

# Phytoplankton diversity and distribution in the Pacific sector of the Southern Ocean

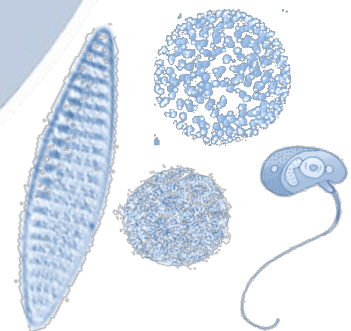
C. Wolf, I. Peeken, E. Kiliyas, S. Frickenhaus,  
K. Metfies

Alfred Wegener Institute for Polar and Marine Research,  
Bremerhaven, Germany



WCMB 2011 - Aberdeen, Scotland

26.09.2011



# Objective

## ultimate objective:

detecting and assessing effects of global warming on the composition and distribution of phytoplankton assemblages in the Southern Ocean

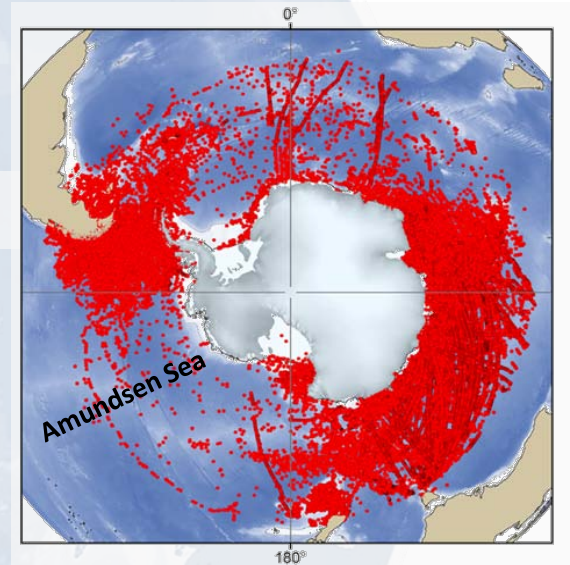
↳ comprehensive data needed

especially for the Amundsen Sea there is a lack of information

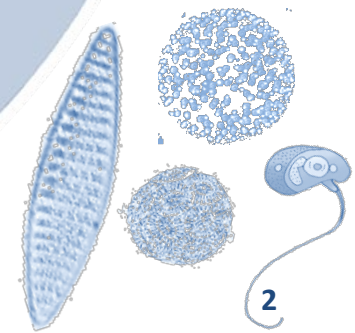
diversity of phytoplankton still largely unknown, especially for the smaller fractions

## current study will provide:

- comprehensive data set of the composition and distribution of phytoplankton assemblages in the Pacific Sector of the Southern Ocean
- baseline for future investigations
- promote next generation molecular tools



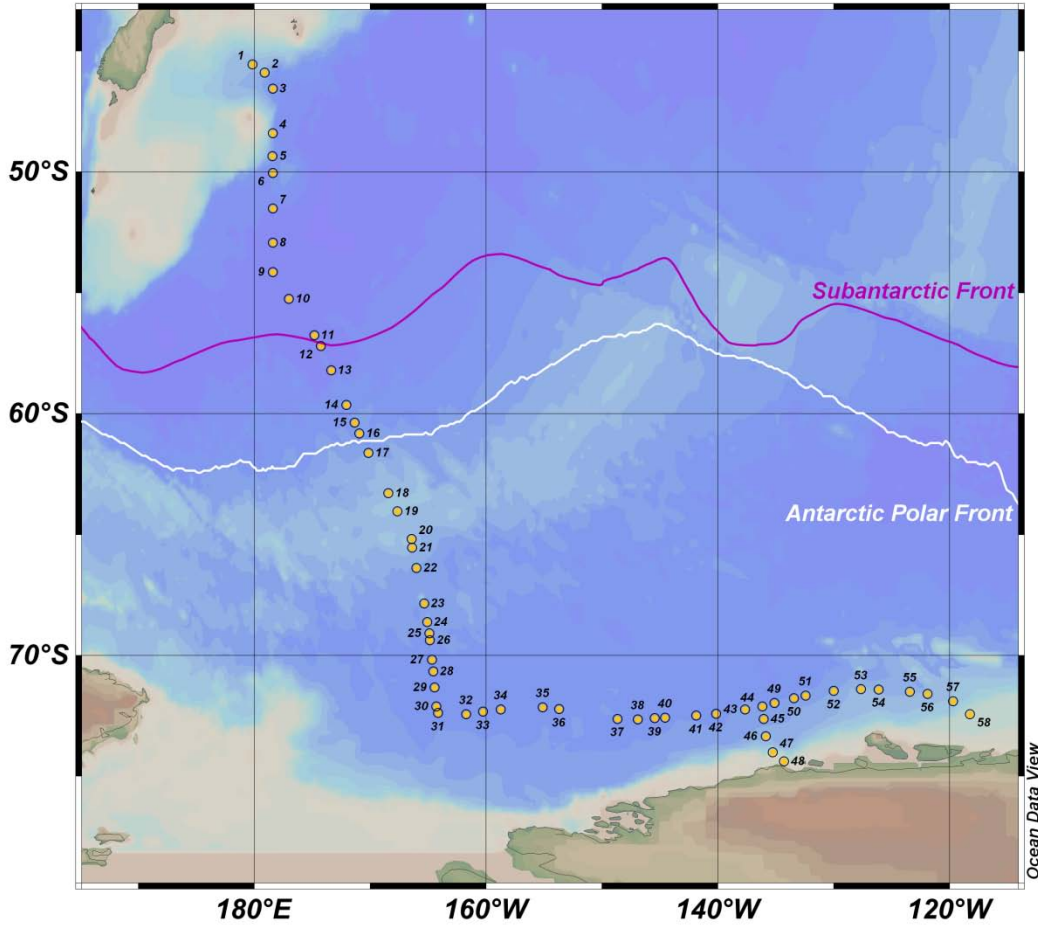
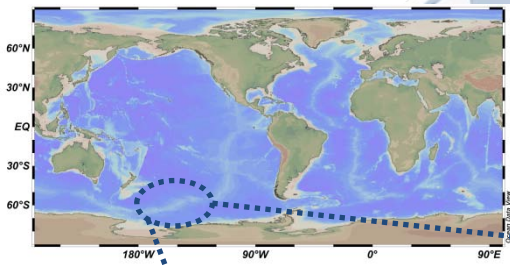
The distribution of the more than 1 million SCAR-MarBIN sample locations in the Southern Ocean. (Griffiths 2010; doi:10.1371/journal.pone.0011683.g004)



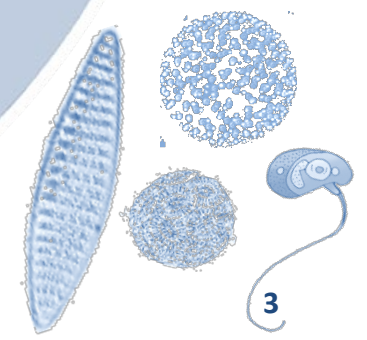
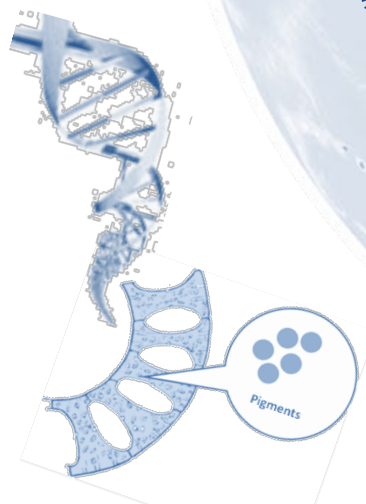
# Methods

58 surface water samples were taken during the *RV Polarstern* cruise ANT XXVI/3

February 2010  
→ austral summer



- north-south transect through all water masses
- west-east transect along the coast of Antarctica



# Methods

surface water sample

- 3-6 l of water sample were filtered
- 5 ml were fixed

filter / fixed sample

molecular techniques

HPLC

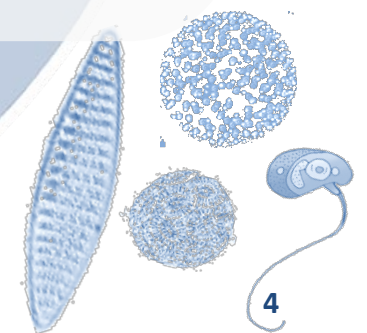
flow cytometry

ARISA

454-pyrosequencing

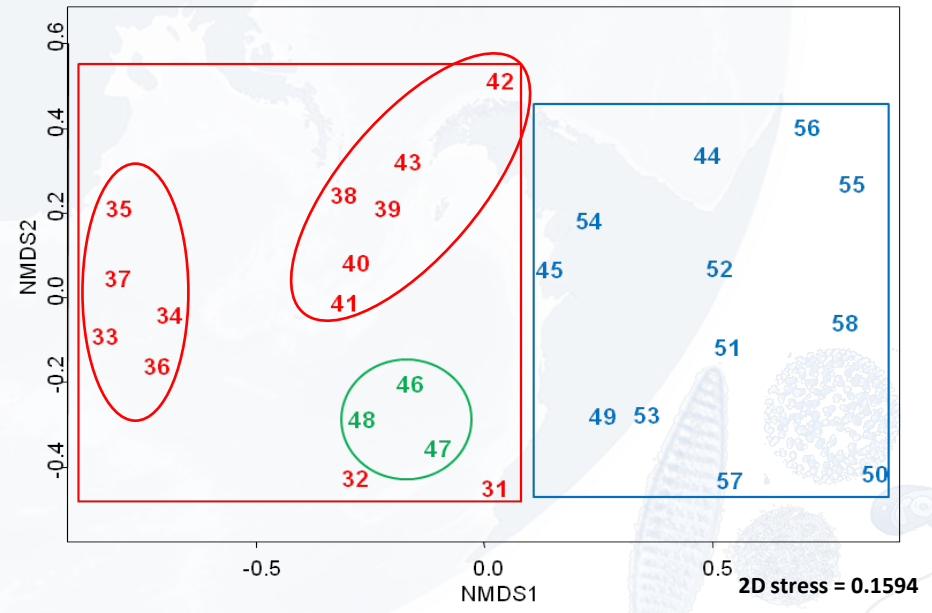
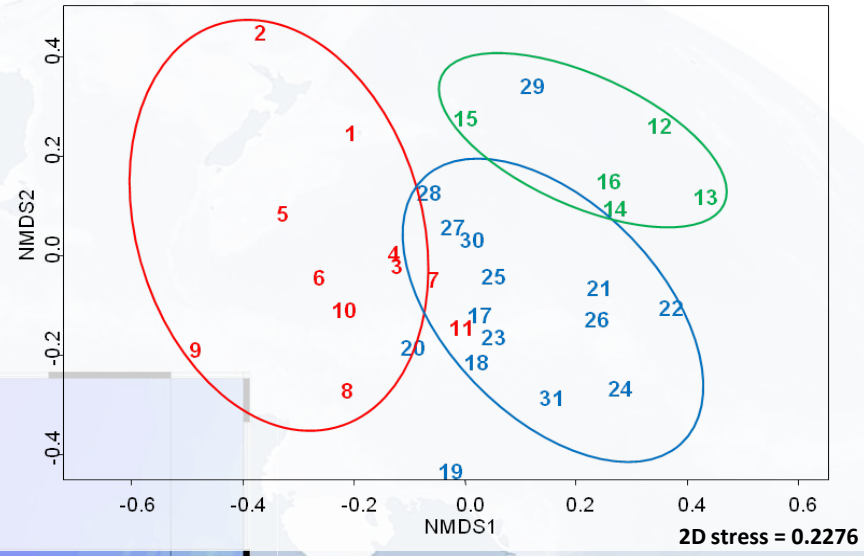
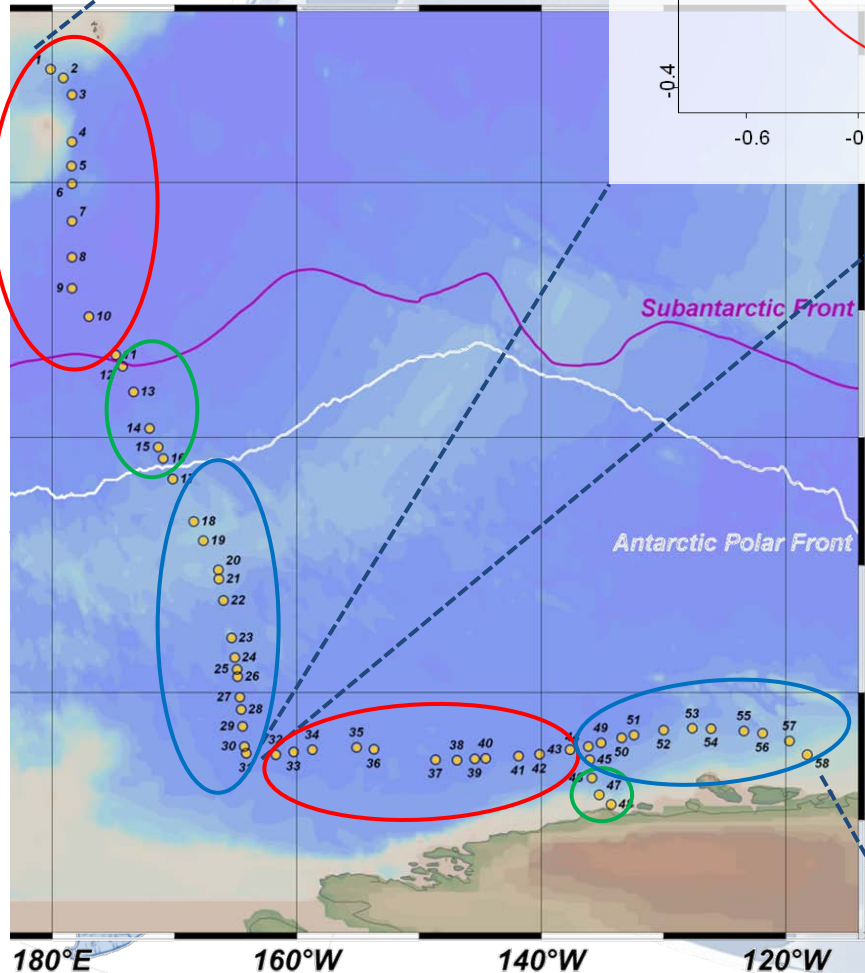
comprehensive picture of the whole sample:

- community structure
- dominant groups/species
- „rare biosphere“



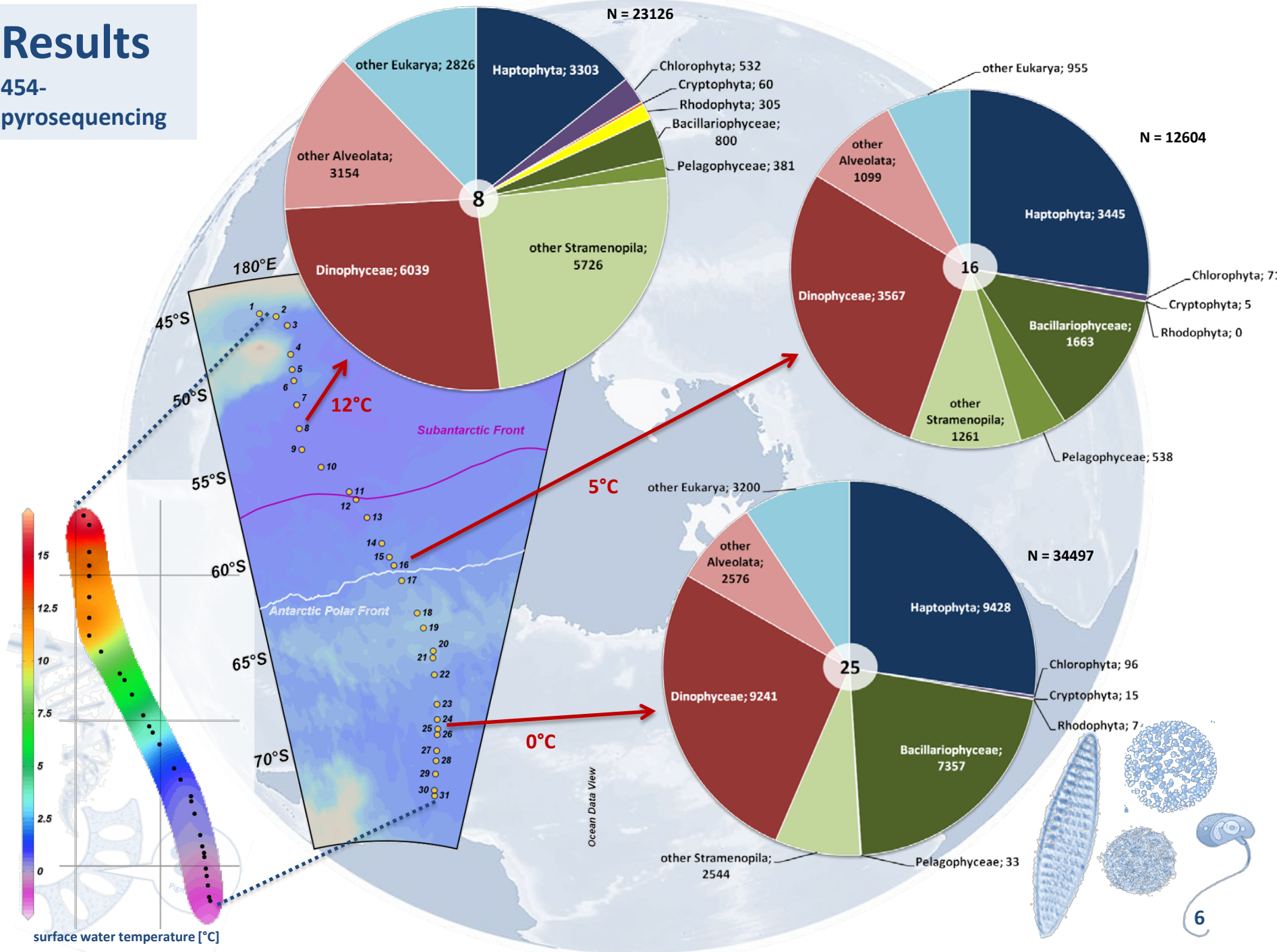
# Results

ARISA



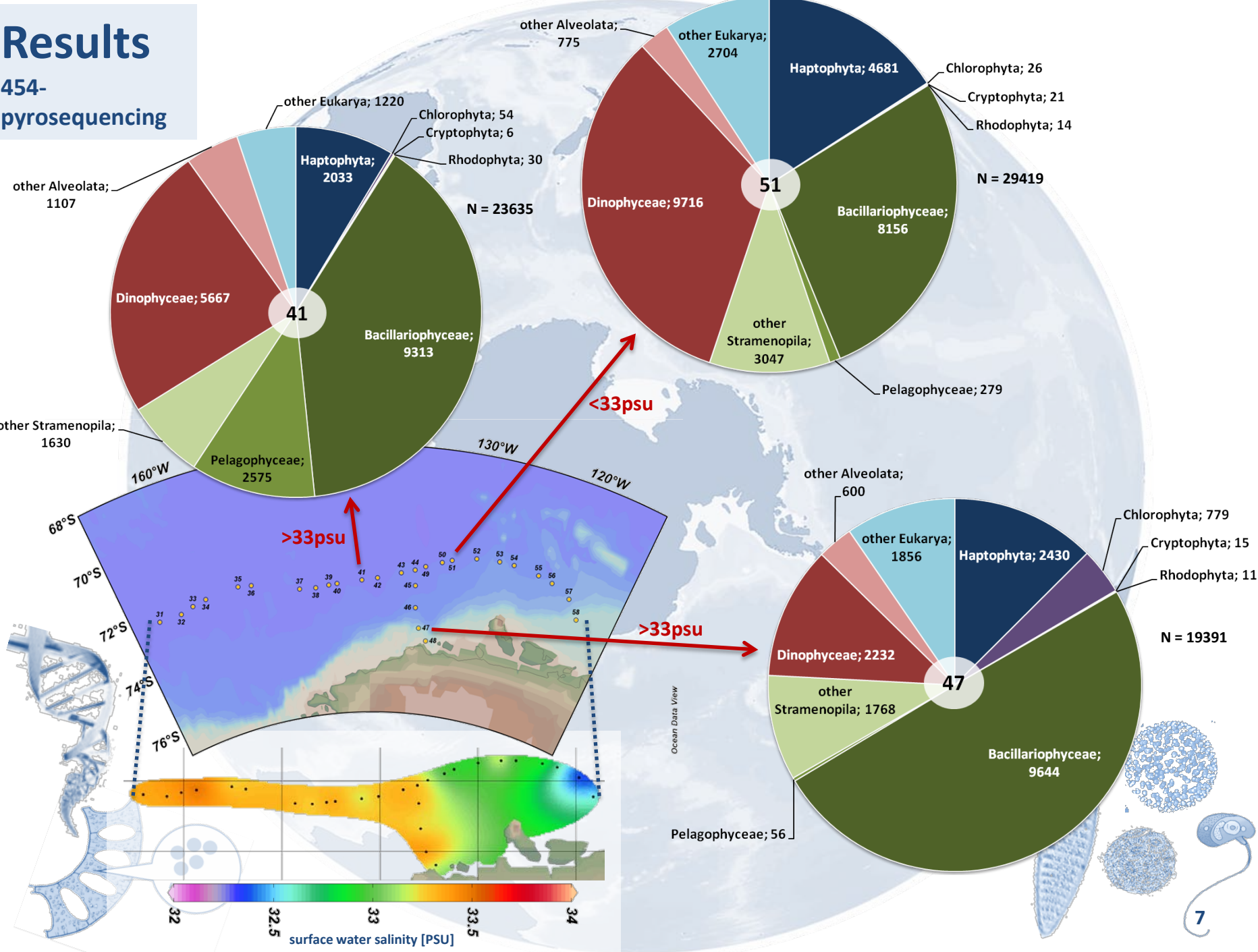
# Results

454-  
pyrosequencing



# Results

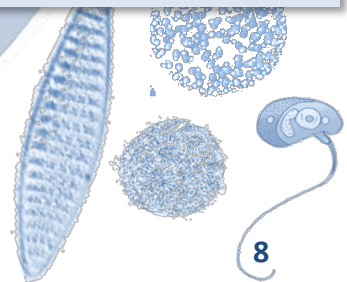
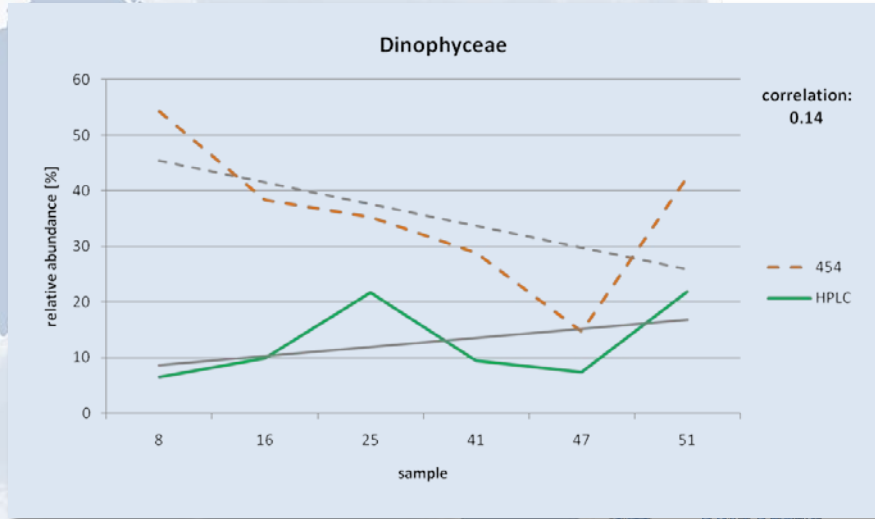
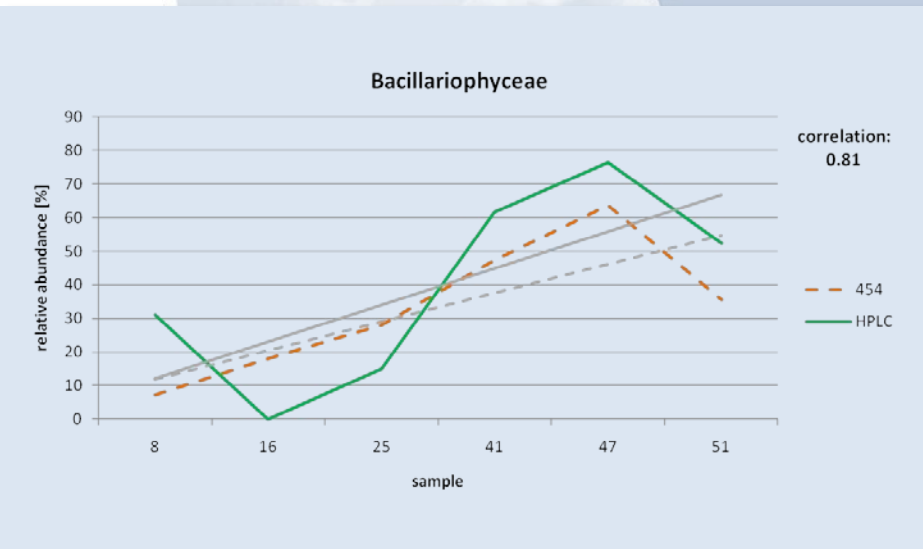
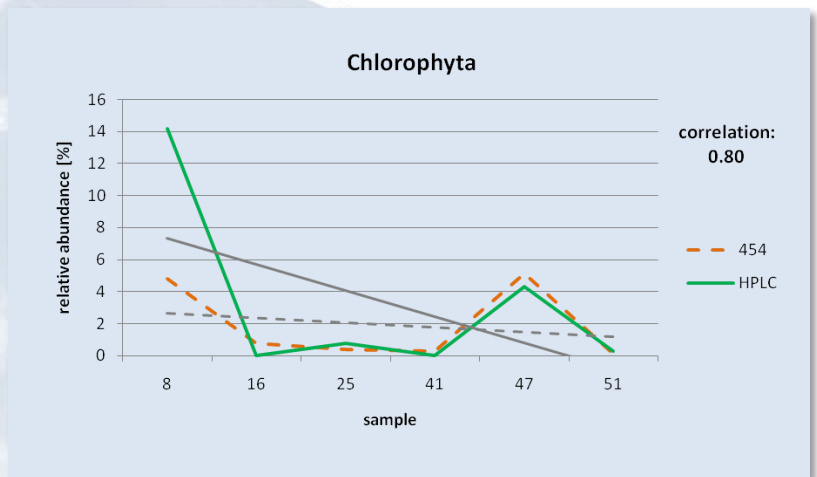
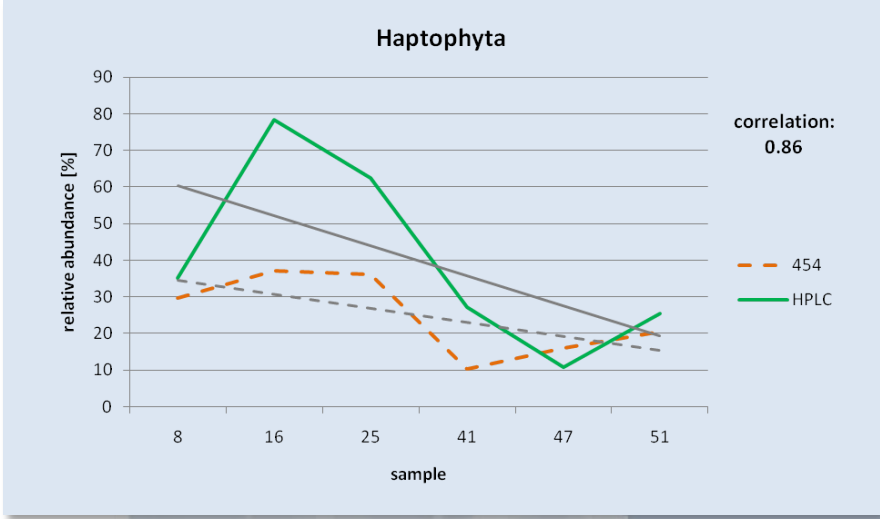
454-  
pyrosequencing



# Results

454 / HPLC


## HPLC and 454 trends mostly consistent






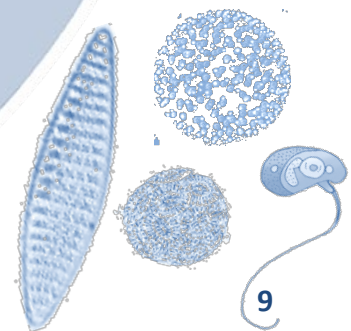
# Summary

 molecular tools seem to be appropriate for describing the community structure

 investigated water regions show clear differences in their community structure, according to the different environmental conditions

 data set can be used for future investigations to determine changes due to global warming

 the “rare biosphere” represents a big part of the diversity (data not shown)



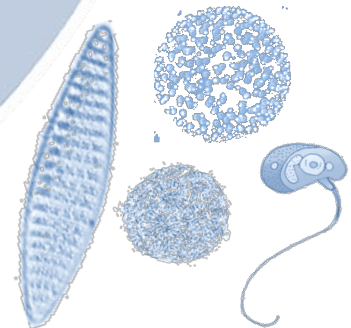
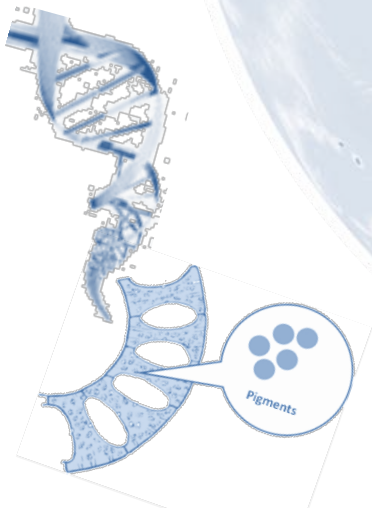
# Thank you for your attention!



## Acknowledgments:

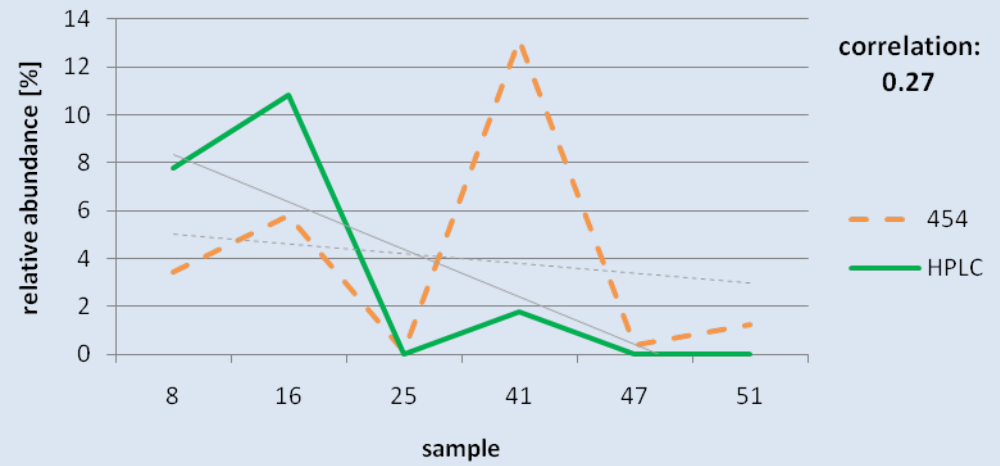
- E. Kiliias and K. Metfies (molecular support)
- I. Peeken (HPLC analysis)
- M. Lunau (flow cytometry analysis)
- S. Frickenhaus and B. Beszteri (bioinformatical support)

**AWI**   **HELMHOLTZ  
ASSOCIATION**

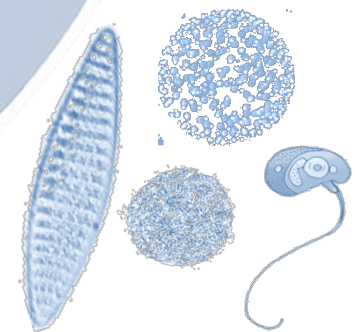
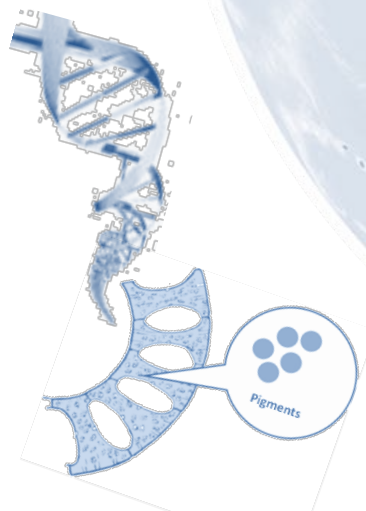
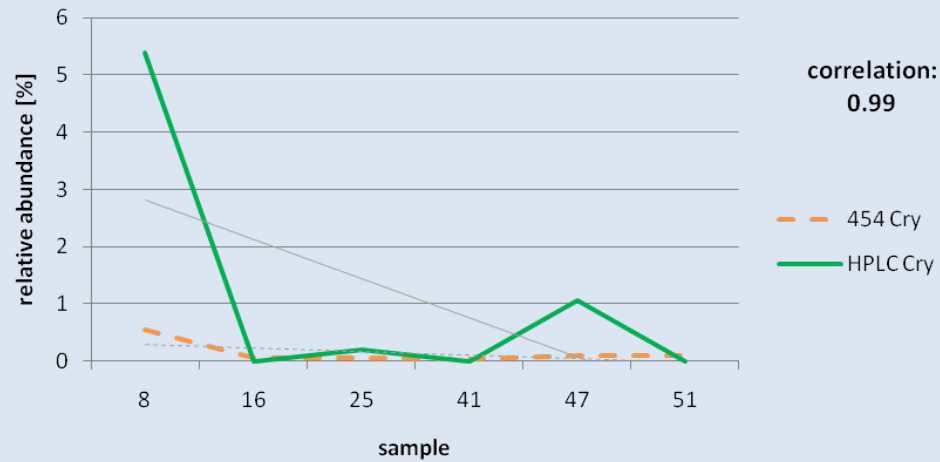


# Appendix

## Pelagophyceae

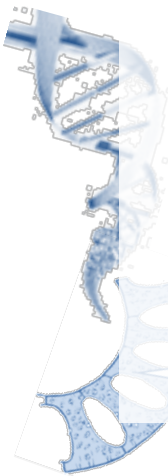
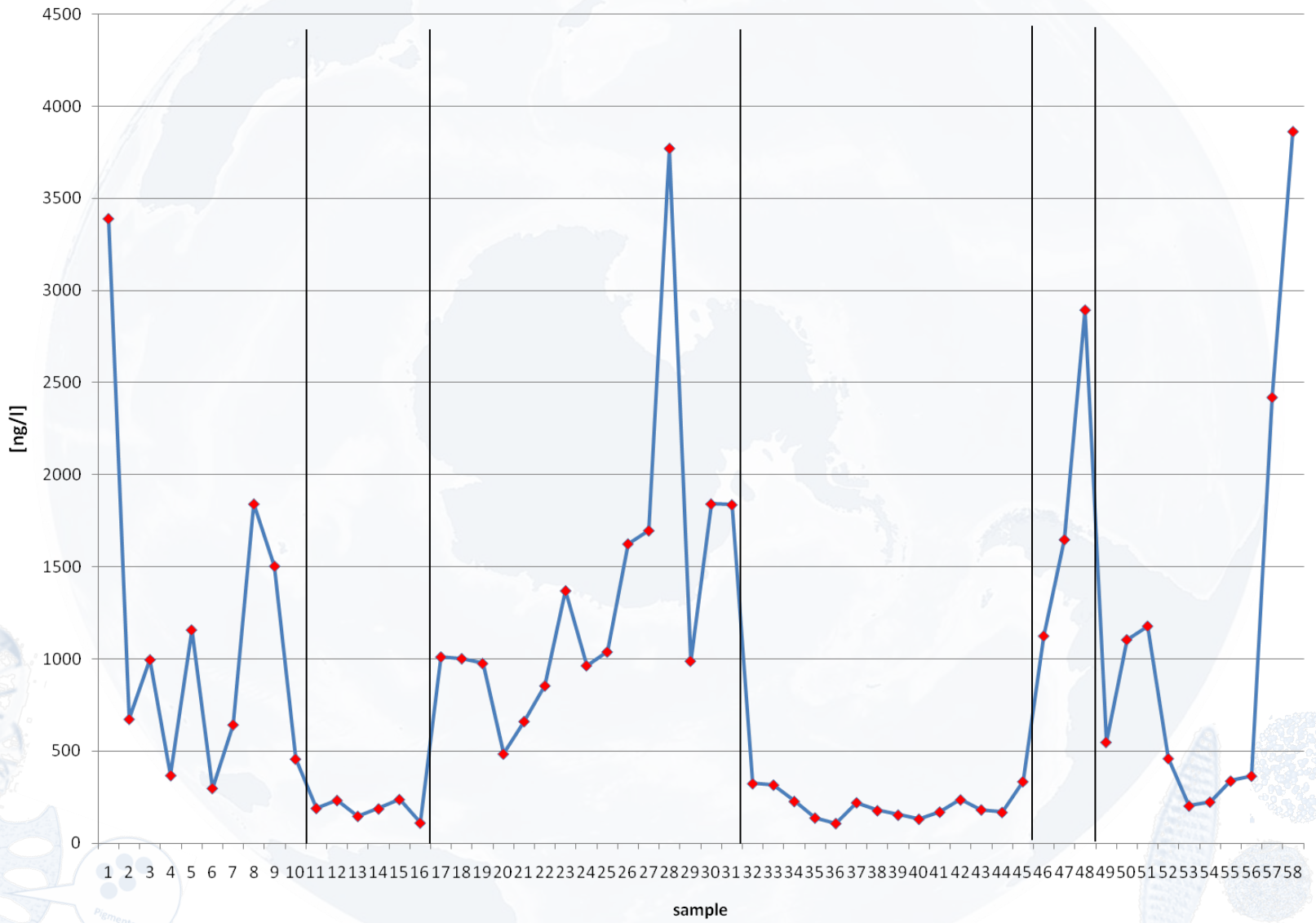


## Cryptophyta

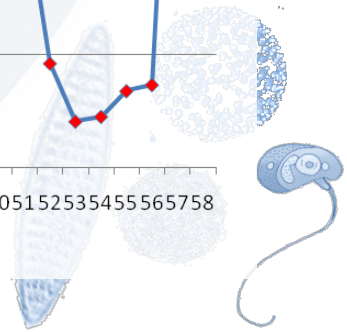


# Appendix

total Chla



Pigments



# Appendix

