

A cell culture approach to evaluate the DMSP and DMSO cell quotas under brines salinity and temperature shifts

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Take home messages

- An increase of the DMSP and DMSO cell quotas with salinity suggests an osmolyte function in the diatom *F.cylindrus* and the prymnesiophyte *P.antarctica*.
- DMSP and DMSO could act as a cryoprotectant in *P.antarctica* cells but not in *F.cylindrus* cells

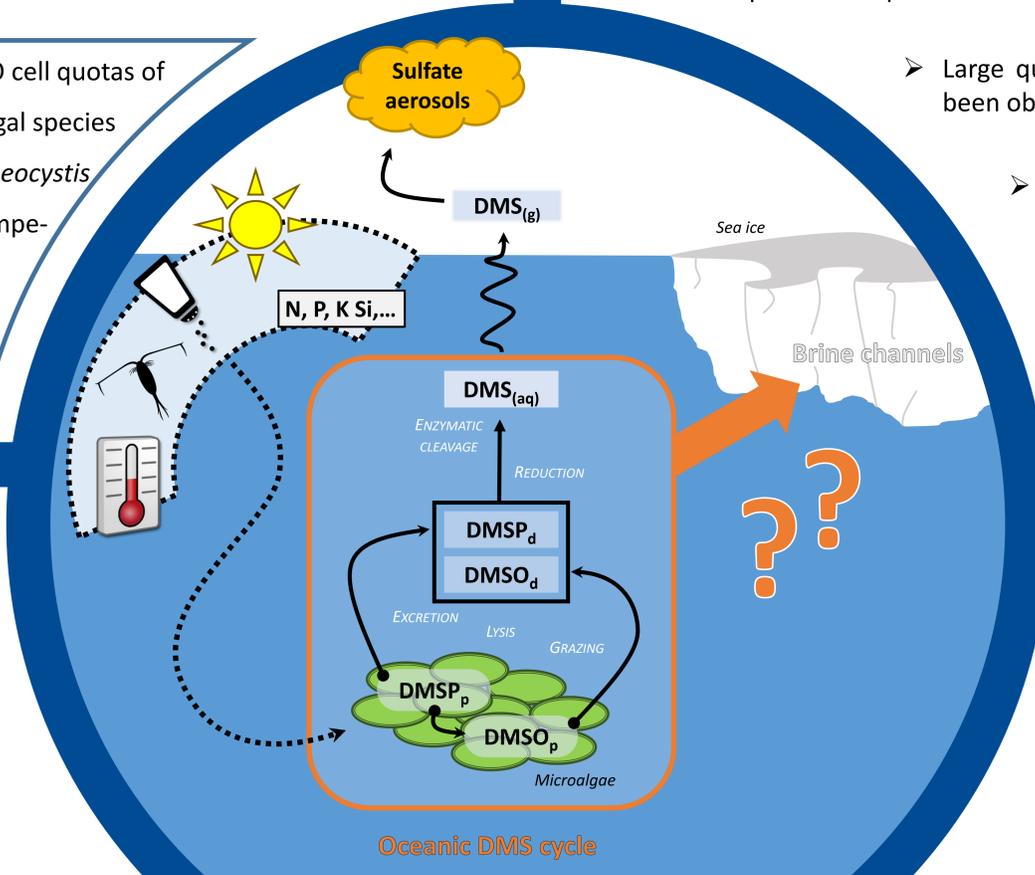
Context

DMS is the most abundant volatile sulfur compound
is the precursor of climate active sulfate aerosols which have a direct and indirect impact on the atmosphere radiative balance
has two biogenic precursors: DMSP and DMSO

DMSP play multiple physiological functions in phytoplankton
DMSO they have been suggested to serve as antioxidant, osmoregulator, cryoprotectant or source of nutrients

Main goal

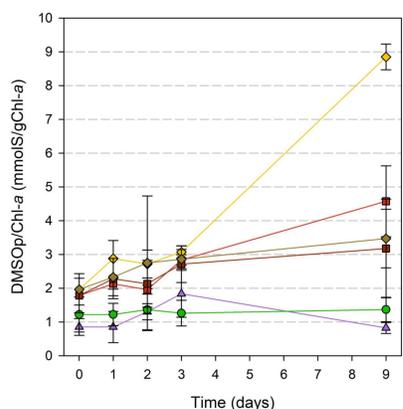
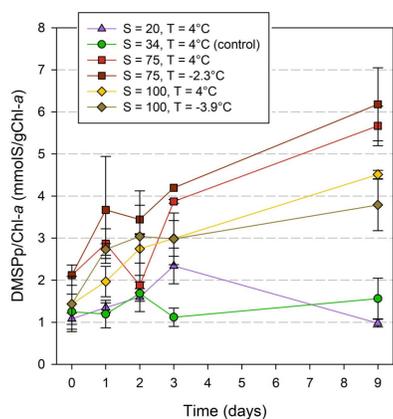
Investigate the DMSP and DMSO cell quotas of two emblematic sea ice microalgal species (*Fragilariopsis cylindrus* and *Phaeocystis antarctica*) under changes in temperature (4 to -7.4°C) and salinity (20 to 150) typical of the brine environment



Sea ice (SI) and DMS cycle

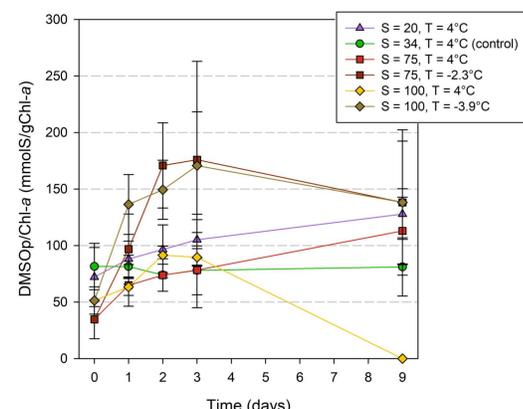
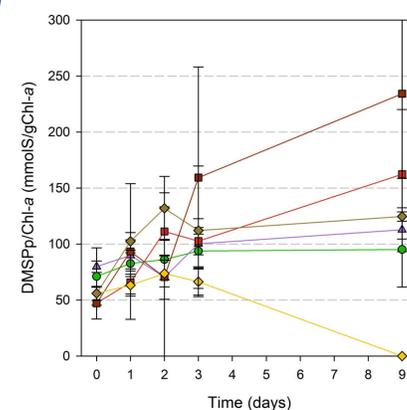
- SI is a potential strong source of DMS for the aerosol poor polar atmosphere
- Large quantities of DMSP and DMSO have been observed in SI
- Algal communities are able to survive in SI brine inclusions and experience important shifts of temperature, light, salinity and nutrients

F.cylindrus



- Effect of salinity on cell quotas (green checkmark)
- Effect of temperature on cell quotas (red X)

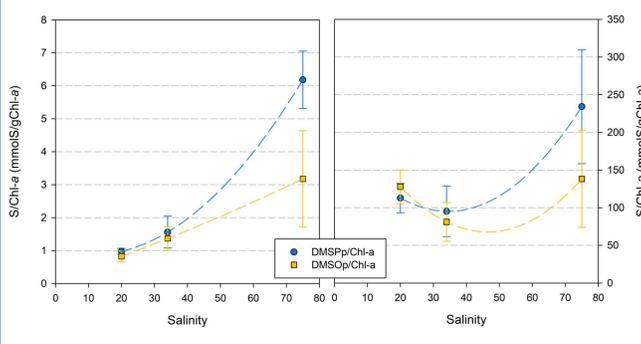
P.antarctica



- Effect of salinity on cell quotas (green checkmark)
- Effect of temperature on cell quotas (green checkmark)

Perspectives

- Connect lab experiment and field experiment



For more details

- Wittek et al. (submitted). Response of dimethylsulfoniopropionate (DMSP) and dimethylsulfoxide (DMSO) cell quotas to salinity and temperature shifts in the sea-ice diatom *Fragilariopsis cylindrus*. In *Polar Biology*
- Wittek et al. (in prep). Dimethylsulfoniopropionate (DMSP) and dimethylsulfoxide (DMSO) cell quotas variations due to sea ice shifts of salinity and temperature: the case of the prymnesiophyceae *Phaeocystis antarctica*. (provisional title)