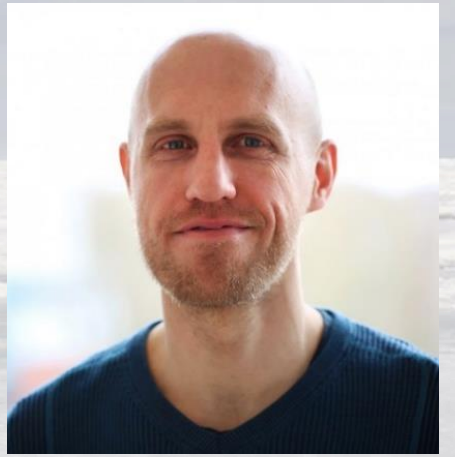
Recurrent and unique patterns of microbial seasonality in the Arctic Ocean revealed by autonomous sampling



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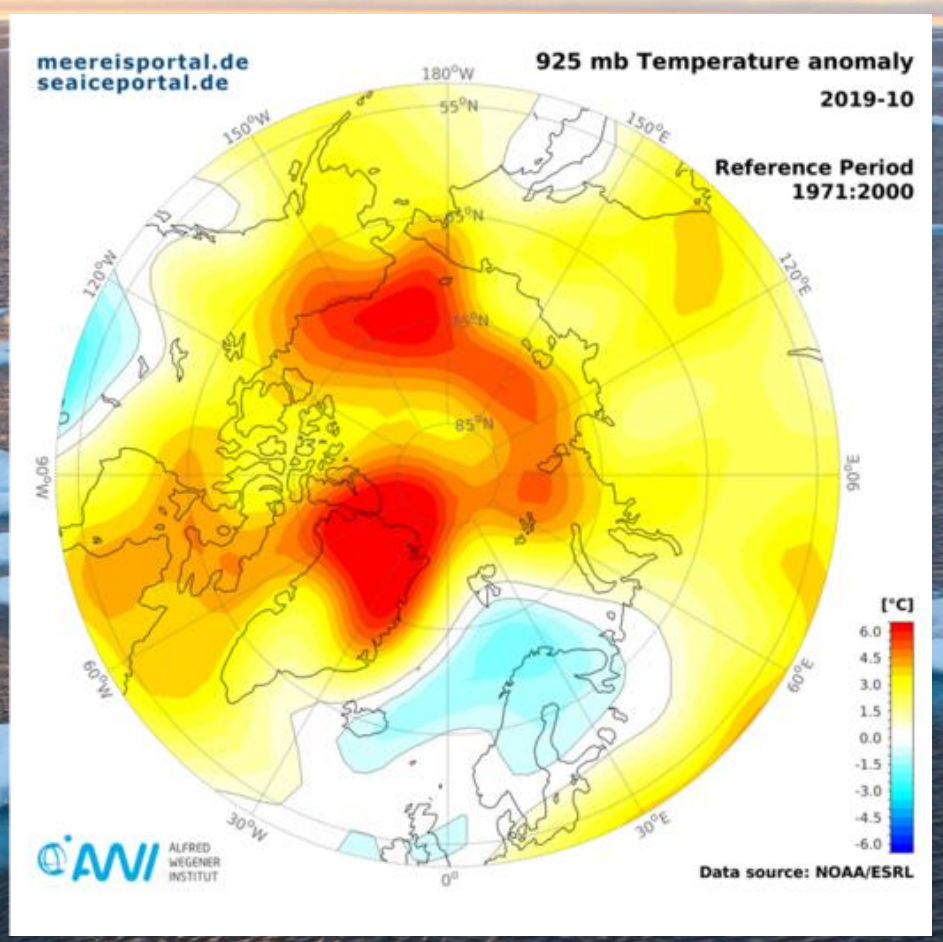
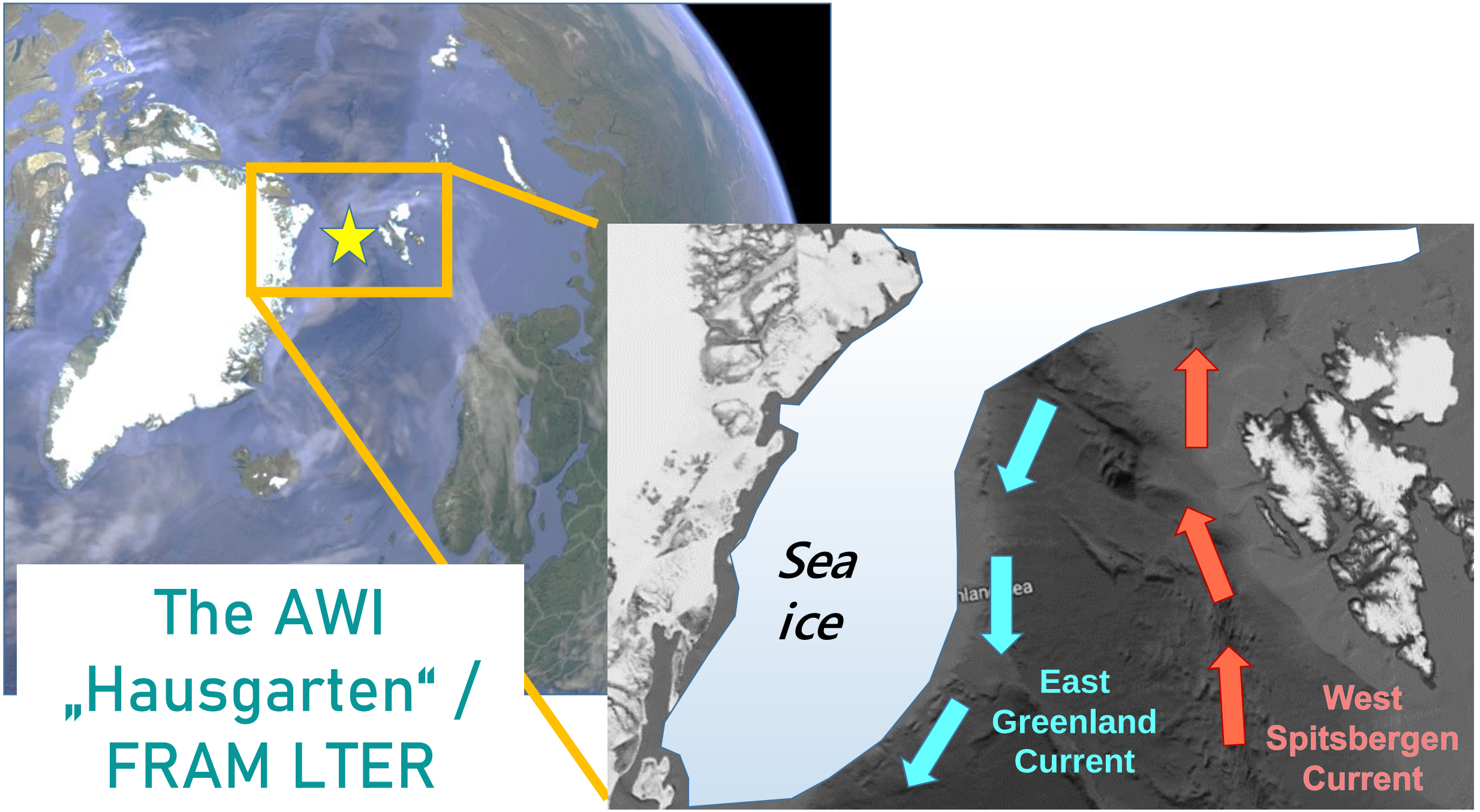
FRAM Frontiers in Arctic Marine Monitoring

The Arctic is changing

Long-term observations essential:

identify natural variability vs. human impact





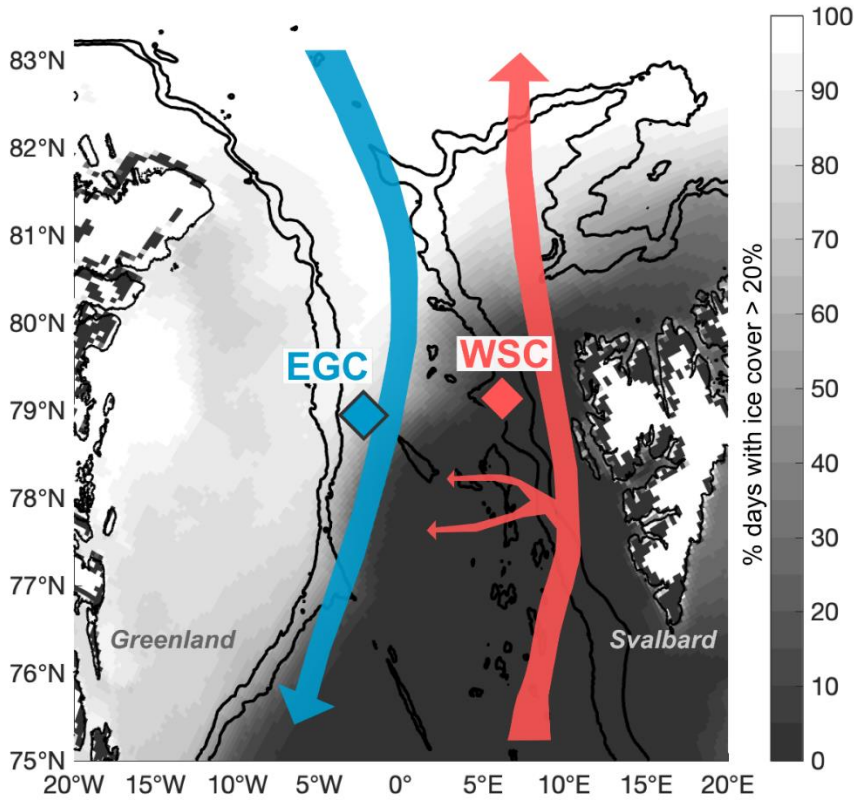
The AWI „Hausgarten“ / FRAM LTER

Year-round moorings + annual summer expeditions

- Biology from surface to seafloor
- Physical oceanography
- Benthopelagic coupling

High-resolution, automated microbial time-series

Remote Access Sampler

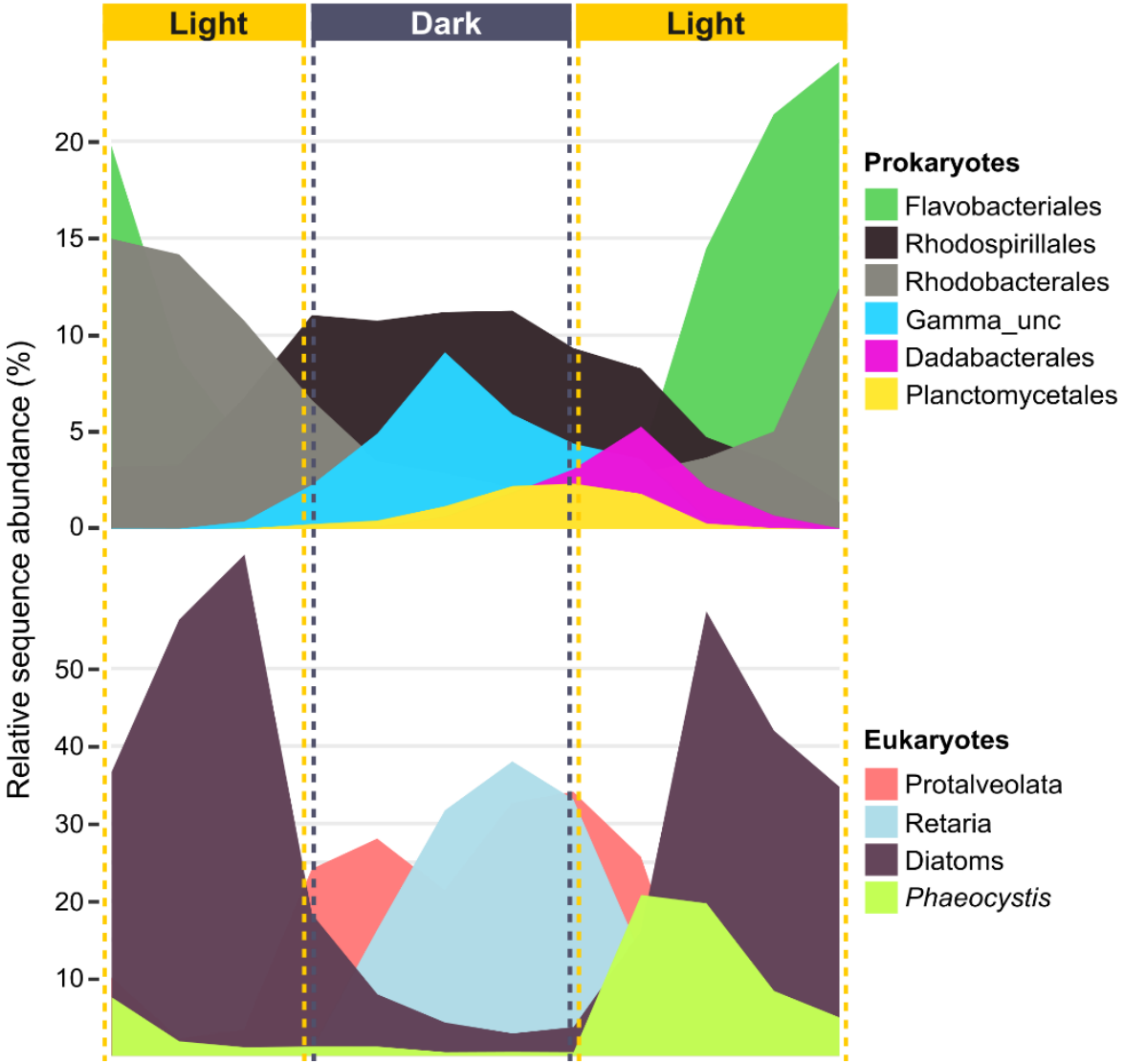


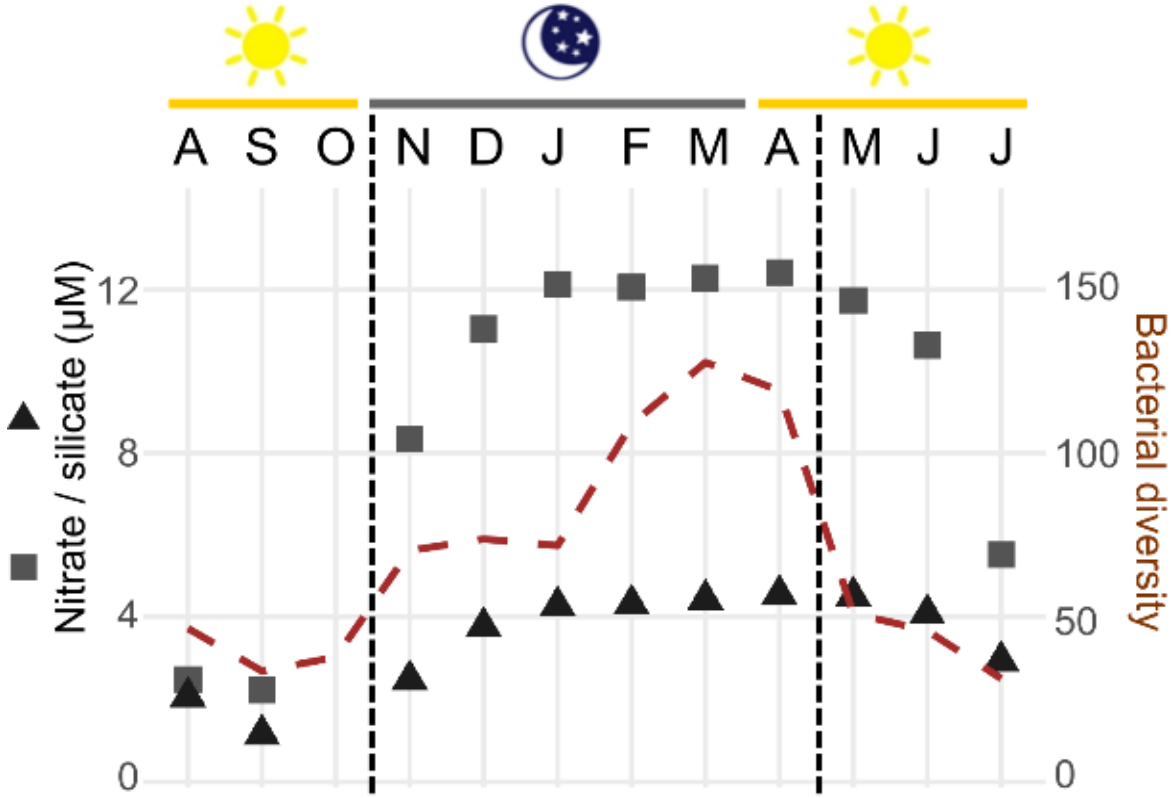
Dynamics and drivers of Arctic microbiomes

Amplicon and metagenome sequencing

Context with nutrients & oceanography

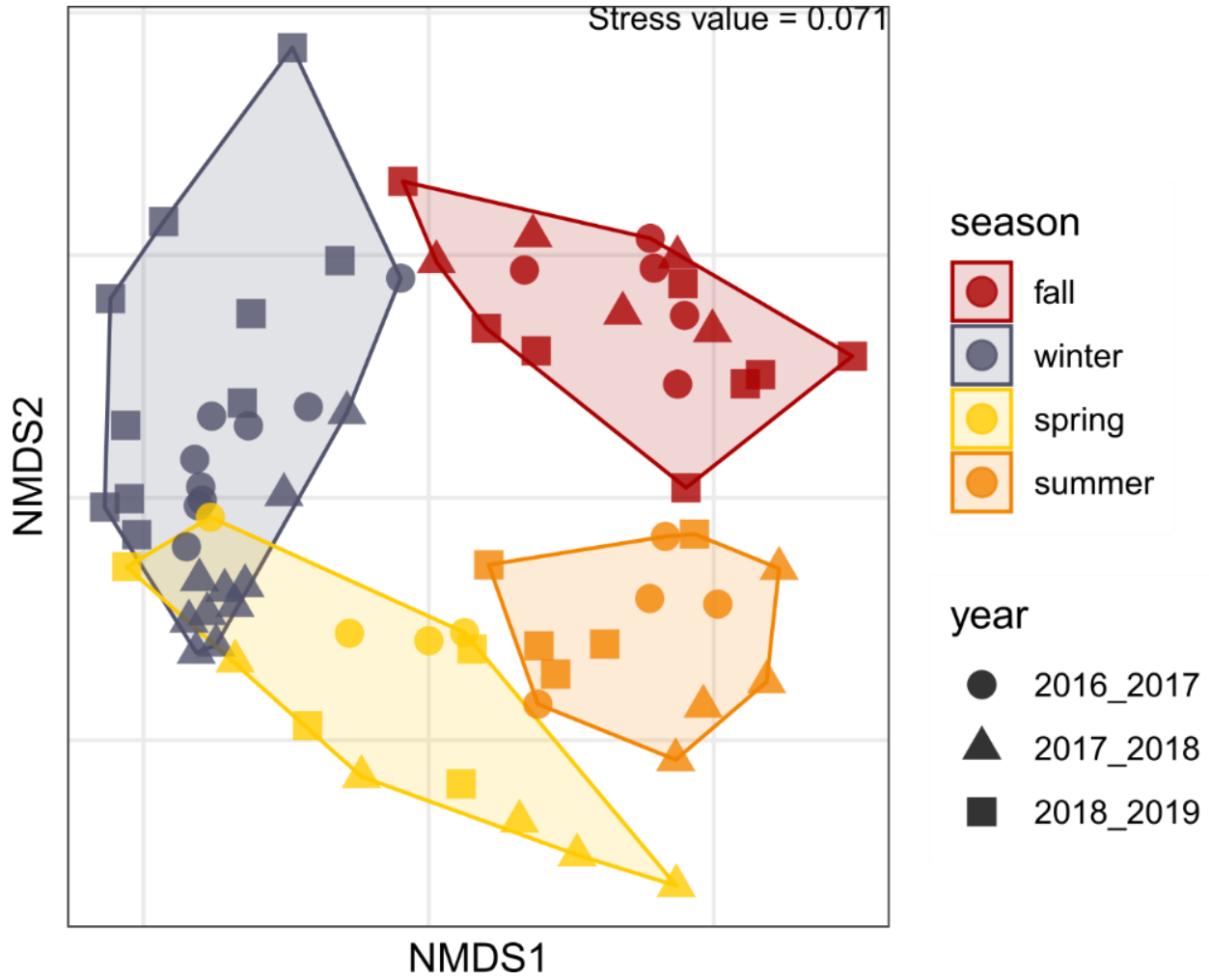
Annual oscillations in microbes & nutrients

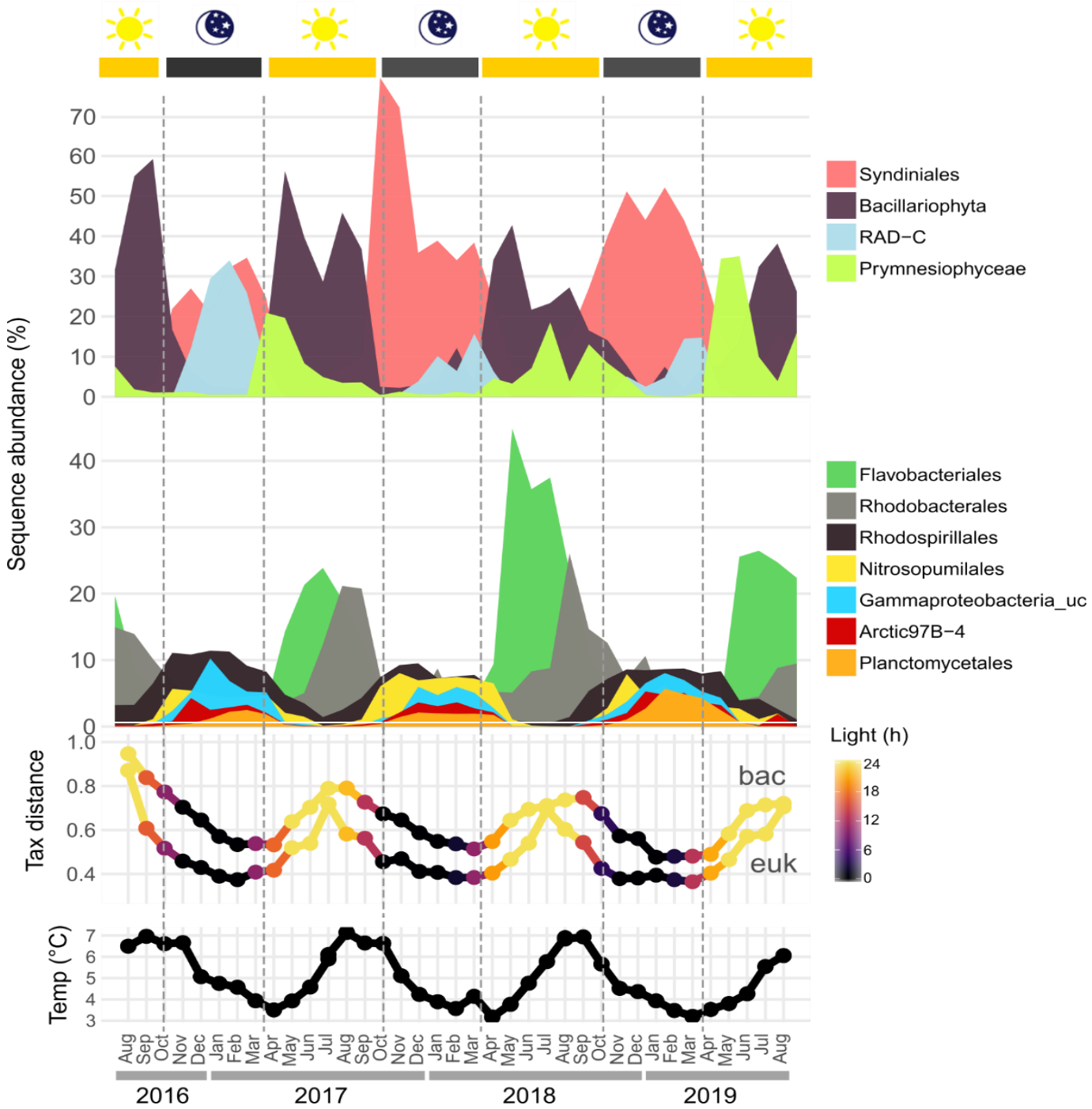




Wietz et al. doi: 10.1101/2021.04.08.436999

Three annual cycles: consistent seasonal boundaries

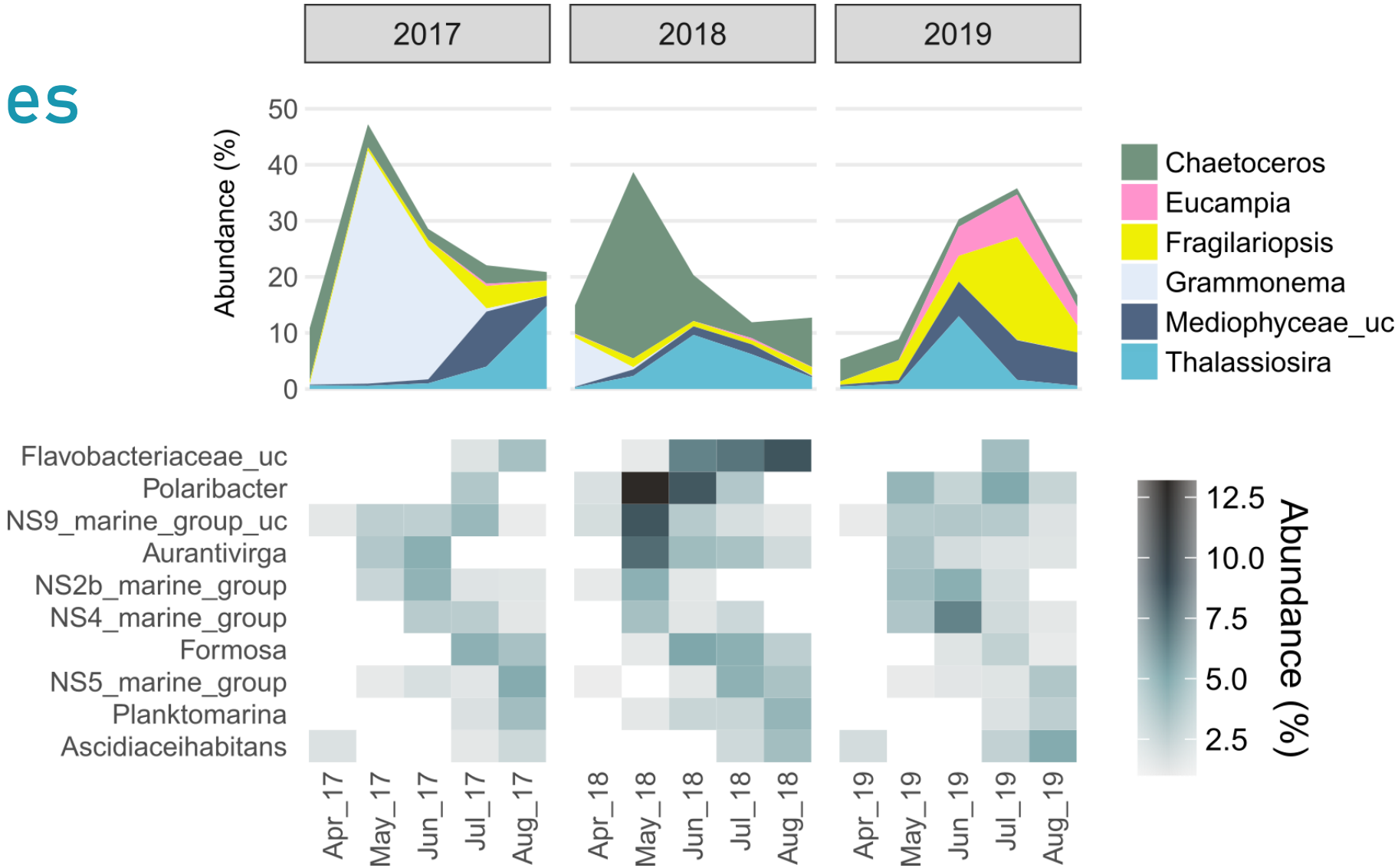




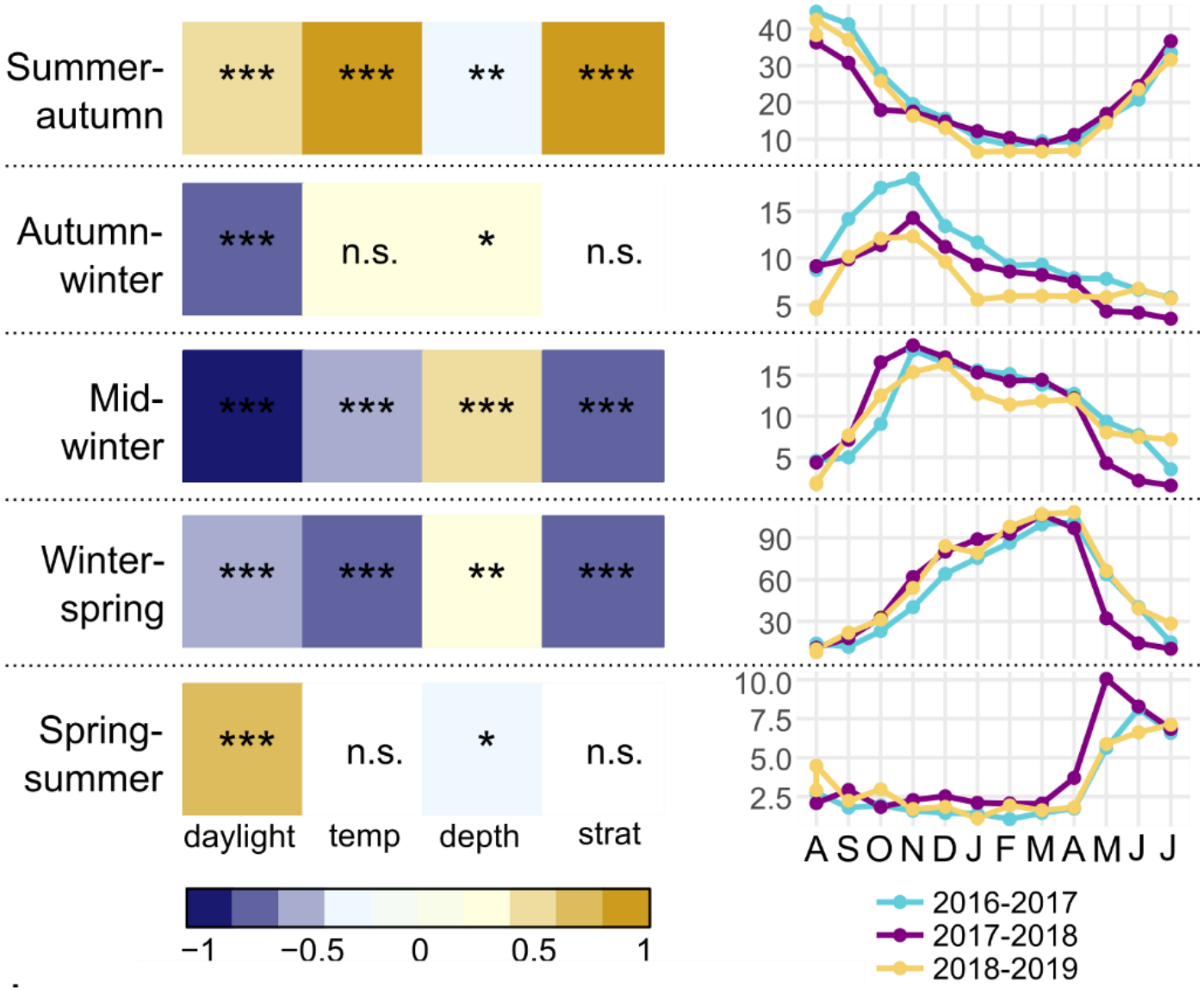
Recurrent patterns in major planktonic microbes

However:

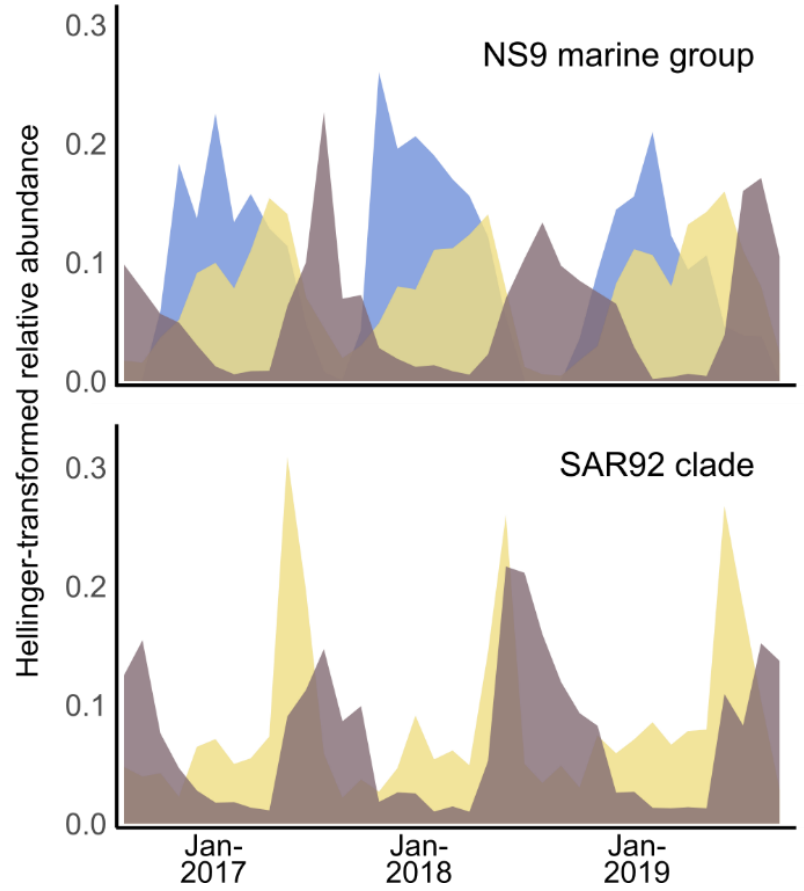
bloom phenologies differ



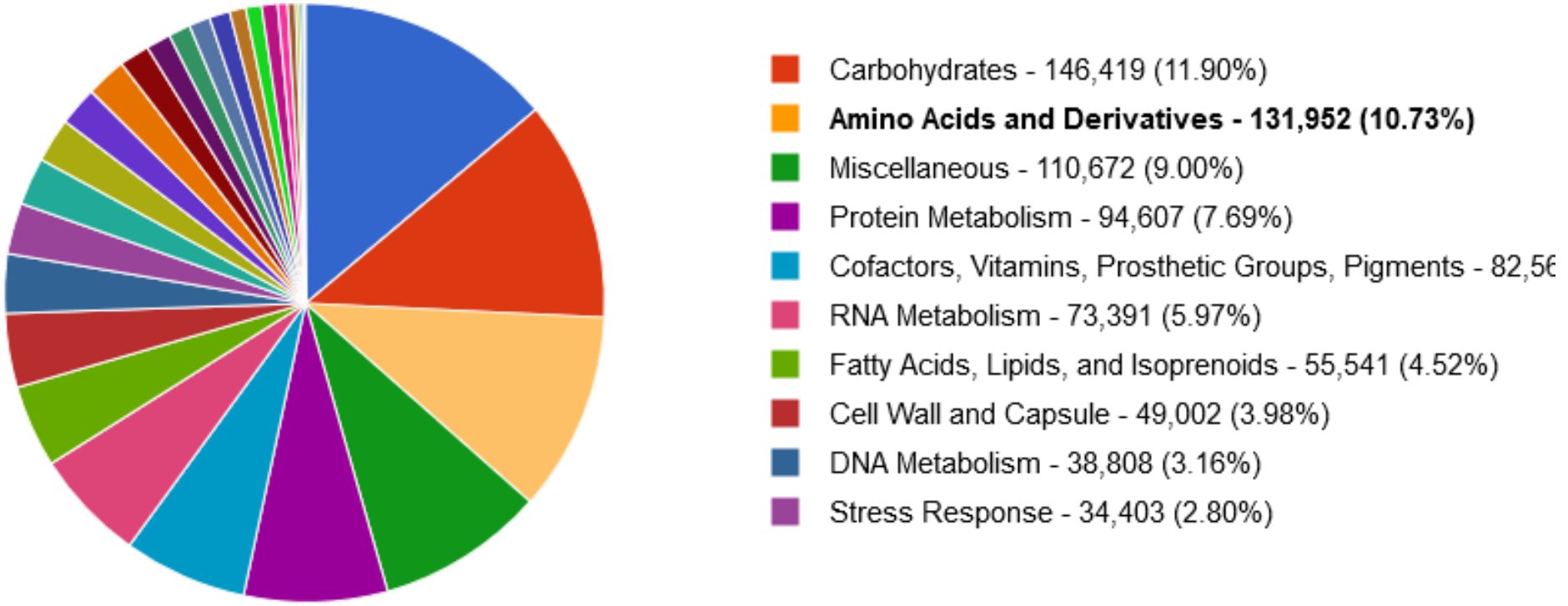
Microbial modules and their drivers



Ecotypes?



Functional seasonality: metagenomes from polar night



Perspectives

- Towards a system-level understanding of (temporal) ecosystem structuring
- Functional capacities in context of the Biological Carbon Pump
- Define community indicators for specific times and conditions
- Baseline for modelling the future Arctic Ocean microbiome

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