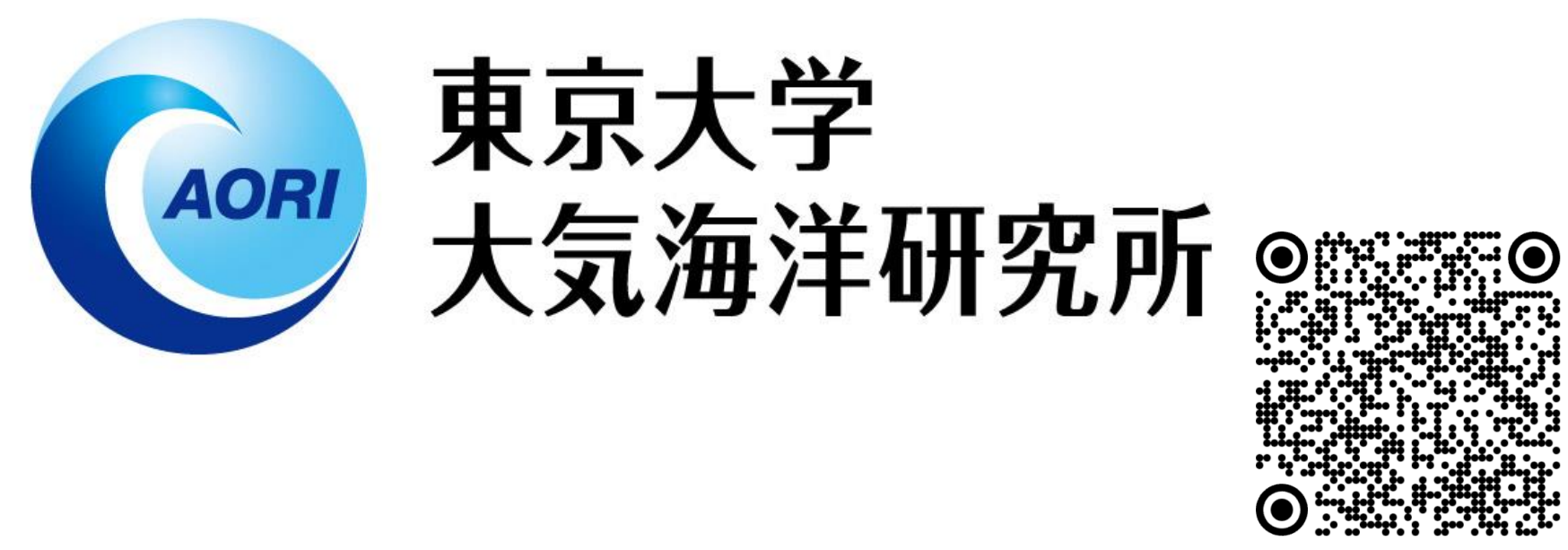


# Prokaryotes show different niche preferences between suspended and sinking particles in the western Pacific Ocean from tropical to subarctic regions

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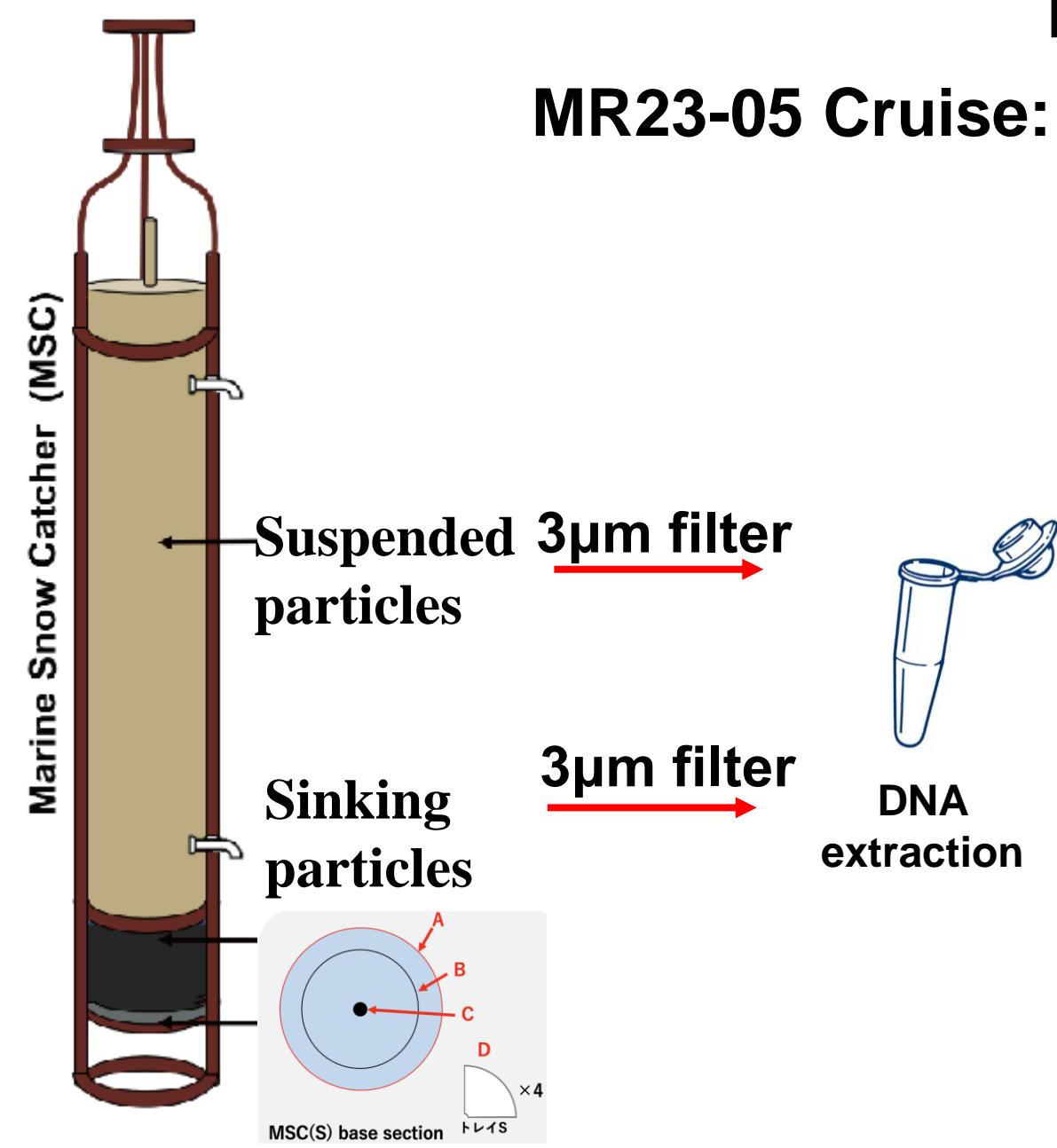
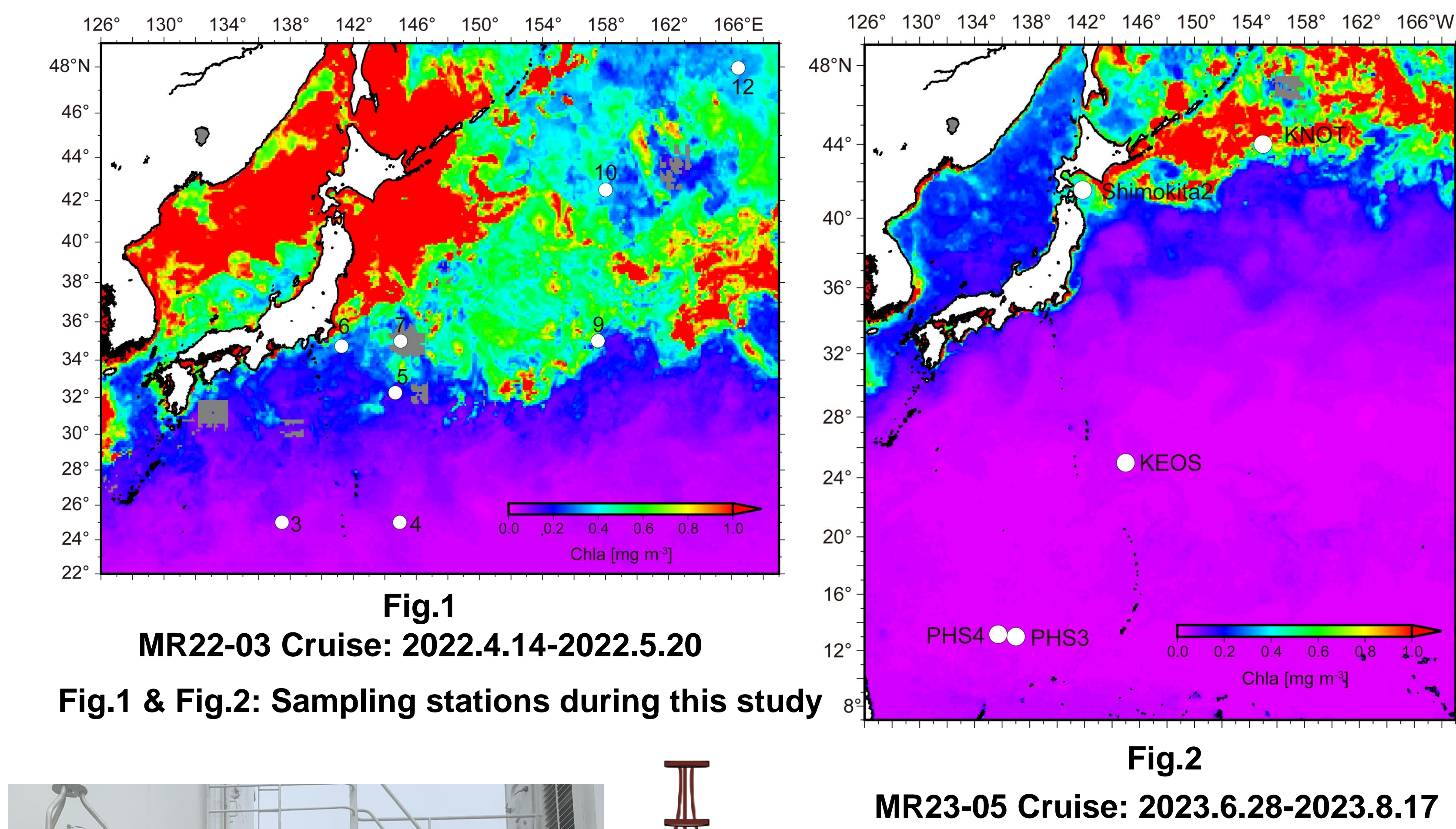


## Background

The efficiency of the biological carbon pump (BCP) are affected by microbial communities of sinking particles. Previously, studies on particle-associated microbes relied on microscopic observations which ignored morphologically indistinguishable microbes. Recently, molecular and bioinformatic techniques have been applied on BCP (Guidi et al, 2016,Nature). However, those studies did not adequately distinguish between **suspended** and **sinking** particles, which play different ecological roles in the BCP. **The western Pacific Ocean** is regarded as a critical region for carbon sequestration, but microbial community structures of **suspended** and **sinking** particles in this region are still unclear.

**Purpose** :1. Using DNA metabarcoding to reveal prokaryotic communities of sinking and suspended particles;  
2. Comparing the similarities and differences of community structures between two particle fractions.

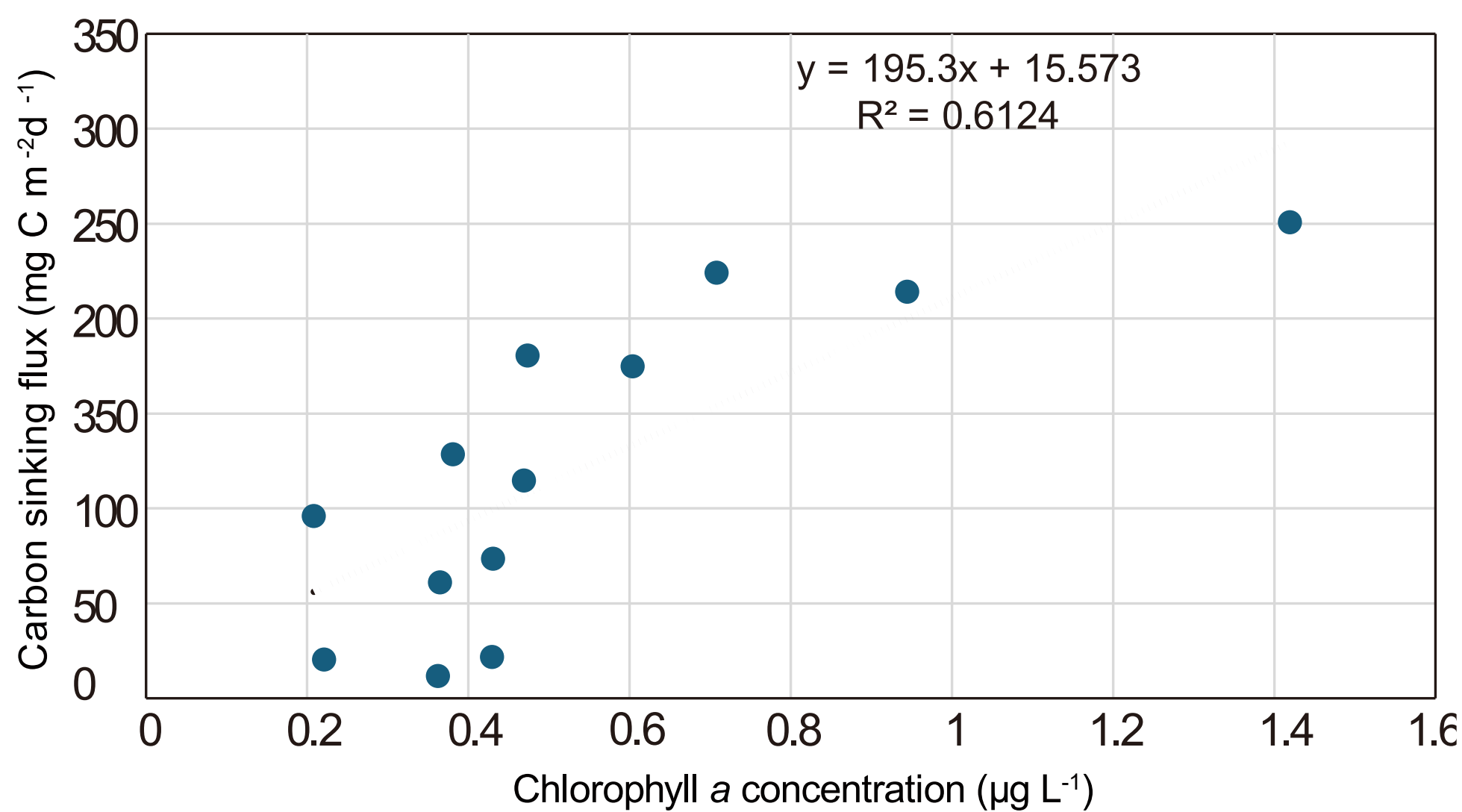
## Sampling Regions and Methods



**Sampling Region** : the western Pacific Ocean (tropical to subarctic regions)  
**Sampling Depth** : surface chlorophyll a maxima  
**Microbial Communities** : DNA metabarcoding (16S rRNA)  
**Carbon Sinking Flux** : Carbon Sinking Flux =  $\text{POC}_{\text{sinking-particles}} \times \text{V/A/T}$   
V: the volume of marine snow catcher; A: the cross-sectional area of MSC;  
T: setting time(2h) (Yamada et al, 2024,L&O )

## Result 1

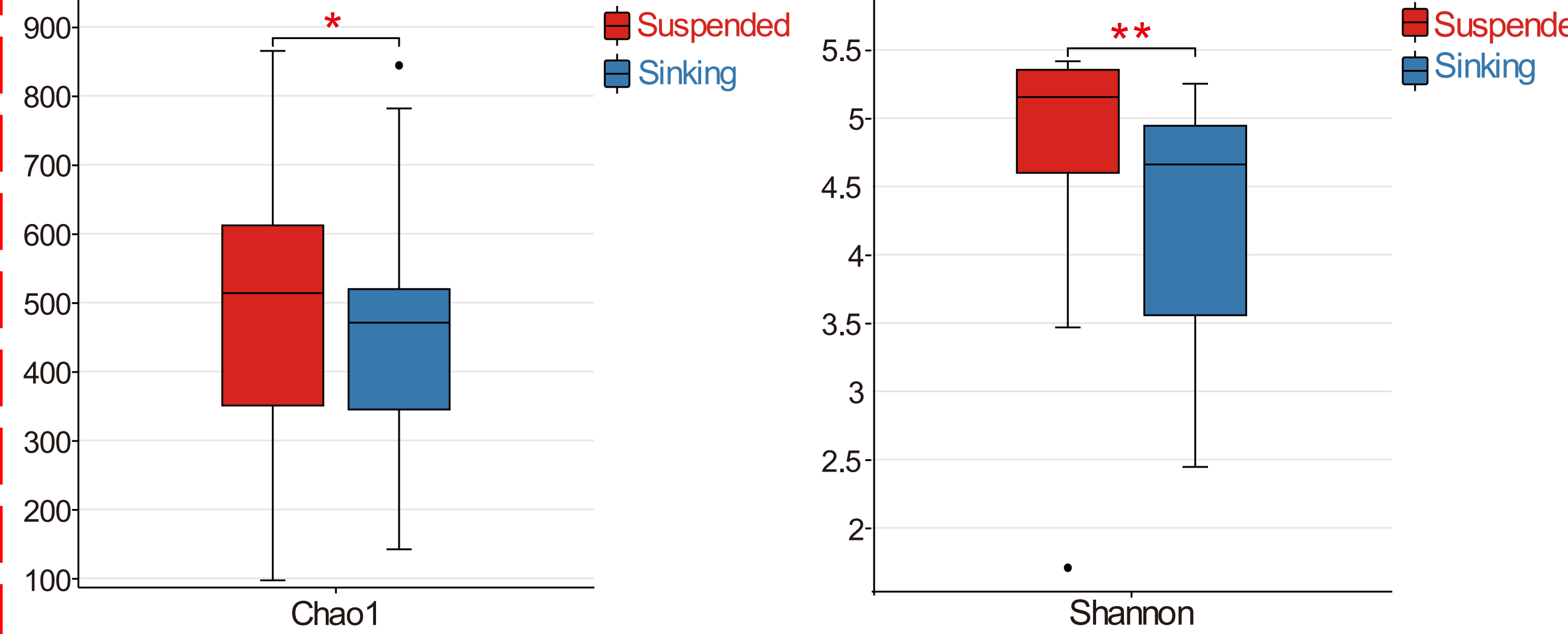
Fig.3 The correlation between carbon sinking flux and chlorophyll a concentration



The carbon sinking flux are positively correlated with total chlorophyll a concentration

## Result 2

Fig.4 α-diversity (Chao1 and Shannon) between suspended and sinking particles



Prokaryotes in suspended fractions showed significantly ( $t$ -test  $p < 0.05$ ) higher richness and diversity than those in sinking fractions

## Result 3

Fig.5 The relative abundance of prokaryotic community structures between suspended and sinking particles.

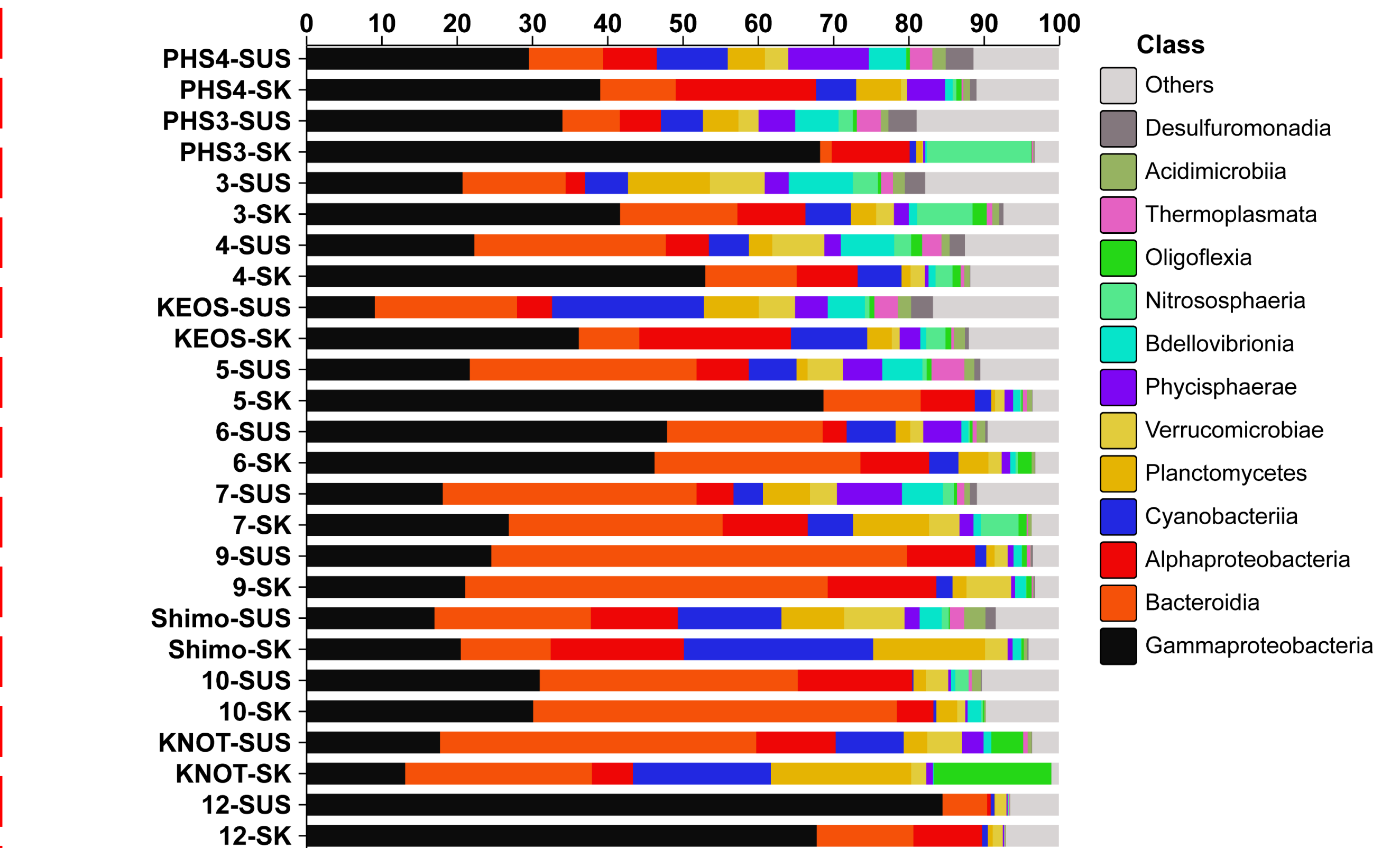
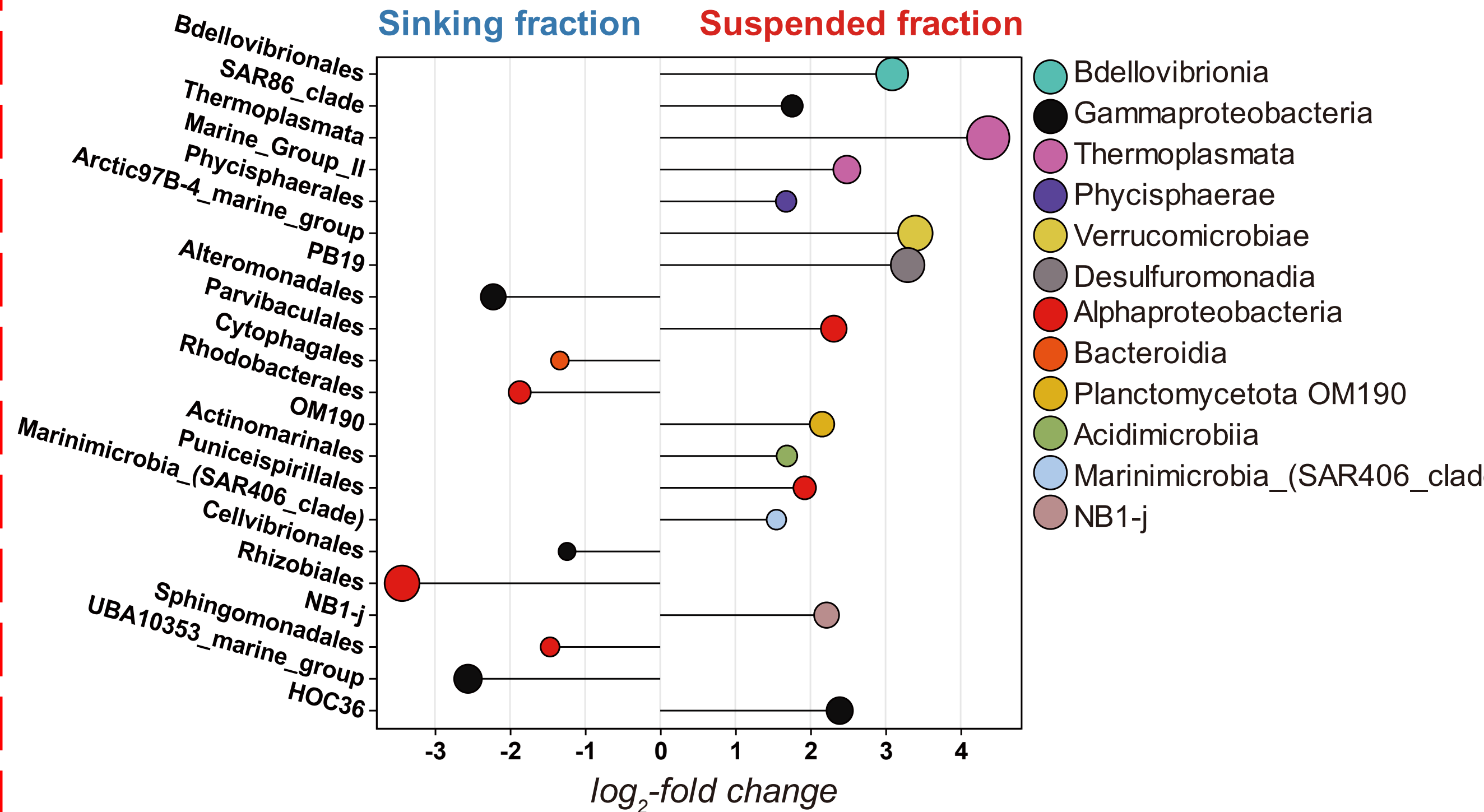


Fig.6 The  $\log_2$ (fold-change) of taxa that have significant difference (adjusted  $p$ -value  $< 0.05$ ) between suspended and sinking fraction (at order level).



## Summary

1. The correlation between carbon sinking flux and chl a concentration indicating we captured the maximum vertical flux by collecting samples from the SCM.
2. Prokaryotes in suspended fractions showed high richness and diversity than those in sinking fractions.
3. The relative abundance and  $\log_2$ - fold change analysis showed that prokaryotes have niche preferences between two particle fractions.