Geophysical Research Abstracts
Vol. 13, EGU2011-11008-1, 2011
EGU General Assembly 2011

Effect of CO2 enrichment on bacterial production and respiration, and on bacterial growth efficiency

Chiaki Motegi (1,2), Tsuneo Tanaka (1,2), Jean-Pierre Gattuso (1,2), Markus Weinbauer (1,2)

(1) Laboratoire d'Océanographie, CNRS, Villefranche-sur-mer, France., (2) Laboratoire d'Océanographie, Université Pierre et Marie Curie-Paris 6, Villefranche-sur-mer, France

The impact of rising carbon dioxide (pCO2) on bacterial metabolism was investigated during the 2010 mesocosm study in Kongsfjord (Svalbard). Mesocosm experiments were conducted from June to July 2010 for 35 days. Nine mesocosms with pCO2 levels ranging from ca. 180 to 1400 μatm were used. At day 13 of the experiment, inorganic nutrients were added to the mesocosms. The rates of bacterial production (BP) and respiration (BR) were measured every 2 to 4 days during the experiment. Bacterial growth efficiency (BGE) was estimated using BP and BR. Generally, BP gradually decreased in the mesocosms in a first phase, displayed a large (3.6-fold in average) increase on day 10, and remained relatively constant afterwards. BP increased with increasing pCO2 at the beginning of the experiment (day 1 to 7). This trend gradually became inverse and BP decreased with increasing pCO2 on day 12 (before nutrient addition). This trend was even clearer after nutrient addition and continued until the end of experiment. In contrast with bacterial production, no clear trend was observed for BR and BGE. Our results suggest that (1) the response to elevated pCO2 had a strong temporal variation, possibly linked to the nutrient status, and (2) pCO2 had an influence on biomass accumulation (i.e. BP) rather than on the conversion of dissolved organic matter into CO2 (i.e. BR).