Georgia on Their Minds

Olympic weather team pushes the limits of forecasting

By ERIK SKINDRUD

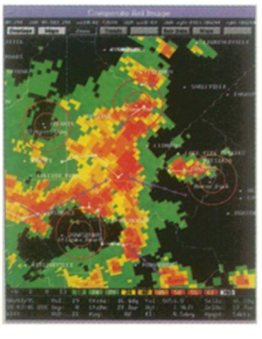
Summer in the southeastern United States can whip up unpleasant, even violent weather—the kind of conditions that organizers of the upcoming Olympic Games in Atlanta would like to disqualify from this month's competition. When tropical storm Alberto swamped central Georgia in July 1994, for instance, 28 people lost their lives and flooding forced more than 30,000 residents from their homes.

Although the possibility of a repeat performance this summer is remote, other types of foul weather present hazards to athletes as well as spectators. Thunderstorms with lightning top the list of concerns, along with the double scourge of severe heat and humidity, which can kill. To deal with these threats, the National Weather Service has developed a system it says provides more detailed—and more consistently accurate—forecasts than any other in the history of weather forecasting.

The cutting-edge system is at least 5 years ahead of what's available in any of the more than 50 regional weather offices today, says Lans P. Rothfusz, chief meteorologist at the Olympic Weather Support Office in Peachtree City, Ga. "We now have a very prototypical office for the future of the National Weather Service."

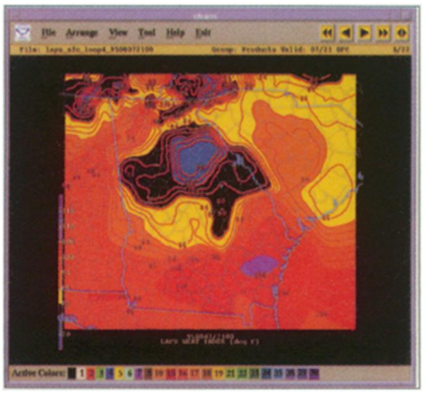
The Olympics' 29 competition sites, or venues, are scattered across numerous microclimates. Forecasters plan to rely on a two-tiered system to anticipate the weather at each site. They can make a 48-hour forecast for the entire Southeast, then use local data to create customized forecasts that can be updated several times a day.

The Olympic meteorological team wields an unprecedented array of computer power. A Cray C90 Class 7 supercomputer in Eagan, Minn., digests data for the longer-term forecasts, while a very high speed computer called the IBM SP2 is on loan for local forecasts.



Advanced radar gives a local view of thunderstorms' approaches (red). Olympic venues are marked by red circles.

The jewel of the integrated system is Eta-10, the computing software designed to predict weather trends over the Southeast. To demonstrate Eta-10's superiority over present systems, Geoffrey J. Dimego Jr. of the National Centers for Environmental Prediction in Camp Springs, Md., points out that the software used elsewhere has a resolution of about 48 kilometers, whereas Eta-10 has an effective resolution of 10 km.



A LAPS-generated image of the heat index over Georgia. Red and violet tones in the lower right indicate the most dangerous conditions.

Olympic organizers need timely forecasts for each venue to ensure the safety and comfort of competitors and viewers at the 271 events. The weather team plans to notify officials at each site if one of the following conditions threatens to reach a dangerous level: rain, hail, lightning, wind speed, low visibility, or heat and humidity.

These site-specific warnings are also tailored to each sport. For example, officials overseeing rain-sensitive sports like baseball, archery, and tennis need to receive notification if *any* rain is expected, whereas others must be told only if heavy precipitation is on the horizon. Forecasters intend to alert all sites if the combined effect of temperature and humidity tops a heat index of 100°F. Temperatures only slightly above normal for summertime Atlanta could make this last warning a daily occurrence.

In making their forecasts, the weather team plans to combine the broad-scale Eta-10 data with the much more detailed data from the Local Analysis and Prediction System, or LAPS. This model focuses on an area about the size of Georgia and has a resolution of just 2 km—a critical feature for detecting the development of localized thunderstorms. The IBM SP2 computer enables meteorologists to run the analysis portion of LAPS hourly, thus getting the most current data to the venues.

Even with bigger computers and improved software, however, meteorologists cannot make accurate forecasts without a third ingredient: high-quality weather observations from enough points to support the high-resolution models. The team depends on an integrated network of sensors spread out over land, sea, air, and even space. Traditional systems, such as surface weather stations, marine data buoys, and weather balloons, must work in tandem with orbiting satellites and advanced weather radar capable of peering inside thunderstorms.

The Olympics come around just once every 4 years, and for a host country it is a rare event. In response to the challenge of the 1996 Summer Games, U.S. meteorologists have developed the kinds of advances in forecasting methods usually seen only in wartime.

As impressive as the technology behind the Olympic weather support is, laurels or defeat will ultimately settle on a team of more than 40 professional meteorologists who have had only a limited amount of time to master the new equipment and software.

"It's an opportunity for us to climb out on the bleeding edge of technology," says Dimego.

Time will tell whether the forecasters triumph over the elements. Yet a tour of the Peachtree City facility convinced Brian Albrecht, chief meteorologist of Atlanta's NBC affiliate, that the Olympic weather team is in prime shape for the games. "I'm sure it's the most advanced weather forecasting center anywhere in the world." □

To get the latest Olympic weather data available during the games, contact: http://www.nws.noaa.gov/olympics/Olympics.html.