VERTIGO Picoplankton @ K2 (NW Pacific)

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Remote sensing images of Chl. \( a \) (Aug. 2005)
Vertical profiles of autotrophic picoplankton and heterotrophic bacteria at K2 (by Flow Cytometry)

- Autotrophic picoplankton = *Synechococcus* + picoeukaryote
- *Prochlorococcus* didn’t occur in the high latitude sea area, limited by low temperature.
- Interestingly, the depths of autotrophic picoplankton max were deeper for the second deployments (40m) than for the first (20m).
- The abundance of autotrophic picoplankton (mainly *Synechococcus*) at CTD031-20m was extremely high.
- No distinct inerratic stratification for heterotrophic bacteria, at least above 50m.
Vertical profiles of Aerobic Anoxygenic Photosynthetic Heterotrophic Bacteria (AAPB) and their rate to total Prokaryote at K2 (by Epifluorescence Microscopy)

- AAPB are a functional group of microorganisms containing Bacterial Chlorophyll a.
- Different from autotrophic picoplankton, the depths of AAPB max were similar (40m) for the second deployments and for the first, though the max depths for the first were less obvious.
- The depths of AAPB max were close to DCM.

The depths of prokaryote max were deeper for the second deployments than for the first, though the variations in the abundances from different layers were small.
- Vertical profiles of rate of AAPB in total prokaryote were coincident to their abundance profiles.
- AAPB accounted for more important portion of the total biomass at 40m for two deployments.

Vertical profiles of rate of AAPB in heterotrophic bacteria were coincident to the above profiles.
Autotrophic picoplankton accounted for more important portion in total prokaryote communities at 10-20m for the first deployments, while did at 40m for the second.
Distributions of *Synechococcus*, Picoeukaryote and bacteria at the survey sites around K2

Left Figure: Blue indicated CTD #004-016; Red indicated CTD #042-058

Sampling depth: 10m (5m at seven sites)
Distributions of picoplankton in Northwest Pacific (Yokohama-K2-Honolulu)
Sampling depth: about 1m

**Prochlorococcus:**
- *Prochlorococcus* didn’t occur in the high latitude sea area, limited by low temperature.
- They are typical oligotrophic species, and dominant in oligotrophic ocean.
- The high value at the site nearest to Japan was caused by Kuroshio.

![Prochlorococcus distribution map](image)

**Synechococcus:**
- *Synechococcus* is ubiquitous in marine environments.
- The higher values occurred in the area with high chlorophyll.

![Synechococcus distribution map](image)

**Picoeukaryote:**
- The abundances of picoeukaryote were lower than other autotrophic picolankton.
- Their distribution was regulated by trophic level.
- The low abundance of picoeukaryote about K2 may be caused by iron limitation?

![Picoeukaryote distribution map](image)
Bacteria:
- Bacterial distribution was regulated by trophic level.

AAPB:
- The abundance and rate of AAPB were regulated by trophic level (Chlorophyll).

AAPB/Bacteria %:
Virioplankton populations were also detected by Flow Cytometry. The further study is going on.

Flowcytogram of a field sample (CTD023-40m) from VERTIGO shows the discrimination of the virioplankton populations. V-I with high fluorescence are considered as algal viruses, the majority below V-I as bacteriophages.