

# Hovmollers and Correlations using NASA Giovanni

Objective: *compare time – latitude plots (Hovmollers) between primary productivity and easterly wind stress along the southern Caribbean Sea to assess the impact of upwelling.*

1. Log in to NASA Giovanni
2. Select Hovmoller, Longitude-averaged from the “Select Plot” menu
3. Choose which dataset to plot. Type “chlorophyll” in the keyword search box then click “search”. You will find 2,011 available datasets. Filter this selection more by clicking the “monthly” selection in the “Temporal Resolutions” menu. Now you will be presented with only 7 available datasets. Choose the one labeled “Chlorophyll a concentration”, the fourth one down from the top.
4. Select the date range to be from Jan 2009 to Dec 2012
5. Enter the map coordinates exactly as follows: -76.5,11.5,-65,17.5. You can click on the map icon / symbol in the “select region” box to verify that the coordinates are located in the southern Caribbean sea.
6. Select “Plot Data” from the bottom right.
7. Adjust the plot options from the options pull down menu: adjust the range to be from 0.1 to 0.5 and chose the Cyan-Red-Yellow color range option.
8. Download the plot as a .PNG
9. Do the same as above, but for the “eastward wind at 850 hPa” dataset. (Just copy and paste into the search bar...it will be the only option.) Keep other time and space parameters the same. Change the plot options to range from -13 to -3 and select the “Spectral, Inverted (Div), 11” color bar.
10. Download the new plot as a .PNG
11. Now you have two plots. Next, we want to examine the relationship between chlorophyll concentration and easterly wind at 850hPa (850hPa is simply a vertical level of the atmosphere roughly 5,000 ft in elevation.) This relationship can be described by correlating the two variables and examining their scatterplot.
12. Make a scatterplot in Giovanni using the two variables above. Keep time period and region the same. Select “Scatter, Area Averaged (static)” from the plot pull down menu. Now you will have a scatterplot.
13. Answer the following questions.

Assignment: complete all of the sections below for full credit

- 1. 2pts** Attach time-latitude plots of both parameters and the scatterplot (3 plots total).
- 2. 1pt** In general, there is a bi-annual peak in chlorophyll concentration along the southern Caribbean Sea. What months are the peaks observed?
- 3. 1pt** During which year was the July chlorophyll concentration the lowest? During which year was the July chlorophyll concentration the highest?
- 4. 1pt** What year saw elevated chlorophyll concentrations extend beyond 17N?
- 5. 2pts** Easterly winds describe winds *blowing from east to west*, BUT eastward winds describe *winds blowing to the east (from the west)*. **We plotted eastward winds.** We can assume that low eastward wind values (more negative values) represent periods when the easterly wind is strongest. Based on your plot between 2009 and 2012, which year had the weakest **eastward** wind during the month of July? Which year has the strongest **eastward** wind during the month of July?
- 6. 1pt** What is the correlation between **eastward winds** and chlorophyll in the southern Caribbean Sea (state the numeric value)?
- 7. 2pts** Is there a direct or indirect relationship between eastward winds and chlorophyll in the southern Caribbean Sea? What would you expect if easterly winds increase in this region? What process would be responsible for this relationship?

DUE BEFORE TUESDAY NOV. 15<sup>th</sup>

Email completed assignments to tallen@cimh.edu.bb