

Variability of summer primary production in the subarctic Pacific and the southeastern Bering Sea shelf

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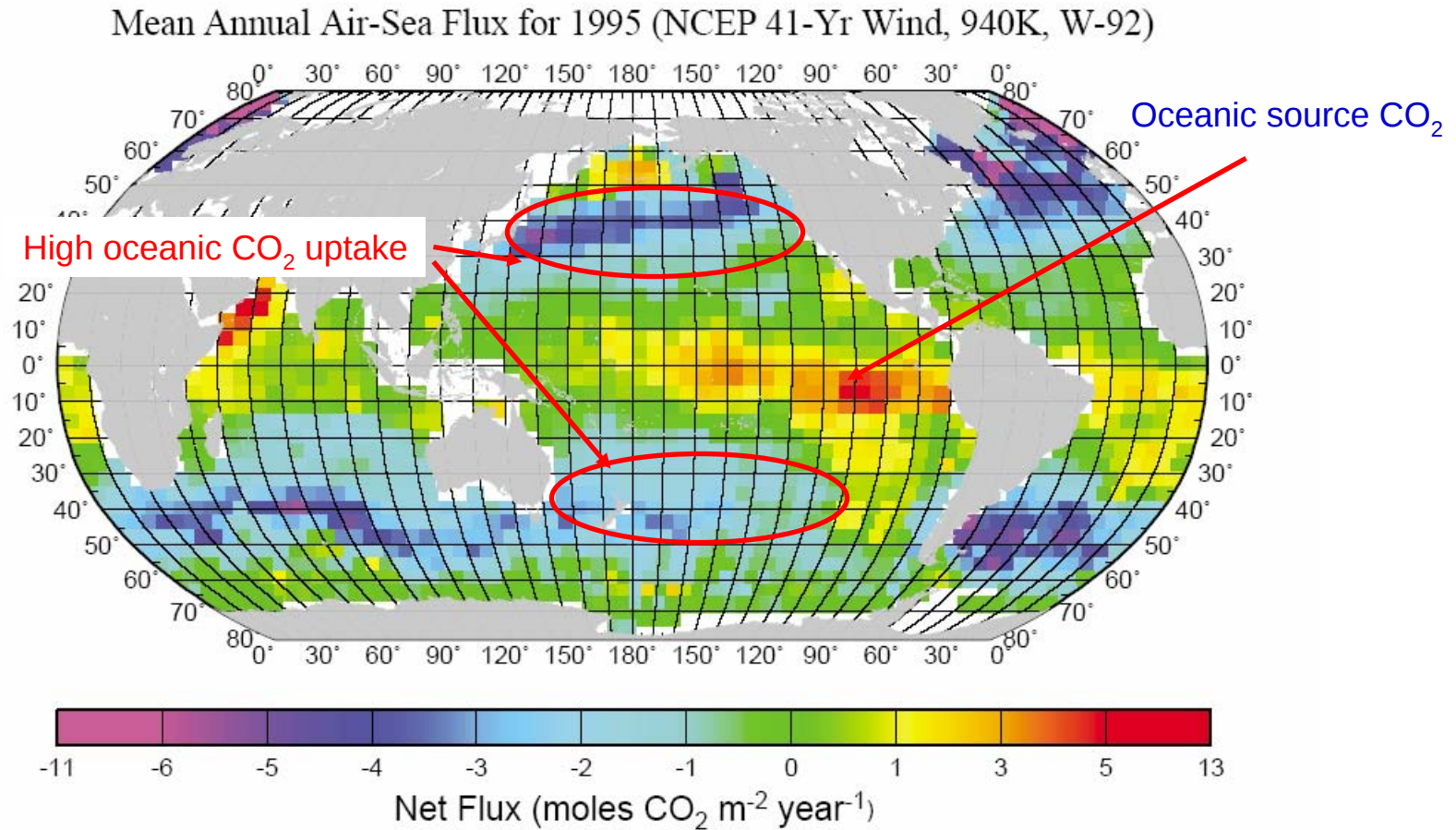
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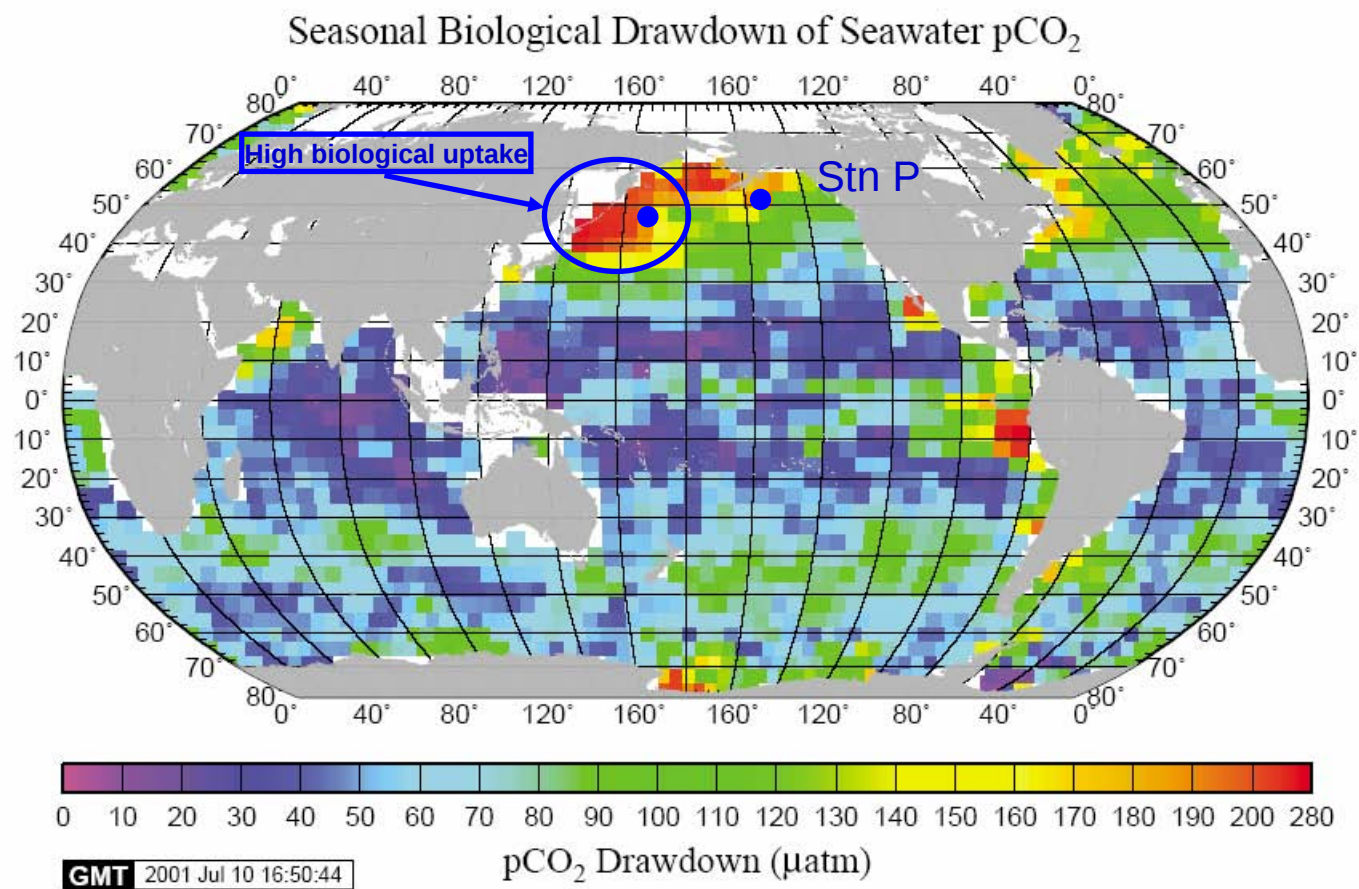
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Cooling effect
Biological drawdown

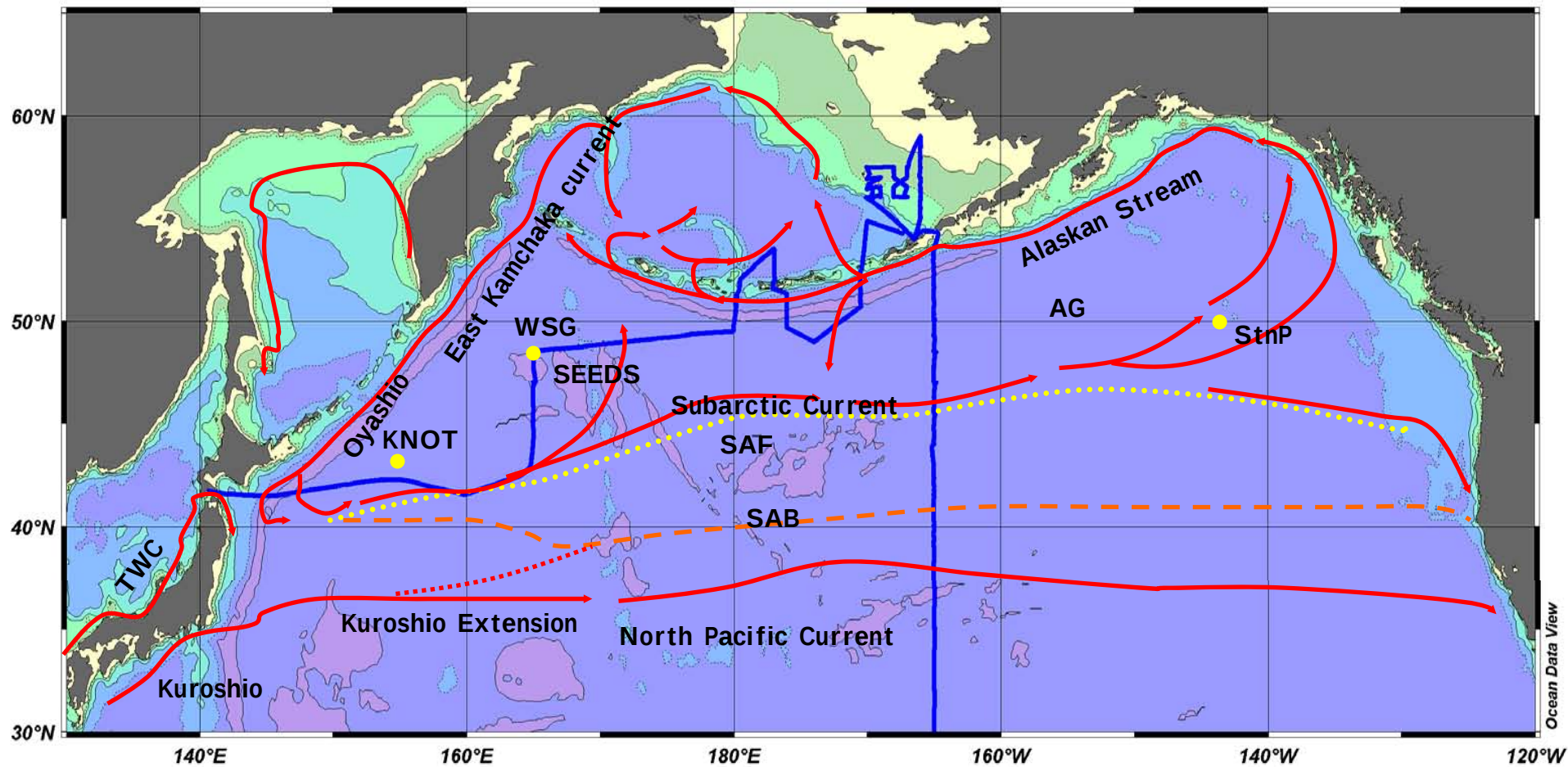


Reduce $p\text{CO}_2$ in ocean





Subarctic North Pacific Ocean



Comparison of the WSG and AG (Harrison et al. 2004)

- **Alaskan Gyre (AG)**

- Time series station
 - AG : Station Papa (50 °N, 145 °W)
- High macronutrient and Low chl-a (HNLC)
 - Fe and Silicate limitation (large phytoplankton)
 - Microzooplankton grazing control (small phytoplankton)

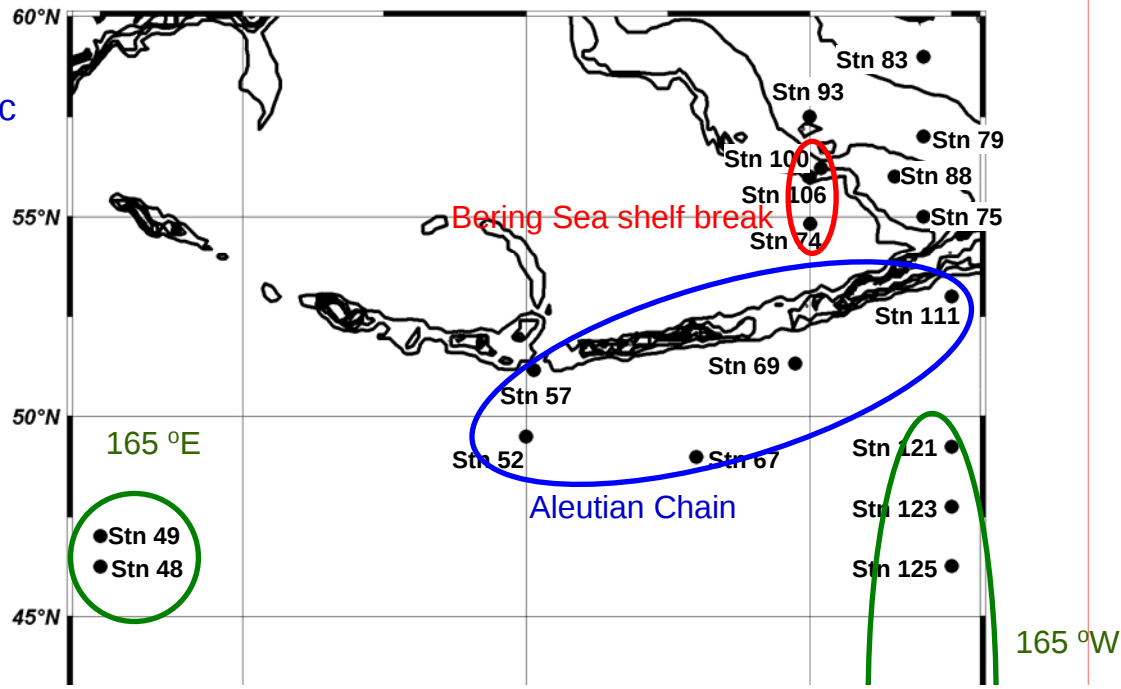
- **Western Subarctic Gyre (WSG)**

- Time series station
 - WSP: Station KNOT (44 °N, 155 °E)
- Spring bloom in May (high chl-a, primary production)
- Lower calcification and higher diatom production than Stn. P
- Summer : High macronutrient and Low chl-a (HNLC)
 - Fe limitation (large phytoplankton)

- Coastal water influence chemical and biological properties in two time series stations. Thus two time series station may not always represent conditions in the main part of gyre, especially the WSG
- Few data is available from the central area of the AG.

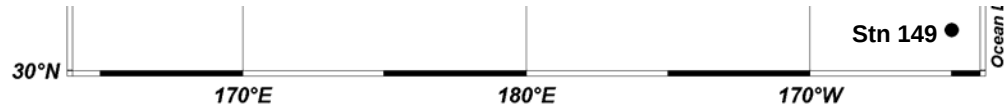
June 27- August 11 2005
 Oshoro Maru North Pacific
 and Bering Sea cruise

Nutrient
 Chlorophyll-a
 -total, <2 μ m, 2-10 μ m,
 > 10 μ m
 Carbon uptake rate
 -total, <2 μ m, 2-10 μ m,
 > 10 μ m

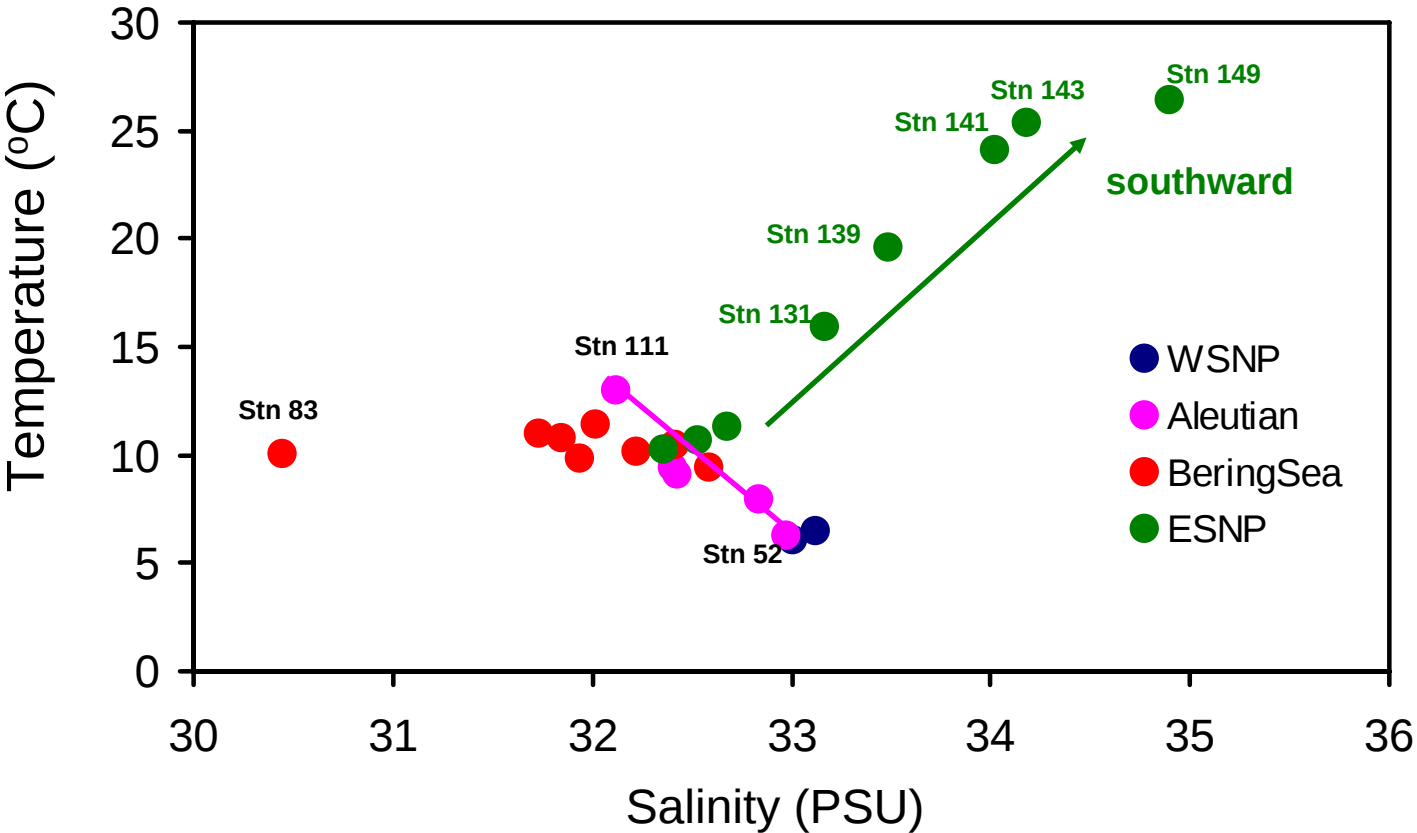


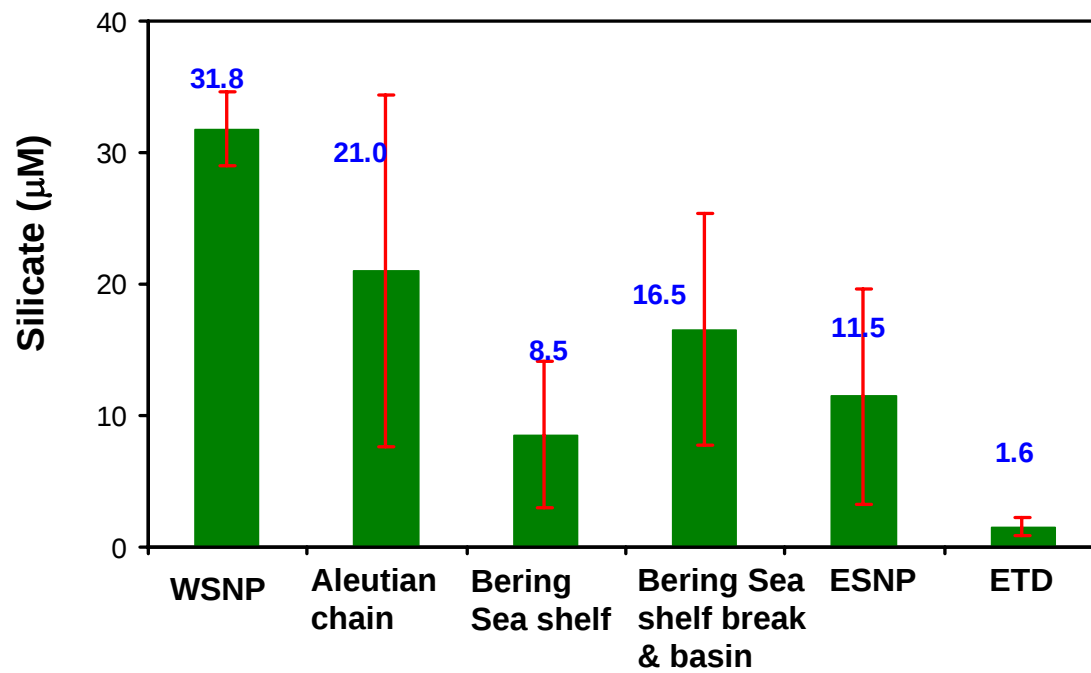
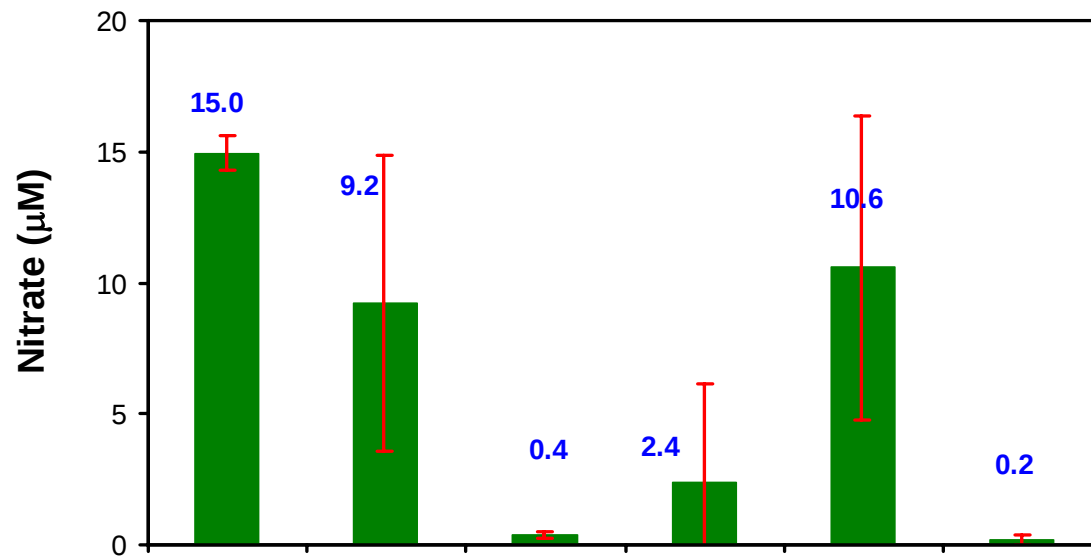
Objective:

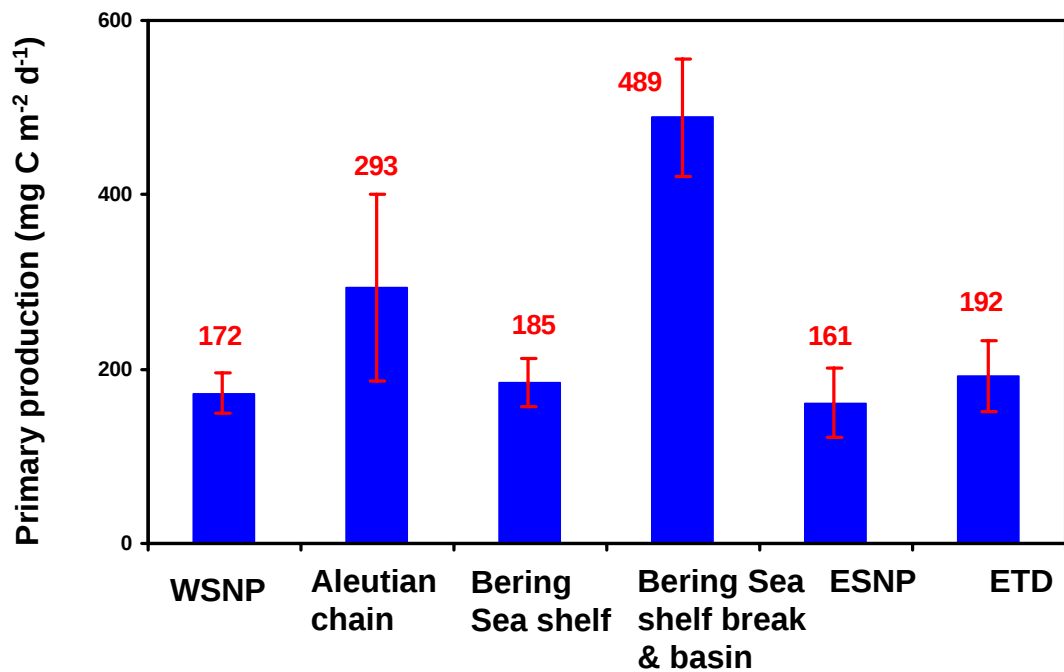
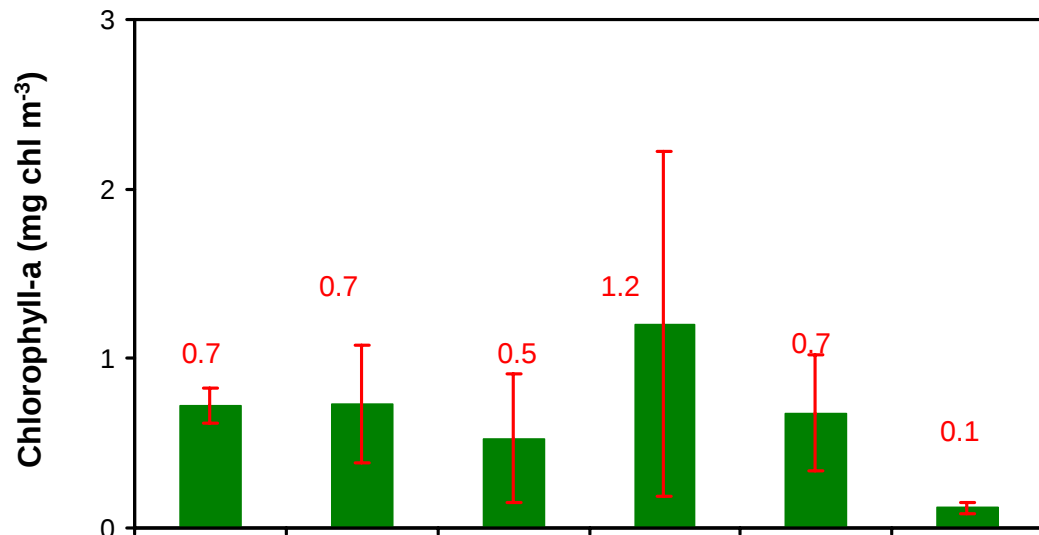
- ❖ To compare primary production in the different regions of the subarctic North Pacific during summer
- ❖ To investigate that the conditions along the 165 °E and 165 °W are similar to those of the previously known from time series measurements at the station Papa and KNOT

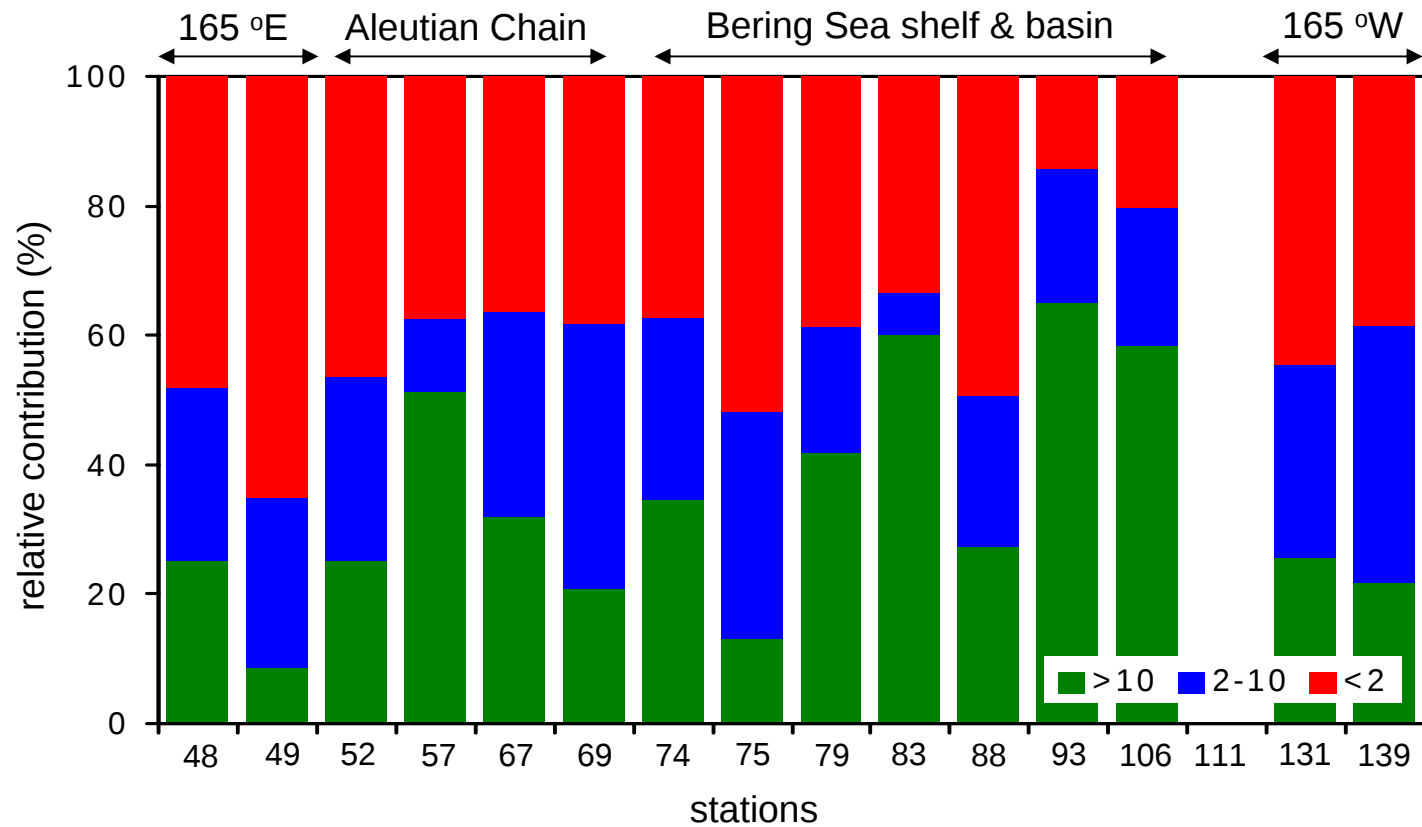


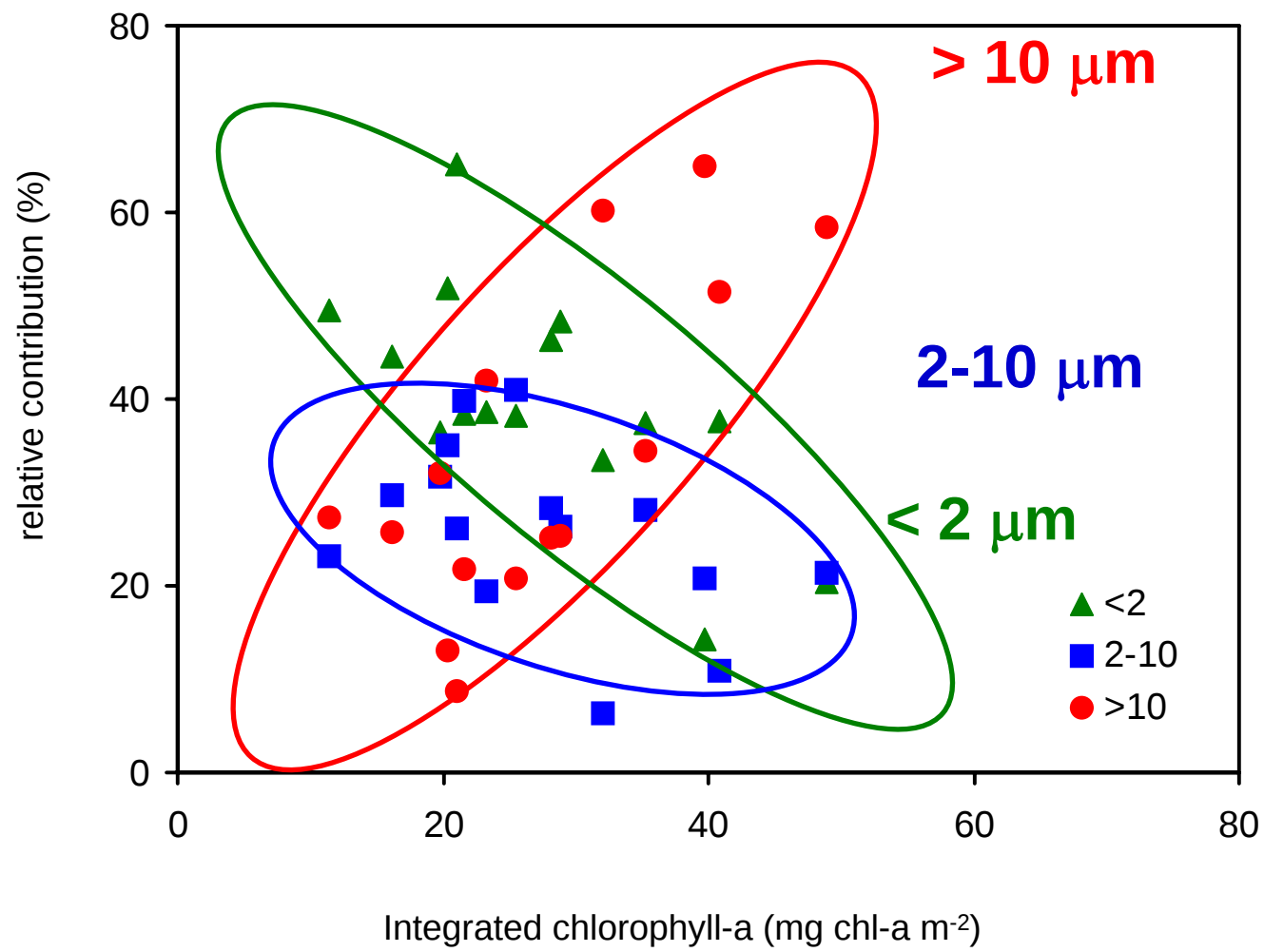
T-S diagram of surface water

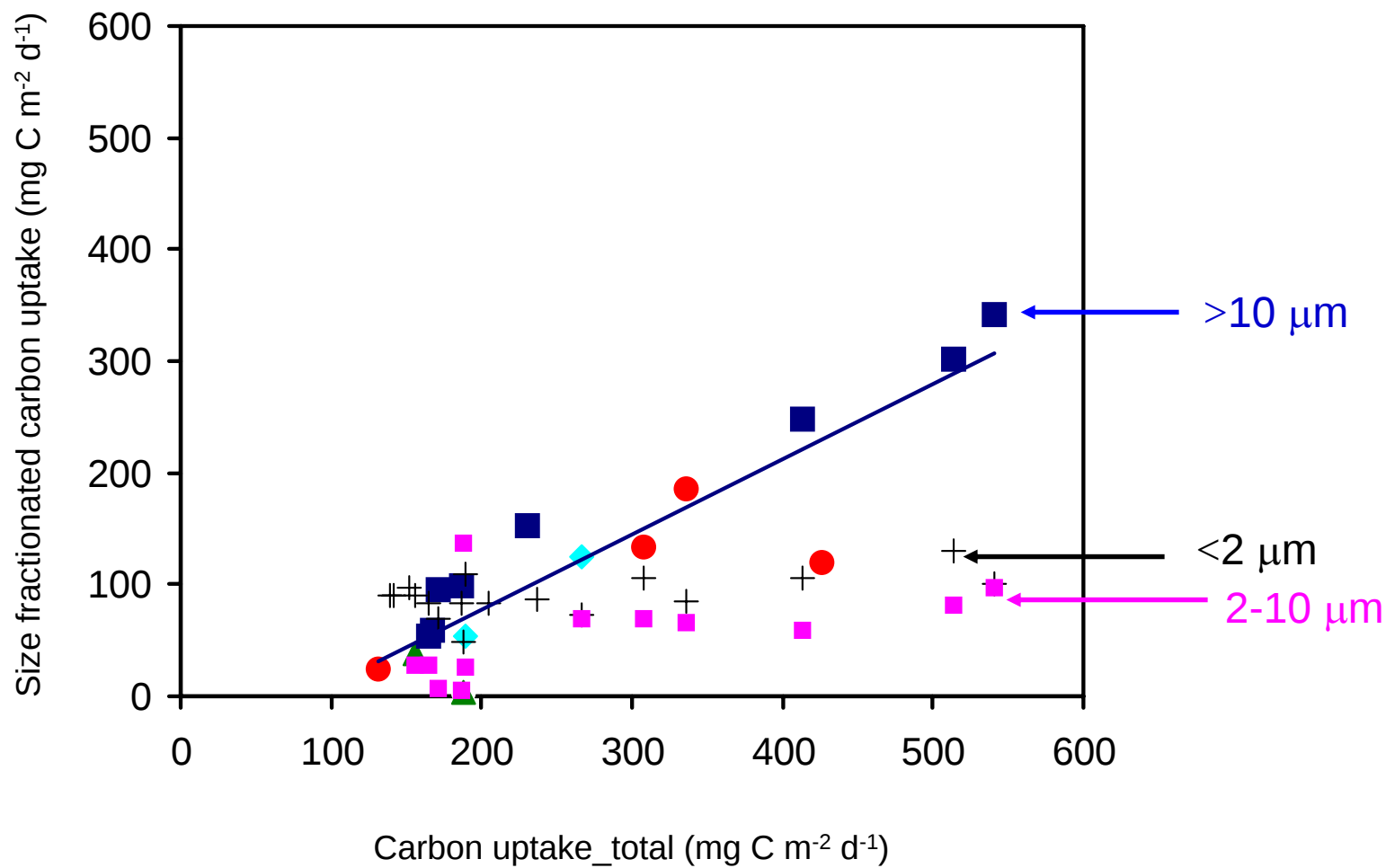


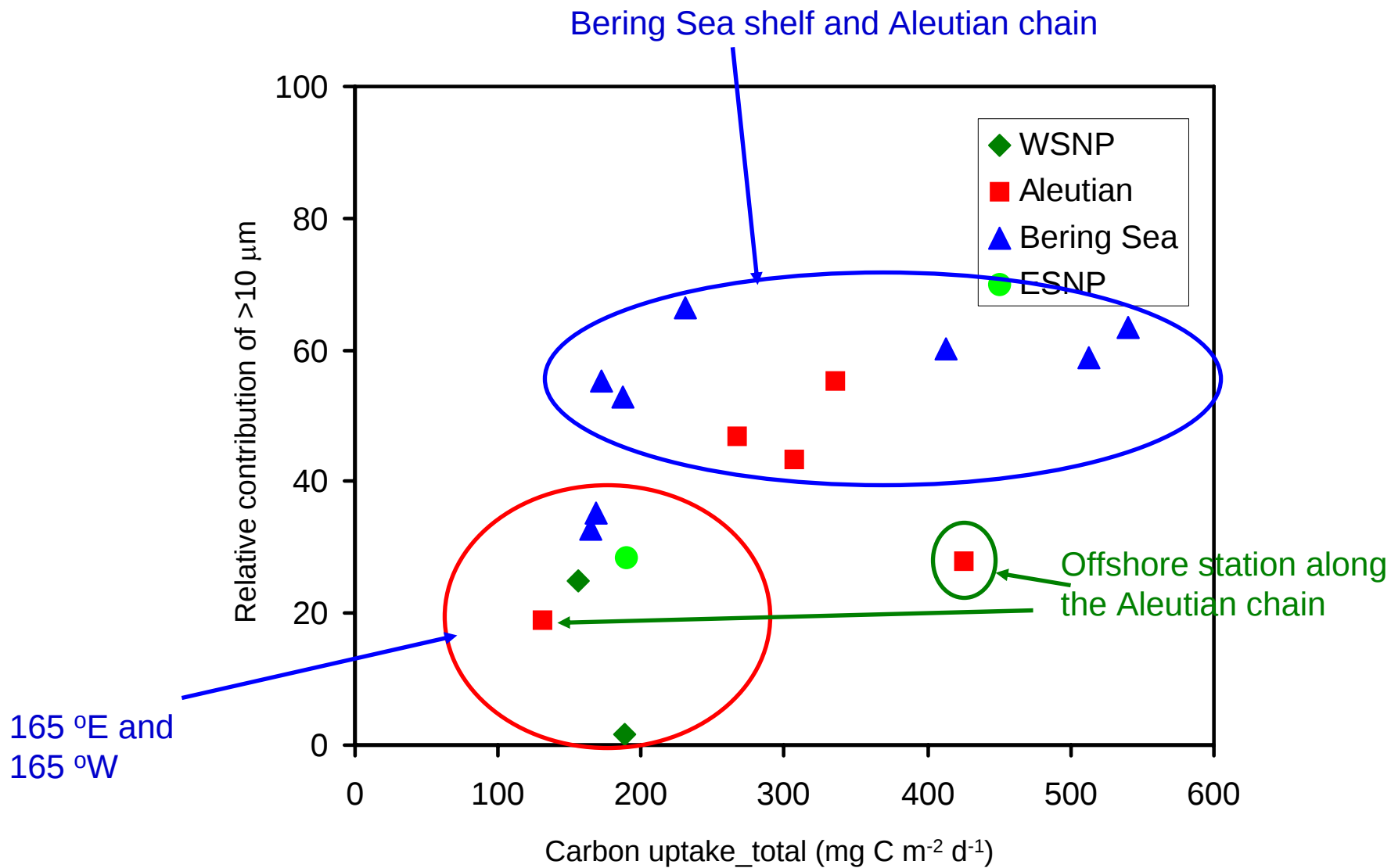




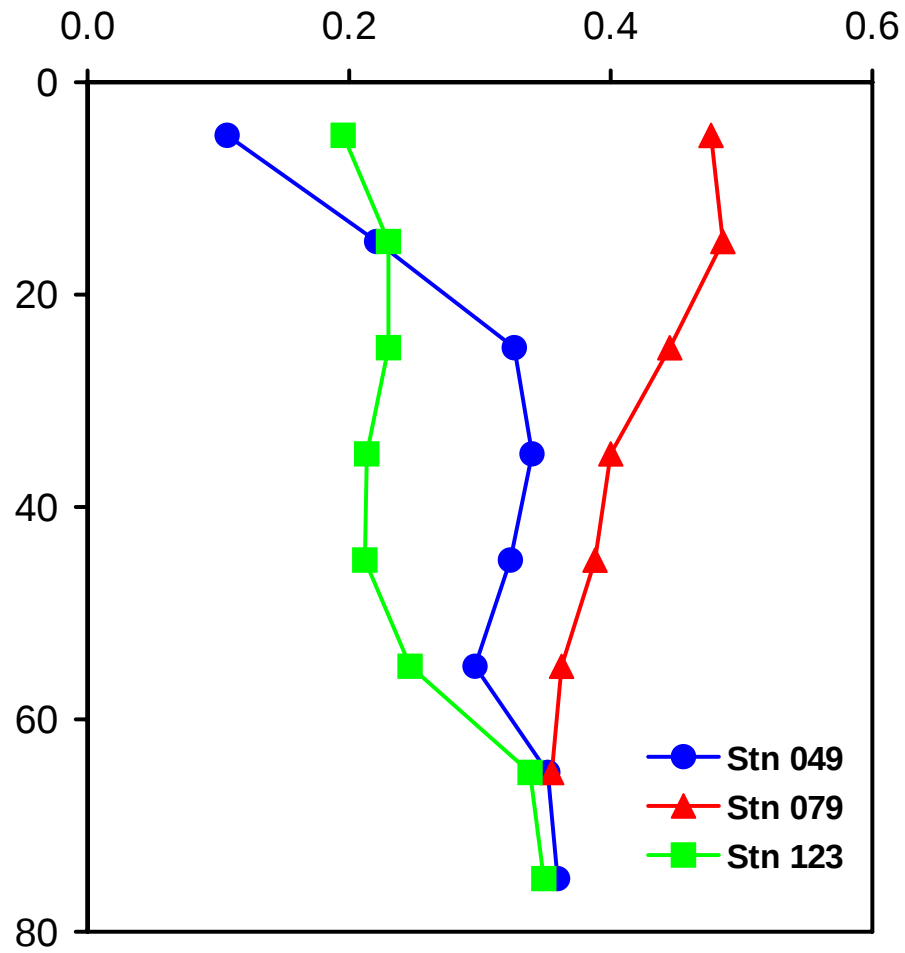




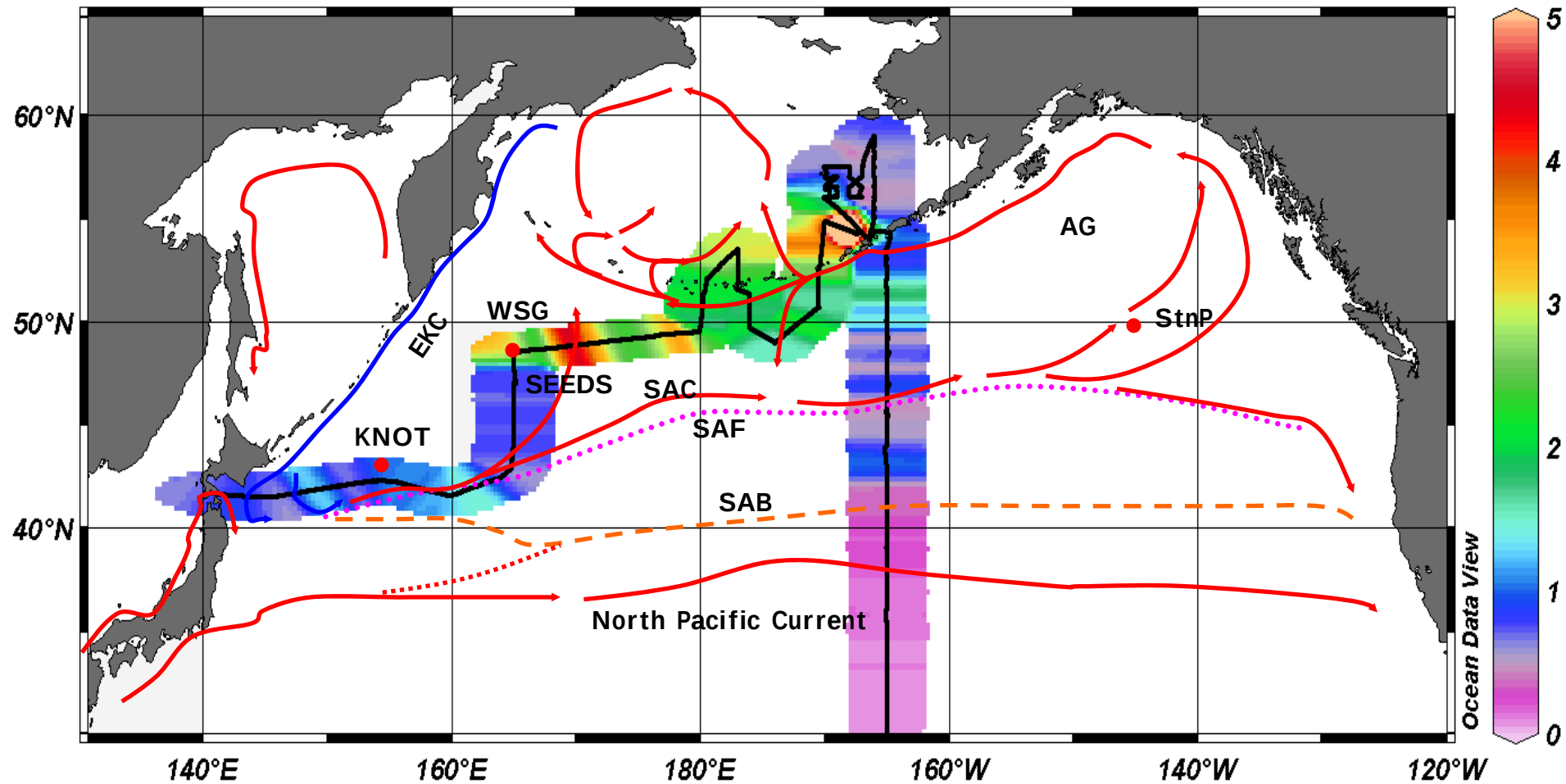




FRRF-Fv/Fm



Surface fluorescence during 2005 Oshoro cruise



Summary

- Along the 165 °E and 165 °W, surface nutrient concentrations were high but chlorophyll-a concentrations were low during summer
- The contribution of large size phytoplankton ($>10\mu\text{m}$) gets more important as total chlorophyll-a concentration increased
- Size fractionated primary production showed that the increased contribution of large size phytoplankton was responsible for higher primary production in the Bering Sea and the Aleutian chains during summer 2005
- The growth of large phytoplankton was limited between 46-48 °N along the 165 °E and 165 °W lines

Acknowledgements

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Thank you for your attention!