Diversity in light:growth optima may occur within not between phytoplankton types in the Northern Gulf of Alaska

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What is the vertical distribution and pigment content of Cryptophyte phytoplankton?

Methods

- Phytoplankton are unicellular primary producers in marine ecosystems
- Environmental conditions, including light, are highly variable in the Northern Gulf of Alaska (NGA)
- Previous work has demonstrated seasonal and cell size-related differences in phytoplankton light:growth relationships
- I explored the effect of light on the <20um phyto community through two questions, one investigating diversity within a plankton class (cryptophyes), and one investigating diversity between phytoplankton classes (pico, nano, syn)

Significance

- Little observed variability in growth-light relationships between phyto groups but high variability in growth rates between stations
- Differences in light niche occupancy may be occurring within phytoplankton groups due either to acclimation or different strains rather than between these groups

Future Directions

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Cells reached their growth rate optima at ~30% of surface irradiance
- Light:growth optima did not differ significantly across cell types
- Variation among the phyto groups, but that variation isn't consistent across the stations
- Evidence for photoinhibition at highest light levels

Larger and more pigmented cryptophyte cells at lower light levels – evidence for photoacclimation within phytoplankton type

Larger variability in size and pigmentation between stations, distinct communities forming with different environmental profiles

CTD Collects Water

Filtration

Fluorometry

Fixation

Flow Cytometry

Pigment Levels

Cell Count, Cell Size

Growth Rates

CTD Collects Water

Dilution to remove grazing

Initial FC samples

24 Hour Incubation

Final FC samples

0 Bags 
1 Bags 
2 Bags 
3 Bags 
5 Bags

Growth Rates