Final Report

COMET Outreach Program

Partners Project S03-41099

Web-Based Tutorial in the Use of Quasi-Geostrophic Diagnostics in Conjunction with NWP Model Output for Improvement of NWS Forecasts

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Section 1: Project Objectives and Accomplishments

1.1 The objective of the project was to develop diagnostic techniques based on quasigeostrophic theory that could be applied by forecasters to Numerical Weather Prediction (NWP) model output as a check on that output, with the goal of anticipating potential model "busts" and applying at least qualitative corrections to the model output in those situations in order to provide a better forecast to the public. The final product emanating from the research project was to be a web-based tutorial that would guide the trainee through the concepts as he (she) worked his (her) way through appropriate cases on the Weather Event Simulator (WES). Dr. Ross' responsibilities were to identity the diagnostic techniques, to learn how to use the WES as an environment in which to apply those techniques, and to take the lead in developing the training devices. Mr. Watson's responsibilities were to aid Dr. Ross in learning the WES software, to assist in selection of appropriate WES case studies and in acquisition of data, and most importantly to provide input on the usefulness of the training products for National Weather Service (NWS) operations.

The research project has been successful in developing two web-based training modules that will be added to the COMET MetEd site under the section "NWP Cases." These modules have the titles, "Medium Range Forecast Exercise for Tallahassee, Florida" and "Forecast Exercise for the Major East Coast Cyclogenesis of 24-26 January 2000." The first module trains forecasters along the Gulf of Mexico coast to watch for possible NWP model errors in the handling of residual moisture from late season tropical cyclones in the

Gulf of Mexico and eastern Pacific Ocean. The second module provides insight into why the NWP models failed to provide good guidance for a major U. S. east coast winter storm. The module shows how the failure was related to improper handling of upper tropospheric jet streaks and tropopause folding by the models. The major lessons learned in this project, therefore, relate to the need for forecasters to (1) inspect NWP model output very closely for its handling of tropical moisture during the late tropical storm season and to (2) focus on upper tropospheric processes in the development of winter season cyclones.

The only change to the scope of the work is that the training devices are completely selfcontained web-based devices with their own graphics, and therefore do not require the trainee to have access to a WES. The original plan was to have the trainee use the webbased device to guide him/her through a WES case, where they would construct their own graphics. Our thinking was that the training modules would have wider use if they were not dependent on the availability of a WES. However, we still think the WES-based idea is a good one and we plan to construct such training devices in the future. It should be noted that all graphics in the web-based modules was developed by Dr. Ross using the WES.

Section 2: Summary of University/NWS Exchanges

2.1 Since the upgrade of the NWS office in Tallahassee to a Weather Forecast Office (WFO), the collaboration efforts between The Florida State University (FSU) and the NWS have been rich and fruitful. The move of the NWS office to the FSU campus and collocation with the Meteorology Department in March 2002 has made opportunities for collaboration even more possible. It has been a successful endeavor for both parties. Besides this COMET Partners project, there are several ongoing projects with FSU, including one COMET Coop project, one NOAA CSTAR project, and one additional COMET Partners project.

NWS Tallahassee provides several avenues for students to learn and gain insight into operational meteorology. A 2-hour course is taught each spring semester introducing seniors majoring in meteorology to the NWS, including its history, structure, programs, observing systems, as well as meteorology basics normally not taught at the undergraduate level.

NWS Tallahassee also provides the opportunity for deserving students to work and learn NWS operations while working side-by-side with forecasters. The premiere program is called the Student Career Experience Program (SCEP). The SCEP is a work-study experience, which can lead to a career in the NWS. Currently there are 3 SCEPs working in the Tallahassee office. Additionally, one student per semester is offered the opportunity to experience NWS operations first hand in a 3-hour meteorology internship class.

Finally, students from both high school and college are given the opportunity to volunteer several hours per week. They work with forecasters, technicians, or managers on special

projects, or just aid NWS personnel requiring assistance in their focal point duties. At present, NWS Tallahassee has 2 volunteers.

Section 3: Presentations and Publications

3.1 The results of this research project will be available as training devices on the COMET MetEd site, as discussed in Section 1.1. No formal publications or presentations are planned at this time.

Section 4: Summary of Benefits and Problems Encountered

4.1 (Dr. Ross) I found the staff of NWS Tallahassee, particularly Mr. Irv Watson, to be extremely open to interaction and to be most helpful with any request that I had. For an academic who had not worked in an NWS forecast office nor had access to NWS equipment such as the Advanced Weather Information Processing System (AWIPS) and WES, it was truly an enriching experience. I think that there is still an enormous untapped potential for interaction. All that is really needed is funding for people's time to invest in the interaction. The forecast problems are there daily, the ideas are there from both the academic and forecast sides, and the equipment is there. Again, all that is needed to enhance the interaction is time!

4.2 (Mr. Watson) It is my pleasure to discuss the benefits resulting from the Outreach partnership between the FSU Meteorology Department and NWS Tallahassee. I found working with Dr. Ross very stimulating and rewarding. The collocation of NWS Tallahassee with the FSU Meteorology Department has made this partnership even more successful. Dr. Ross is truly interested in education and training. He has been a fine addition to Dr. Krishnamurti's laboratory at FSU. Dr. Ross has made extensive use of the WES, developing all his graphics in that system. Without WES, these exercises would have been much more difficult to develop. The training exercises developed by Dr. Ross will not only benefit the forecasters at NWS Tallahassee, but they will be useful to all NWS forecasters, as well as meteorology majors at universities, and professionals in private industry. I hope that we can partner another such study in the very near future.