Consortium 1: Pelagic ecosystems under ocean acidification: Ecological, biogeochemical and evolutionary responses
WP 1.6: The role of microzooplankton under future ocean acidification and warming scenarios

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Ocean acidification and global warming: Can we expect effects on microzooplankton communities?

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Introduction

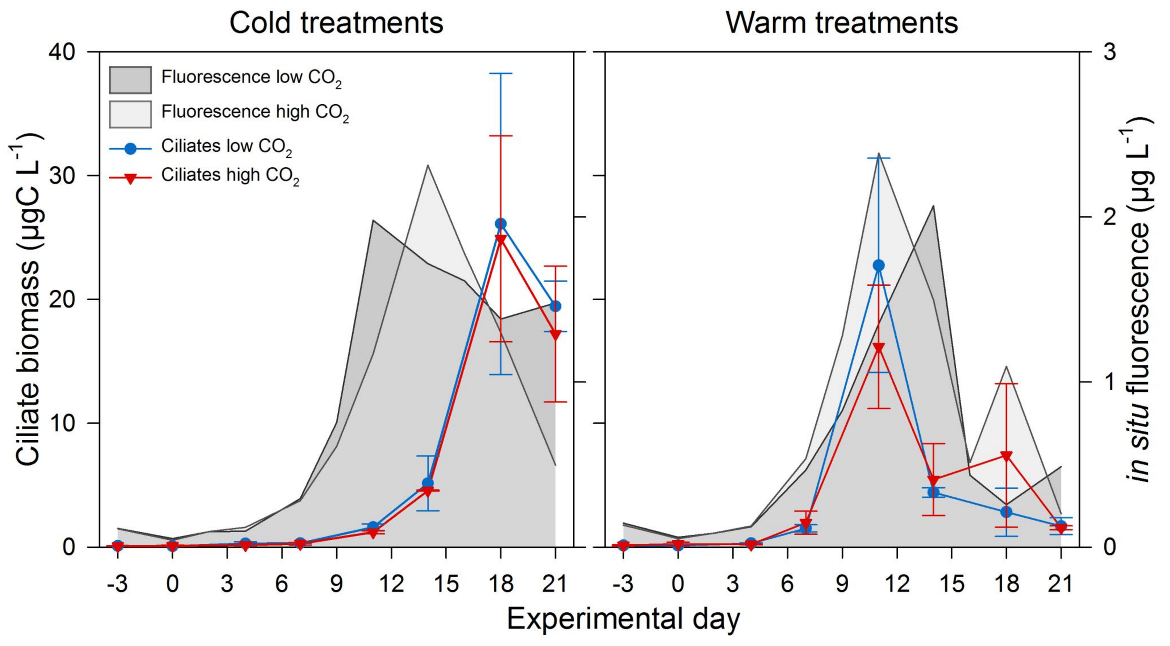
Microzooplankton (MZP) is an important competitor for food and a food source for larger mesozooplankton. With phytoplankton growth being enhanced at high CO_2 conditions, we expected an enhanced MZP growth as well.

Methods

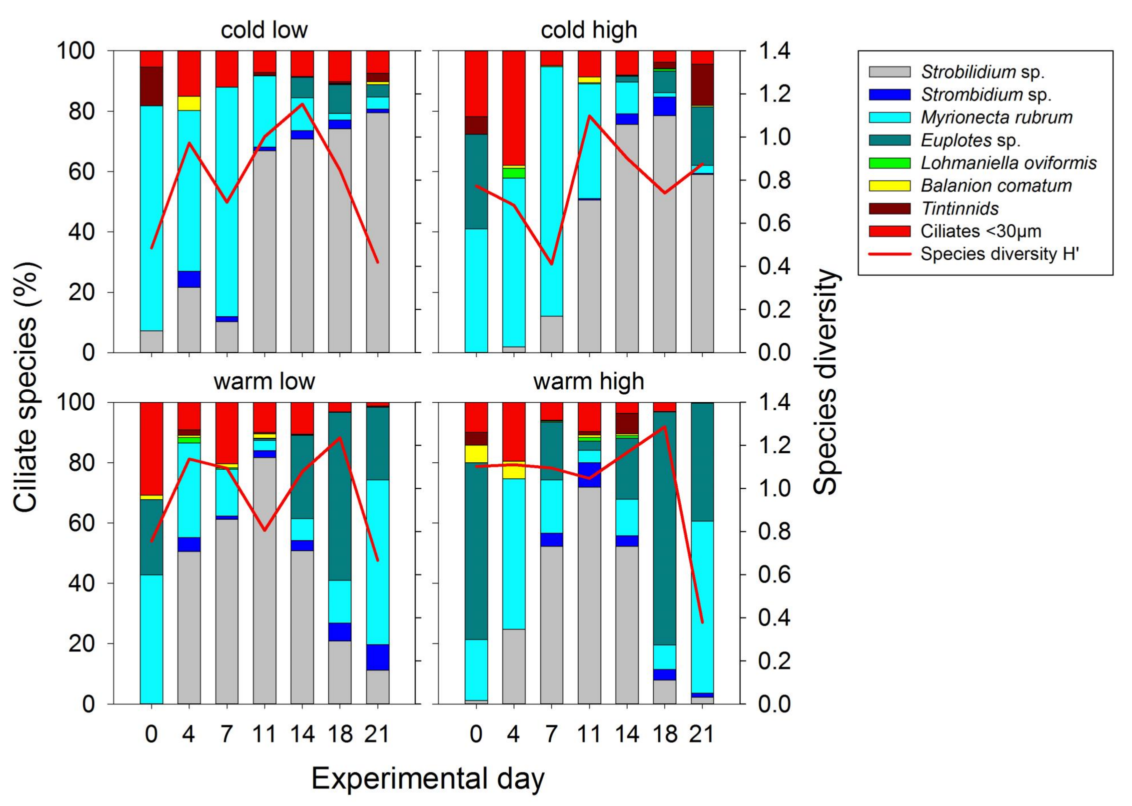
MZP abundance, biomass, size classes and taxonomic composition were determined by microscopic counts in three mesocosm experiments. Additionally, grazing experiments were conducted.

BIOACID 2012 Autumn Experiment

- 12 indoor mesocosms (Kiel)
- 9 and 15˚C
- 440 and 1040 ppm CO_2
- Oct – Nov 2012 (24 days)



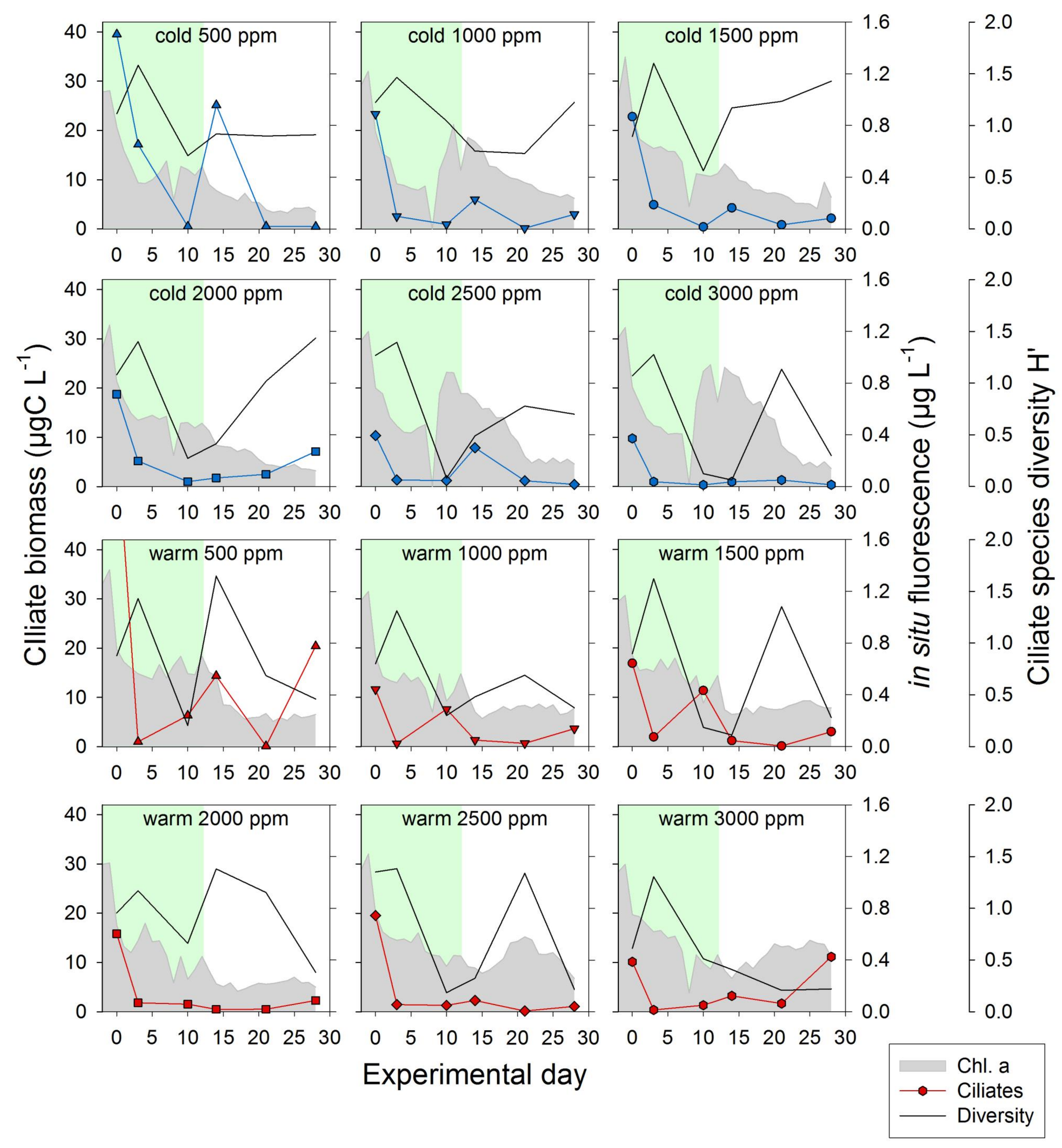
➢ Higher MZP growth rates and earlier timing of MZP in the warm treatments but no effect of CO_2

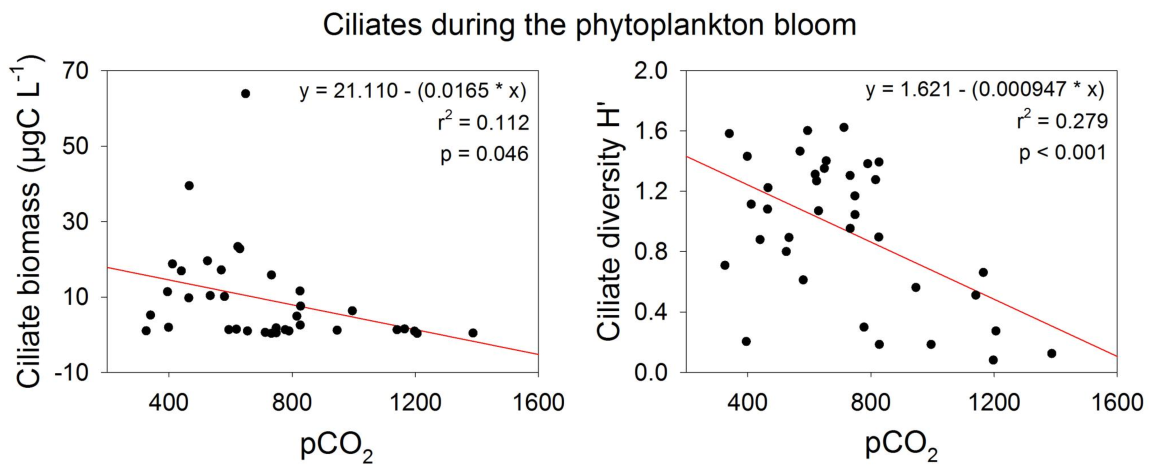


➢ Higher MZP diversity in the warm treatments but no differences between CO_2 treatments

BIOACID 2013 Summer Experiment

- 12 indoor mesocosms (Kiel)
- 16.5 and 22.5˚C
- 500 to 3000 ppm CO_2 gradient
- Aug – Sept 2013 (28 days)

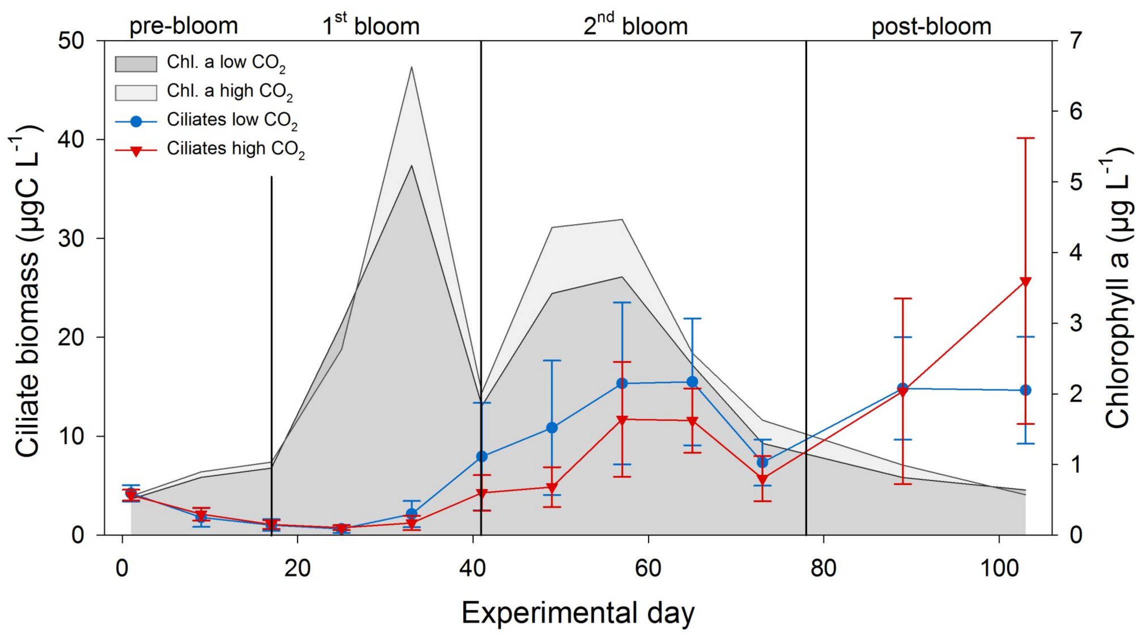




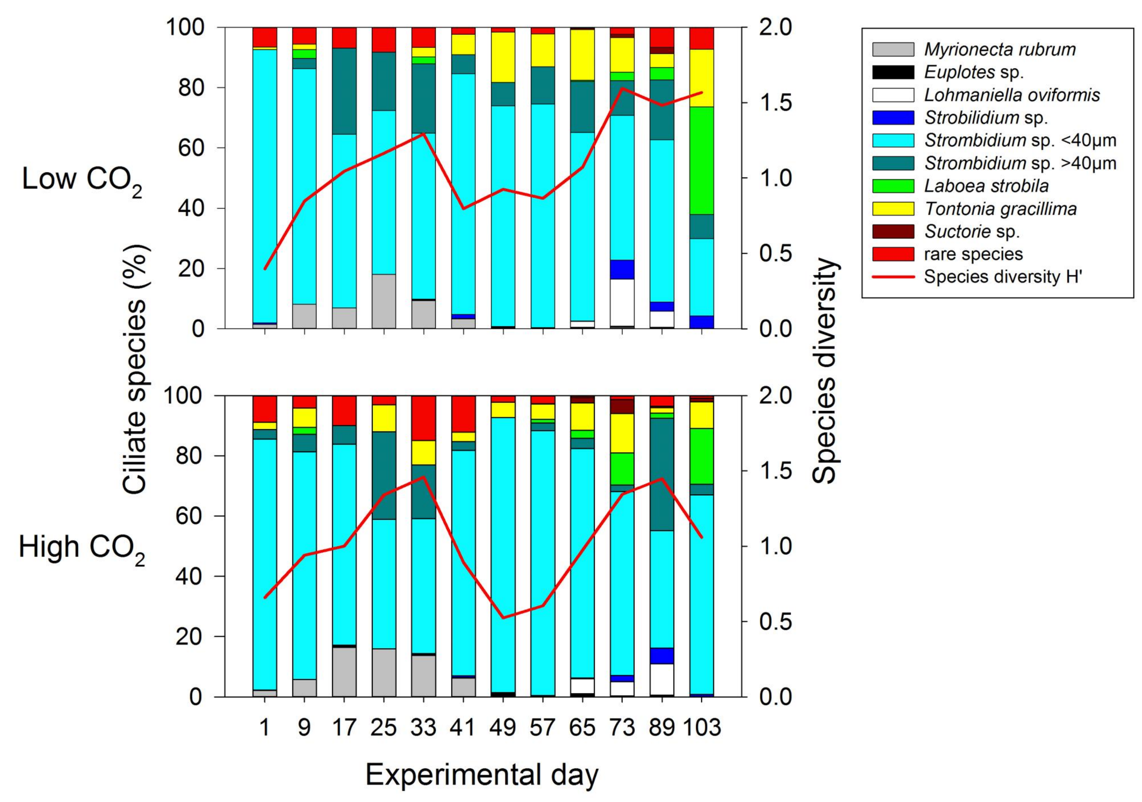
➢ Lower MZP biomass and diversity in the high CO_2 treatments during phytoplankton bloom (day 0-12)

KOSMOS 2013 Gullmar Fjord Experiment

- 10 outdoor mesocosms (Sweden)
- 400 and 900 ppm CO_2
- 5 replicates
- Mar – June 2013 (107 days)



➢ No differences in MZP biomass or growth rates between CO_2 treatments



➢ No differences in MZP taxonomic composition or diversity between CO_2 treatments

Conclusions

With exception for the Summer experiment, **no effects of high CO_2** on MZP biomass, diversity or taxonomic composition were found. We observed increased MZP growth rates at high CO_2. These results point at indirect effects of CO_2 caused by changes in phytoplankton being **compensated on an ecosystem level**. In contrast, **warming** can be expected to have a strong effect on MZP. It led to **increased growth rates** and a reduced time lag between phytoplankton bloom and MZP biomass maximum.

BIOACID

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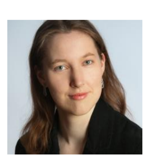

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