

Seasonal changes in zooplankton community and population structure, body size and lipid contents of small copepods in Ishikari Bay, Sea of Japan

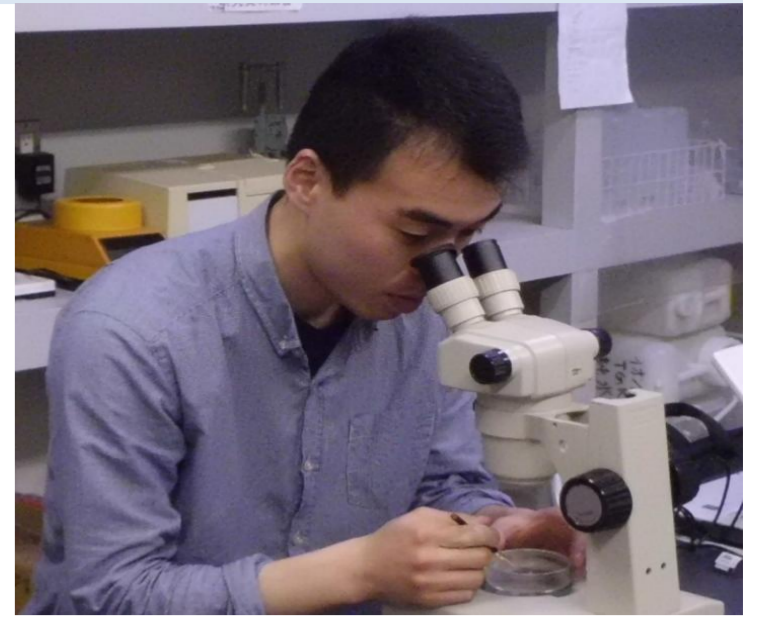
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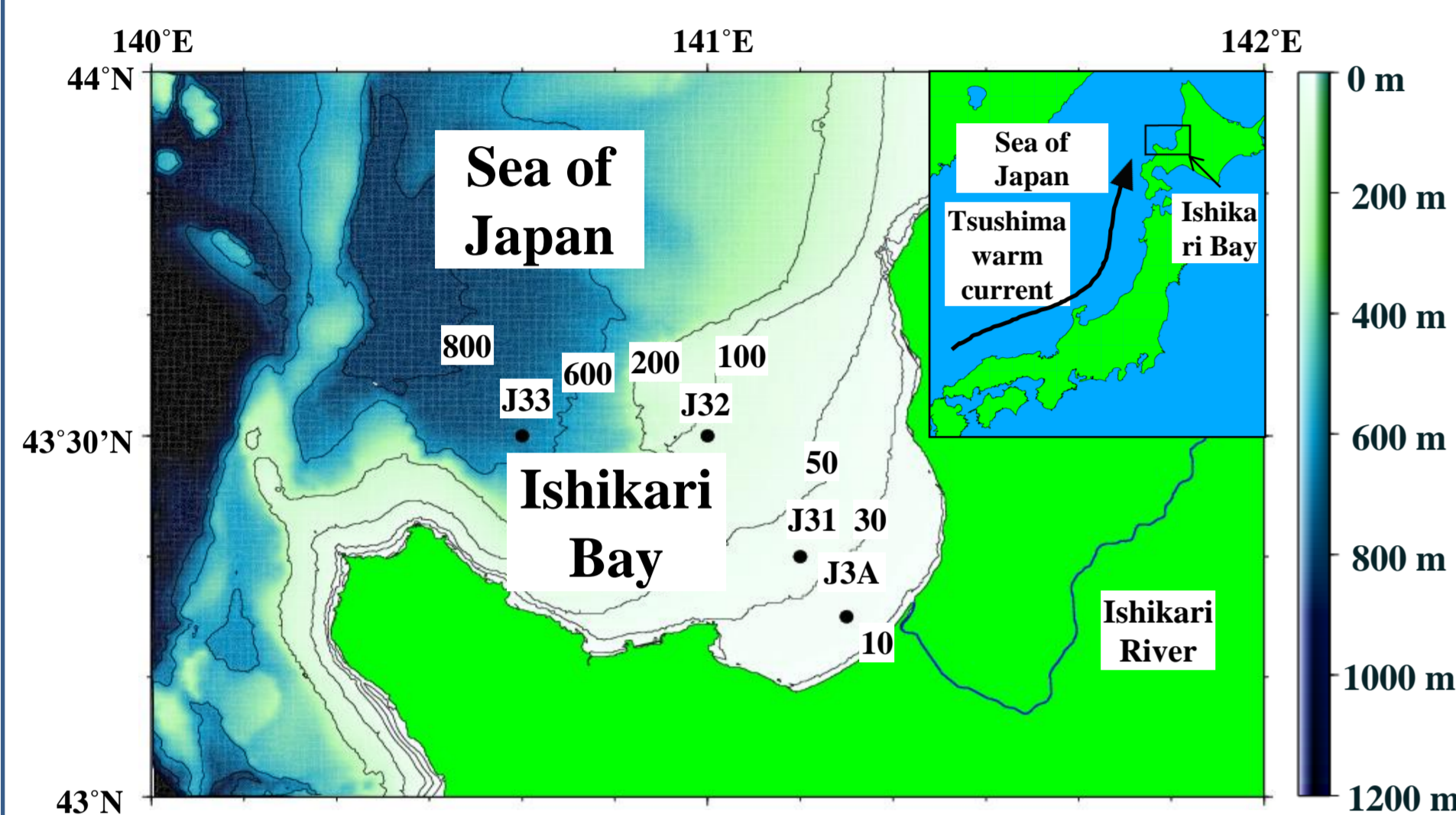
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Introduction

- Despite their importance, little information is available for seasonal changes in zooplankton community, especially small copepods in Ishikari Bay.
- The present study aims to evaluate seasonal changes in zooplankton community and population structure, prosome length (*PL*) and oil sac volume (*OSV*) of the numerical dominant small copepods (*Paracalanus parvus*, *Pseudocalanus newmani* and *Oithona similis*) in the bay.

Material & Methods



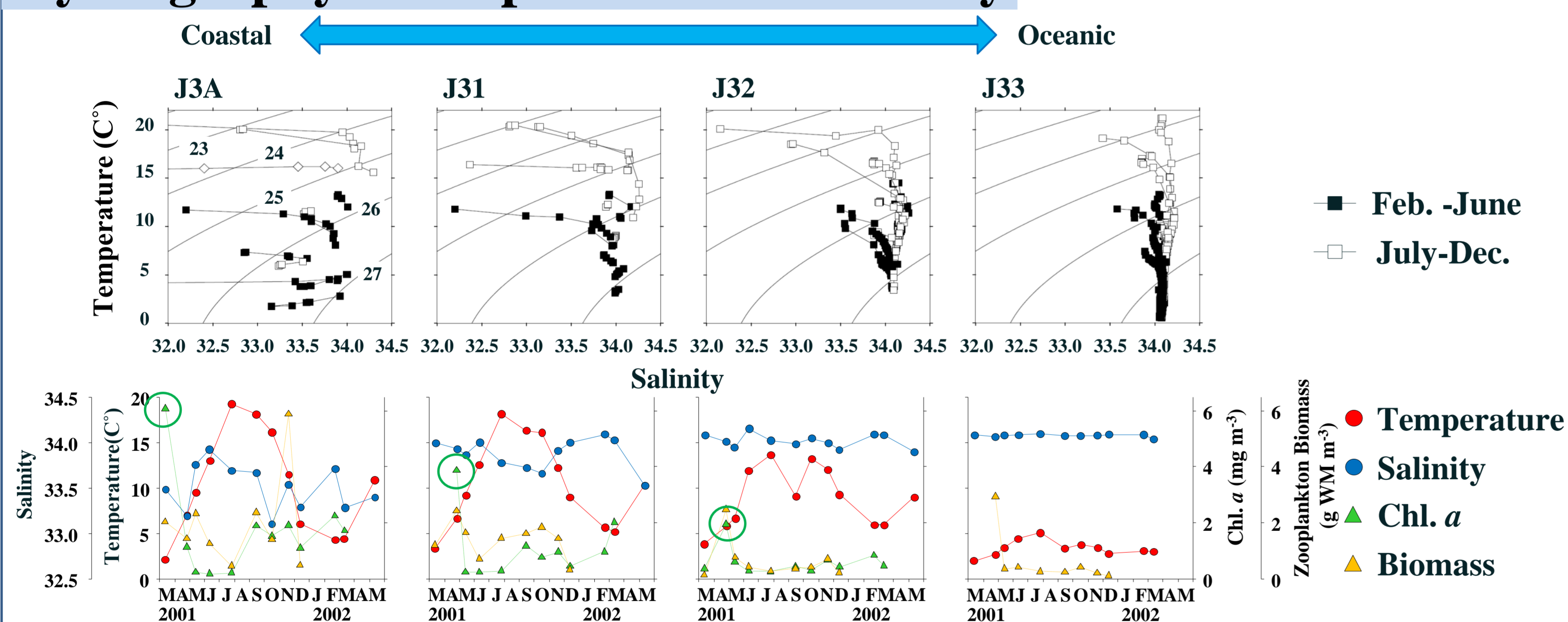
- Monthly zooplankton samples were collected by vertical hauls of 100 μm mesh NORPAC nets during March 2001 to May 2002.
- Wet mass (*WM*) was measured for each sample.
- Samples at St. J3A, J32, and J33 were sorted and counted according to each zooplankton taxonomic group.

- For samples at St. J31, copepod species and copepodid stages were identified and enumerated.
- For adult females (C6F) of small copepods, prosome length (*PL*), prosome width (*PW*), oil sac length (*OSL*) and oil sac width (*OSW*) were measured at least 50 individual for each sample. Prosome volume (*PV*) and Oil sac volume (*OSV*) were calculated using following equations.

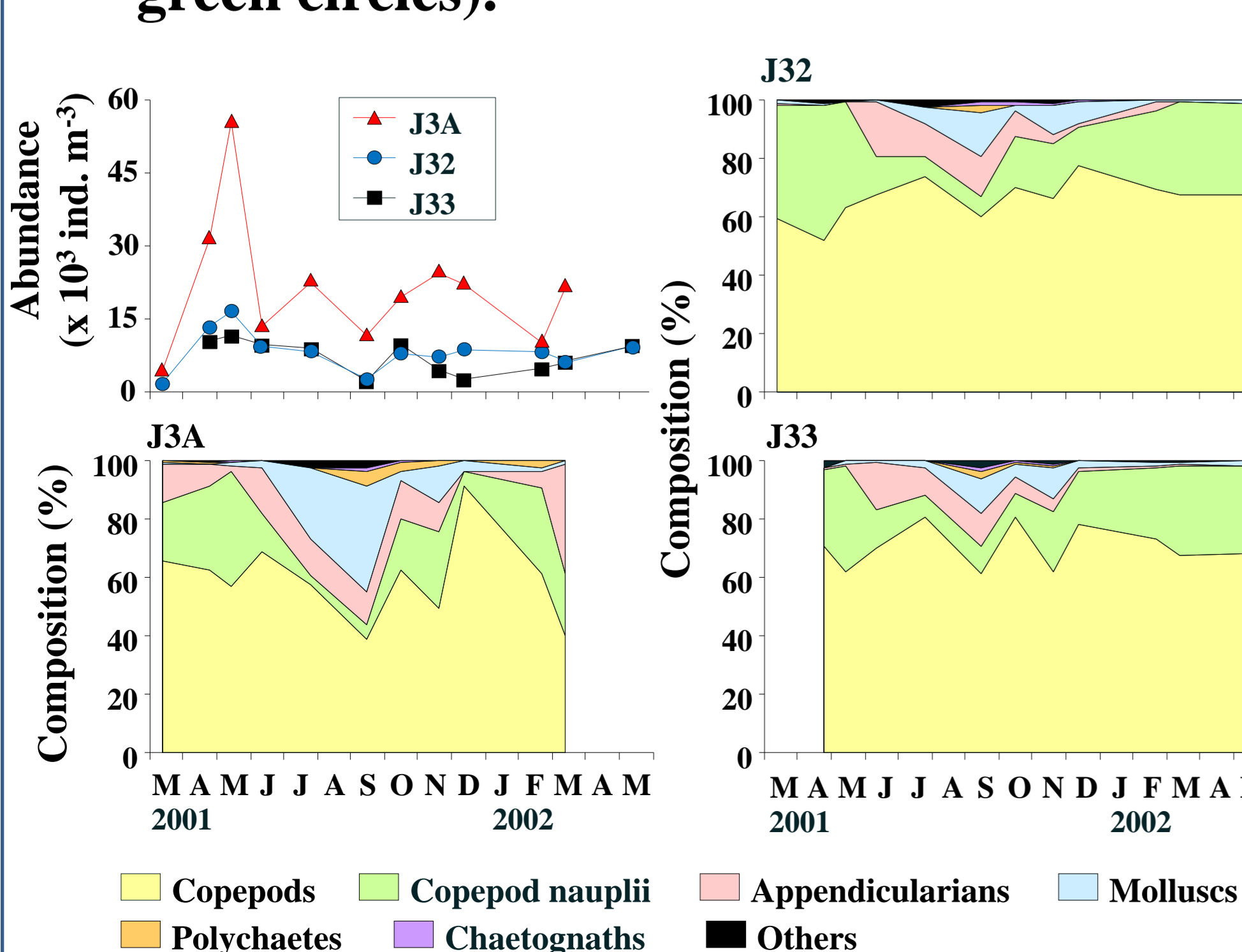
$$PV = \frac{4}{3} \pi \left(\frac{PW}{2} \right)^2 \left(\frac{PL}{2} \right)$$

$$OSV = \frac{4}{3} \pi \left(\frac{OSW}{2} \right)^2 \left(\frac{OL}{2} \right)$$

Hydrography & zooplankton community

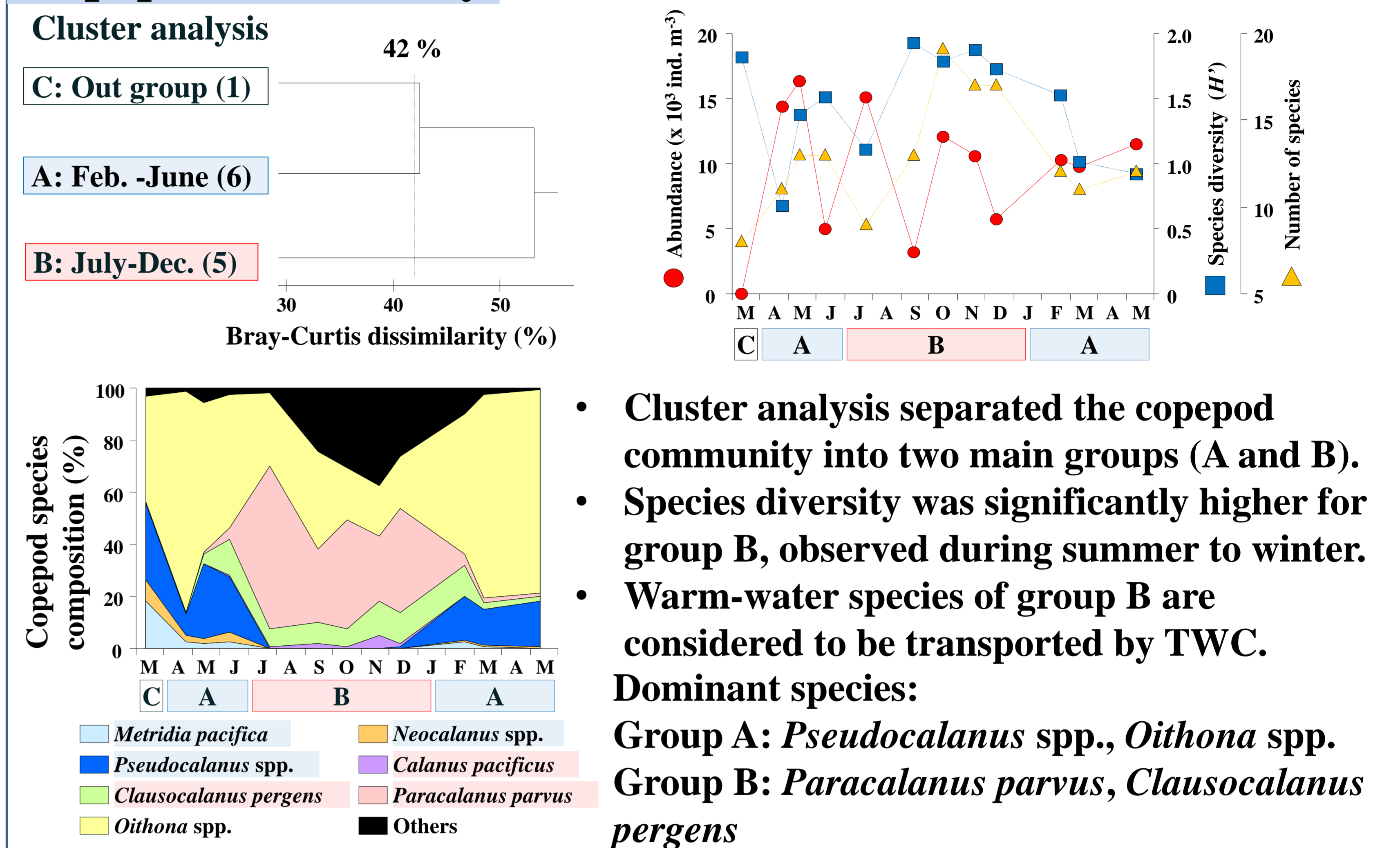


- Influence of river water was observed at the coastal stations (St. J3A, J31).
- Influence of saline Tsushima Warm Current (TWC) was observed during July to December.
- High chl. *a* was recorded at the coastal stations during spring (marked with green circles).

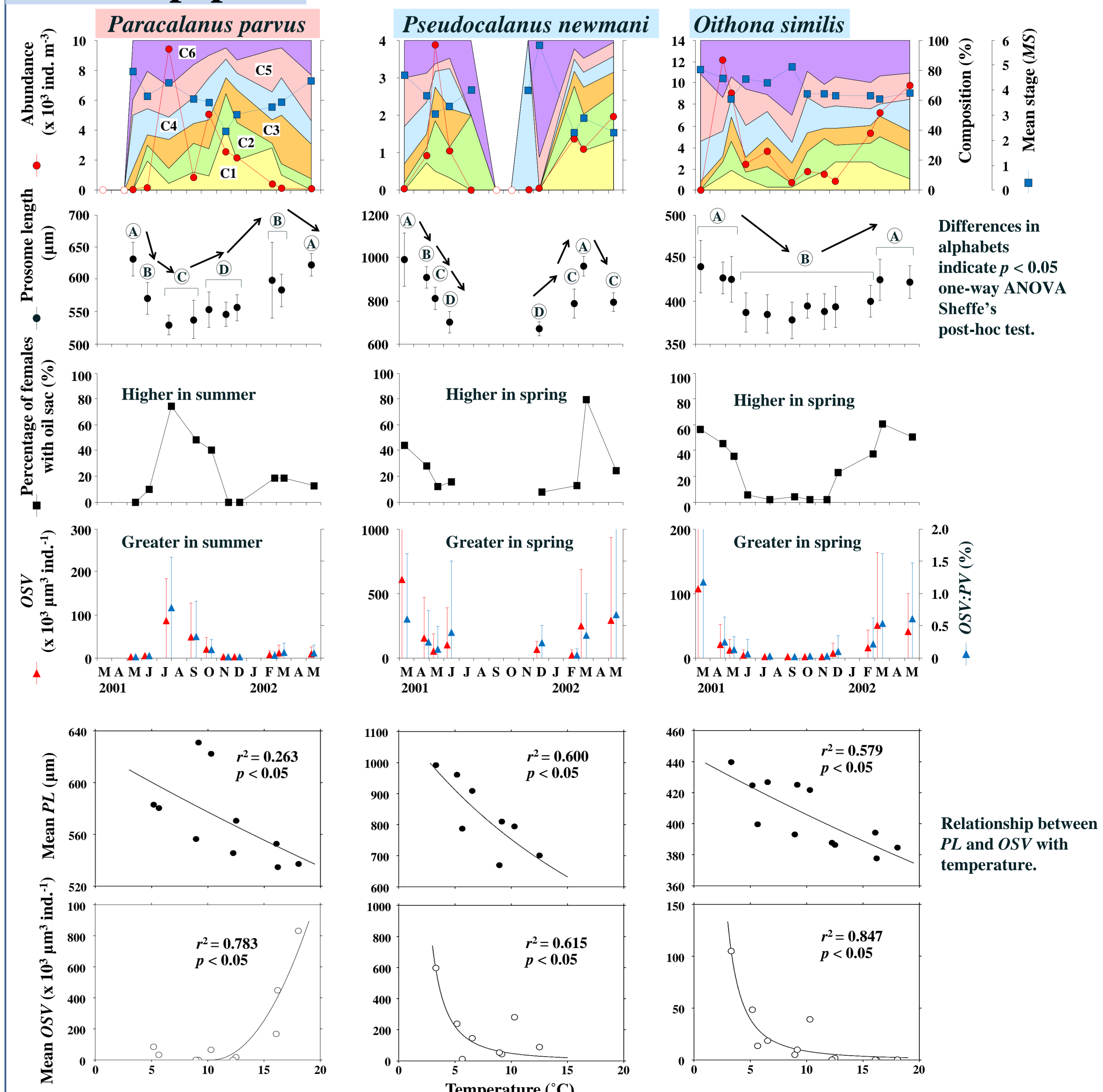


- Zooplankton abundance reached a peak in May.
- Taxonomic composition in abundance was dominated by copepods.
- Dominance of nauplii during winter to spring would be caused by reproduction of copepods come from phytoplankton bloom as energy.
- Dominance of appendicularians during summer to autumn might be transported by TWC.

Copepod community



Small copepods



- Similar seasonal pattern of *PL* (larger during spring) was observed both warm-water species (*Paracalanus parvus*) and cold-water species (*Pseudocalanus newmani* and *Oithona similis*).
- However, composition of oil containing specimen and *OSV* showed species-specific seasonal pattern: higher/greater in summer for warm-water *P. parvus*, while higher/greater in spring for cold-water *P. newmani* and *O. similis*.

Species-specific seasonality in lipid accumulation (greater in summer for *P. parvus*, while greater in spring for *P. newmani* and *O. similis*) suggests that small-sized copepods utilize stored lipid not only for overwintering but also for reproduction.