4.4 NC-FIRST: WEATHER INFORMATION AND TRAINING FOR NORTH CAROLINA EMERGENCY MANAGERS

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1. INTRODUCTION

Sorting through the vast amounts of weather data and information that is accessible on the Internet can be cumbersome for many emergency managers. This frustration is compounded when faced with a weather-based disaster. Many emergency managers are not trained to correctly interpret weather data and therefore are not receiving as much information as possible for decision making. To help alleviate this problem for North Carolina emergency managers, and facilitate communications with the local Weather Forecast Offices a program called NC-FIRST was developed by the Renaissance Computing Institute (RENCI). NC-FIRST is modeled after the successful OK-FIRST program developed as a formal educational outreach program at the Oklahoma Climatological Survey (Morris et al. 2001), which has been providing up-to-date and pertinent weather data and training to Oklahoma emergency managers and first responders for over a decade.

This paper discusses the motivation behind NC-FIRST, the NC-FIRST training program for emergency managers, the NC-FIRST Weather Information Portal, the current status of training in North Carolina, and the future of NC-FIRST.

2. MOTIVATION FOR NC-FIRST

RENCI is a state-appropriated institute that uses technology to solve problems in several focus areas of interest to the state of North Carolina. One focus area for RENCI is the field of emergency management and disaster studies. RENCI works with emergency managers at both the state and local levels to solve problems, including communication, data sharing, and environmental observation issues, using technology. This technology ranges from joint authoring web portals to high speed networking to sensor deployments around the state. The focus of this paper is NC-FIRST, a weather information program designed by RENCI specifically for North Carolina emergency managers that began in March 2007. Preliminary discussions with several North Carolina emergency managers revealed a recurring difficultly with determining what weather information should be used during a specific disaster event and how to correctly interpret this information. Accessing county-specific weather information was also a concern.

To address these concerns, RENCI began discussions with the State Climate Office of North Carolina to develop an educational outreach program for North Carolina emergency managers similar to OK-FIRST. In Oklahoma, OK-FIRST has been shown to empower local officials to make decisions that protect life and property, improve the scheduling of public works projects, and provide information for police and fire investigations (Morris et al., 2001). According to an independent evaluator (James et al., 2000), the program has changed the way participants make decisions, as well as their behavior, in a positive way. By tailoring a program similar to OK-FIRST to the needs of North Carolina emergency managers, we hope to realize the same benefits in our state.

A demonstration of the utility of the OK-FIRST system was the response by local public-safety officials during the events of 3 May 1999 (Morris et al., 2001). Actions taken during this event showed that decisions that day were guided by the information and training that participants received through OK-FIRST. Local public-safety officials trained by OK-FIRST, the National Weather Service (NWS), and the Oklahoma City broadcast media all worked together, allowing for a much smaller number of

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casualties than would be expected during such a severe event.

The goal of NC-FIRST is to make weather information more available and intuitive to emergency managers so that communication with their local National Weather Service office is enhanced and more informed decisions can be made. The OK-FIRST program has achieved this goal; questions Oklahoma emergency managers ask the NWS have changed from very basic ones such as "what is going on" to more targeted ones about particular data signatures (Morris et al., 2001). A similar goal is set for the NC-FIRST program.

3. NC-FIRST COMPONENTS

NC-FIRST is comprised of two main components: the weather information portal and classroom training. Both components are discussed in detail below.

3.1 *NC-FIRST Weather Information Portal*

The NC-FIRST Weather Information Portal is a web portal created and hosted by RENCI that culminates weather data from various government sources, including the NWS, the National Hurricane Center (NHC), and the State Climate Office of North Carolina. The portal posts real-time weather information in an intuitive, easy to navigate web space. The NC-FIRST Weather Information Portal is divided by weather disaster type ("5" in Figure 1) : tropical weather, thunderstorms, winter weather, flooding, fire weather, drought, and coastal weather.

Users can select the tab of interest to view disaster-specific weather information. The default front page is determined by the current season. For example, the winter weather tab is the default front page December through February.

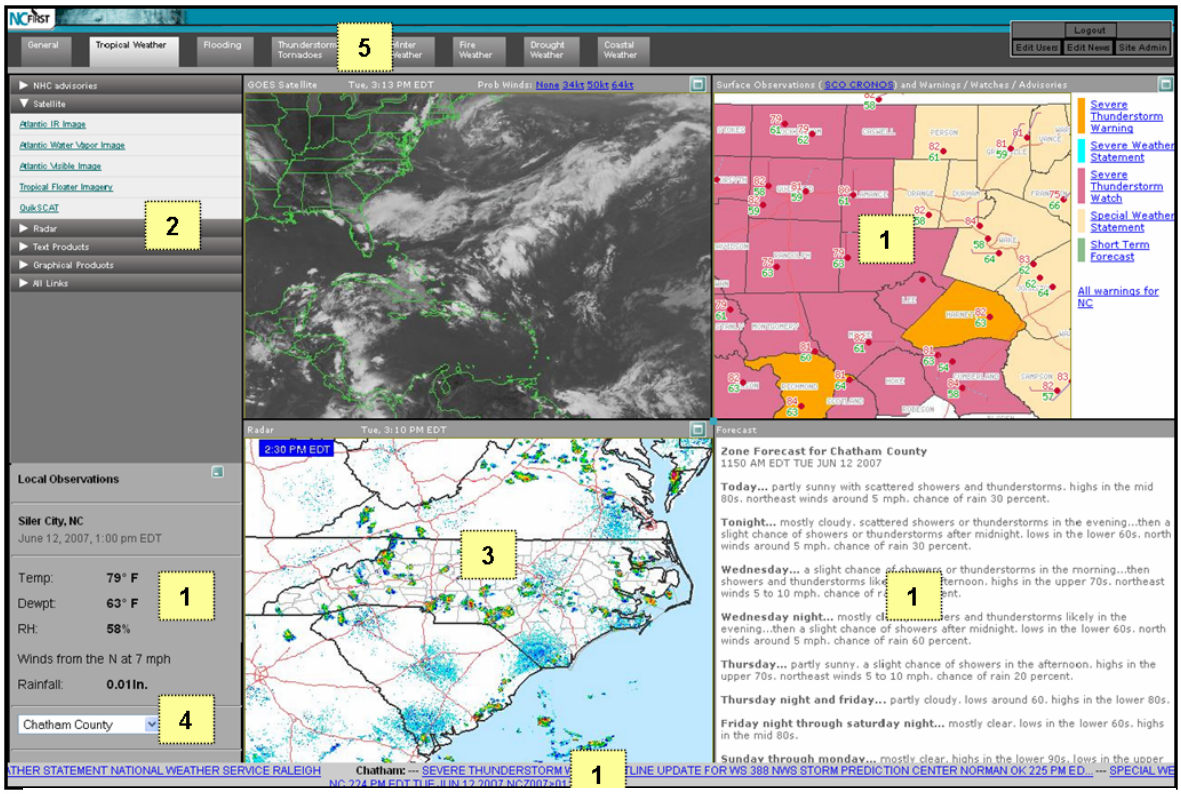

Figure 1: NC-FIRST front page. Features include: 1- local observations available to users; 2- expandable menu by information type (satellite, radar, text, and graphical products); 3- real-time looping radar for North Carolina; 4- county drop down box that allows users to change what county's data is being viewed; 5- hazard tabs that allow users to change what hazard (e.g. tropical weather, winter weather) for which data is being viewed.

Within each disaster type, the page is broken down into three main areas: a quadrant display that shows data such as real-time looping radar for the entire state ("3" in Figure 1); a local observations box that shows surface observation data and the option to switch the county for which information is being viewed ("4" in Figure 1); and an expandable menu area that gives the user more detailed information ("2" in Figure 1, discussed more below).

To minimize the web server burden, the portal requires a password to log in, which allows for data tailored to an emergency manager's home county to be provided upon entering the site ("1" in Figure 1). This tailored information includes a regional county map on the front page that shows the current NWS or other NOAA agencies' warnings, watches, and advisories issued for the user's county and immediate surrounding counties. The colors used to denote warnings, watches, and advisories match the colors used on standard NWS maps to eliminate confusion. Links directly to the corresponding text are included in this quadrant as well. Other tailored data include local surface observations plotted on the regional map, a zone forecast from the local NWS office, and a ticker that scrolls along the bottom of the page listing current warnings, watches, and advisories for the user's home county. This availability of local information allows the user to obtain a broad overview of what type of weather is currently impacting or may soon impact their county.

After gaining this broad overview, users can then refer to the expandable menu area ("2" in Figure 1) to view more detailed information such as river forecasts from the Advanced Hydrologic Prediction Service (AHPS) and fire weather forecasts from the local NWS office. This section is divided by information type and includes a section for satellite data, radar data, graphical products, and text products.

The NC-FIRST Weather Information Portal updates the products on the page as frequently as possible to ensure that emergency managers are getting the most up-to-date information. When not updated, information is labeled "out-of-date". Monitoring of portal usage since its launch in June 2007 has revealed spikes in usage during minor events that have affected the state. Moreover, usage spikes have been location-specific to the area of the event. These usage spikes are an encouraging sign of preliminary success of the NC-FIRST project. However, a lack of tropical storms affecting North Carolina during 2007 and the severe drought in the southeastern United State has not allowed for a major test of the portal's potential and has limited a conclusive evaluation of its impact.

3.2 *NC-FIRST Classroom Training*

NC-FIRST classroom training takes place at locations around the state and uses technology, such as laptops and the NC-FIRST Weather Information Portal, to enhance learning. Meteorologists teach disaster-specific classes to groups of emergency managers ranging in size from 10 to 25. The training begins with an introduction to NC-FIRST and its relevance. The instructor and participants then discuss past experiences with a particular hazard event and the types of problems that hazard poses. Next, a general overview of the NC-FIRST Weather Information Portal is given and includes instruction on how to log in to the page and how to navigate basic features of the page. The majority of the training is spent on discussing each quadrant of the page and the links in the expandable menu area so that participants are aware of the products available and understand how to properly interpret them. Examples of training topics include understanding wind barbs on surface observation stations, the difference between composite and base reflectivity, the different vertical thermal profiles needed for various types of winter precipitation, and discussions on how to use various NOAA products such as the NWS Graphical Forecasts. The training for each hazard lasts anywhere from 50-75 minutes depending on the venue and the participants' availability. Future trainings (discussed in Section 4) will be much longer and more robust.

Laptops are provided to participants during training so they may follow the instructor and have hands-on experience operating the web portal. Engaging the users with the web portal from the beginning increases familiarity, enhances learning, and encourages future use.

Because training began in mid-June, the first sections focused on tropical weather. Other weather disaster courses (e.g. winter weather, thunderstorms) are planned over the next six months. Emergency managers will be encouraged to attend several of these sessions, with the goals of understanding basic meteorology and utilizing the information on the page to aid in their decision making process during future disaster events.

4. THE FUTURE OF NC-FIRST

Since mid-June about 55 of North Carolina's 100 counties have had at least one emergency manager trained with a total of 175 emergency managers and other public safety officials trained. Two courses have been offered thus far: tropical and winter weather. All counties will have had at least one course offered to them by mid-spring.

Due to the enthusiastic and positive response to NC-FIRST from emergency managers NC-FIRST will be standardized and is planned to become an elective course for the North Carolina Emergency Management Certification Program through the North Carolina community college system. In order to get credit for the course, an emergency manager will have to complete a module on each hazard that includes a lecture on the basic meteorology of that hazard, a demonstration on where to find and how to use the weather information on the NC-FIRST Weather Information Portal, and completion of a case study. This course is currently being designed by partners at RENCI, NWS, State Climate Office of North Carolina, North Carolina state universities, and North Carolina Emergency Management. The target date for completion is spring 2009

5. CONCLUSION

NC-FIRST is a weather information program designed specifically for North Carolina emergency managers and other public safety officials. The goal of NC-FIRST is to make weather information more available and intuitive to emergency managers so they can better communicate with their local NWS office and make more informed decisions. NC-FIRST has two components: a weather information portal that gathers relevant weather data on one web page and classroom training that teaches emergency managers how to navigate the portal and interpret the information. It is modeled after the successful OK-FIRST system created by the Oklahoma Climatological Survey.

Over half of the counties in North Carolina have had at least one emergency manager trained on NC-FIRST. All counties will have had at least one course offered to them by mid-spring. Because of the positive response of the program in North Carolina NC-FIRST will become part of the North Carolina Emergency Management Certification Program through the North Carolina community college system in 2009.

6. REFERENCES

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