

2nd Assignment from Haiyan Jiang

Due Friday December 5 , 2008

From Nov. 21's class, you have already learned that the intensity change of a tropical cyclone (TC) is related to the strength of its convective precipitation features (PFs). The chance of TC rapid intensification (RI) increases when a hot tower exists, but not substantially. In the 9-yr TCPF database, there are 44 eyewall PFs associated with RI, of which there are only 12 PFs with one or more hot towers. We do see some hot towers associated non-intensifying or even weakening. In the database, there are 48 eyewall PFs associated with TC **rapid weakening**, of which there are even 3 PFs with one or more hot towers. In this assignment, we will explore some of these extreme cases. The objective is to get some insights on how the large-scale and convective-scale factors work together to control the process of TC intensity change. Please use the reference of Kaplan and DeMaria 2003 (Weather and Forecasting) on favorable large-scale environmental factors (mainly SST and vertical wind shear).

Below are two TC cases that underwent rapid intensifying and rapid weakening, respectively, at the given time periods. In both cases, at least one hot tower is found associated with the rapid intensifying or weakening event. Please check the TRMM, NCEP/ECMWF, SST, and/or other available satellite/model reanalysis data for the two cases at the given time periods and write a report to explain why the rapid intensifying or weakening happened.

- 1) Rapid intensifying case: Hurricane Bret 1999 at the Atlantic basin. Hot tower observed by TRMM at 22.76 UTC on August 21. During the 24 hour period centered on the TRMM observation time, the TC maximum sustained wind increased 46 kt.
- 2) Rapid weakening case: Hurricane John 2006 at the North East Pacific basin. Hot tower observed by TRMM at 9.79 UTC on September 2. During the 24 hour period centered on the TRMM observation time, the TC maximum sustained wind decreased 41 kt.

Please use the "seasons archive" in the NOAA National Hurricane Center web page (<http://www.nhc.noaa.gov/>) to check the TC best track information.

TRMM data web page: Navy TC site or JAXA TRMM tropical cyclone database web site.

NCEP data web page: <http://www.met.utah.edu/zipser/pub/projects/ncep/>

ECMWF data web page: <http://www.met.utah.edu/zipser/pub/projects/ecmwf/>

You can get SST data from the RSS storm archive page:

http://www.ssmi.com/hurricane/data_archive.html

This assignment should be a combination of text and figures that may be emailed to me (Haiyan) with or without some printed pages.