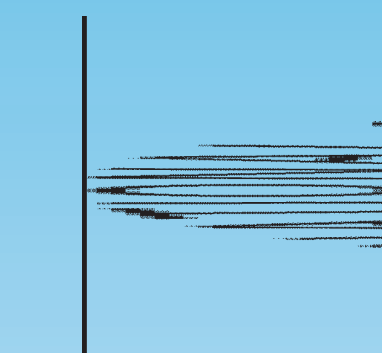


Maps of Salinity, Nitrate and Chlorophyll over the Gulf of Alaska Continental Shelf

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NOAA ship *Miller Freeman*

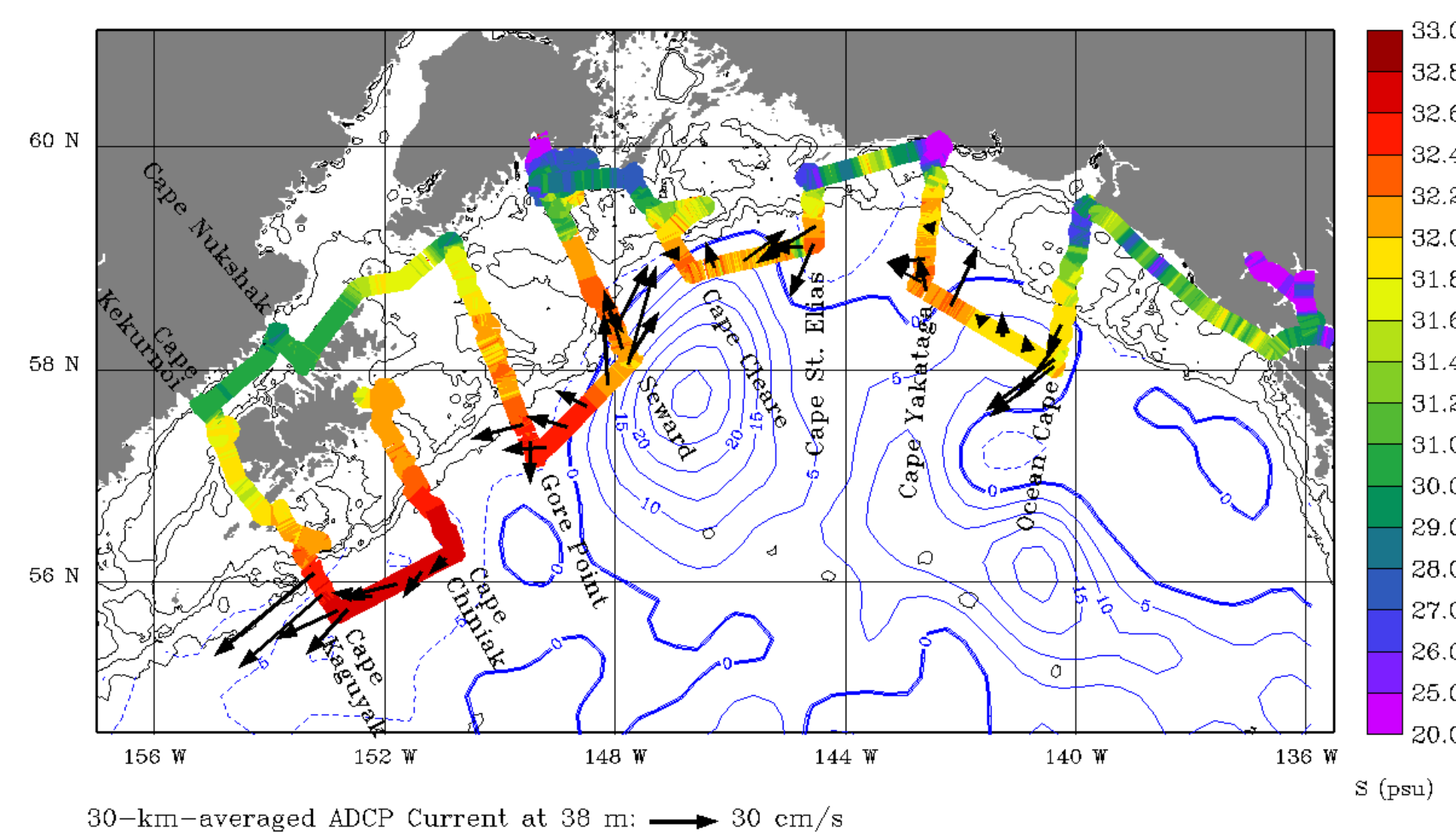


Objectives Relate basic physical and chemical parameters to the ecosystem in the Gulf of Alaska (GoA).

Methods Measure sea-surface temperature, salinity, nitrate, chlorophyll and currents on the NOAA Ship *Miller Freeman*, July 19 to August 9, 2003.

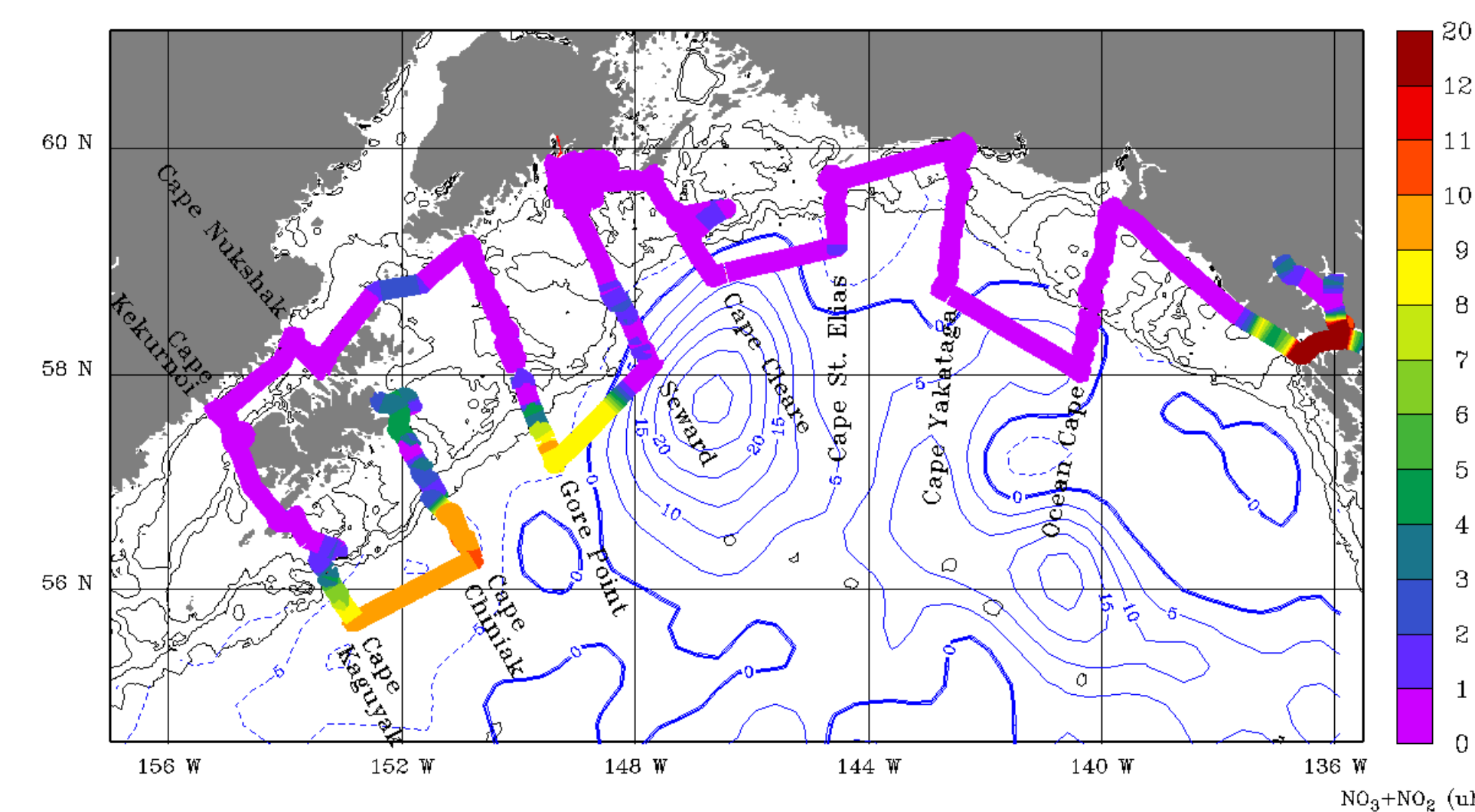
Salinity and Circulation

Salinity (5 m), Sea Surface Height (cm) and Ocean Current, 19 July–9 Aug 2003



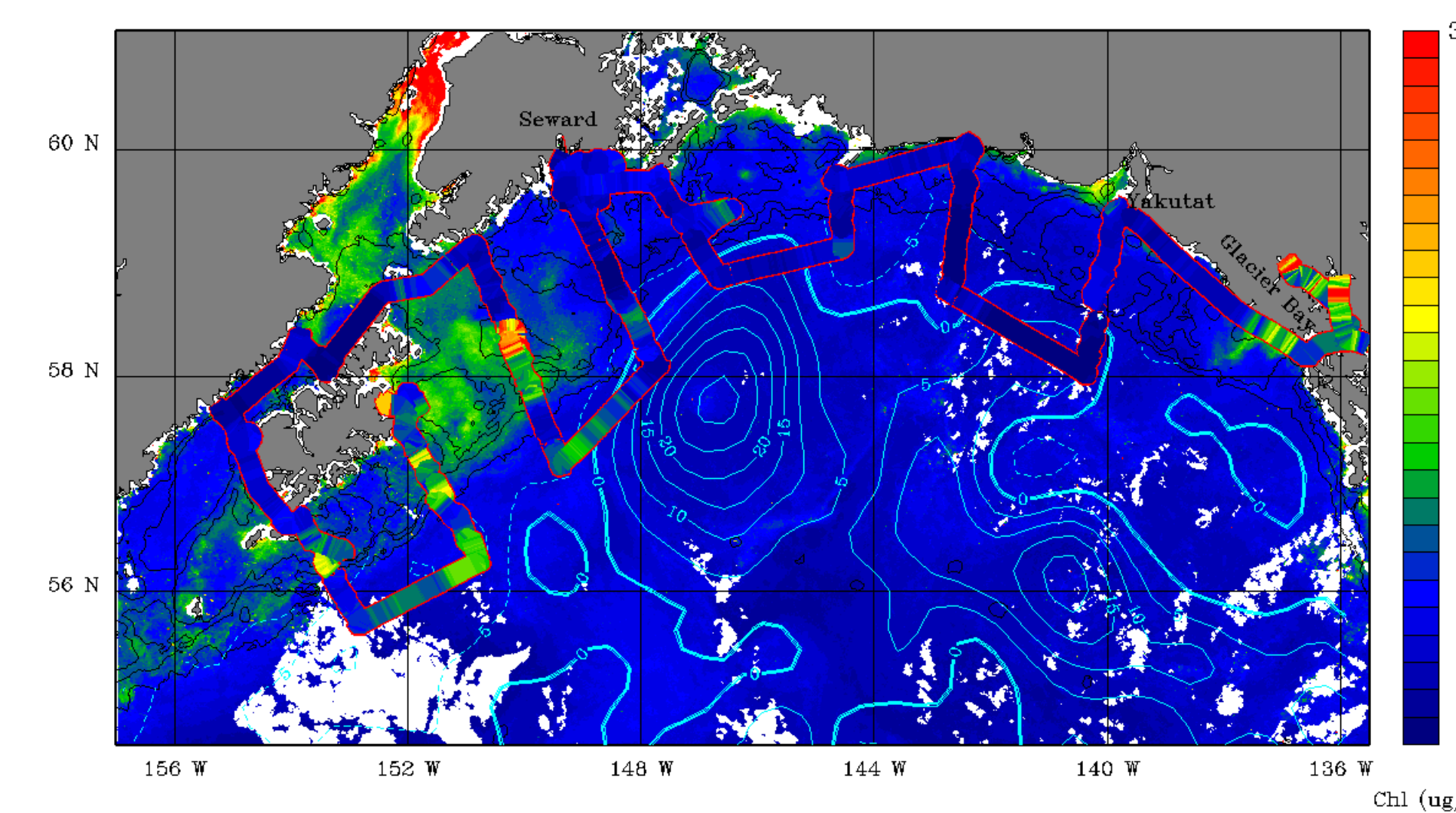
Nitrate+Nitrite

Nutrients Nitrate+Nitrite (5 m) and Sea Surface Height (cm), 19 July–9 Aug 2003



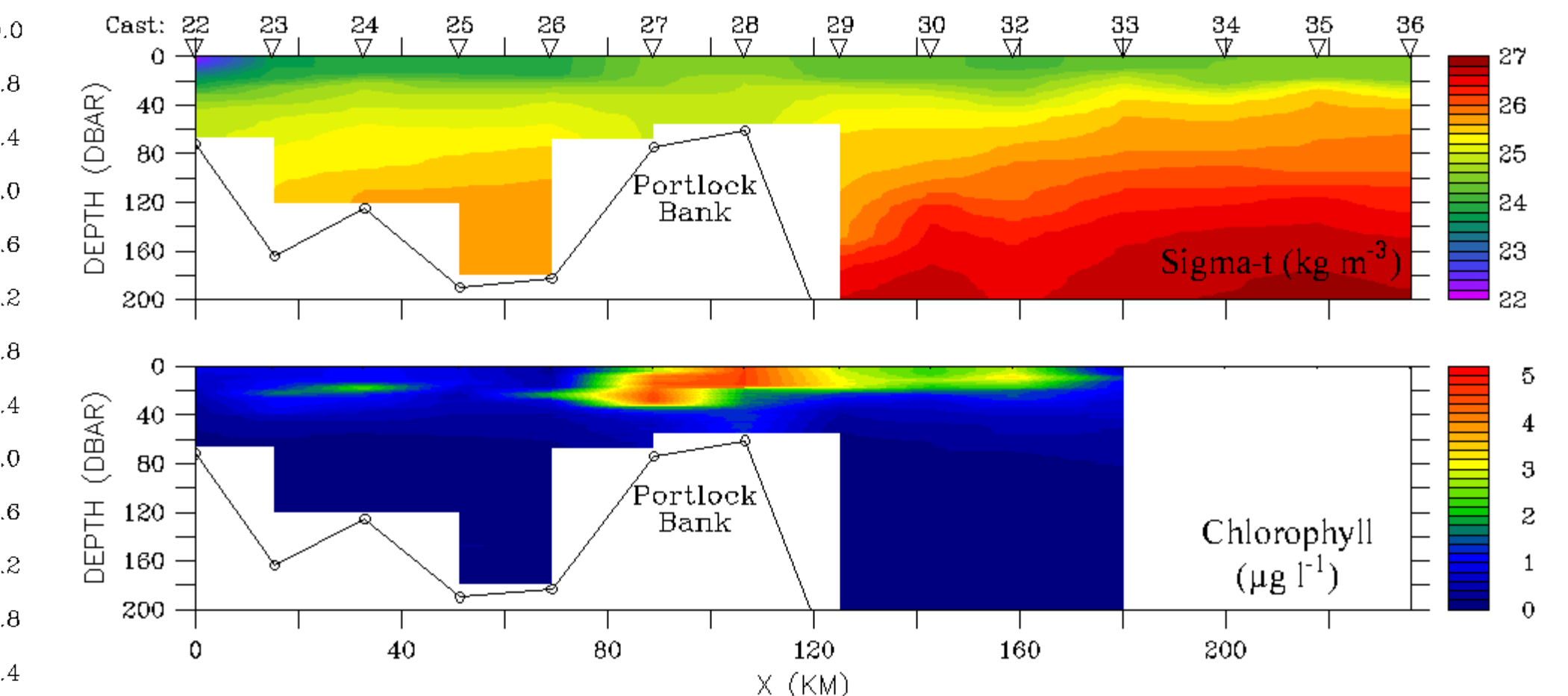
Chlorophyll

SeaWiFS & Sea Chest (5 m) Chlorophyll and Sea Surface Height (cm), 19 July–9 Aug 2003



Exceptions

Gore Point CTD Sections of Water Density and Chlorophyll



- Greater (32-33 psu) over basin
- Lower (20-32 psu) over shelf owing to freshwater dilution
- Brackish portion of Alaska Coastal Current hugs coast near Seward Line after leaving Prince William Sound
- Satellite-based sea surface height shows large (~300 km diameter), strong (up to 40 cm/s) clockwise eddy off Seward Line
- Eddy confirmed by lower salinity and strong currents on ship track at outer end of Seward Line
- Eddy reverses usual southwestward Alaskan Stream over continental shelf
- Note strong velocity perturbation off Ocean Cape Line

- Higher nitrate (4-11 μM) and higher chlorophyll (1.5-3.5 μg/l) in basin off Kodiak Island
- Lower nitrate (0-2 μM) and lower chlorophyll (0-1 μg/l) over the continental shelf and eastern basin, but with exceptions
- Generally, surface nutrients over the shelf are depleted from spring production, and cannot be easily replenished due to enhanced salinity (inner shelf) and thermal (outer shelf) stratification.
- SeaWiFS and shipboard chlorophyll compared: mostly agree to within measurement error
- Shipboard chlorophyll (@ 5 m) higher off Kodiak, perhaps due to chlorophyll maximum at ~20 m
- Large basin eddy has lower nitrate (< 1 μM) and lower chlorophyll (< 1 μg/l) with slight chlorophyll elevation on the outer rim

- Isolated regions of high chlorophyll around islands and over shallow banks where tidal currents mix nutrient-rich water from below, fueling phytoplankton growth
- Around Barren Islands (NE of Kodiak I), higher nitrate and chlorophyll suggests nutrients supplied by tidal-current mixing keep pace with bloom (see chlorophyll map)
- Low nitrate but high chlorophyll over Portlock Bank suggests bloom strips nutrients from slightly stratified water
- Gore Point density section shows reduced, but not vanishing stratification, due to tidal mixing over Portlock Bank
- Gore Point chlorophyll section shows mid-depth maximum owing to balance of cell sinking and mixing around islands

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