

# The Effects of CO<sub>2</sub> on Phytoplankton Community Structure in the Amazon River Plume

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The Amazon River Plume, which results from an enormous discharge of freshwater and organic matter into the Atlantic Ocean, is a unique environment with a natural pCO<sub>2</sub> gradient in the surface waters of the plume that range from 130-950 μatm. The response of coastal marine phytoplankton to increased anthropogenic CO<sub>2</sub> emission is still unknown, hence the Amazon River Plume gradient can serve as a natural laboratory to examine the potential influence of atmospheric CO<sub>2</sub> increases and ocean acidification on phytoplankton community composition. A two pronged study was undertaken: the first in which shipboard samples from a 2010 cruise to the Amazon River Plume were analyzed to examine the distribution of 3 major phytoplankton groups (diatoms, diatom-diazotroph associations [DDAs], and the diazotroph *Trichodesmium* spp.) with respect to the natural pCO<sub>2</sub> gradient; the second in which the growth responses of *Thalassiosira weissflogii*, a representative diatom species, were examined under experimentally manipulated CO<sub>2</sub> conditions. Differential growth was observed at 150, 400, and 800 ppm CO<sub>2</sub> treatments. Absorption spectra analysis of pigments and Fast Repetition Rate Fluorometer analysis indicate potential changes in photosynthetic machinery with different CO<sub>2</sub> treatments. Future CO<sub>2</sub> manipulation experiments on representative DDA and diazotroph species will be undertaken to compare the growth responses of these 3 major phytoplankton groups to changes in CO<sub>2</sub>.