Joint Hurricane Testbed Semi-Annual Report for Year 1
September 1, 2005-February 28, 2006

Project title: *Improved Statistical Intensity Forecast Models*
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1. Background Information

This project is to improve the SHIPS intensity model by incorporation of a new formulation of the inland decay component and to evaluate new methods for the evaluation of the vertical wind shear. Improvements to the companion rapid intensity index (RII) are also proposed by utilization of a discriminate analysis method that would weight the input parameters to provide the optimal separation of the rapid and non-rapidly intensifying tropical cyclones. The timeline and deliverables for this project are listed below in the Appendix.

2. Accomplishments

Databases have been assembled so that SHIPS forecasts for the past two seasons (2004 and 2005) can be re-run for testing of the vertical shear routines. A script for running an entire season of forecasts has also been developed. Preliminary coding has begun on the part of the SHIPS code that generates the vertical shear.

Using the scripts developed for the vertical shear evaluations, the 2005 Atlantic forecasts were re-run with the new and old versions of the decay model. The re-runs were needed to make the comparison exact because it is not always possible to exactly reproduce everything that can happen in real time. The 2005 season was ideal for this evaluation because of the large sample size, and the large number of storms impacted by land. The new decay model provides a more accurate decay rate for storms moving over islands and narrow landmasses, and the 2005 provided many examples.

Figure 1 shows the improvement (reduction in mean absolute error) of the 2005 SHIPS forecasts for the entire sample of storms. The new decay model improved the forecasts at every forecast internal, with the maximum impact at 96 hours. The improvement at most time periods was statistically significant at the 95% level. Similar, but slightly smaller, improvements were seen in the reruns of the 2004 Atlantic forecasts with the new decay model. The new decay model has been implemented on the IBM is ready to be run in 2006.

The new decay model was also tested on the 2005 east Pacific forecasts, and there was little impact. This result is not surprising since few of these storms were affected by land.
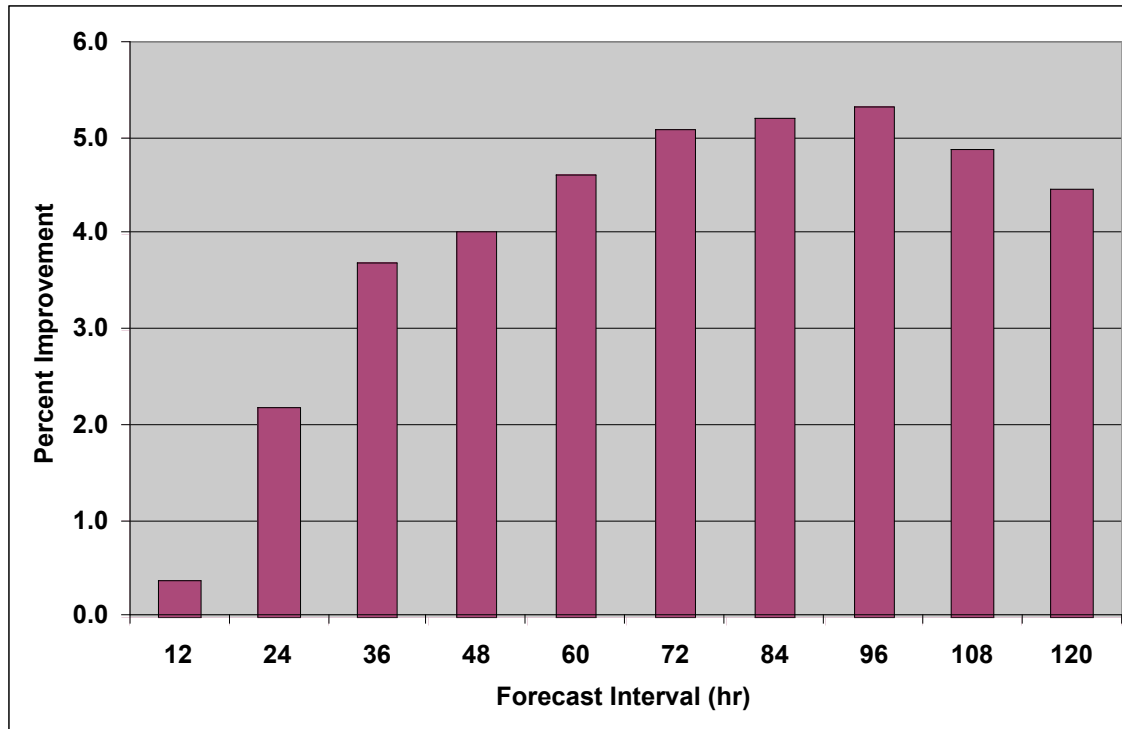
Figure 1. The improvements in the 2005 Atlantic SHIPS forecasts due to the inclusion of the new decay model. The sample includes all of the 2005 SHIPS forecasts, including those not affected by land.

The weights for the input to the RII will be determined by an IMSL library routine that performs the discriminant analysis. This software was previously only available on a UNIX system that is scheduled to be retired. In preparation for the JHT project, a new version of the IMSL software was obtained for a Linux system at CIRA. Preliminary discussions of this work have begun with John Kaplan, and tentative plans have been made for him to visit CIRA in early April to develop the discriminant analysis version of the RII.

3. Plans for the Next Six Months

The project will continue according to the schedule listed in the Appendix. Further progress will be reported by M. DeMaria at the Interdepartmental Hurricane Conference in March of 2006.

Appendix

Year-one project timeline and deliverables:
Sep 2005 - Funding arrives at CIRA
Sep 2005 – Begin development of optimal shear routines for SHIPS
Oct 2005 – Begin development of discriminant analysis RII

Nov 2005 - Finalize the revisions of SHIPS with the new decay model
Feb 2006 – Provide year1 semi-annual report
Mar 2006 - Present preliminary results at the IHC.
May 2006 - Begin real-time testing of parallel version of SHIPS with optimized shear
May 2006 - Begin real-time testing of discriminant analysis version of RII
Aug 2006 – Provide year 1 final report/proposal renewal