Progress Report to the National Oceanic and Atmospheric Administration Joint Hurricane Testbed Program

for the

Atlantic Oceanographic and Meteorological Laboratory
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Title: An Updated Baseline for Track Forecast Skill Through Five Days for the Atlantic and Northeastern and Northwestern Pacific Basins

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Performance Period: 01 July 2003 – 30 June 2004

Current progress:

Aberson and Sampson (2003) derived a new version of CLIPER for the Western Pacific basin using best track data from 1970 to 1998. The regression was derived with the current storm motion vector calculated using the current and 6-h old locations from the best track dataset to mimic operations. However, the original CLIPER was derived with the current storm motion vector calculated from positions 6 h before and after the initial time. In a test, James Franklin found that the latter method provided better tracks, so the Joint Hurricane Testbed has funded the development of a new Western Pacific CLIPER model.

The coefficients for the newly derived version of the West Pacific model have been sent to the Navy, and are undergoing testing. The new version is somewhat improved over the older one in that data through 2002 are used. The percentage of the variance explained is higher in the new version that in the current version, and the consistency between forecast times is also greater.

Similarly, Aberson (1998) derived a version of CLIPER for the Atlantic and Gulf of Mexico basins. The Principal Investigator and three contacts from the National Hurricane Center, James Franklin, James Gross, and Colin McAdie, held a meeting 22 January to formulate a strategy for the Atlantic CLIPER development. During that meeting, the participants agreed that the first step would be to produce a version of CLIPER that most closely resembles the original provided by Neumann (1970) and to proceed from there. This method was provided to the NHC participants for testing on 23 January. For this version, the Principal Investigator:

1. Went back to the original CLIPER paper by Charlie to copy his methods. I found:

a. His independent data set was 1931 to 1970. I used the same in this derivation.

b. He used linear, binomial, and trinomial predictors, for a total of 164 predictors. I did the same.

c. He used current and 12-h-old motion calculated centered on the particular time. I did the same.
d. He used stepwise regression. I did the same.

e. His predictand was the displacement from the initial position. I did the same.

2. One part of his procedure could not be duplicated due to the regression program available to me. Charlie arbitrarily cut off the predictors after 8 were found to be important. Modern regression techniques tend not to allow for this. I have included all predictors that are significant in the regression at the 99.9% level (going down to 95% does not change anything). The addition of these predictors will have only a minimal impact on the forecasts.

For the meridional motion, the most recent meridional motion was the most important predictor at 12-108 h, except 60 h. At 60 h, this predictor went in first, but was later removed by the stepwise regression.

For the zonal motion, the most recent zonal motion was the most important predictor at 12 - 108 h.

Here is a comparison of the variance explained by both versions for the persistence predictor:

	Meridional		Zonal	
	Neumann	Aberson	Neumann	Aberson
12 h	87.4	88.8	94.3	94.3
24 h	69.4	74.3	84.9	86.4
36 h	57.4	59.9	76.8	78.1
48 h	46.3	47.2	68.6	69.9
60 h	37.0		61.4	62.1
72 h	29.4	26.7	55.1	55.9

I have no way of accounting for the differences, which may be due just to higher-prediction computers or different regression codes.

The third-order predictors were never the first or second most important.

Work on the Eastern Pacific version of CLIPER will begin when the other two versions have been tested.