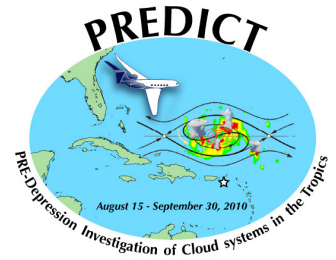


## FIELD PROJECT FACT SHEET #3

### PREDICT :: Pre-Depression investigation of Cloud Systems in the Tropics

#### SCIENCE MISSION

Having more accurate predictions of hurricane development, as well as more advanced notice of hurricane land- fall would save coastal regions billions of dollars in preparation and evacuation costs.



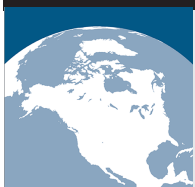
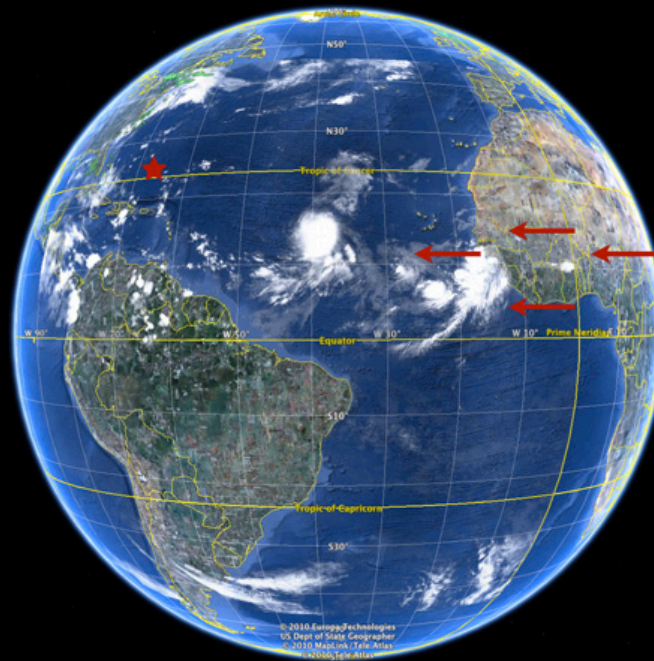
Prediction and understanding of tropical storm development remains one of the most challenging aspects of atmospheric science. A multitude of tropical storms emerge from the West African coast every year near the Cape Verde islands, but only a few of these develop into tropical depressions, storms, or hurricanes.

#### ABOUT PREDICT

The PRE-Depression Investigation of Cloud-systems in the Tropics (PREDICT) field experiment will deploy the High-flying Research Aircraft in the Atlantic basin in the heart of hurricane season, 15 August - 30 September, 2010 to explore interactions between the ocean and atmosphere, that either promote or hinder the development of a tropical storm.

The combination of warm, moist westward winds carrying dust off of the west coast of Africa create an ideal environment for storms to develop. As the storms move West across the Atlantic Ocean, they pick up addition moisture and grow into larger storms. Some of these storms eventually develop into hurricanes, while some simply turn into tropical storms or just fade away. The goal of PREDICT is to explore the environmental conditions that either promote or hinder the development of a tropical storm forming into a hurricane.

Developing storms traveling west off of the coast of Africa ~12°N

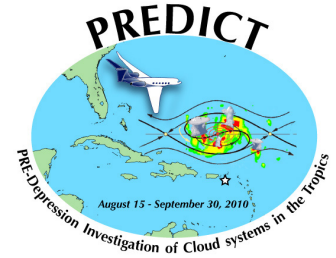


## Field Projects: Science in Action

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# FIELD PROJECT FACT SHEET #3

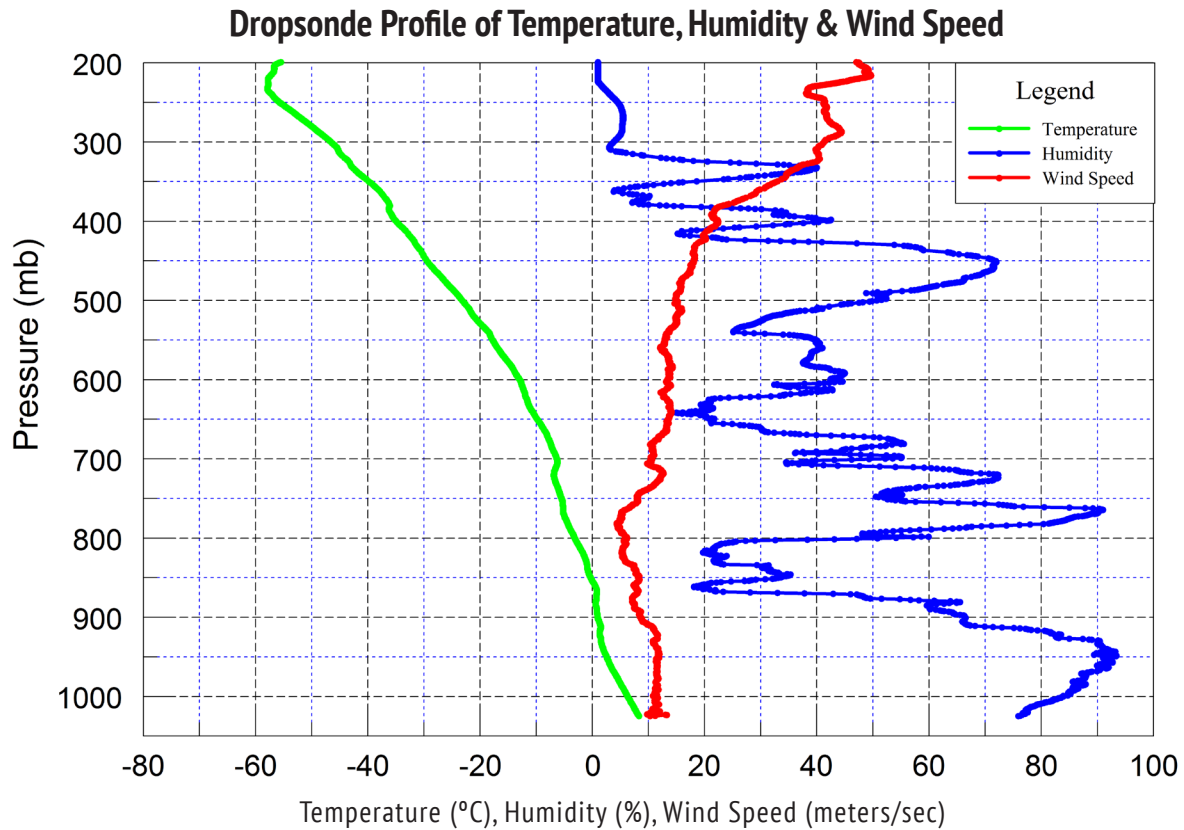
## PREDICT :: Pre-Depression investigation of Cloud Systems in the Tropics



### INSTRUMENTS & PLATFORMS

- High-flying Research Aircraft
- Dropsonde
- Cloud Droplet Sensor

### SAMPLE DATA FROM PREDICT



Data from a dropsonde released out of the High-flying Research Aircraft, as the it descends to the ocean surface. Y-axis is pressure in millibars, ground-level is 1000 mb; x-axis shows temperature in degrees Celsius, percentage of humidity, and wind speed in meters per second.

### Data Discussion Questions

1. What is the highest speed wind recorded here in meters/second? Can you convert that to miles/hour?
2. Why do you think the humidity (blue) changes so much as the dropsonde falls from the aircraft to the ocean surface? (Hint: What might the dropsonde be passing through?)
3. Why does the pressure in millibars decrease as altitude increases?



## Field Projects: Science in Action

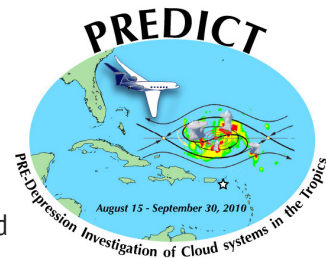
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## FIELD PROJECT FACT SHEET #3

### PREDICT :: Pre-Depression investigation of Cloud Systems in the Tropics

#### RESEARCH SUMMARY OF PREDICT

PREDICT successfully gathered data from four developing and four non-developing tropical storms over the tropical North Atlantic basin between 15 August and 30 September 2010. These data will serve as the basis for a variety research topics over the years to come and are expected to provide new insights into the tropical cyclone formation process.



PREDICT scientists have confirmed the importance of maintaining a column of very moist air from the surface to at least 3 miles above the surface in order for tropical cyclones to develop. They have further confirmed how this moist column can be maintained in developing storms by the swirling winds that effectively “insulate” or protect the moist region from surrounding dry air. The moistened and cooled conditions within the protected region also produce more efficient rainfall and more direct enhancement of winds at the surface that ultimately define the formation of a storm.

It can take up to five to ten years to organize, analyze, and examine the relationships, patterns, trends, etc of these millions of data points that are collected during this huge field project. Scientists are still in the process of analyzing the data from this research project.



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