



## **Long-term effects of elevated pCO<sub>2</sub> and temperature on microbial abundance and respiration in mesopelagic waters of the NW Mediterranean Sea**

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Mesopelagic communities are subject to higher pCO<sub>2</sub> levels than surface ones. Some studies have been performed on the combined effects of elevated pCO<sub>2</sub> and temperature on surface pelagic communities but nothing is known in the mesopelagic zone. We investigated the effects of elevated pCO<sub>2</sub> and temperature on microbial abundance and respiration community composition and related variables in long-term (2 months) experiments with mesopelagic waters (300 m depth) collected off the Bay of Villefranche, NW Mediterranean. Two experiments were conducted with two temperatures (13 and 16°C) and two pCO<sub>2</sub> levels (ambient pCO<sub>2</sub>, 400 μatm; elevated pCO<sub>2</sub>, 1000 μatm). The abundance of viruses, prokaryotes and flagellates were measured together with the concentration of transparent exopolymeric particle (TEP) and microbial respiration. Abundances and TEP concentrations (as far analysed) were not or only slightly affected by the treatments. Microbial respiration increased with temperature and decreased - in one experiment- with elevated pCO<sub>2</sub>. The fact that no clear cause-effect relationship could be detected for all treatments could be due to the different communities present at the start of the experiments (see companion abstract by Motegi et al.). Overall, we temperature and pCO<sub>2</sub> changes could affect microbial respiration and that temperature changes had a stronger and more consistent effect.