



## **PHYTOPLANKTON, BACTERIA AND VIRUSES: SOURCES OF CDOM IN EXPERIMENTAL MESOCOSMS MAINTAINED UNDER DIFFERENT PCO<sub>2</sub> LEVELS**

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Chromophoric dissolved organic matter (CDOM) represents the optically active fraction of the bulk dissolved organic matter (DOM) pool. CDOM strongly absorbs light in the ultra violet and visible ranges and as a consequence the presence of CDOM in natural waters can have important optical and ecological effects. Optically, the presence of CDOM can affect estimates of ocean color and primary productivity. Ecologically, CDOM, as a consequence of its light absorption properties, can act as a sunshade to phytoplankton, thus reducing the water column PAR penetration. Conversely, CDOM can act as a sunshade protecting organisms from ultraviolet radiation. High concentrations of CDOM can also affect heat exchange, and, through photolysis, can be a source of inorganic nutrients and small carbon moieties. Recent evidence pointed towards a microbial source of CDOM in the aquatic environment and led to the proposal that phytoplankton are not a direct source of CDOM, but that bacteria, through reprocessing of DOM of algal origin are an important source of CDOM. In a recent experiment designed at looking at the effects of elevated pCO<sub>2</sub> on the carbon cycle of *Emiliana huxleyi*, we found that despite three different pCO<sub>2</sub> levels, no differences were observed in either accumulation of DOM or CDOM over the 23 days of the incubation. There was no relationship between CDOM accumulation and algal biomass, measured as either cell numbers or chlorophyll a, nor between CDOM and respiration or primary production. Unlike previous mesocosm experiments where relationships

between CDOM accumulation and bacterial abundance have been observed, we did not find one. However, there was some evidence for a relationship between the accumulation of CDOM and cyanobacterial and viral abundance in the post bloom period (presumably caused by a massive viral attack). These results provide some insight into the potential effects of pCO<sub>2</sub> on CDOM accumulation in surface waters and the potential and indirect role of viruses and cyanobacteria in the production of CDOM.