Are Intertidal Seaweeds Nutrient-Limited in the California Upwelling System?

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Specific Research Questions
- How does nitrate vary in the intertidal zone in an upwelling ecosystem?
- Does seaweed tissue nitrogen vary across sheltered vs. exposed sites?
- Is there a relationship between periods of upwelling and seaweed nitrogen reserves?

Results

Seawater Nitrate Concentrations

- Within a week nitrate levels varied by about 20 µM
- There were periods of relatively low nitrate availability
- There seemed to be no differences between exposed and sheltered sites

Tissue Nitrate

- Seaweeds responded dynamically to upwelling strength
- Tissue NO₃ varied greatly within a week
- Seaweeds at exposed sites had higher NO₃ reserves
- Seawater nitrate levels correlated with seaweed NO₃ reserves at wave-exposed locations

Methods

1. How does NO₃ vary in the intertidal zone at Bodega Marine Laboratory, CA?
   - Collected water samples every day
   - 4 sites
     - 2 exposed: Lessoniopsis Point (LP) & Mussel Point (MP)
     - 2 sheltered: Horseshoe Cove North & South (HCN & HCS)
   - Analyzed dissolved NO₃ with a Lachat Autoanalyzer

2. Does seaweed tissue nitrogen vary across sheltered vs. exposed sites?
   - 2 seaweed species were collected (Porphyra perforata and Pelvetiopsis limitata)

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