

**JHT Mid-term Report**  
**May 1, 2004 –January 31, 2005**

**Development of a Rapid Intensification Index for the Eastern Pacific Basin**

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**Mid-term progress report:**

**Funded accomplishments:**

The E. Pacific threshold version of the SHIPS RI index was run in real-time every 6 h from 24 May to 30 November 2004. This version of the RI index compares the operational magnitudes of seven SHIPS predictors (previous 12-h intensity change, 850-700 hPa relative humidity, 850-200 hPa vertical shear, sea-surface temperature, potential intensity, and 100-300 km area-averaged GOES infrared brightness temperature and standard deviation of GOES infrared brightness temperature) to previously determined RI thresholds to estimate the probability of rapid intensification (defined as a 35 kt increase in maximum wind speed over a 24-h period commencing at t=0 h). These RI index probability of RI estimates were provided on the SHIPS log files that were printed out at TPC/NHC after the completion of each SHIPS forecast.

An updated scaled version of the E. Pacific RI index was also derived. This version was developed using more sophisticated data binning methods for computing the sample RI probabilities than were previously employed as well an extra year of data (i.e., 2003). The final version of this updated scaled RI index was determined after extensive sensitivity tests were conducted to determine the optimal combination of predictors using the 1995-2003 SHIPS database. These sensitivity tests evaluated the forecasts both quantitatively by comparing their Brier skill scores and qualitatively by examining the smoothness of the curves that resulted from the binned RI probabilities. The final version of the scaled E. Pacific RI index included all of the same predictors that were used in the RI threshold version that was run in real-time during the 2004 E. Pacific hurricane season except that the percent are covered between 50-200 km by  $-30^{\circ}$  C was used instead of the area-averaged brightness temperature from 100-300 km radius. An evaluation of the scaled version of the RI index and the standard version that was run in real-time during the 2004 E. Pacific season was performed for the 1995-2003 developmental sample. It was found that the scaled version had 6 % more skill in absolute terms for the entire 1446 case sample which represents a relative improvement of 30% when compared with that obtained for the threshold version of the E. Pacific RI index for the same developmental sample.

**Additional accomplishments:**

The 1995-2003 SHIPS developmental sample was employed to develop and to evaluate additional versions of the scaled E. Pacific RI index for several other RI thresholds (i.e., 20, 25, 30 kt) to determine the accuracy and utility of such versions of the index. Also, a version of the scaled RI index was also developed and tested for each of the aforementioned RI thresholds for the 1995-2003 Atlantic basin sample. The results of these tests showed that the skill increased as the magnitude of the RI threshold decreased in both basins. Also, the level of skill of the scaled RI index in the E. Pacific was found to be substantially higher than it was for the Atlantic basin.

**Future Work:**

The real-time performance of the E. Pacific version of the RI index will be evaluated for the 2004 E. Pacific hurricane season. Also, the performance of the updated version of the scaled RI index will be compared to that of the threshold version that was run in real-time in 2004 by re-running all of the cases from the 2004 E. Pacific hurricane season. These results will be presented at the upcoming Interdepartmental Hurricane Conference that will be held in March 2005 in Jacksonville. Prior to the start of the 2005 Hurricane season, the E. Pacific RI index will be updated using data from the 2004 Hurricane season. Finally, the operational SHIPS code will be modified so that real-time testing of the scaled version of the E. Pacific version of the RI index can be conducted during the upcoming 2005 Hurricane season.