University: University of Northern Iowa

Name of University Researcher Preparing Report: Alan C. Czarnetzki

<u>NWS Office</u>: La Crosse, Wisconsin

Name of NWS/DOT Researcher Preparing Report: Glenn Lussky

<u>Partners or Cooperative Project</u>: Partners Project; Title: "The Correlation Between October Temperature Anomalies and Winter Temperature Anomalies During El Nino Events

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SECTION 1: PROJECT OBJECTIVES AND ACCOMPLISHMENTS

The main objectives for our Partners Project were to:

- summarize the relationship between October temperature departures and subsequent winter temperatures in the Midwest during El Niño events;
- present the results at national meeting of the National Weather Association; and
- publish the results in the National Weather Digest.

The first step in our work was to identify El Niño events. Our starting point was to examine preliminary work performed by Glenn Lussky and Jeff Boyne at the National Weather Service (NWS) office in La Crosse. The classification scheme they used was based on the subjective Climate Prediction Center (CPC) 3-month classifications for warm and cold episodes and examination of the Niño 3.4° (120° W – 170° W, 5° N – 5° S) time series. In September 2003, NOAA established an operational definition of El Niño (EN) and La Niña (LN) events. This index has come to be called the Oceanic Niño Index (ONI). While the CPC scheme is not identical to the ONI, the classifications from each are close. So, we decided to continue with the CPC-based classifications we had constructed. We also decided to examine LN events in addition to the EN events. This was a change from our original plan

The second step was to identify a subset of first-order surface observing stations in the Midwest where October/winter anomaly correlations could be examined. We worked cooperatively on this step. In order to be selected, a station's location couldn't change and the station had to have complete monthly temperature data for October and the following winter months (December, January, and February) [DJF].

Next, the partners at the University of Northern Iowa (UNI) calculated October and DJF temperature anomalies for the EN and LN years. Then, linear correlation coefficients were computed. We were somewhat surprised by the small value of the coefficients, but knew that expecting a linear correlation was somewhat simplistic. We consulted with a UNI statistics professor for suggestions on interpreting our results. He suggested techniques that would best test their statistical significance.

The preliminary results of the project were presented at the National Weather Association Annual Meeting in Jacksonville, Florida on October 20, 2003. The presentation was well received. One audience member asked that we post our results on a Web page very soon.

The UNI partners traveled to the La Crosse NWS office on November 25, 2003. We discussed our preliminary results and the need for re-examination of the years included in our study in light of the new OCI.

One of the key UNI partners has been an undergraduate student in the Department of Earth Science. The students participated in the project to gain undergraduate research experience. This student transferred to Iowa State University after the Fall 2003 semester where she will pursue a degree in Meteorology (UNI does not have this major). Work continued on the project and the results based on a revised set of years were presented as a poster at the Central Iowa Chapter of the National Weather Association's Severe Storms and Doppler Radar Conference on March 26, 2004.

We continue to work on writing a paper for submission to the National Weather Digest.

SECTION 2: SUMMARY OF UNIVERSITY/ NWS/DOT EXCHANGES

We jointly prepared both the oral and poster presentations describing our results. We also continue to collaborate in preparing the manuscript for the National Weather Digest. The UNI student who participated in the project applied to the NWS's Student Educational Employment Program for Summer 2004. This has been a very positive experience for all participants.

SECTION 3: PRESENTATIONS AND PUBLICATIONS

Boyne, J., M. Brown, A. C. Czarnetzki, and G. R. Lussky, 2003: The Correlation Between October/Winter Temperature Anomalies in the Midwest During El Nino Events. <u>Proceedings of the 28th Annual National Weather Association Meeting</u>, 18-23 October 2003, Jacksonville, Florida, National Weather Association.

Boyne, J., M. Brown, A. C. Czarnetzki, and G. R. Lussky, 2004: The Correlation Between October/Winter Temperature Anomalies in the Midwest During El Nino Events. <u>Abstracts of the Severe Storms and Doppler Radar Conference</u>, 25-27 March 2004, Des Moines, Iowa, Central Iowa Chapter of the National Weather Association.

SECTION 4: SUMMARY OF BENEFITS AND PROBLEMS ENCOUNTERED

4.1 The UNI undergraduate student gained valuable research experience through this project. Her interest in a career with the NWS was heightened by her interaction with the

NWS staff at La Crosse. Her poster presentation at the Severe Storms conference allowed her to meet many NWS employees and other MICs. The only problem encountered was simply the obstacle that distance puts between participants. UNI is about a 3-hour drive from La Crosse. Though email makes the process of keeping connected possible, face-to-face meetings are still the most valuable. Despite this obstacle, all of the project's partners were active and productive team members.

4.2 This project has provided an excellent foundation upon which downscaling information can be applied at the La Crosse WFO as well as in the surrounding area. Downscaling is the process that will be employed in the newly-enhanced NWS Climate Services program, whereby national products, forecasts and information is scaled down to the local office level to provide local application of the national information. The fact that the long range issuances are based largely on events tied closely to the ENSO cycle only accentuates the applicability of this study to the downscaling process in the future. The NWS will be applying these downscaling processes within the next year at the local offices. This project fits in very nicely with the national initiative to enhance local information related to national longer-range forecast issuances and provides very useful information that can be applied to future downscaled forecast products.