Understanding phytoplankton community shifts in the eastern Cariaco basin

This is the current state of progress towards the first manuscript

Regime shift in the Cariaco Basin The CARIACO time-series has been collecting detailed data on the phytoplankton community in the Cariaco Basin from 1995 to 2017 (see Section CARIACOintro for a full description). What has been a particular focus of the research based on this data set is the apparent changes in environmental conditions documented in both the physical boundary conditions as well as the biological data. Taylor2012 described a state shift in the biotic community. Using the fluorometric *chl a* data collected their analysis proposes a reduction in phytoplankton biomass, coinciding with a reduction in nutrient upwelling. An increase in zooplankton abundances (although the measurements of this were only commenced in 2001) was linked to a collapse in sardine fisheries in the region (see Figure TaylorSHIFTS). Pinckney2015 further expanded on this work by looking in detail at both the phytoplankton taxonomy data, as well as HPLC-derived *chl a* data. The HPLC-derived data showed no clear reduction in total *chl a* and spoke against a reduction in phytoplankton biomass. In comparison to the fluorometric method, HPLC can measure the concentrations of multiple pigment types and the total chlorophyll signal is less influenced by the specific pigment composition of the phytoplankton community. What the data showed specifically was that instead of a reduction in total chlorophyll within the water column, overall bloom intensity (i.e. the variability in biomass) decreased and phytoplankton moved to greater depth (see Figure TChlAPinckney). This is also supported by irradiance measurements showing a reduction in the depth of the euphotic zone Pinckney2015. Using the software CHEMTAX, the individual pigment composition can be used trace the proportion of total chlorophyll biomass that is substituted by the individual functional groups. This data was kindly supplied by James Pinckney and forms the basis of the planned study.

figure [trim = 0mm 0mm 0mm 0mm, clip, width=0.7]./Chp2-Pre/Tayloretal2012$_F$3.$large.jpg$[$Scheme$]"$Shiftsinphyt$