The wide distribution of *Euphausia* species in low-latitude ecosystems supported by omnivory: two cases in the Indian and Pacific Oceans

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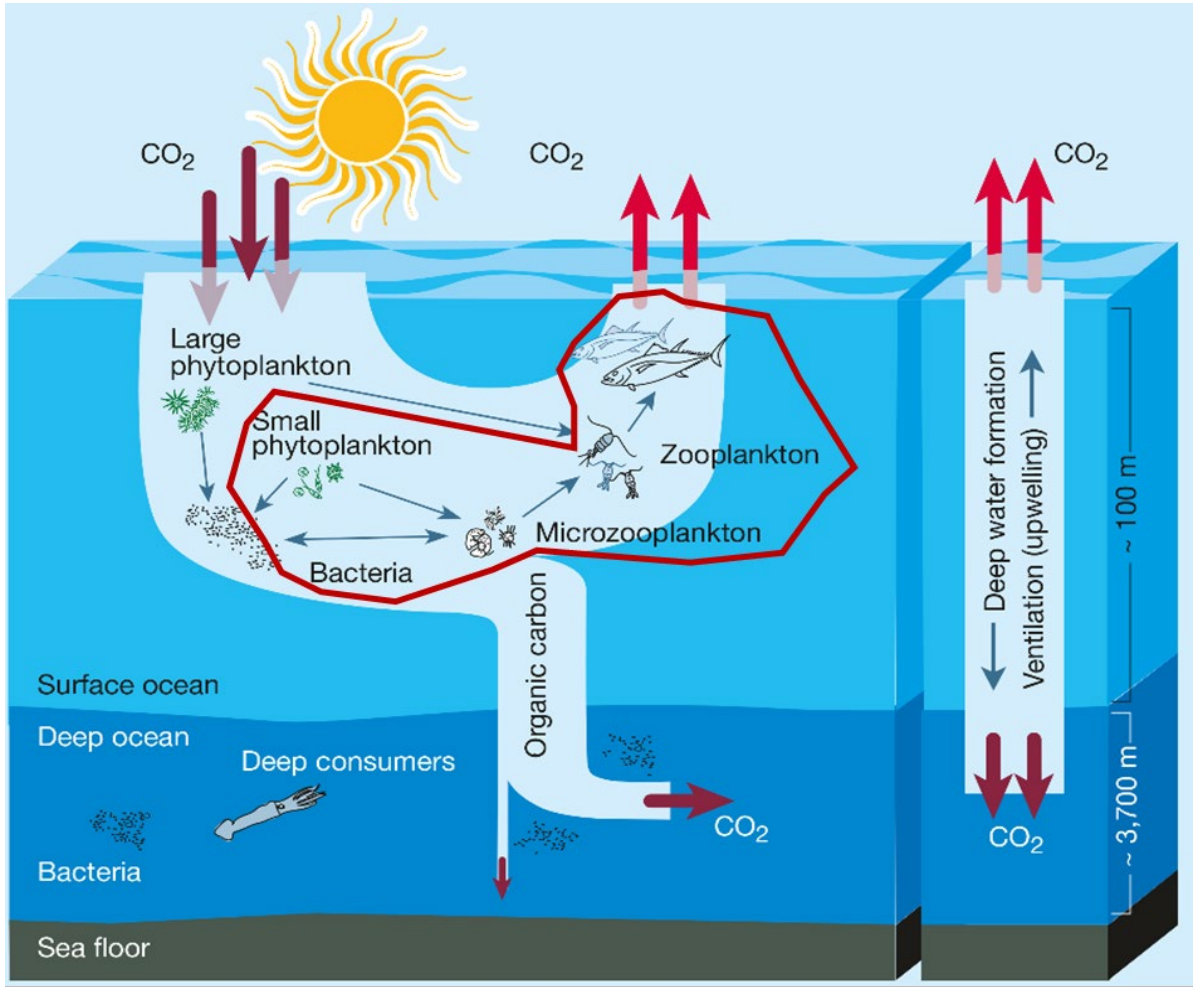
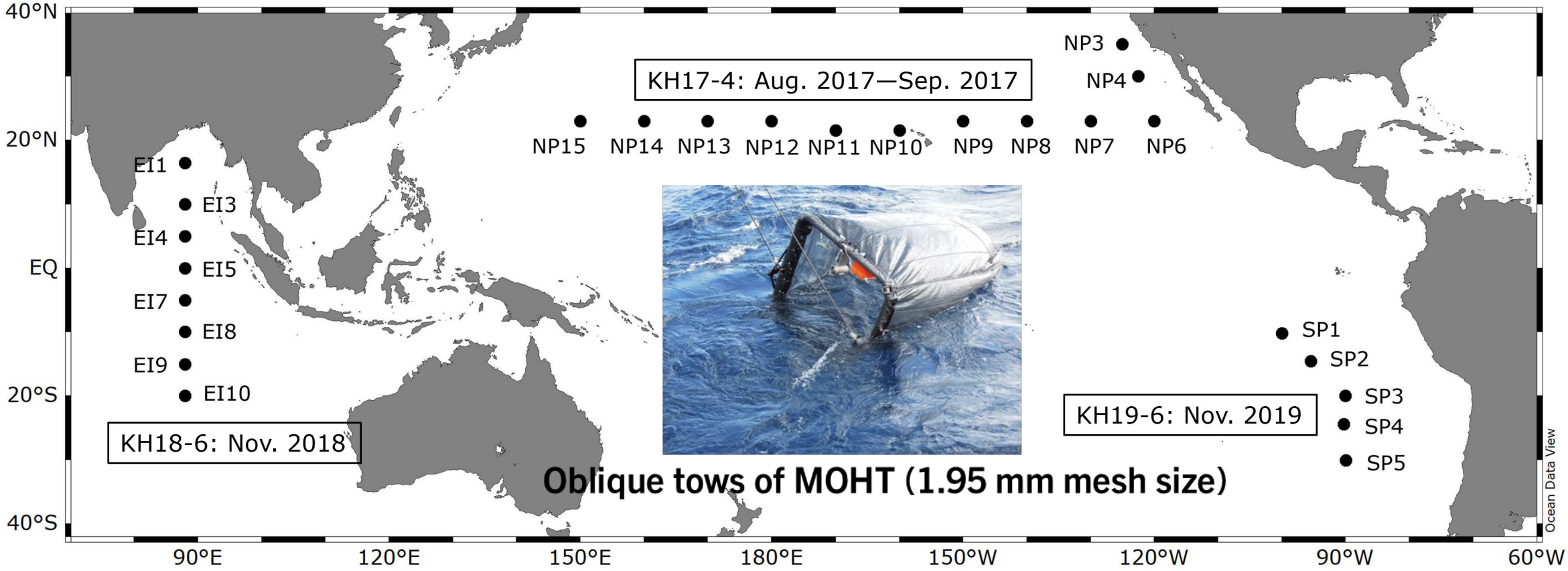
Euphausiids in the marine ecosystem



(Chisholm, 2000)

- A vital component of total zooplankton biomass and biological pump
- Critical link between lower and higher trophic levels
- **Euphausiids in low latitudes (oligotrophic ecosystems) have long been overlooked!**

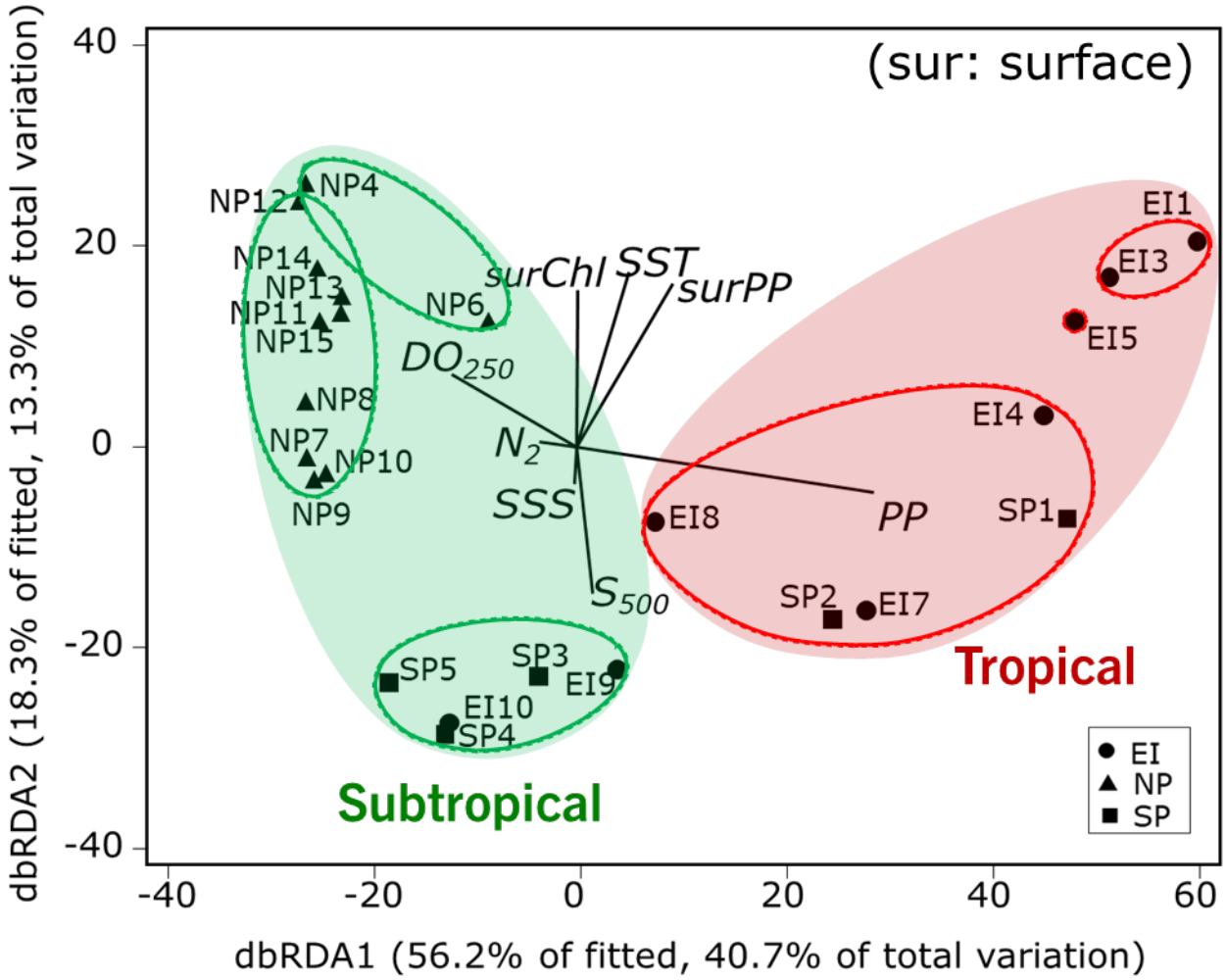
Large-scale survey on low-latitude euphausiids
(24 stations in Indian and Pacific Oceans)

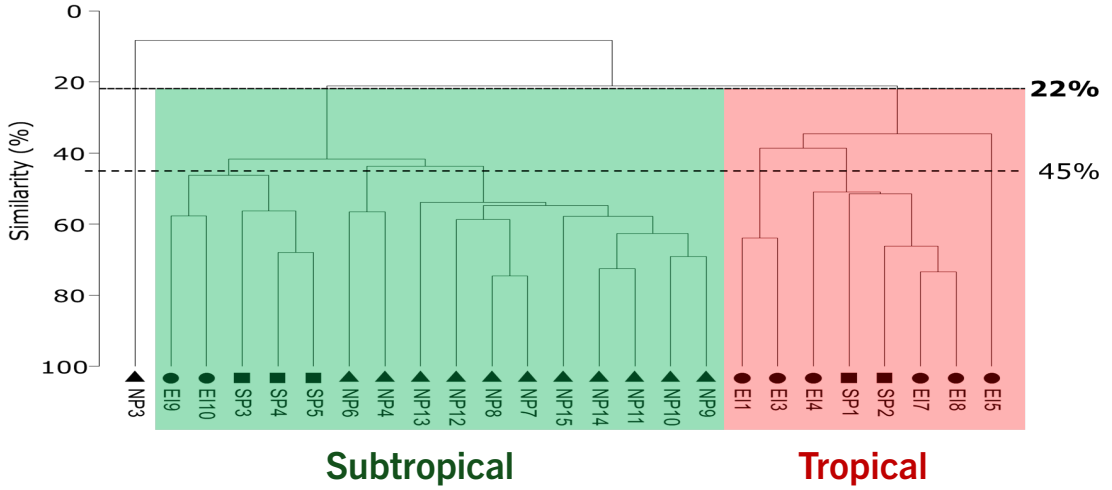


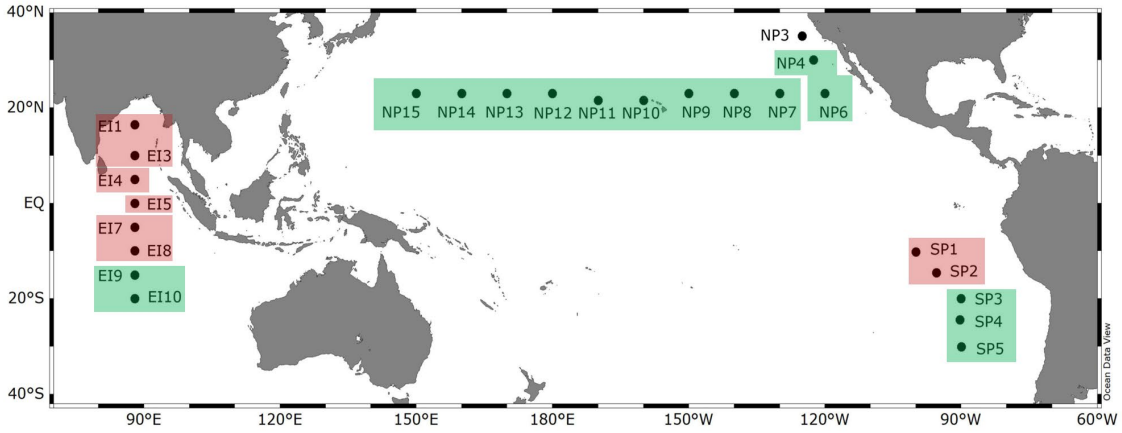
- Euphausiids collected ~500 m to the surface at night (~1/4 aliquots for community structure study)
- Hydrographic parameters (Temperature, Salinity, Chl-*a*, Primary production…)

(Zhou et al. 2024) https://doi.org/10.1007/s10872-024-00713-z

Food resource impacts low-latitude euphausiid community structure

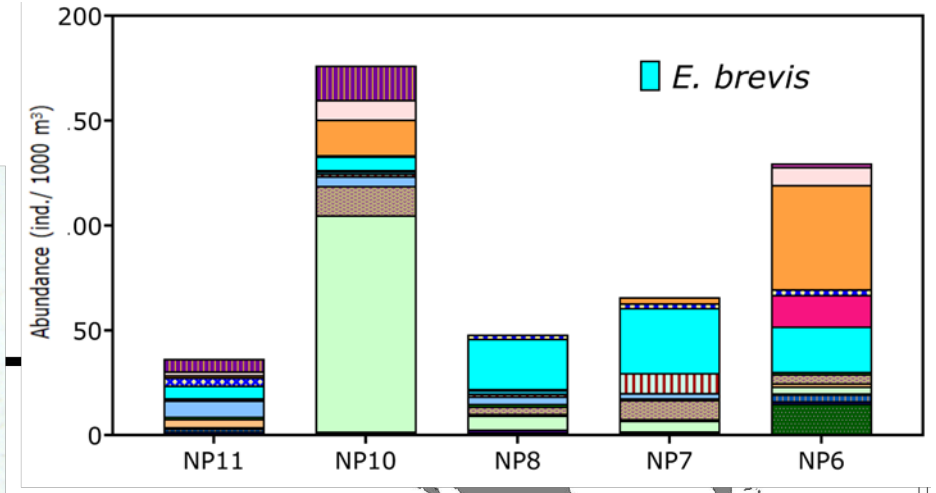


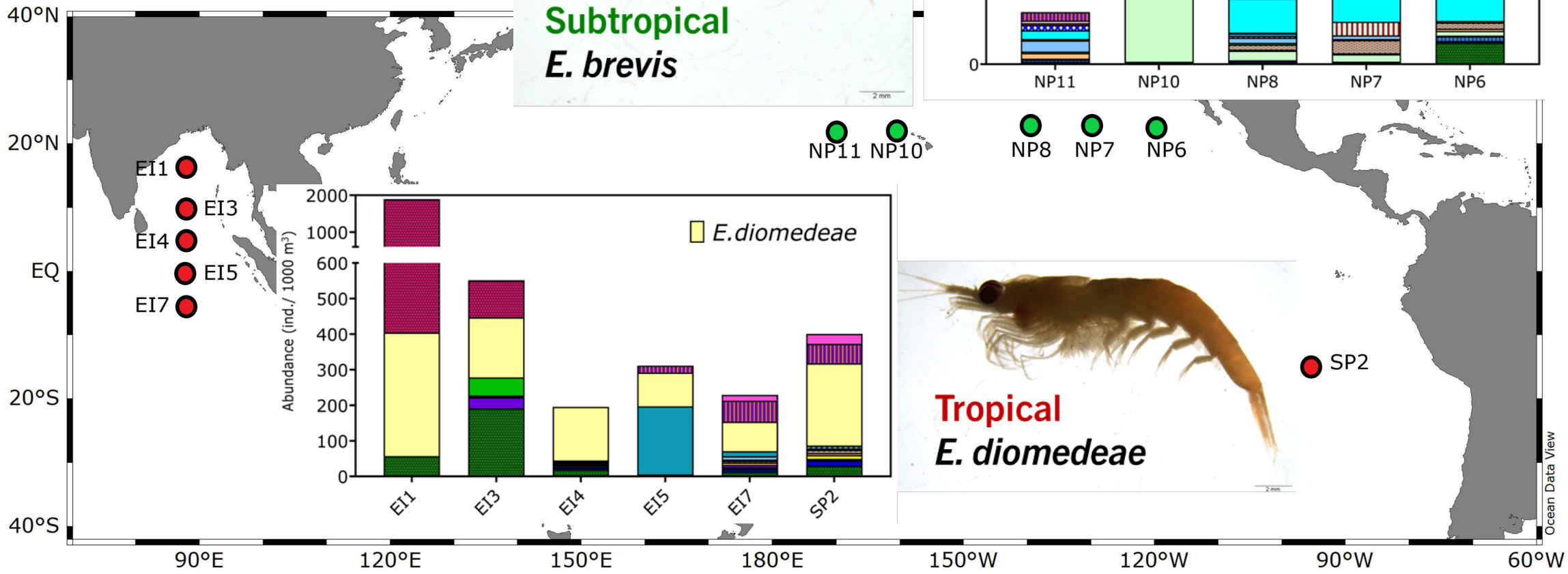




Euphausiids' feeding habit influences their distribution pattern?

Two widely distributed species for feeding habit study



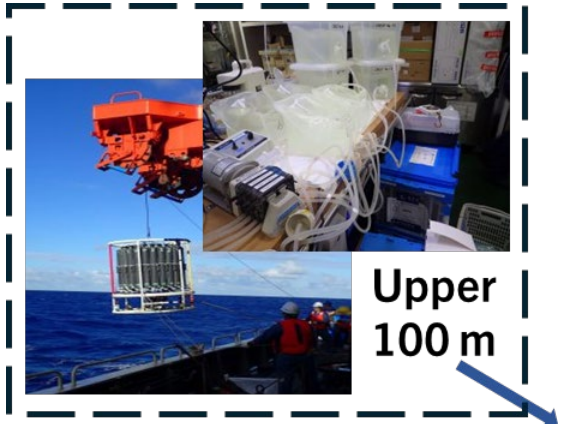


Subtropical group stations Tropical group stations

Questions

- What are *E. brevis* and *E. diomedeae* feeding on?
- Same or different diet between two species?
- Why can they distribute widely in low-latitude ecosystems?

A combined Method of



Upper 100 m

Seawater filter (0.22 & 3 μm mesh size) as food availability

(10—30 individuals)

DNA extraction

① Whole gut

② Body tissue

One sample

(1389F/1510R)

18S V9 barcode amplification by PCR

(Miseq)

Next Generation Sequencing

(MOTHUR)

Bioinformatic processing

① Gut content analysis by 18S V9 metabarcoding

(high taxonomy resolution)

+

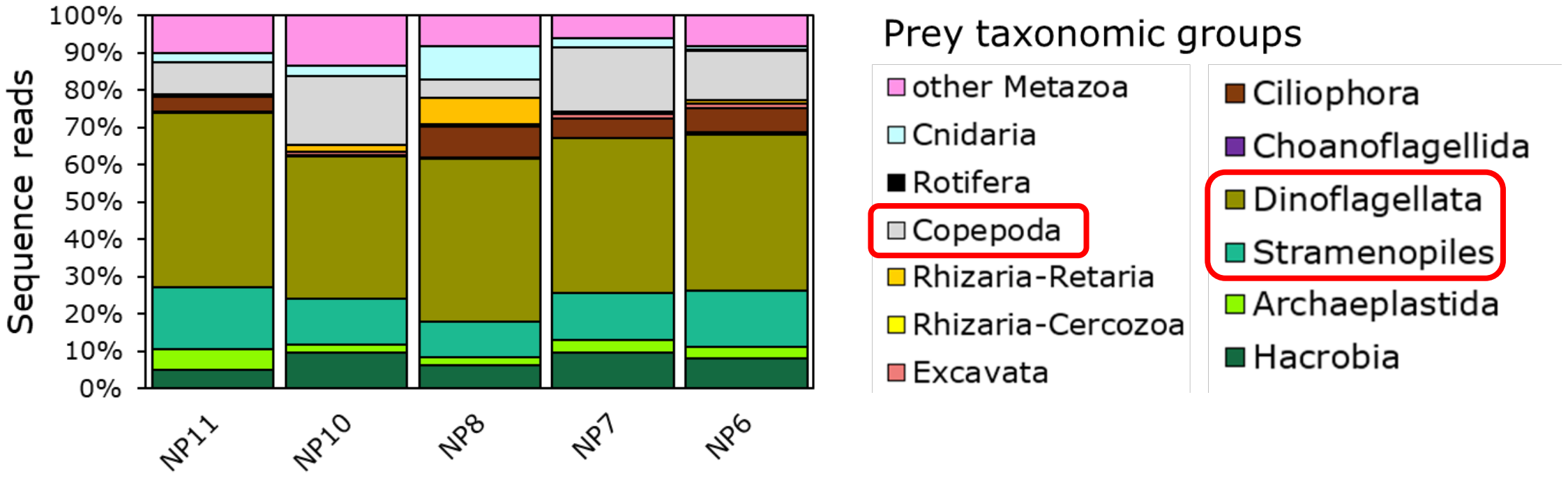
($\delta^{13}C$ and $\delta^{15}N$)

Baseline: surface POM

② Trophic level assessment by stable isotope analysis

(Good time-integrity)

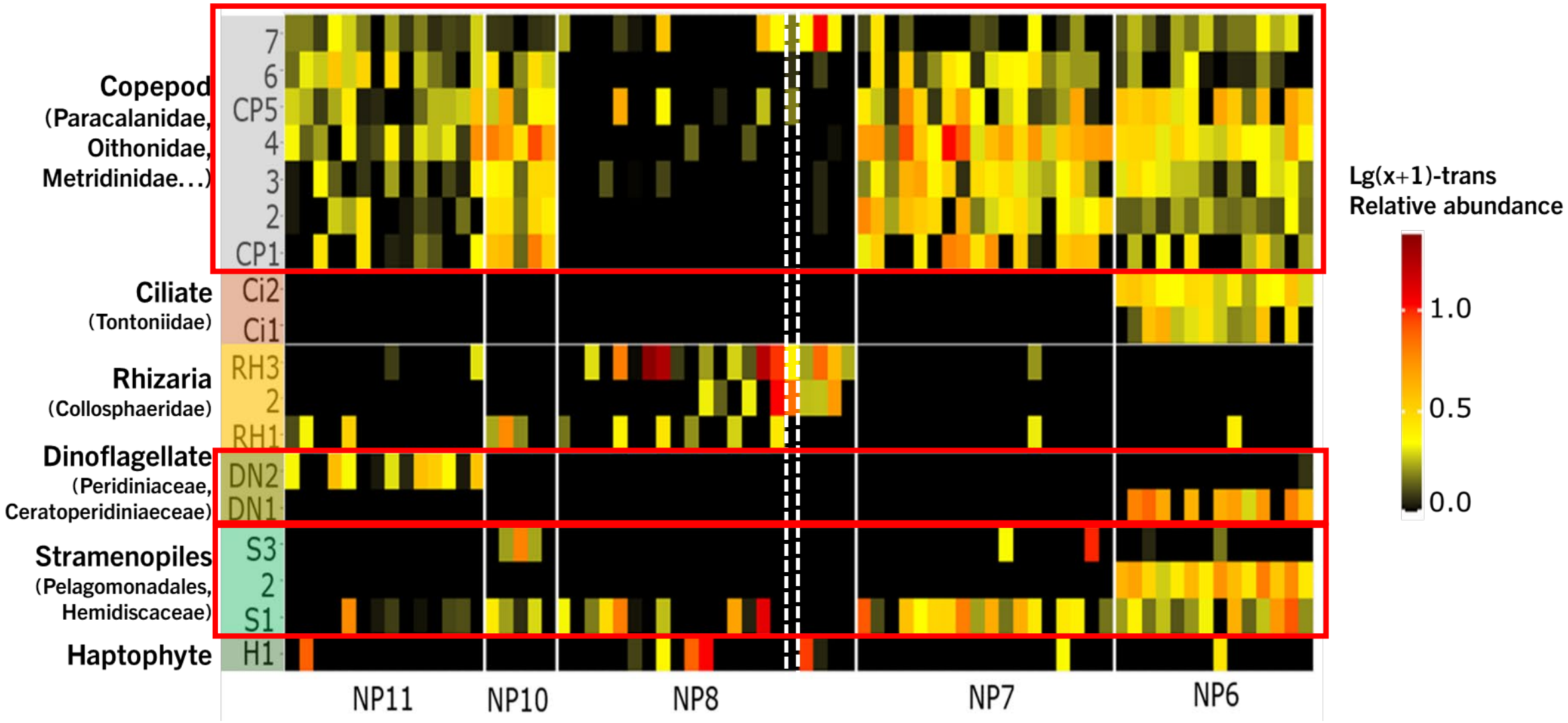
Gut content composition of *E. brevis* (N=78)



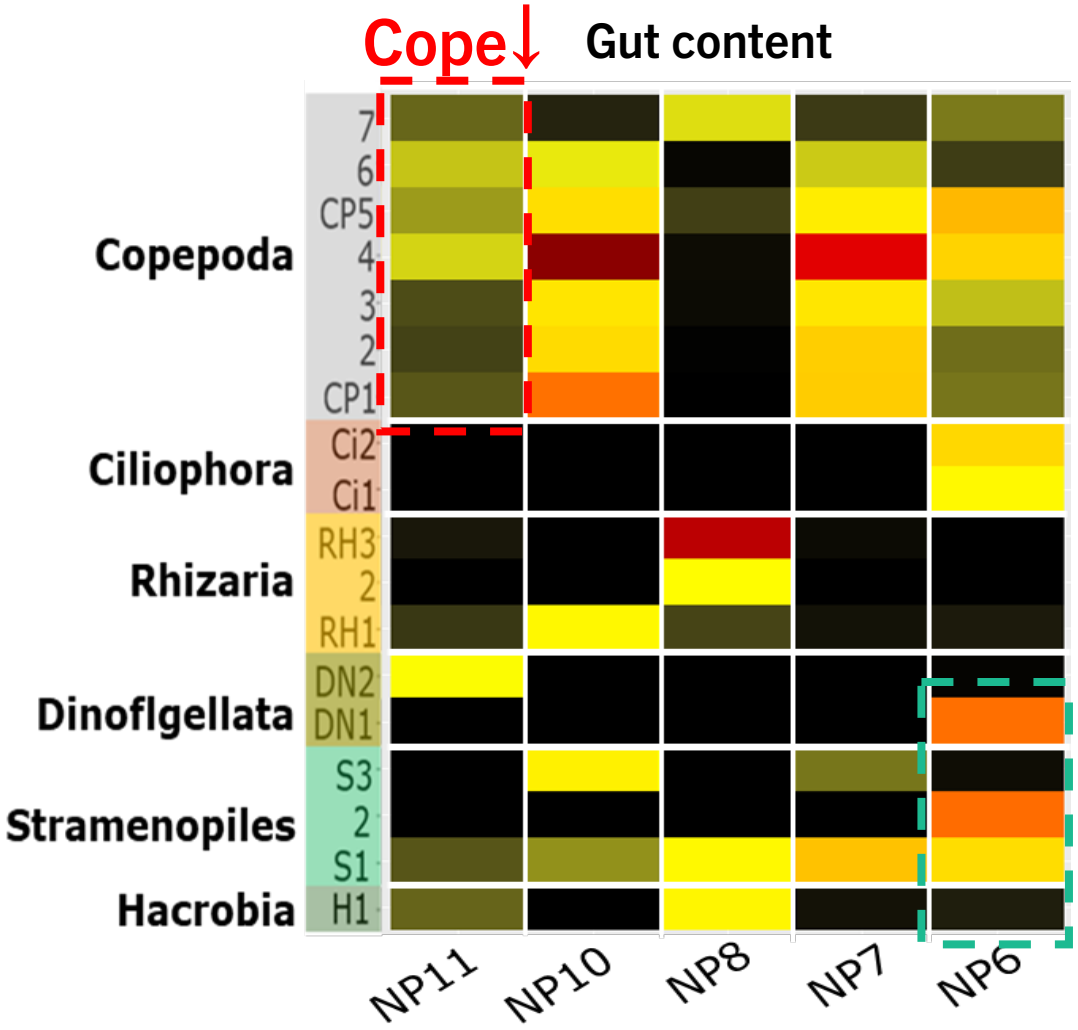
Similar diet across stations?

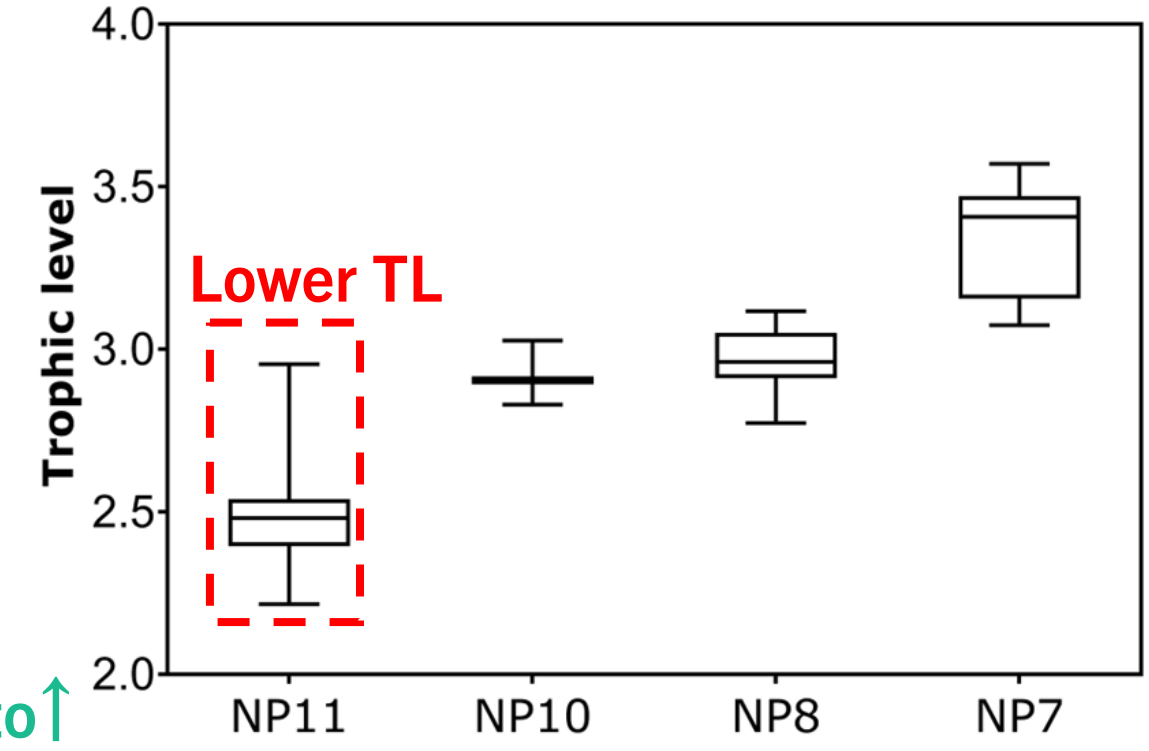
Primary prey OTU composition of *E. brevis* (N=78)

(with >1% relative abundance & >1/3 occurrence frequency at one station)



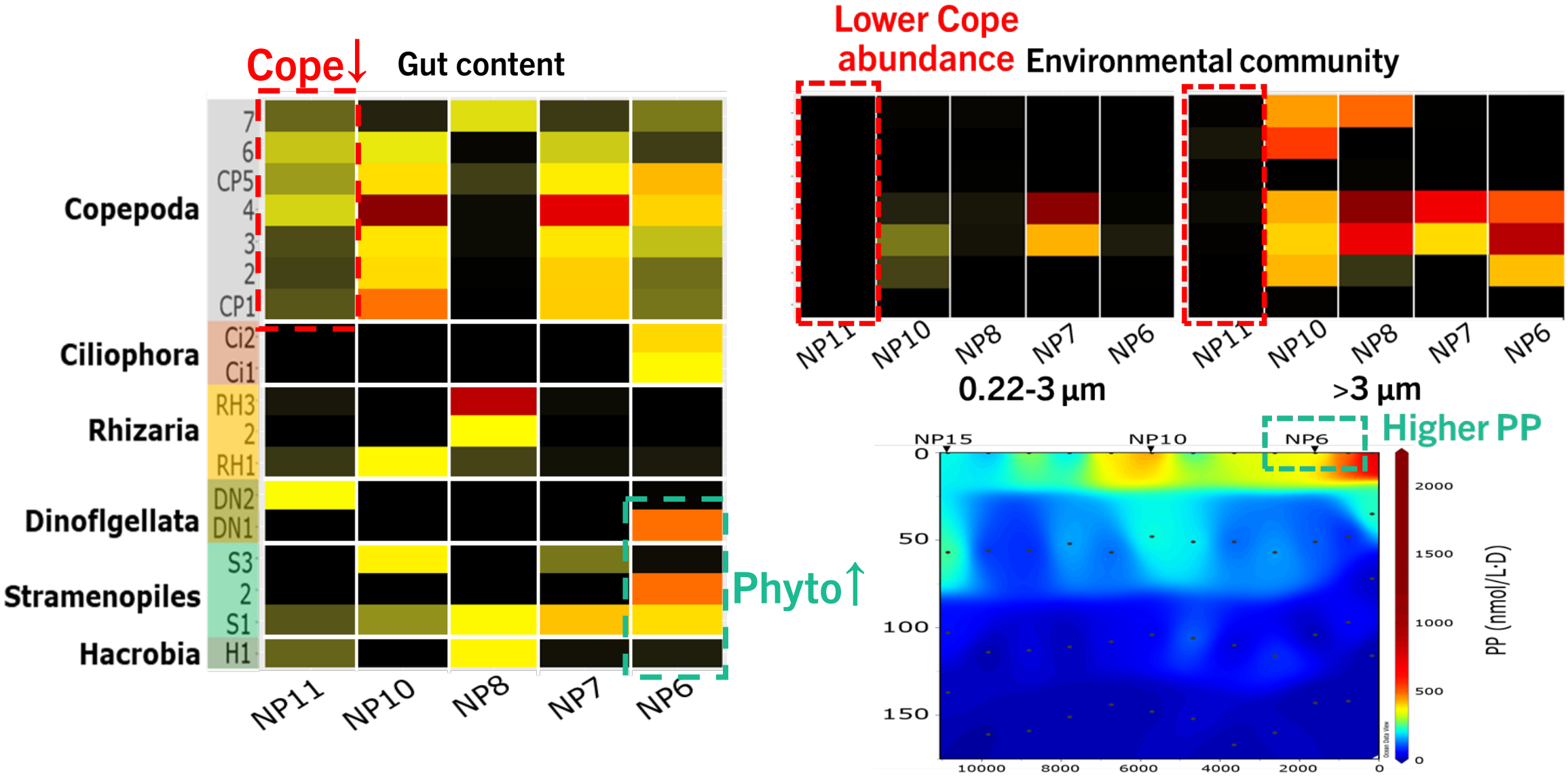
Regional diet variation of *E. brevis*





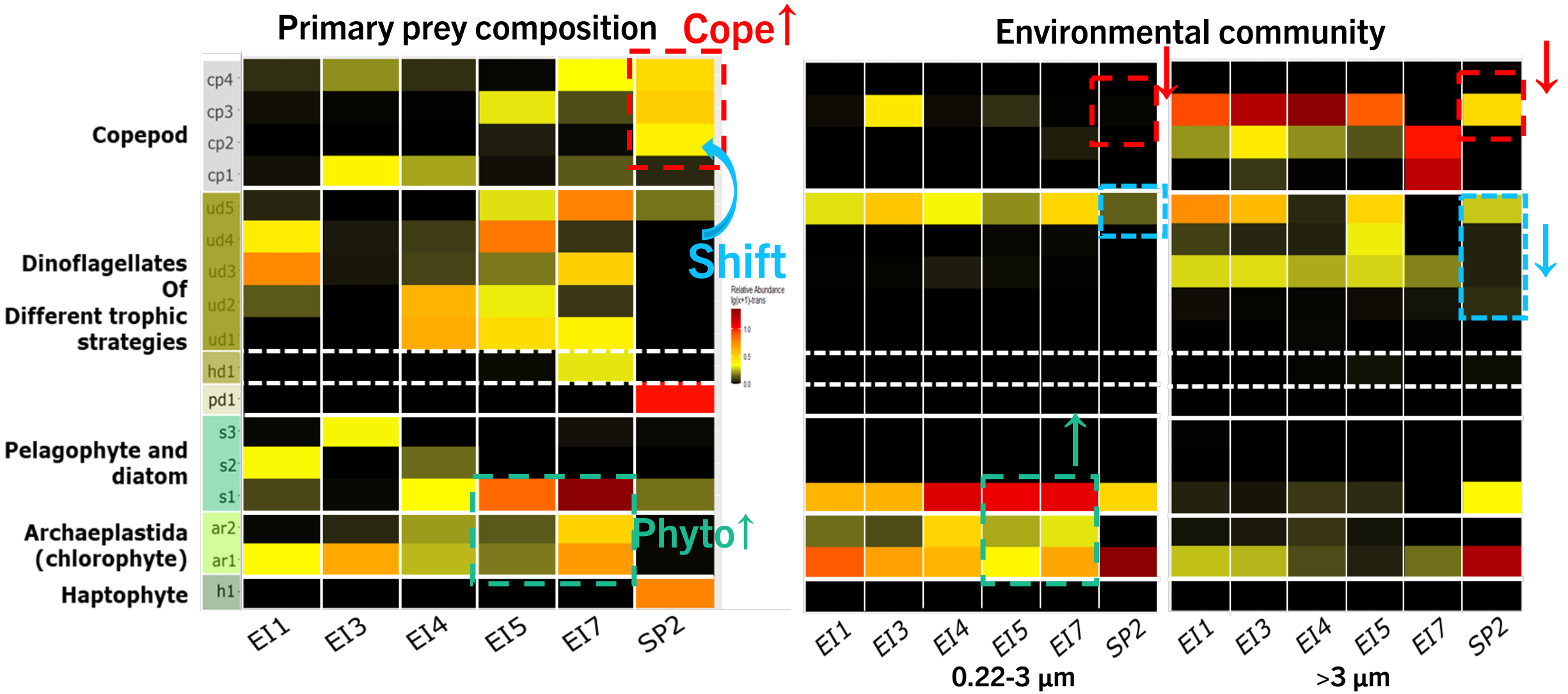
Average TL=2.96±0.3

Regional diet variation of *E. brevis*



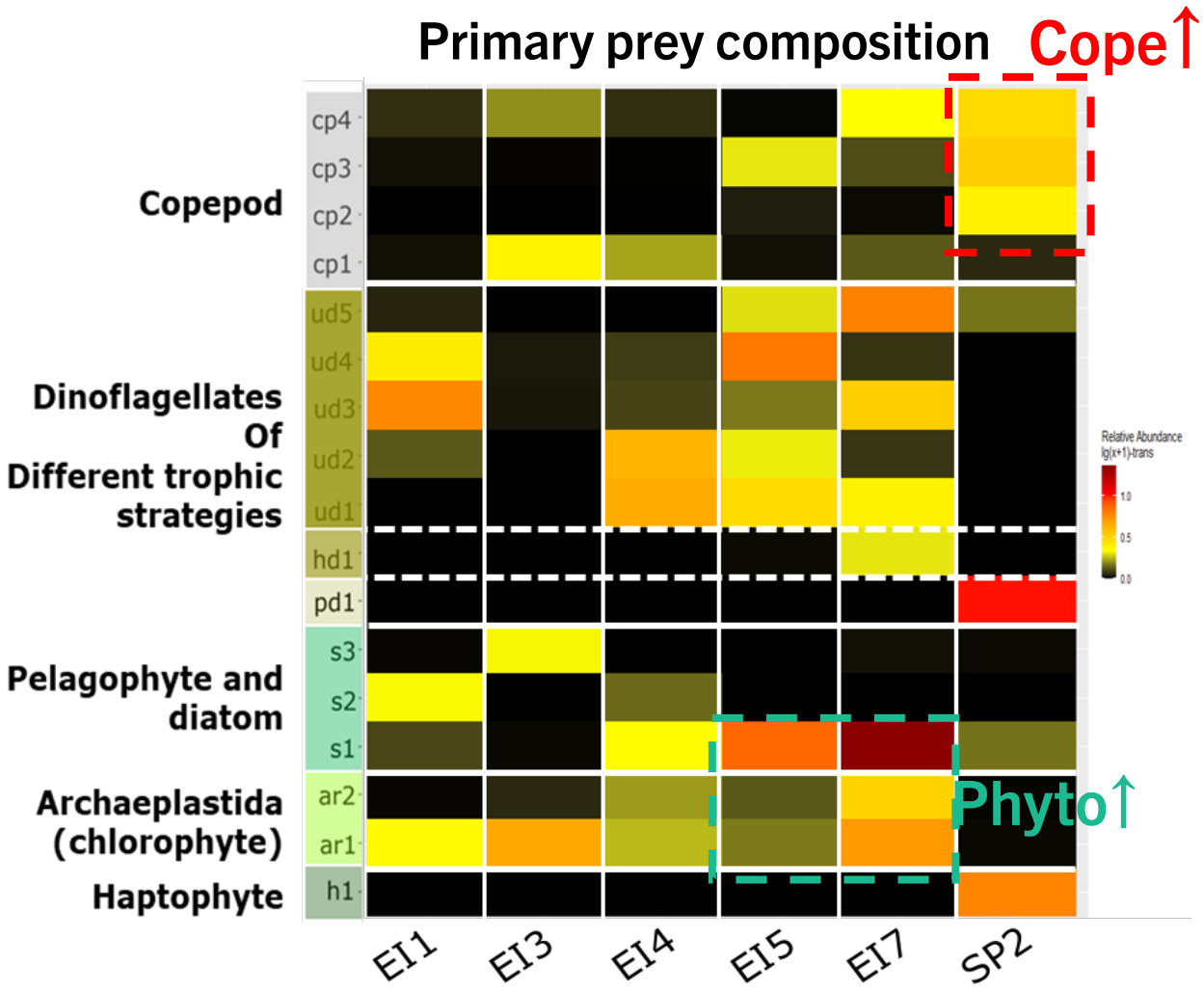
Opportunistic feeding shaped by food availability

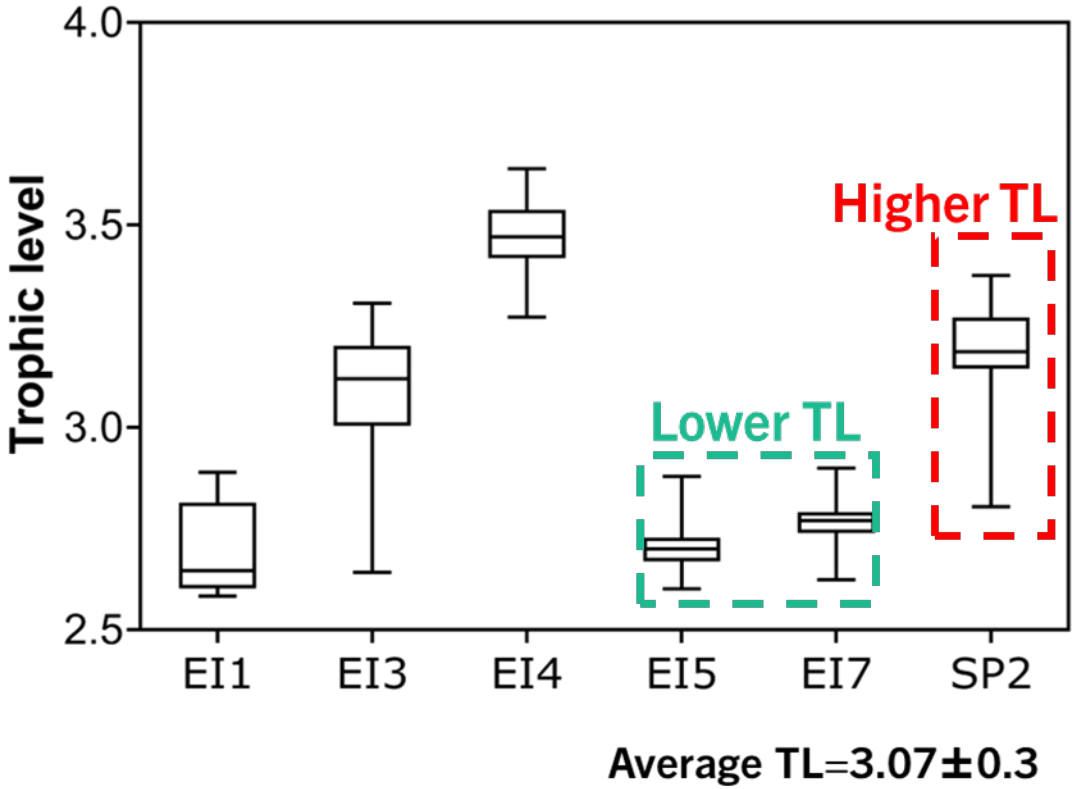
Regional diet variation of *E. diomedeae* (N=121)



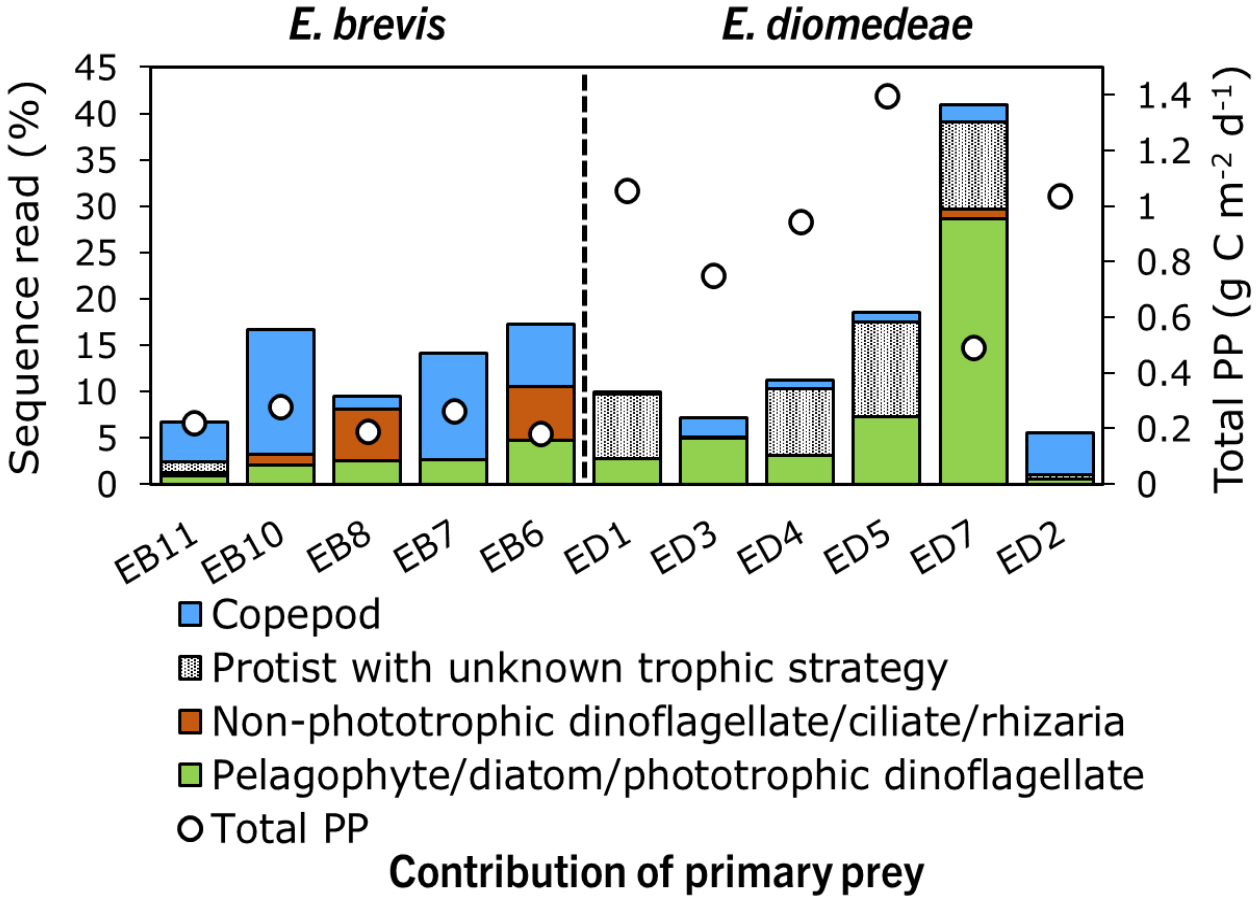
An opportunistic feeding with trophic plasticity

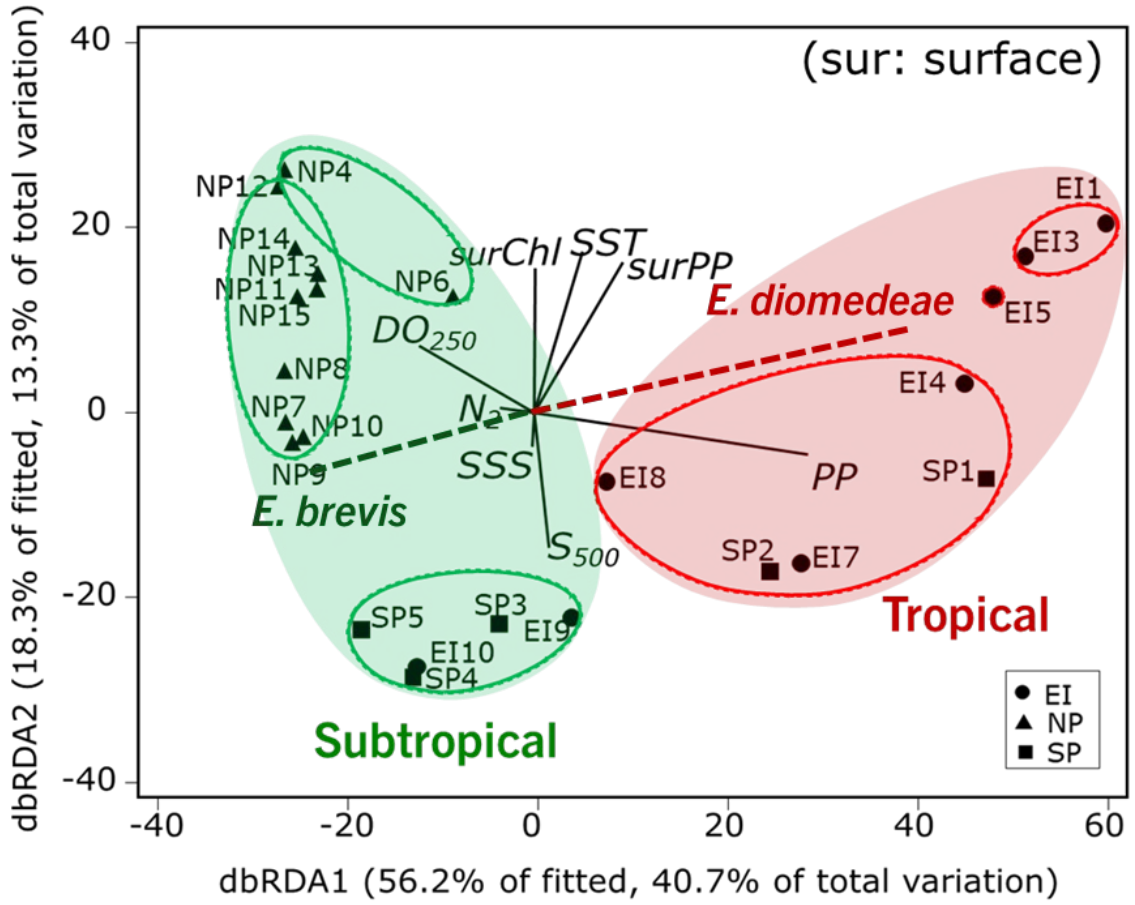
Regional diet variation of *E. diomedeae* (N=121)





Subtropical *E. brevis* VS Tropical *E. diomedeae*





- Subtropical PP: picophytoplankton;
  Tropical PP: picophyto+diatom/pelagophytes/haptophytes (Isaji et al. 2022)
- ***Euphausia*** tended to **graze on PP directly** if provided with.

Summary

- **What are *E. brevis* and *E. diomedeae* feeding on? Same or different diet between two species?**

  E. brevis: Copepods, other non-phototrophic protists

  E. diomedeae: Dinoflagellates of different trophic strategies, diatoms, pelagophytes, copepods

- **Why can they distribute widely in low-latitude ecosystems?**

  Ominvory (opportunistic feeding with high trophic plasticity) favors rapid adaption to changing environmental conditions.

Thank you !

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