One-Year Report to the National Oceanic and Atmospheric Administration Joint Hurricane Testbed Program

for the Atlantic Oceanographic and Meteorological Laboratory
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Title: The Assimilation of non-NOAA and non-AF GPS dropwindsonde data in NOAA numerical models

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Performance Period through August 3, 2012

Summary of proposed scope of work:

The proposed experiment is designed to demonstrate the potential value of assimilating dropwindsonde data collected using the NASA DC-8 and NSF G-V aircraft for the improvement of hurricane track forecasting. These aircraft regularly participate in field experiments and the data are routinely assimilated into global numerical models with the exception of those at NCEP as they consider the data to be experimental at this time. Since the dropwindsonde sensors and data processing techniques are identical across platforms and are consistent with what is currently assimilated, the impact of assimilating dropwindsonde data from these aircraft on the forecasts can be tested by running a parallel cycle of the NCEP GFS . Two parallel cycles of the NCEP GFS are to be produced using data collected during the 2010 Genesis and Rapid Intensification Program (GRIP) and PRE-Depression Investigation of Cloud systems in the Tropics (PREDICT) field experiments. The cycles which contain the experimental dropwindsonde data are detailed in Table 1. The forecasts which include the assimilation of these data will then be evaluated relative to the operational GFS.

Progress:

The first of two parallel cycles has been completed on the now defunct VAPOR high performance computing system for the time period beginning at 0Z UTC August 15, 2010 ending August 25, 2010. Preliminary results show improvement in tropical cyclone track forecasts due to the inclusion of the NASA and NSF dropwindsondes (Fig. 1). These results were presented at the 2012 Interdepartmental Hurricane Conference.

This project is currently on hold due to the unexpected early decommissioning of VAPOR in March 2012. The PI has requested that JHT acquire resources on the replacement system ZEUS so that the project can be completed. A second cycle spanning the time period between August 29 and October 1, 2010 will be initialized as soon as the necessary computational resources have been allocated. The first cycle will also need to be rerun on this system in order to maintain consistency throughout the experiment. Once the resources are available the full scope of work is expected to be completed within a time frame that is consistent with the original proposal. A final report will be submitted at that time.

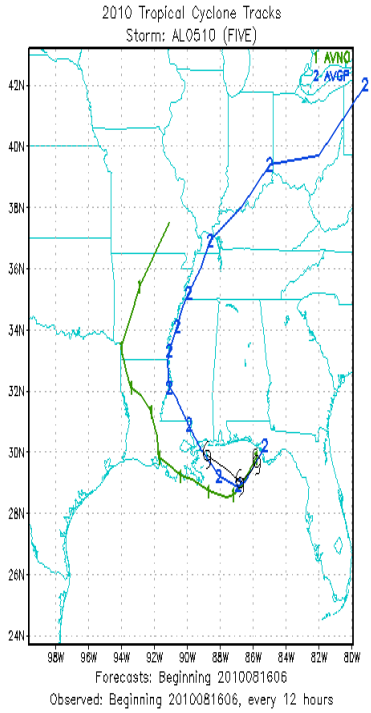

Figure 1: GFS track forcast for TD5 initialized at 6Z August 16, 2010. The black curve gives the NHC best track position, green (1) the GFS forecast track without assimilating the PREDICT dropwindsondes and blue (2) with the PREDICT data

References:

Montgomery, M. T., and co-authors, 2012: The Pre-Depression Investigation of Cloud Systems in the Tropics (PREDICT) Experiment: Scientific Basis, New Analysis Tools and some First Results, *Bull. Amer. Met. Soc*., 153-172.

Table 1:

DATE	EXPERIMENT	# of DROPS	CYCLES
20100815	PREDICT	9	0Z
20100817	PREDICT	20	12Z
20100818	PREDICT + GRIP	25 + 9	12Z, 18Z
20100821	PREDICT	17	12Z
20100823	PREDICT	12	12Z
20100824	GRIP	23	12Z, 18Z
20100829	GRIP	13	18Z , 0Z
20100830	PREDICT + GRIP	29 + 13	12Z, 18Z
20100831	PREDICT + GRIP	26 + 5	0Z, 12Z, 18Z
20100901	PREDICT	16	12Z, 18Z
20100902	PREDICT + GRIP	20 + 9	18Z
20100903	PREDICT + GRIP	16 + 4	0Z, 18Z
20100905	PREDICT	22	12Z, 18Z
20100906	PREDICT + GRIP	18 + 3	12Z, 18Z
20100907	PREDICT + GRIP	19 + 7	12Z , 18Z
20100908	GRIP	12	0Z
20100910	PREDICT	34	12Z, 18Z
20100911	PREDICT	22	18Z
20100912	PREDICT + GRIP	21 + 3	12Z, 18Z
20100913	PREDICT + GRIP	13 + 23	0Z, 12Z, 18Z
20100914	PREDICT + GRIP	18 + 18	0Z, 12Z, 18Z
20100915	GRIP	10	0Z
20100916	GRIP	12	28Z
20100917	GRIP	18	0Z, 18Z
20100920	PREDICT	18	12Z, 18Z
20100921	PREDICT + GRIP	21 + 10	12Z, 18Z
20100922	PREDICT + GRIP	15 + 22	0Z, 12Z, 18Z
20100924	PREDICT	15	12Z, 18Z
20100927	PREDICT	19	12Z, 18Z
20100928	PREDICT	16	12Z, 18Z
20100930	PREDICT	25	12Z, 18Z