast often occur in series, like the ones that recently raked Washington, Oregon, and California. These storms have their counterparts in the North Atlantic, and scientists are hot on their trail. A major field program involving 11 countries is straddling the Atlantic from Newfoundland to Ireland to study fierce winter storms that move eastward across the ocean and pound western Europe.

The project is called the Fronts and Atlantic Storm Track Experiment (FASTEX). Operations began on January 6 and will continue through February. The findings should lead to better forecasts for the west coasts of both Europe and North America, as well as a better understanding of how oceanic winter storms affect world climate.

Scientists from the United States, Canada, Iceland, Ireland, the United Kingdom (U.K.), Denmark, Norway, France, Portugal, Spain, and the Ukraine are involved in FASTEX. The key U.S. scientific participants include the National Oceanic and Atmospheric Administration (NOAA), the U.S. Navy, the National Center for Atmospheric Research (NCAR), and university researchers supported by the National Science Foundation. The University Corporation for Atmospheric Research (UCAR), which operates NCAR under sponsorship of NSF, is providing logistical support.

Forecasting the development of oceanic storms is still a challenge, largely because there are fewer weather observations at sea than over land. Cyclones (low-pressure centers) that rake Europe tend to develop along slow-moving cold fronts that extend across the Atlantic. The cyclones often develop midway between North America and Europe and reach their peak strength a day or two later near the British Isles.

Even if a cold front is well forecast, the smaller cyclones that focus wind and rain along it are harder to predict. The researchers of FASTEX are hoping to identify precursors that may trigger cyclones once the precursors overtake the cold front. These precursors could include jet streaks (regions of higher wind speed inside the jet stream) and pockets of air that descend from the stratosphere. If such precursors can be located as they reach the North Atlantic, the cyclones they later generate might be better forecast up to two or three days in advance.

To follow the life cycles of precursors and cyclones, a wide array of observational tools stretches from continent to continent and extends from midlatitudes to polar regions.

- Three turboprop aircraft are probing cyclones as they develop: the NSF/NCAR Electra, the NOAA P-3, and the U.K. C-130. Both the NSF/NCAR and NOAA planes feature on-board Doppler radar that can trace wind and precipitation patterns inside the storms.

- Farther west, two high-altitude jets--the NOAA Gulfstream IV and a Lear 36 leased for the experiment--are searching for precursors as high as 13 kilometers (8 miles) above the western Atlantic. The long-range Gulfstream can fly from coast to coast to follow an intense cyclone. The two jets are deploying instruments to sample the atmosphere over the ocean. Also operating out of Newfoundland is a WC-130 "hurricane hunter" turboprop from the U.S. Air Force Reserve.

- Four ships (French, Icelandic, Ukranian, and U.S.) are stationed near longitude 35 degrees west to make measurements of heat and moisture exchange between the ocean and air, as well as to launch balloon-borne radiosondes.

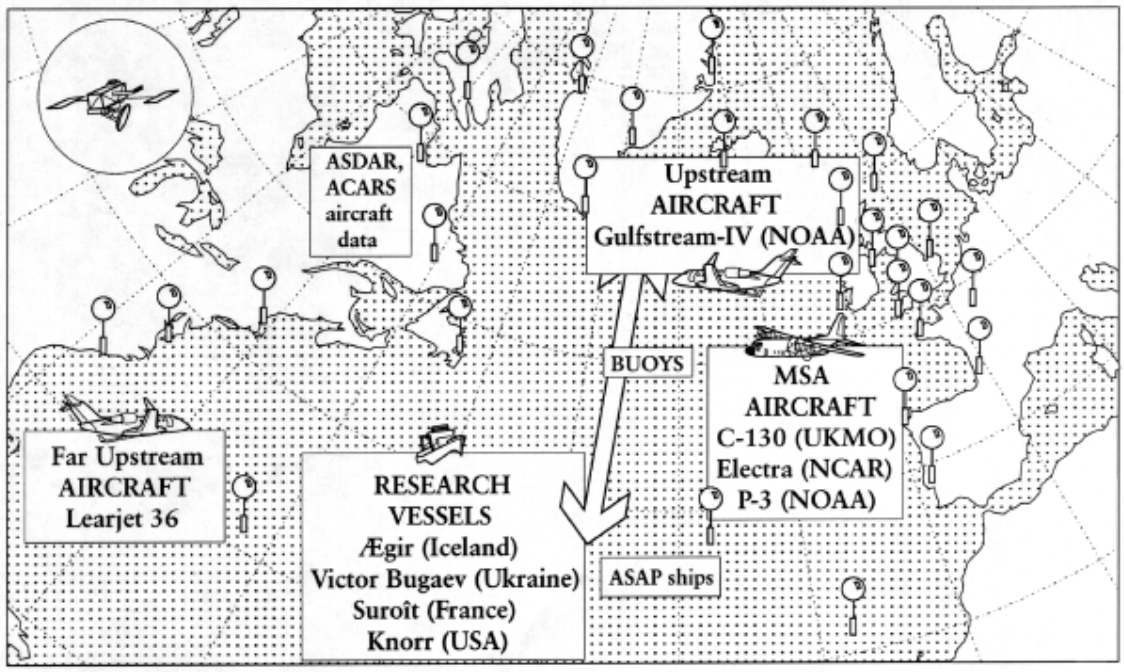
- Many other observing systems, such as radiosondes launched from land, drifting ocean buoys, and wind profilers, are contributing.

The decision-making process for instrument placement in FASTEX may lead to a model for everyday weather monitoring in the future. Computer models of the atmosphere (the main source of forecasting guidance) require a detailed picture of current weather in order to extend that picture into the future. Where data are limited--such as over the oceans--it may be worthwhile to focus data collection on a small area where storms are developing, rather than on a bigger area where relatively little is happening. Two major goals of FASTEX are to develop better techniques for targeting these sensitive regions and to measure how much the targeting will improve computerized forecasts. The prime spots for enhanced observation include developing cyclones as well as their precursors farther upstream.

The airborne Doppler radars aboard the NSF/NCAR and NOAA turboprop aircraft are being used to analyze mature cyclones at altitudes near or below 10,000 feet (3 kilometers). One of the flight plans, called a "lawnmower" pattern, crisscrosses a cyclone to analyze the frontal rainbands that produce much of a cyclone's heavy precipitation. The rapid-scanning abilities of the NCAR/NSF Electra Doppler radar are helping to document the turbulent ascent and descent of air in shallow rain showers behind a cyclone's cold front.

Although the geography of the Pacific Ocean differs from that of the Atlantic, some insights from FASTEX will be applicable to both. For instance, precursors exiting Asia are likely responsible for some cyclones that reach the U.S. West Coast several days later. Techniques developed in FASTEX for identifying precursors and targeting observations could help to improve forecasts for both North America and Europe. A follow-up field experiment is being considered for the North Pacific.

The main operations center for FASTEX is located at a newly constructed extension of the Shannon, Ireland, airport, where three of the five aircraft are based. The Lear jet will fly from an auxiliary control center at St. Johns, Newfoundland, and the U.K. C-130 from Brize Norton and Lyneham, both in England. The control center is being managed by French, British, and U.S. support staff, with logistics help from UCAR's Joint Office for Science Support (JOSS) and NCAR's Atmospheric Technology Division. Forecasters from France, United Kingdom, Ireland, and Canada are directing the experiment and providing computer-model guidance. A variety of specially generated weather products from the United States and elsewhere is being provided via five high-speed data lines.



The extensive reach of the FASTEX observational network includes radiosondes (weather balloons), aircraft, and ships. (Illustration courtesy David Jorgensen.)

The FASTEX logistics managers, both from Meteo-France, are Federic Marin, who can be contacted at the Shannon operations center at (353) 61-47-46-26 through February 5, and Christophe Periard, at (353) 61-47-46-59 from February 6 through 28. Operations directors at Shannon, Ireland, are Jim Moore (January) and Dick Dirks (February), both from UCAR/JOSS. They may be reached at the operations center at (353) 61-47-46-24.

The FASTEX field catalog is available on the World Wide Web.

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