

Overriding questions

- **What are the relevant time and space scales to study plankton diversity?**
- **Are the time and space scales that regulate diversity the same as those that control biogeochemical cycling?**

The Hawaii Ocean Time-series (HOT)

- Established in 1988 as part of the U.S. JGOFS program.
- Primary objectives: characterize time-dependent dynamics in carbon, nitrogen, and phosphorus inventories and fluxes.



Hawai'i Ocean Time-series (HOT)



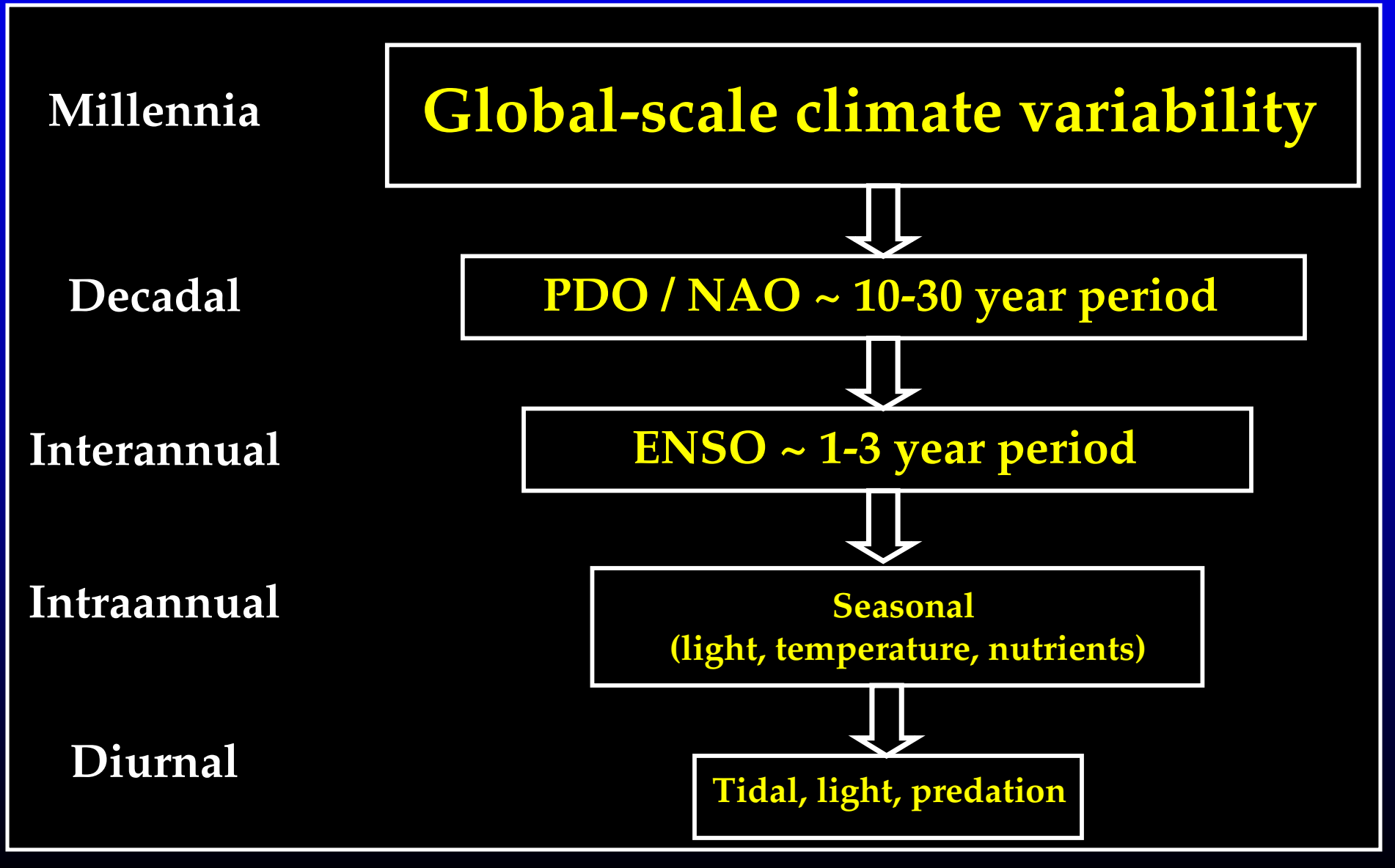
Data availability:
<http://hahana.soest.hawaii.edu>

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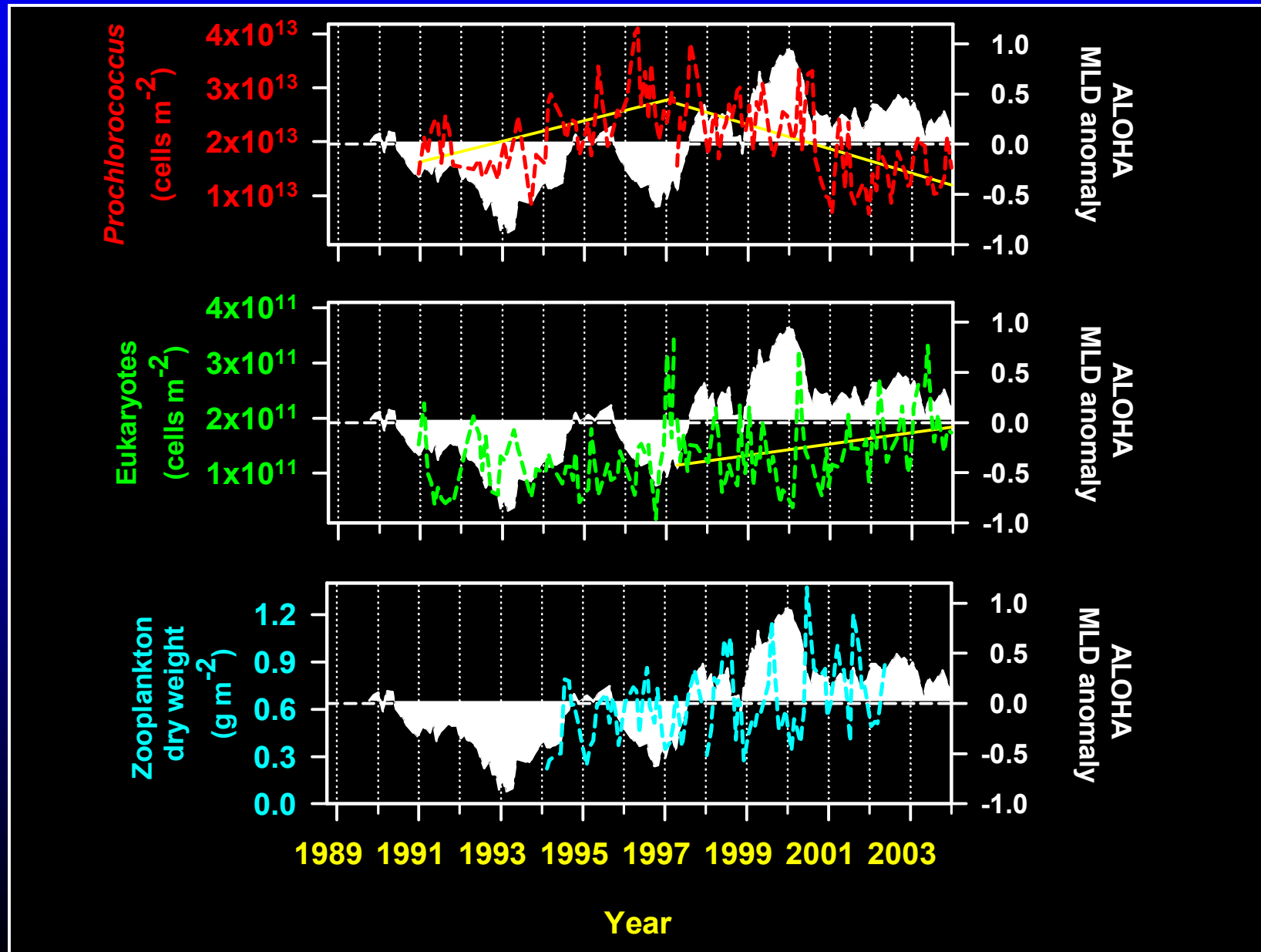
What have we learned?

- **Prokaryote dominated ecosystem.**
- **Ocean biology regulates nutrient stoichiometry and carbon export.**
- **Chronically oligotrophic upper ocean**
($\text{NO}_3^- + \text{NO}_2^- < 10 \text{ nM}$, $\text{PO}_4^{3-} < 100 \text{ nM}$).
- **N_2 fixation plays an important role in nutrient dynamics and carbon export.**
- **Organization of plankton populations may be controlled by ocean-climate teleconnections.**

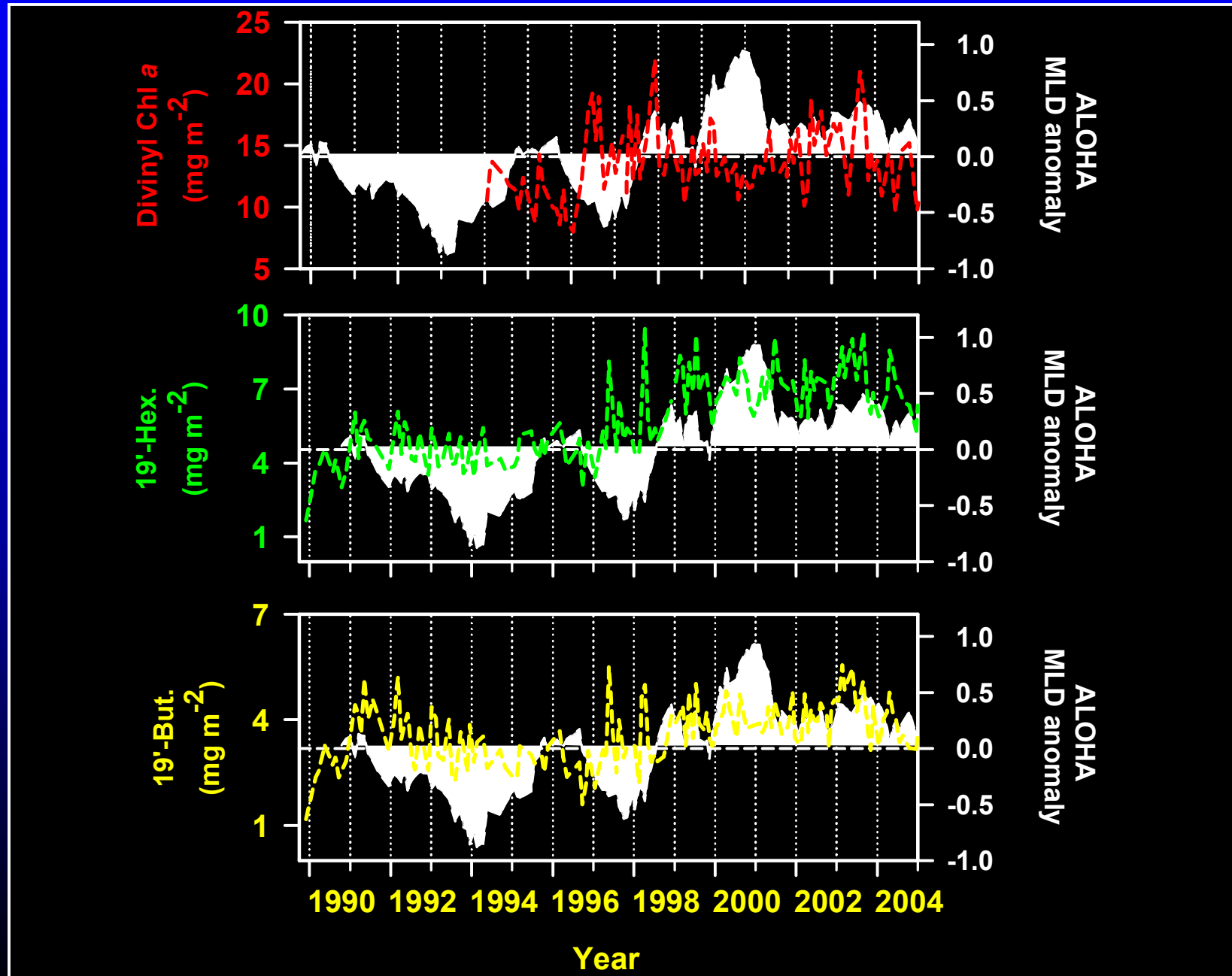
Time scales and processes driving biological variability in the oceans



Are ocean-climate teleconnections reflected in plankton dynamics?



Interdecadal and decadal scale dynamics in pigment biomarkers



Summary

- **Plankton populations at Station ALOHA vary over a broad continuum of time scales ranging from seasonal, to decadal.**
- **Plankton population structure in the central North Pacific Ocean appears linked to ocean-climate dynamics.**
- **Understanding the mechanisms regulating temporal dynamics in plankton populations requires an integrated biogeochemical approach.**