Session: C9 Poster: M162A

Impact of regional climate variability on harmful algal blooms along the coast of Southern California

Kelly Perry[†]; Burt Jones
[†] University of Southern California, USA
Leading author: kelly.l.perry@jpl.nasa.gov

Algae are the most abundant photosynthetic marine organisms and form the basis of the aquatic food chain. When the quantity of these algae increases to a point where they negatively impact an ecosystem, due to either the production of toxins or other deleterious effects such as anoxia, they are referred to as harmful algal blooms or HABs. HAB events are often referred to as "red tides" due to the discoloration of the water by certain algae. However, many HABs, including some of the most deadly, are not visually obvious. These "invisible" blooms only become evident through direct sampling or after fish kills, marine mammal strandings or human illness occur. HABs are unfortunately increasing in frequency and intensity on global, regional and local scales. Although Climate Change has been suggested as one of the key factors, very few interdecadal studies comparing HABs variability to low frequency physical forcing have been performed. Low-frequency (interannual and interdecadal) variability in sea level and sea surface temperature along the Southern California Coast has been shown to have high correlation with the El Niño-La Nina signal originating from changes to equatorial winds. This is important in the study of phytoplankton in Southern California, because abnormally low sea level corresponds to increased sea surface nutrient concentrations in this region. The California current is stronger during these times, and the higher nutrient water found to the north is advected southward. In fact, previous work has successfully shown that variability in the California Current forces low-frequency changes in Southern California zooplankton. We are applying the techniques used in these zooplankton studies to evaluate the impact of low frequency variability on populations of HABs in Southern California. In situ and space borne measurements of sea surface height, ocean wind, sea surface temperature, ocean color and phytoplankton are used to produce monthly anomaly data sets. These data sets are then run through a low pass filter, and coherence is determined. Results are then analyzed to determine if this method of observation can be used to locate and perhaps even predict HAB events along the coast of Southern California.