VPS Script- African Great Lakes Weather – WC – Fall 2015

**Annabelle:**

 Lake Victoria. As one of the biggest lakes in the world at almost 27,000 square miles it plays a natural role in the economy and culture of the millions of people in the region.

Straddling the border of Kenya, Tanzania, and Uganda and lying within a depression within the East African rift Valley, the lake yields over 3,000 miles of shoreline to this population which in effect has grown to be Africa’s largest inland fishery.

However, intense storms occur around the lakes with little warning and can create life-threatening hazards to unsuspecting fisherman, causing their fishing vessels to capsize or wreck.

Almost 5,000 fisherman are killed every year in incidents like these.

**Will**: Atmospheric monitoring practices in the area are a collaborative effort between meteorological agencies from Kenya, Uganda, and Tanzania.

The Kenya Meteorological Department, our partners for this project, currently use observations from a series of ground based sites and regional meso-scale models to create forecasts for the area.

Our project, the African Great Lakes Weather project, looked at earth observation data that could complement the efforts of the Kenya Meteorological Department to improve weather forecasting over Lake Victoria.

**Grant:**

Our project employed the Hazardous Storm Event Database, compiled by Kristopher Bedka of NASA Langley Research Center’s science directorate, climate science branch.

The Hazardous Storm Event Database consists of a collection of attributes associated with overshooting tops that have been detected using infrared images from the EUMETSAT SEVIRI geostationary satellite. These overshooting tops (or OT’s) can be linked to storm events. Using this data, we focused on 2 sample sets of study dates from 2007 – 2013 based on detection frequency.

**Juan:**

The bulk of our analysis was centered on the use of MERRA data variables. Modern-Era Retrospective Analysis for Research and Applications, or MERRA, is a data structure that has integrated data from various earth observing systems using complex models, yielding data products that are especially useful for climate studies.

**Will:**

The primary data product we considered was the MERRA IAU 2-dimensional atmospheric single-level diagnostics, which contains over 40 variables. Out of these 40 variables, we focused on 7 that with the exception of surface temperature, all variables were measured at an air pressure of 500 milliBars. This pressure occurs at around a 6 kilometer altitude and circulations, winds, and/or localized regions of cold temperatures at this altitude have strong impacts on what happens with regards to thunderstorms at the surface.

**Juan:**

We extracted these variables for our study area and created 6 hour and daily averages from the data.

Using these averages, an empirical distribution analysis was performed on the 50th and 99th percentile values for each variable. From this analysis, the means of the two data sets are compared in order to identify if significant differences exist.

Correlation calculations were also performed between variables in the same percentiles to study the interrelation of any or all of the variables. The strength of these correlations were then compared between the 50th and 99th percentiles in order to find any discernable changes between the two levels.

**Will:**

Using the initial data collected from the Hazardous Storm Event Database, the TRMM – LIS, and associated MERRA products, our project will hopefully provide a base to future projects which will ultimately aid weather forecasting efforts over the African Great lakes. Further vetting the difference in atmospheric conditions between the high impact days vs the “normal days” will help to demonstrate what atmospheric conditions are favorable for producing high impact weather over the region.