INSPIRES

How climate change affects phytoplankton community composition

Investigating drivers and mechanisms through micro- and mesocosm experiments

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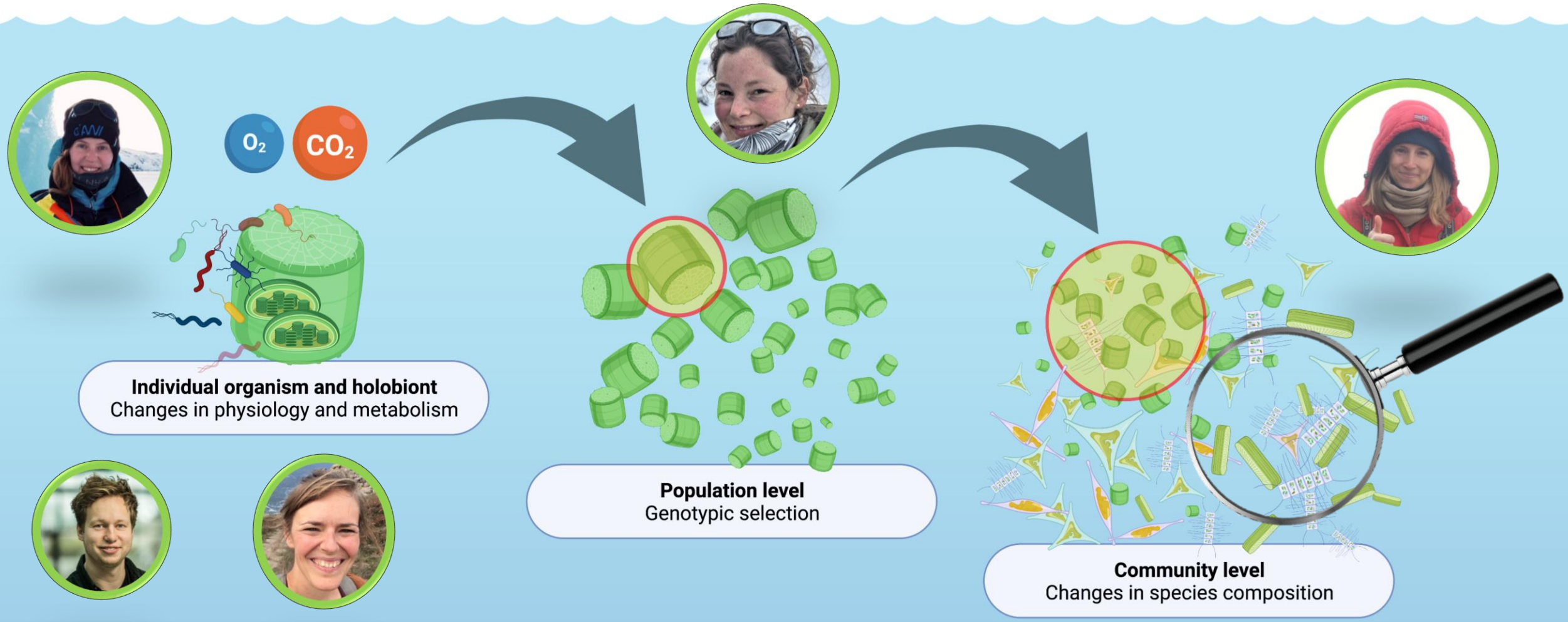
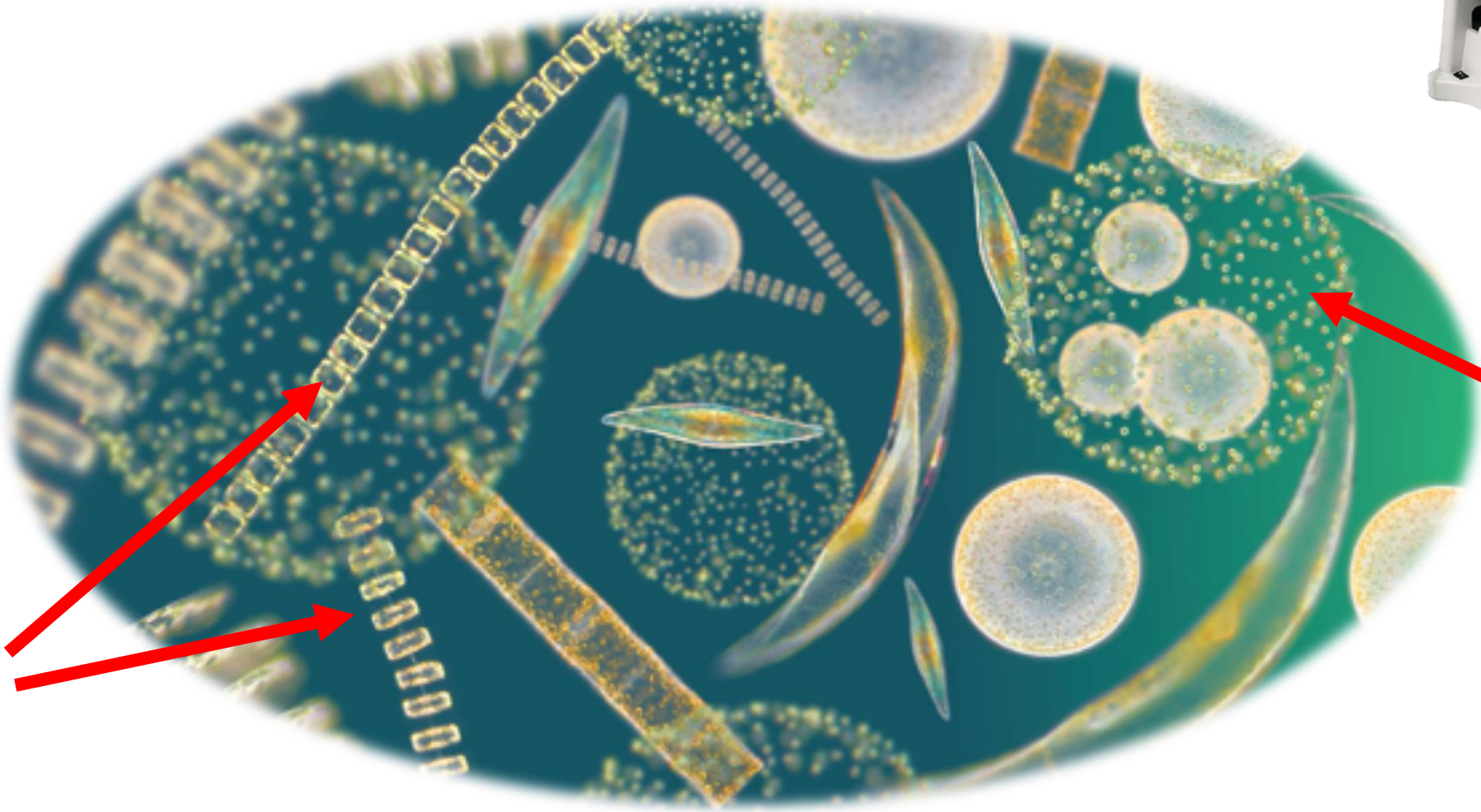
TOPIC 6
MARINE LIFE

INSPIRES umbrella of phytoplankton communities



Phytoplankton communities



Research questions

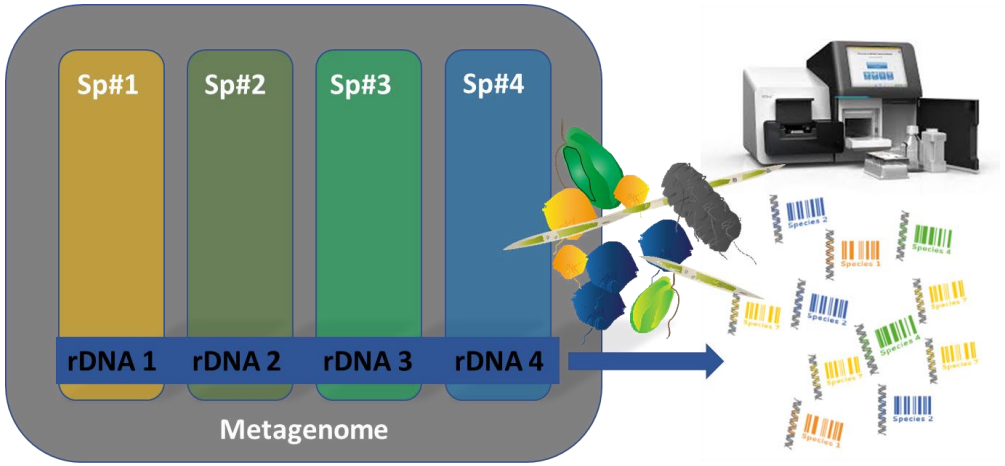
How will future Arctic and North Sea plankton communities be composed and what does this mean for the ecosystem?

→ Under which conditions does the composition shift?

→ Who are the winners/losers and why?

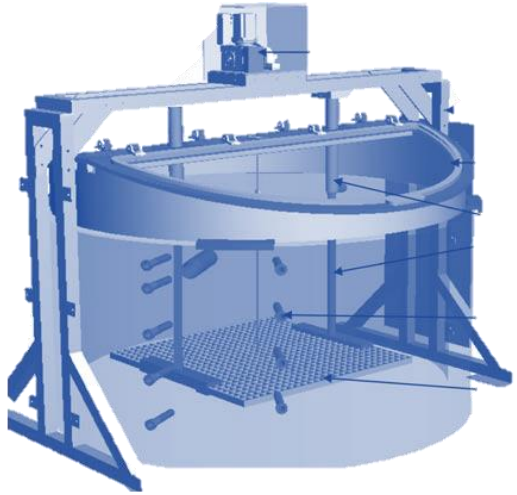
→ How do community changes affect the ecosystem?

Assessment of community composition



Functional parameters

- Particulate carbon, nitrogen, and phosphorus (POC, PON, POP)
- C:N:P ratio
- Metatranscriptomics (“active” genome)
- Chlorophyll a
- Dissolved nutrients
- Carbonate system (alkalinity, pH)



Mesocosms

Microcosms

Single-cell isolation

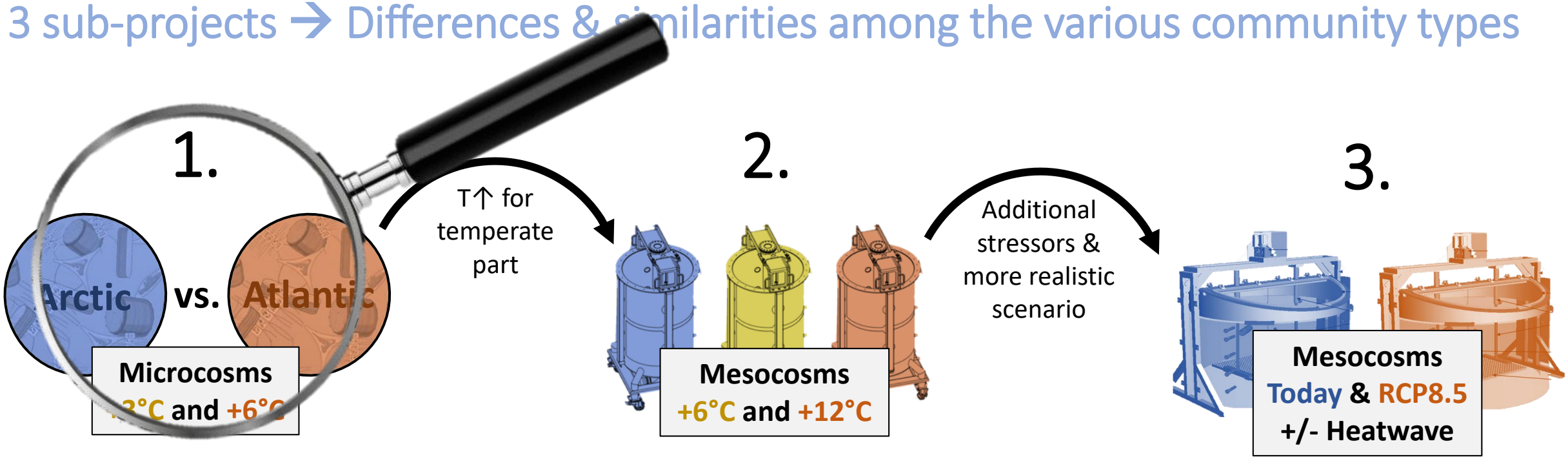
Species characterisation

Culturing

Growth assays

INSPIRES PhD project overview

3 sub-projects → Differences & similarities among the various community types

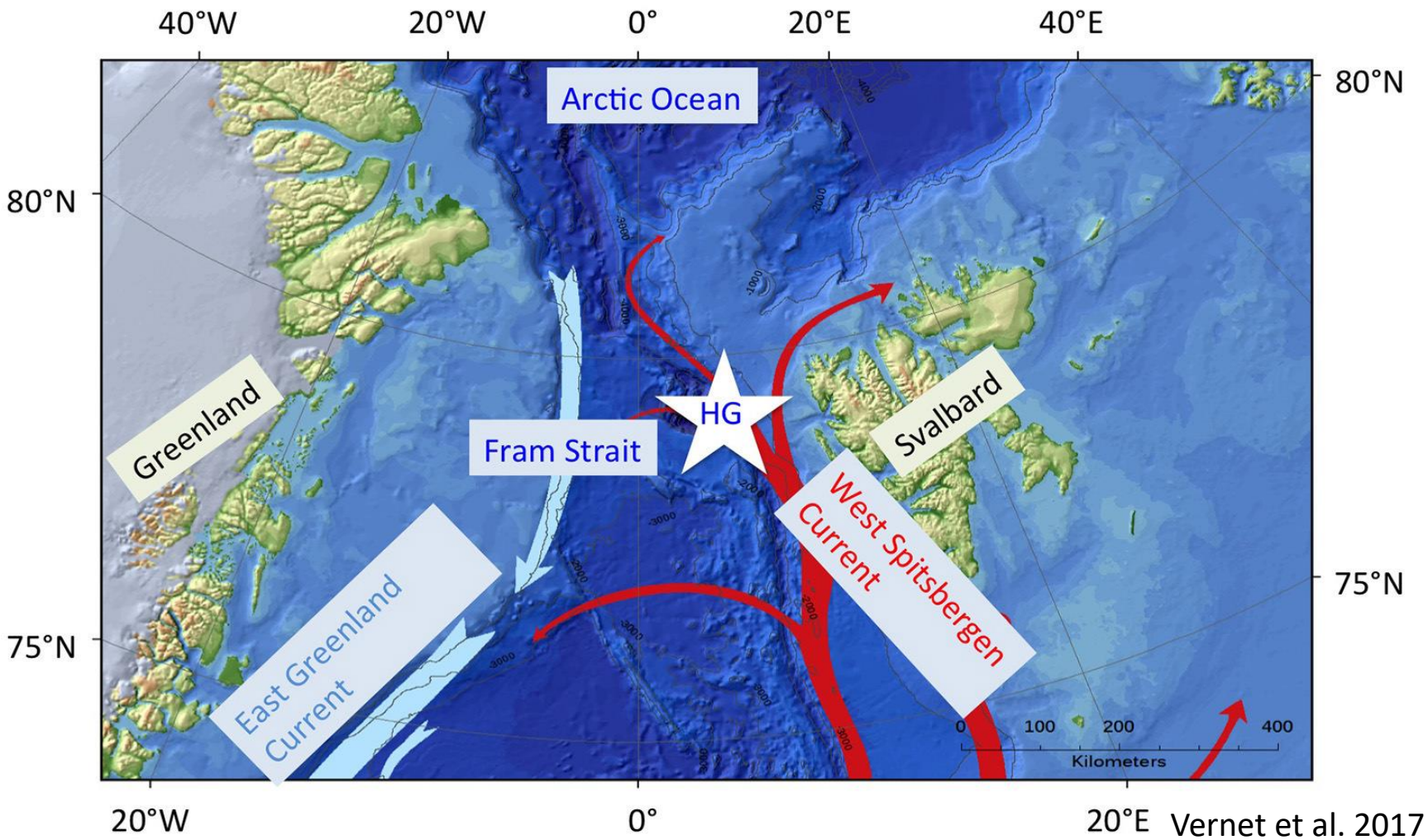


Arctic vs. Atlantic community parts (Polarstern cruise PS126)

Spring bloom North Sea community (Maren Striebel @ICBM)

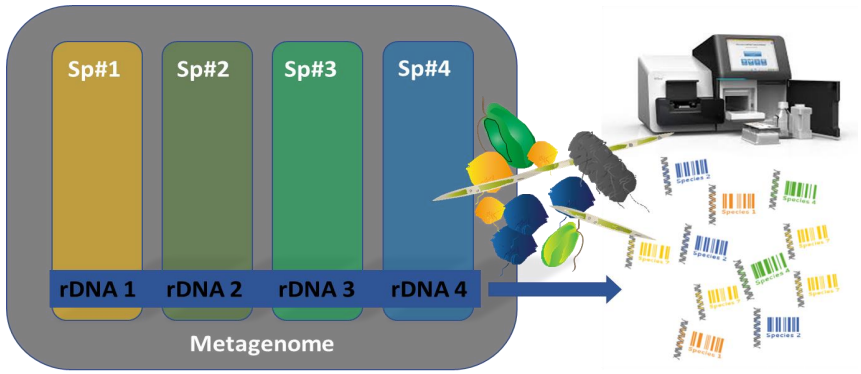
Summer bloom North Sea community (Cedric Meunier & Inga Kirstein)

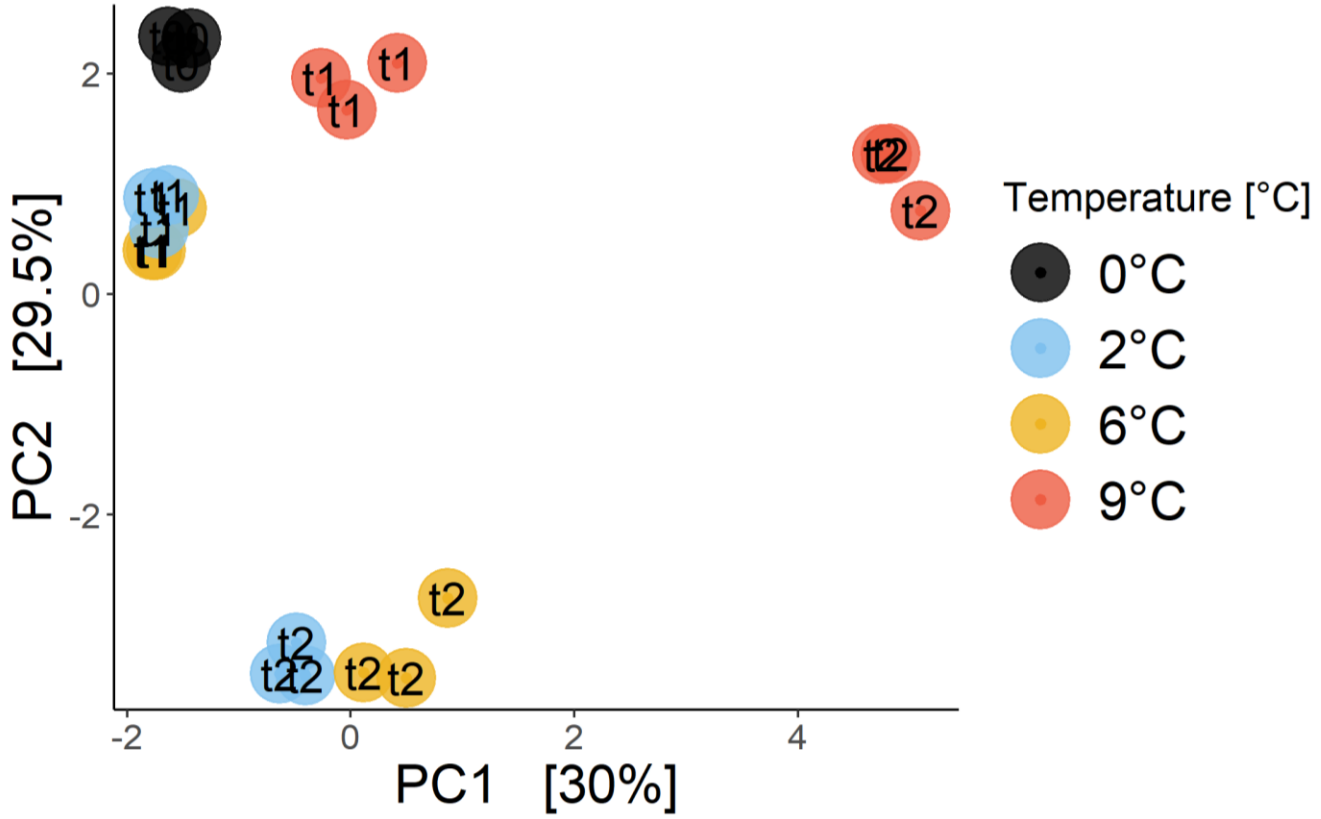
Hydrography of the sampling station



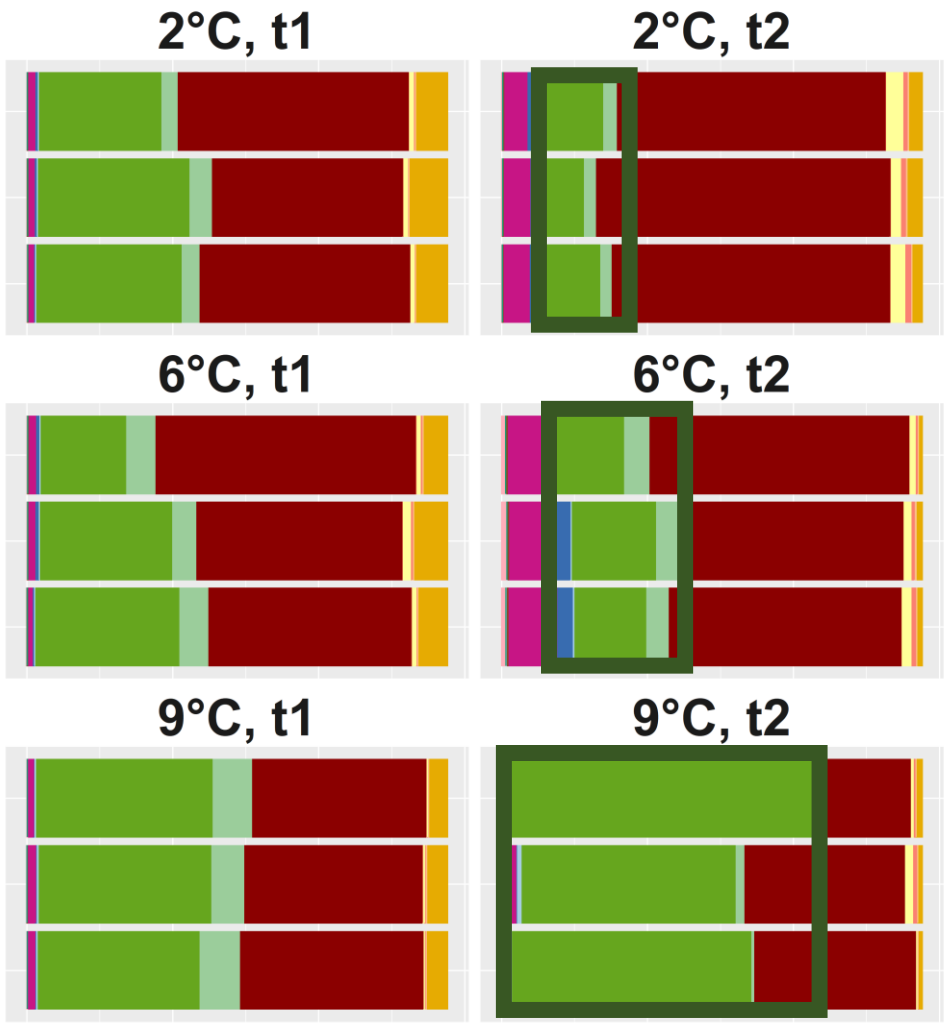
Vernet et al. 2017

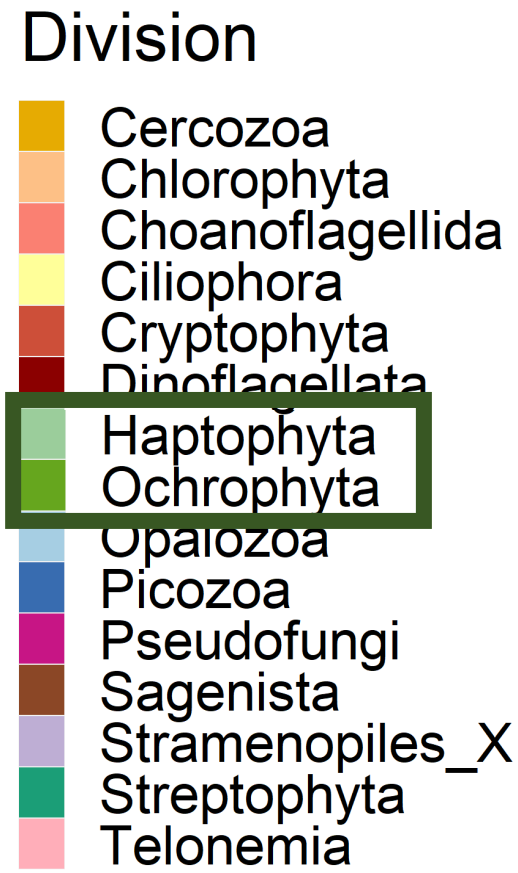
PCA of DNA-metabarcoding data



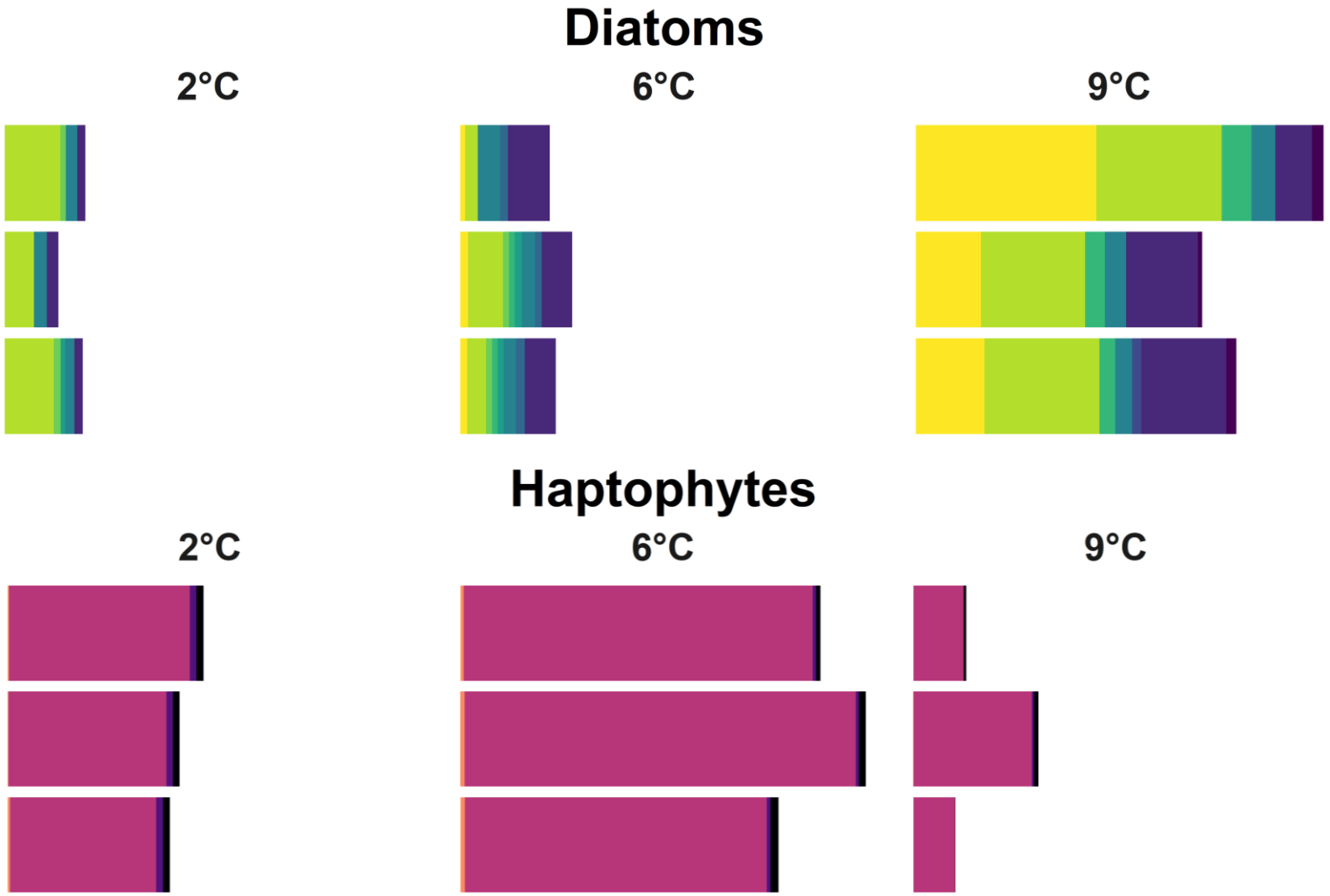


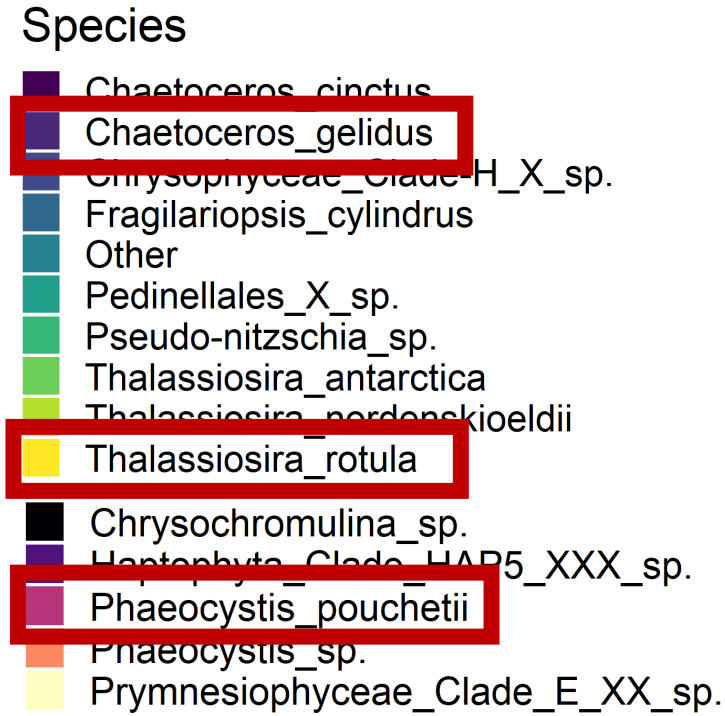
Relative proportions of annotated sequences





Diatoms and haptophytes after ten days





Take-home message of first sub-project

- 2°C & 6°C differ mainly “quantitatively” in relative proportions
- 9°C differs qualitatively (more temperate diatoms)
- Differences only become apparent after 10 days, but not yet after 3

→ The **degree of warming** matters

→ The **duration** of a potential heatwave matters

Keep an eye out for the publication to get further information on functional parameters 😉

Sardet 2015





THANK YOU

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