JP1.20 USING THE NCAR AUTO-NOWCAST SYSTEM TO NOWCAST OCEANIC CONVECTION

Cathy Kessinger, Rita Roberts
National Center for Atmospheric Research
Boulder, CO

and

Richard Bankert
Naval Research Laboratory
Monterey, CA

1. Abstract

On 15 May 2000 at approximately 2300 UTC, naval flight operations on the aircraft carrier USS George Washington (CVN 73) were suspended in mid-cycle due to severe weather events that included a waterspout, intense lightning and an apparent microburst (Fig. 1). The USS George Washington was participating in a simulated wartime exercise off the coast of North Carolina. As part of this exercise, the U.S. Navy and the Lockheed Martin Corporation were testing a weather radar processor called the Tactical Environmental Processor (TEP) that computes radar moment data (reflectivity, radial velocity and spectrum width) from the four-face, agile beam SPY-1 radar. The SPY-1/TEP system was deployed on the USS Normandy (CG 60) and collected considerable data on this severe weather event.

The National Center for Atmospheric Research (NCAR) Auto-Nowcast System (ANC) provides short-term (0-60 minute), time- and space-specific nowcasts of thunderstorm intensity using fuzzy-logic techniques (Mueller et al, 2002). The ANC has been successfully deployed at multiple, land-based sites to produce automated nowcasts in operational environments. The ANC uses a variety of input data that includes GOES satellite imagery, Doppler radars (like the SPY-1/TEP), numerical model output, surface and upper air data, among others. The ANC has had considerable development and testing on continental convection. The ANC has also been successfully tested on its ability to nowcast oceanic convection (Kessinger et al, 2001).

For this paper, the performance of the ANC is evaluated with the 15 May 2000 case. In oceanic regions, radars have a limited ability to detect boundary layer convergence zones due to the absence of insects. These convergence zones are typically important precursor indicators for the initiation of convection. In Kessinger et al (2001), the convergence zone position was manually entered into the ANC because the TEP could not detect it. For naval operations, automation is critical. Therefore, the radar-based techniques used to locate the convergence zones have been modified such that satellite imagery can be used instead. Additional techniques are under development to better utilize the GOES satellite imagery within the ANC. This is desired since satellite imagery can extend the ANC region past the TEP maximum range. These additional techniques include using output from the Naval Research Laboratory (NRL) cloud classification algorithm in various ways (Bankert and Hawkins, 2003).

Corresponding author: Cathy Kessinger, NCAR, P.O. Box 3000, Boulder, CO 80305; email: kessinge@ucar.edu
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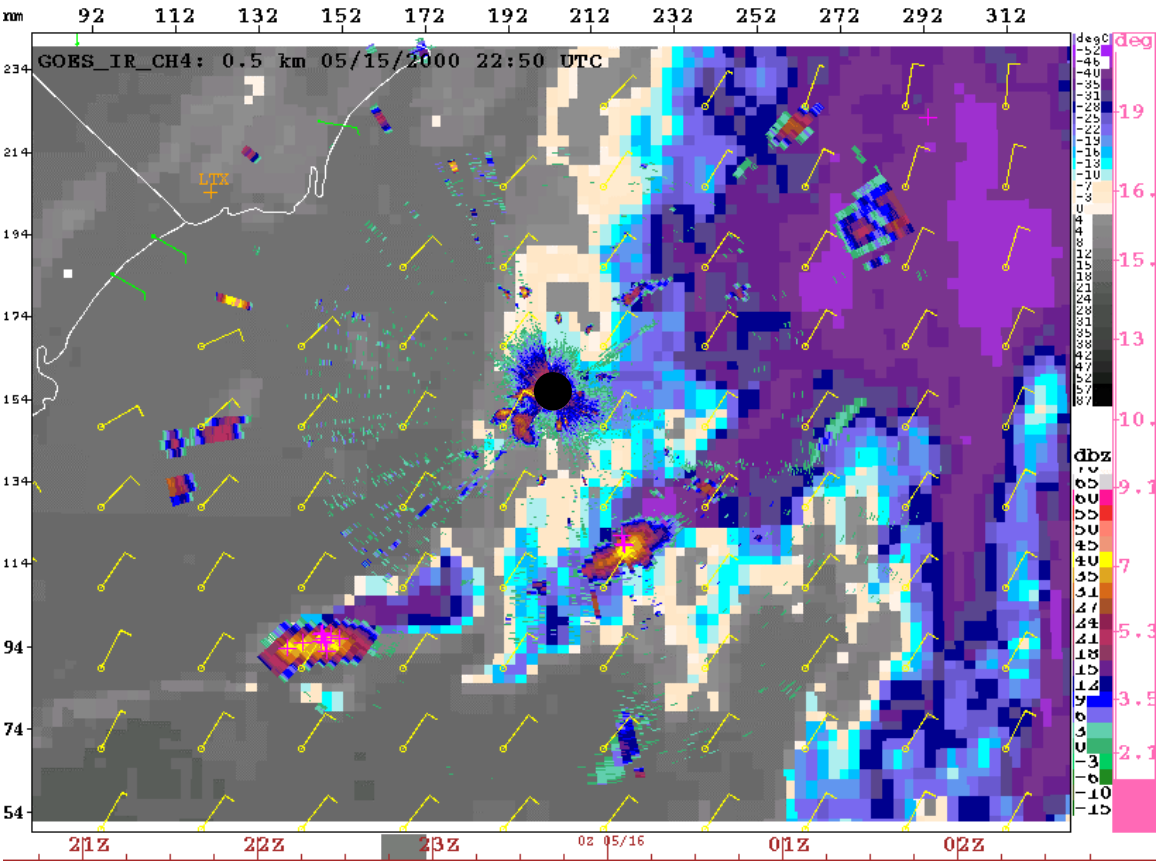

Figure 1. TEP radar reflectivity data (dBZ) are shown at 2253 UTC on 15 May 2000 and are overlaid onto GOES infrared imagery (channel 4) at 2250 UTC. The black, filled circle indicates the location of the USS Normandy. Lightning ground stroke locations are indicated by a magenta '+'. Winds from the Rapid Update Cycle (RUC) model at 00 UTC on 16 May 2000 are shown in yellow. The green wind barbs indicate the surface winds.

2. Web Link

The full text of this paper will be available at http://www.rap.ucar.edu/staff/kessinge/Sat03_Kessinger.pdf by 1 January 2003.

3. Acknowledgements

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4. References

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