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Project Progress Report – October 25, 2011

Evaluating Local and Global Stresses on Coral Reefs: A Case Study of Caribbean/Atlantic Reefs

Items Completed:

1. Basemap of coral reefs in the Caribbean Sea and Atlantic Ocean region
2. Global Stress Analysis:
    a. Creation of CO_2 concentrations raster and use of Natural Neighbor interpolation method to infer CO_2 concentrations on the region. Figure 2 below is for the year 2002. Additional analysis was made for 1980 and 1990.
    b. Creation of sea temperature raster and use of raster calculator to see changes of temperature compared to a baseline created from averaging sea temperatures (at 50 m below surface) from the years 1958 to 1962.

    ****New Question: How do the sea temperatures at 50 m below the surface compare to the range of temperatures that allow coral reefs to thrive?****

Items to be Completed:

1. Local Stress Analysis
2. Risk assessment

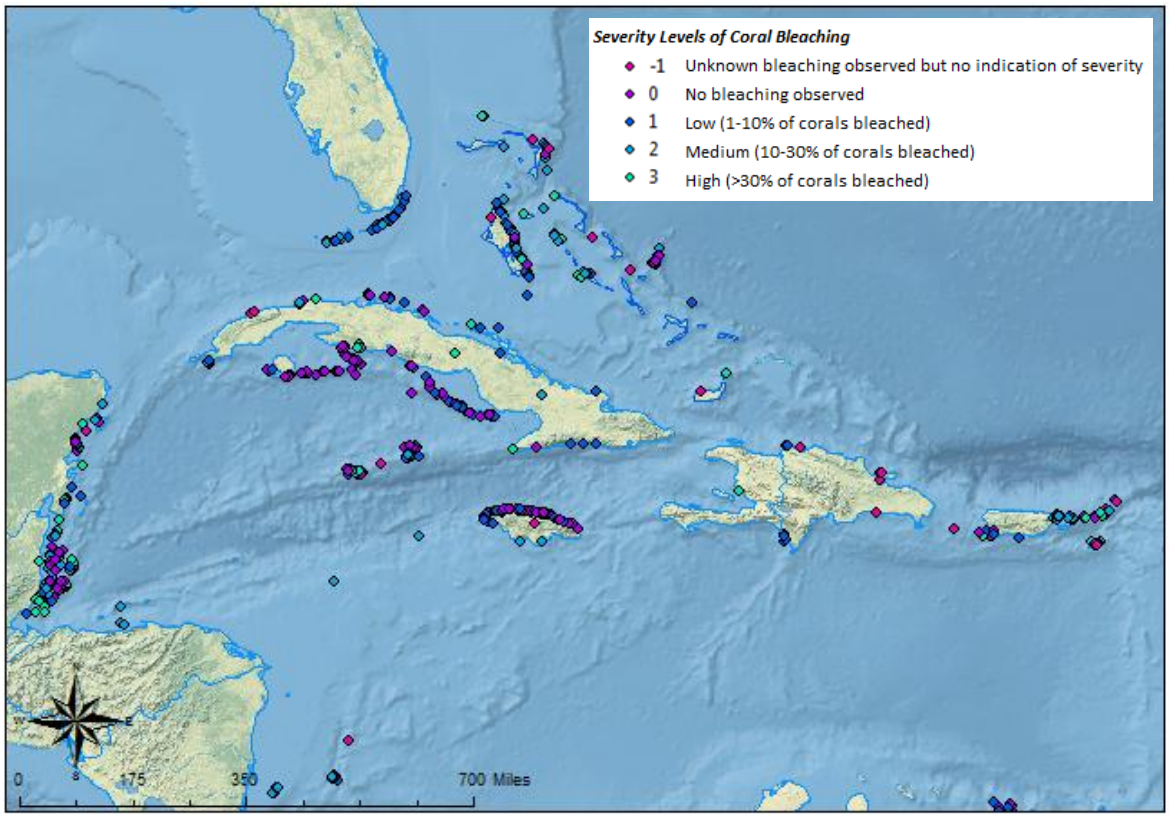

Figure 1. Basemap of Caribbean Coral Reefs and their observed severity levels of coral bleaching.

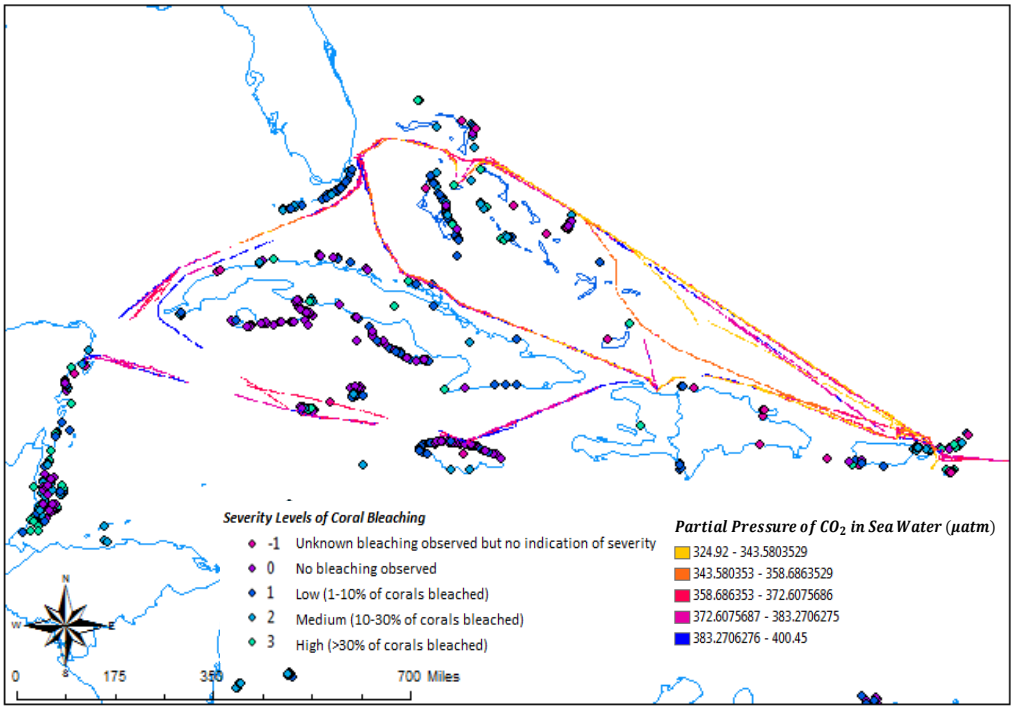

Figure 2. Caribbean/Atlantic Reef Base Map indicating observed locations of coral bleaching and a raster of the CO_2 partial pressure observations in 2002.

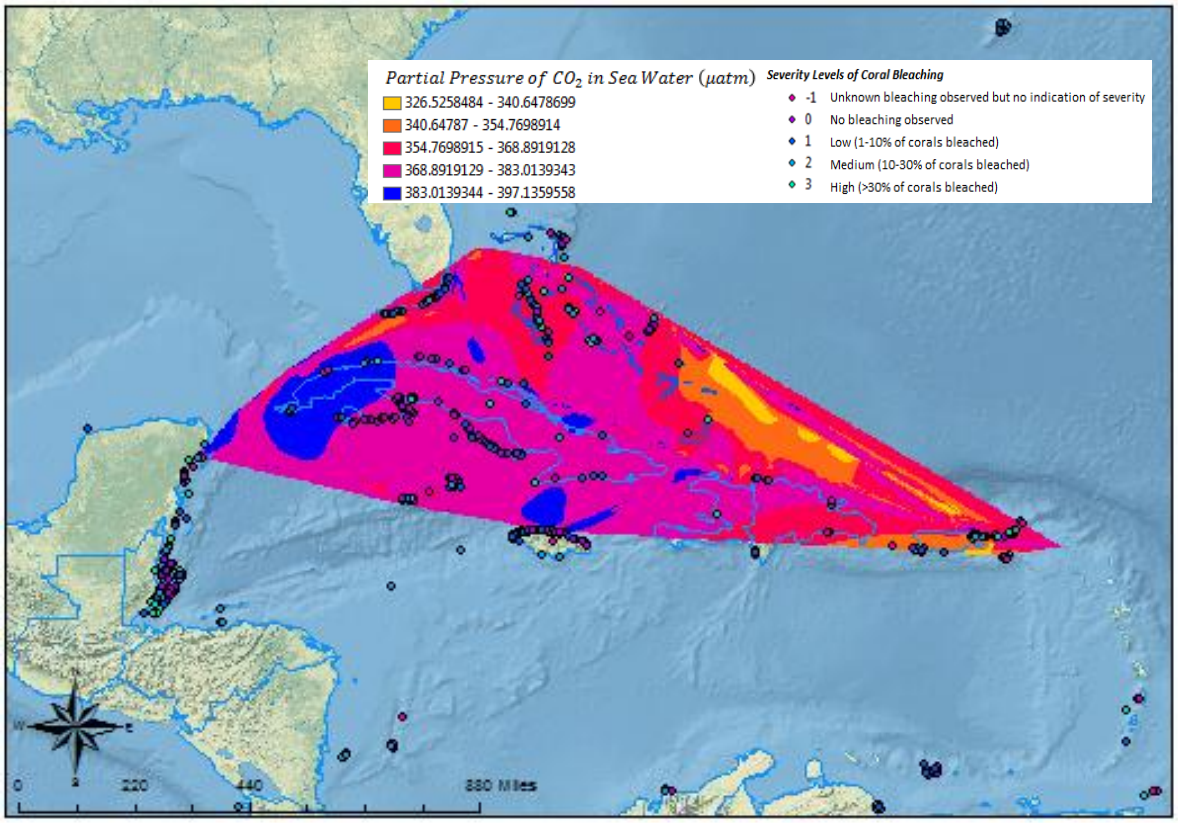

Figure 3. Levels of CO_2 spatially interpolated from CO_2 raster using Natural Neighbor method for 2002

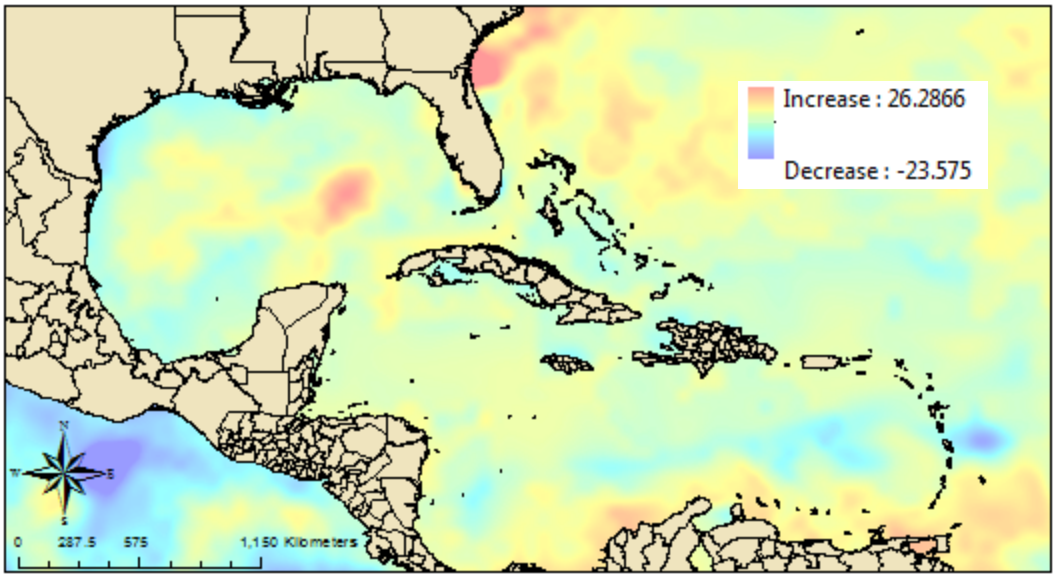

Figure 4. Differences between sea temperatures at 50 m below in 1990 and the baseline sea temperatures at 50 m below created from averaging annual mean temperatures from 1958 to 1962

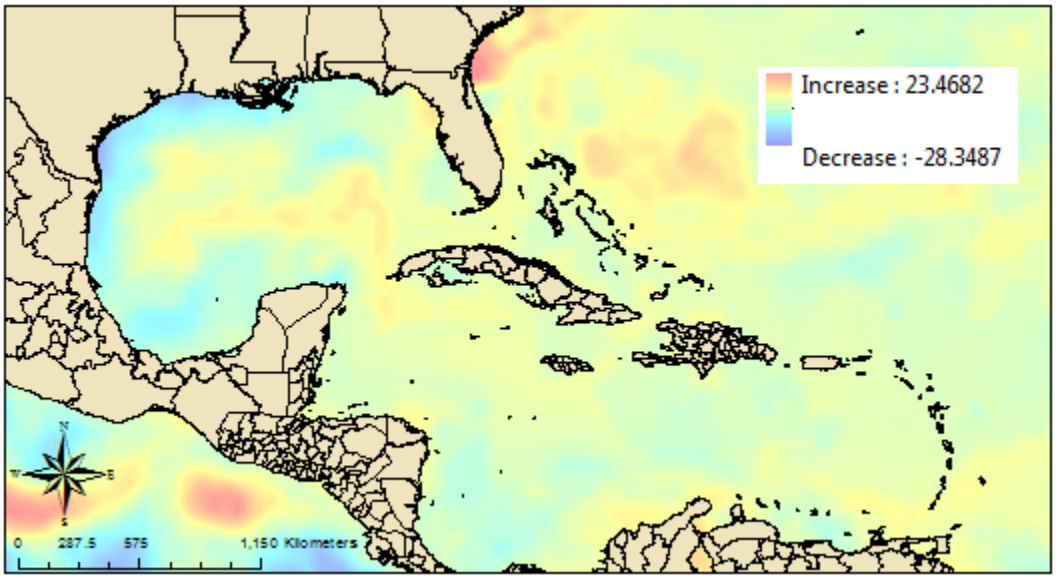

Figure 5. Differences between sea temperatures at 50 m below in 1990 and the baseline sea temperatures at 50 m below created from averaging annual mean temperatures from 1958 to 1962

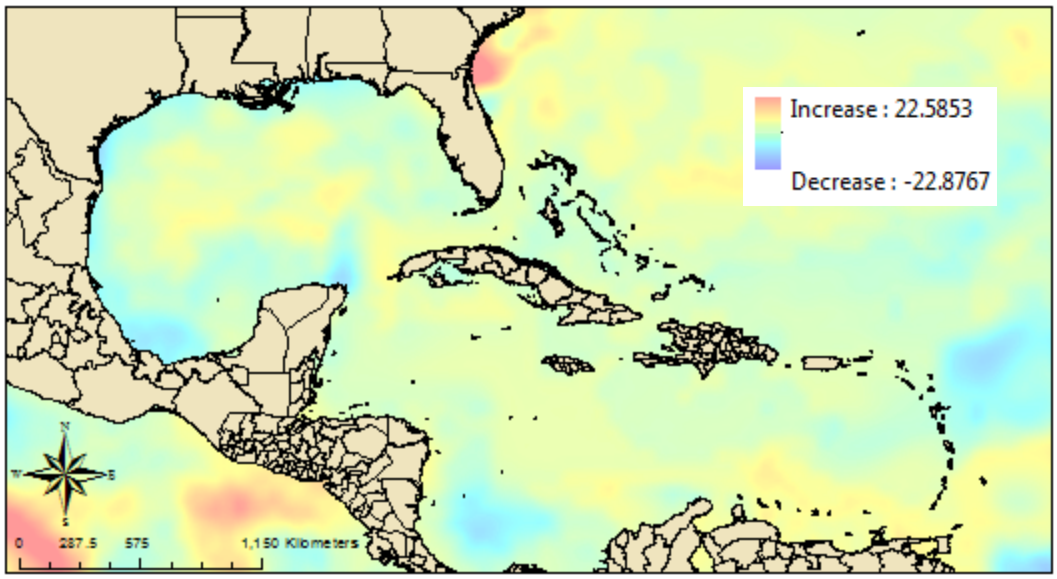

Figure 6. Differences between sea temperatures at 50 m below in 1980 and the baseline sea temperatures at 50 m below created from averaging annual mean temperatures from 1958 to 1962