



Benthic dissolved inorganic carbon dynamics in the Gulf of Biscay (June 2006 – May 2007)

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The biogeochemical properties of an extensive bloom of the coccolithophore, *Emiliana huxleyi*, at the shelf break in the northern Gulf of Biscay was investigated in June 2006 and May 2007. We report the results from the benthic measurements during both cruises. Benthic respiration rates were quite low and varied between 2 and 9 mmol m⁻² d⁻¹, in agreement with the fact that the study area consists of sandy sediments with low organic matter content. Benthic respiration was well correlated to the Chlorophyll-a (Chl-a) content of the top 1 cm of the sediment, and in particular to the grain size fraction smaller than 63 μm. Chl-a values in May 2007 were higher than in June 2006 in agreement with the fact that the 2007 cruise was conducted after the first large peak of phytoplankton biomass associated to diatoms, visible on the Seawifs Chl-a values in the study area, and that the 2006 cruise took place after the second smaller peak associated to coccolithophores. Based on the co-variance of water-sediment TA fluxes and O₂ consumption, evidence was found for dissolution of CaCO₃ due to acidification of superficial sediments in relation to the production of CO₂ by respiration. This evidence is strengthened by the increase in calcium (although very small values from 0.06 to 0.23 mmol m⁻² d⁻¹) with increasing dissolved inorganic carbon (DIC) and increasing TA. There was an increase in nitrate in the overlying water of the sediment core, ranging from 0.03 to 1.18 mmol m⁻² d⁻¹ over an average incubation period of 44 hours. The increase in silicate of 0.05 to 0.8 mmol m⁻² d⁻¹.