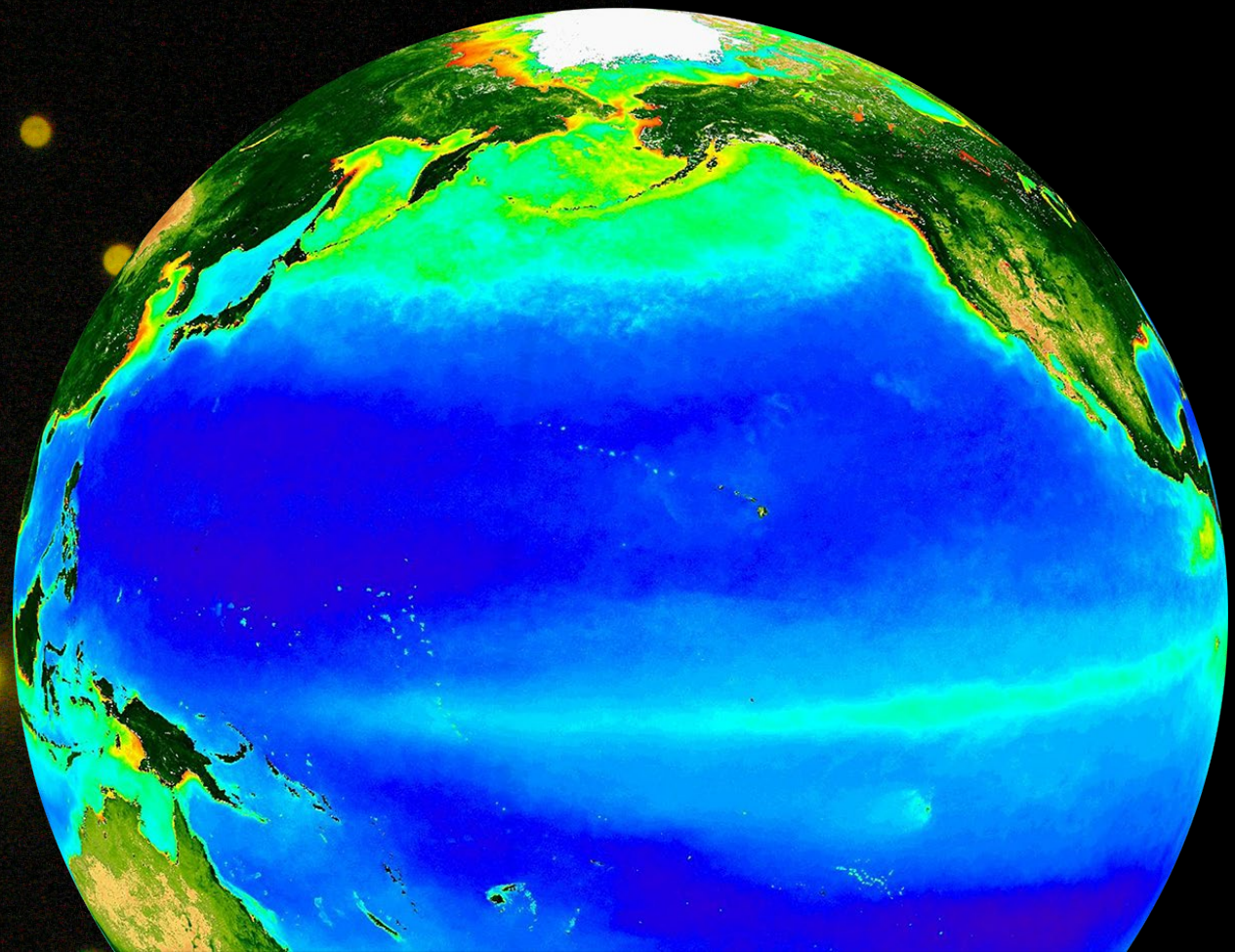
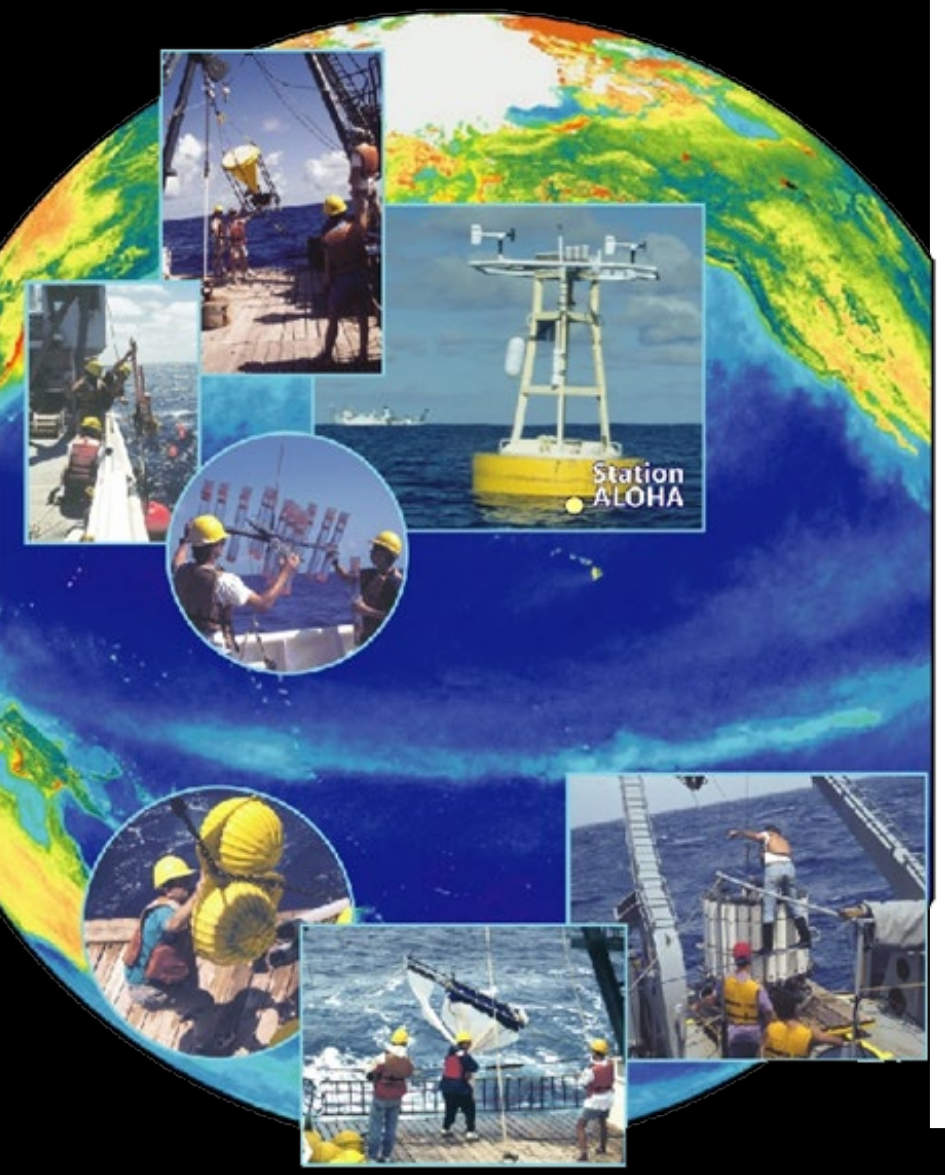
Ocean Research Advisory Panel

Angelicque White
University of Hawaiʻi at Mānoa





http://hahana.soest.hawaii.edu

Hawaii Ocean Time-series: It's HOT! (1988 – present)

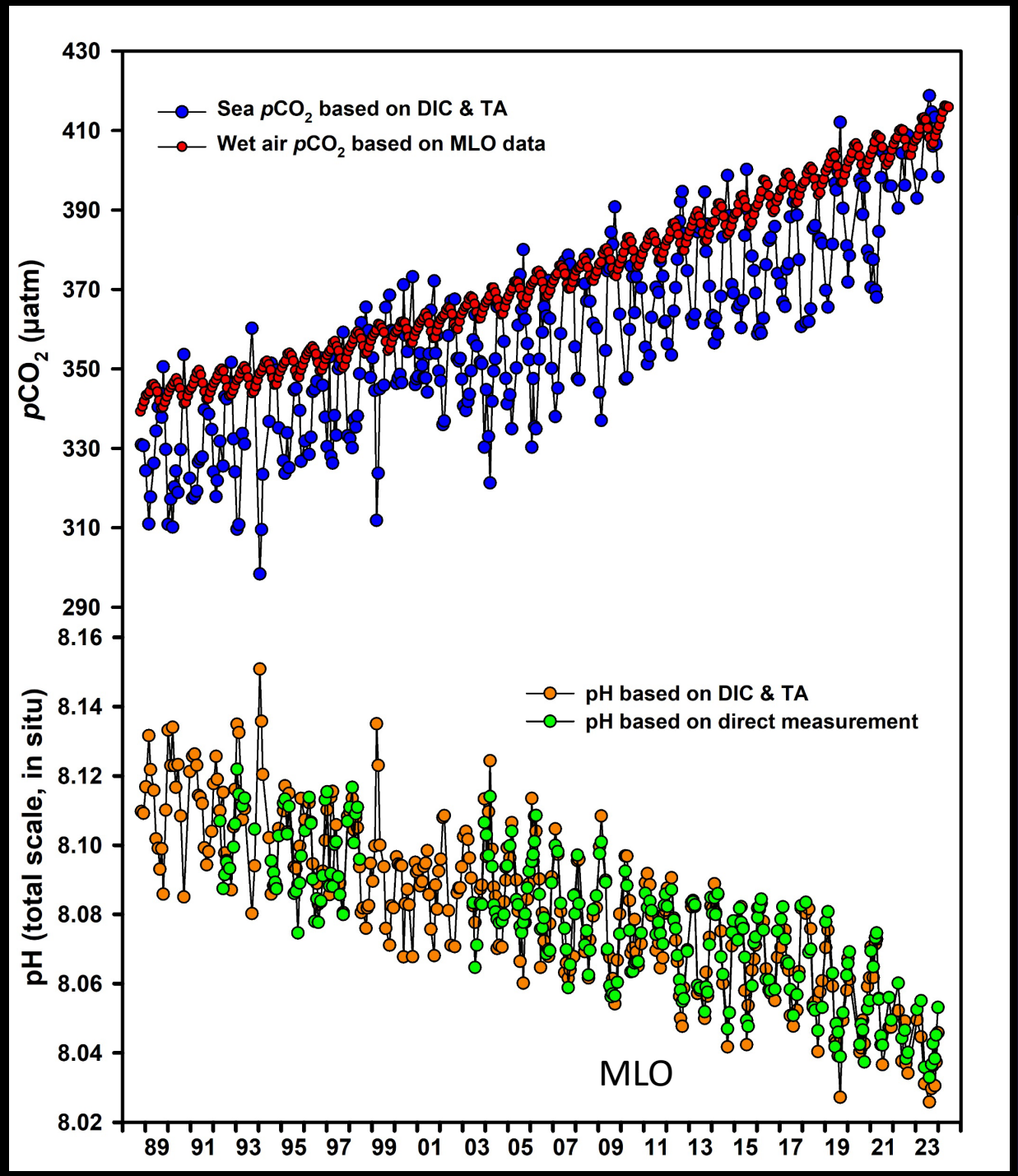
- Approximately monthly cruises to Station ALOHA
- More than 50 core measurements
- Special focus on C-N-P: The building blocks of life, and on microbial community dynamics

~800+ Publications

60+ Thesis and Dissertations

Recently renewed for another 5 year cycle with 50 UNOLS ship days awarded per yr


Oceanic Time-series reveal real,
measurable and persistent



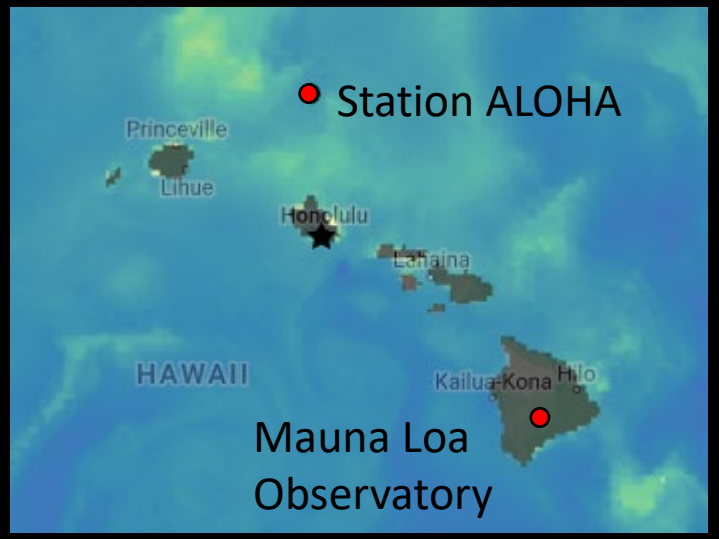
PNAS

Physical and biogeochemical modulation of ocean acidification in the central North Pacific

John E. Dore[a,1], Roger Lukas[b], Daniel W. Sadler[b], Matthew J. Church[b], and David M. Karl[b,1]

PNAS | July 28, 2009 | vol. 106 | no. 30 | 12235–12240

Measurable Real Persistent Change

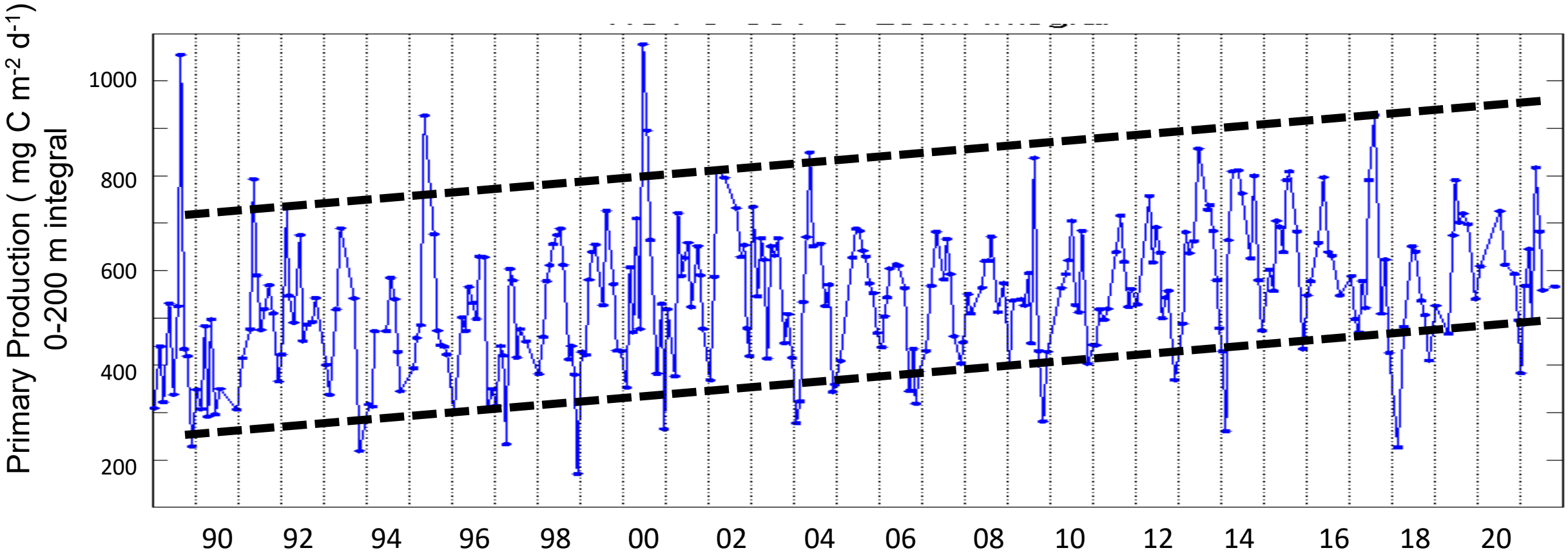


Long term trend in primary production (+4 (mg m^{-2} d^{-1}) yr^{-1}) at Station ALOHA

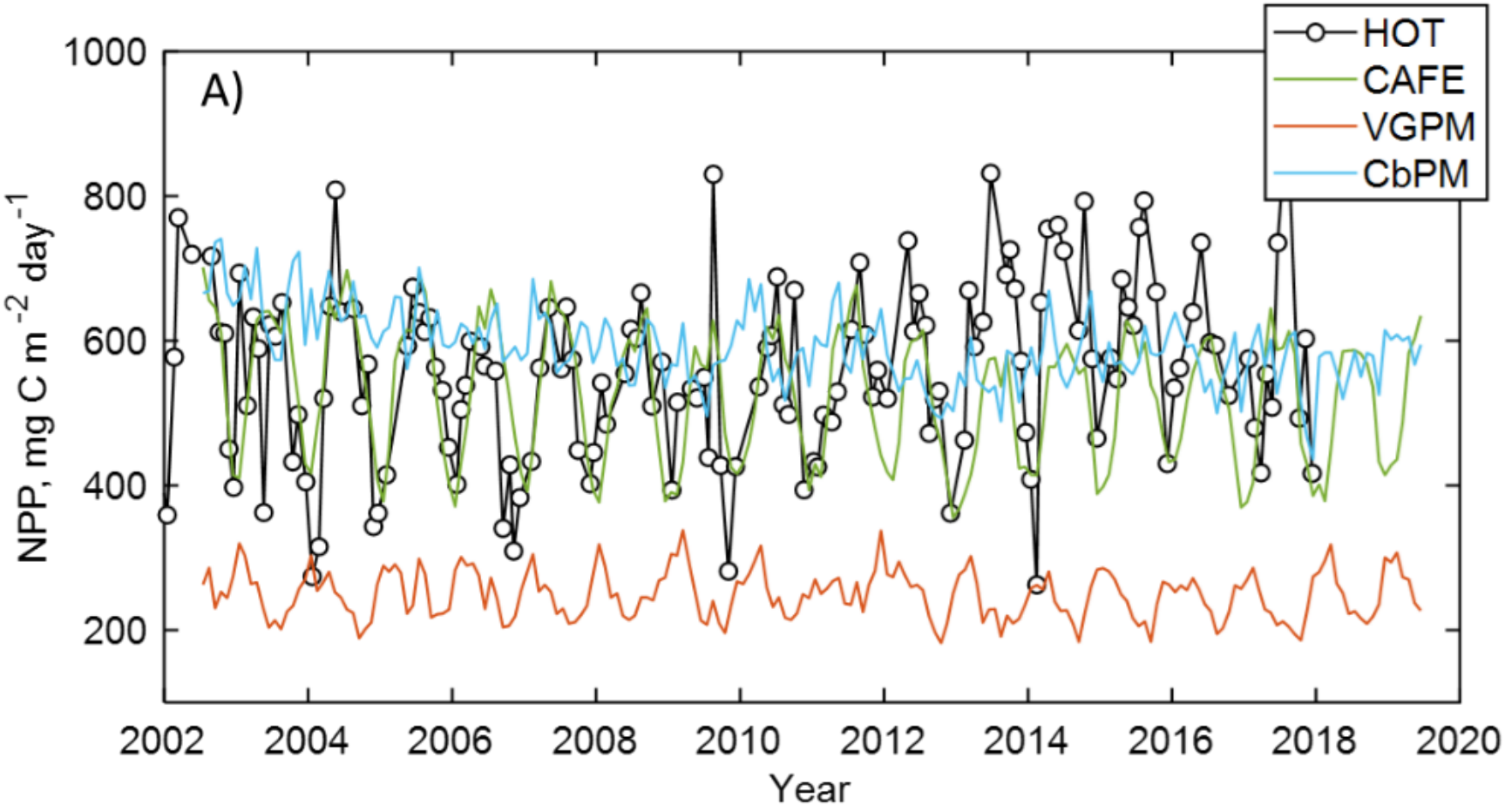
Progress in Oceanography 195 (2021) 102563

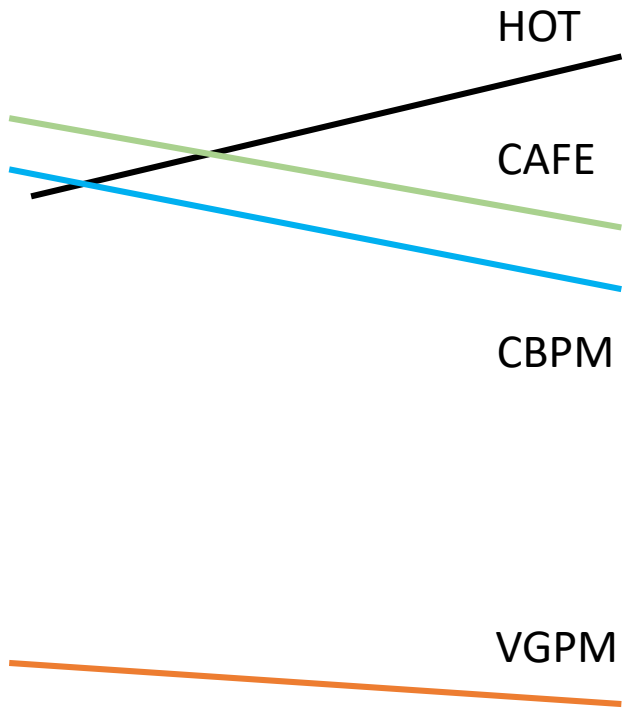
Seasonal-to-decadal scale variability in primary production and particulate matter export at Station ALOHA

David M. Karl [a,*,1], Ricardo M. Letelier [b,1], Robert R. Bidigare [c], Karin M. Björkman [a], Matthew J. Church [d], John E. Dore [e], Angelicque E. White [a]

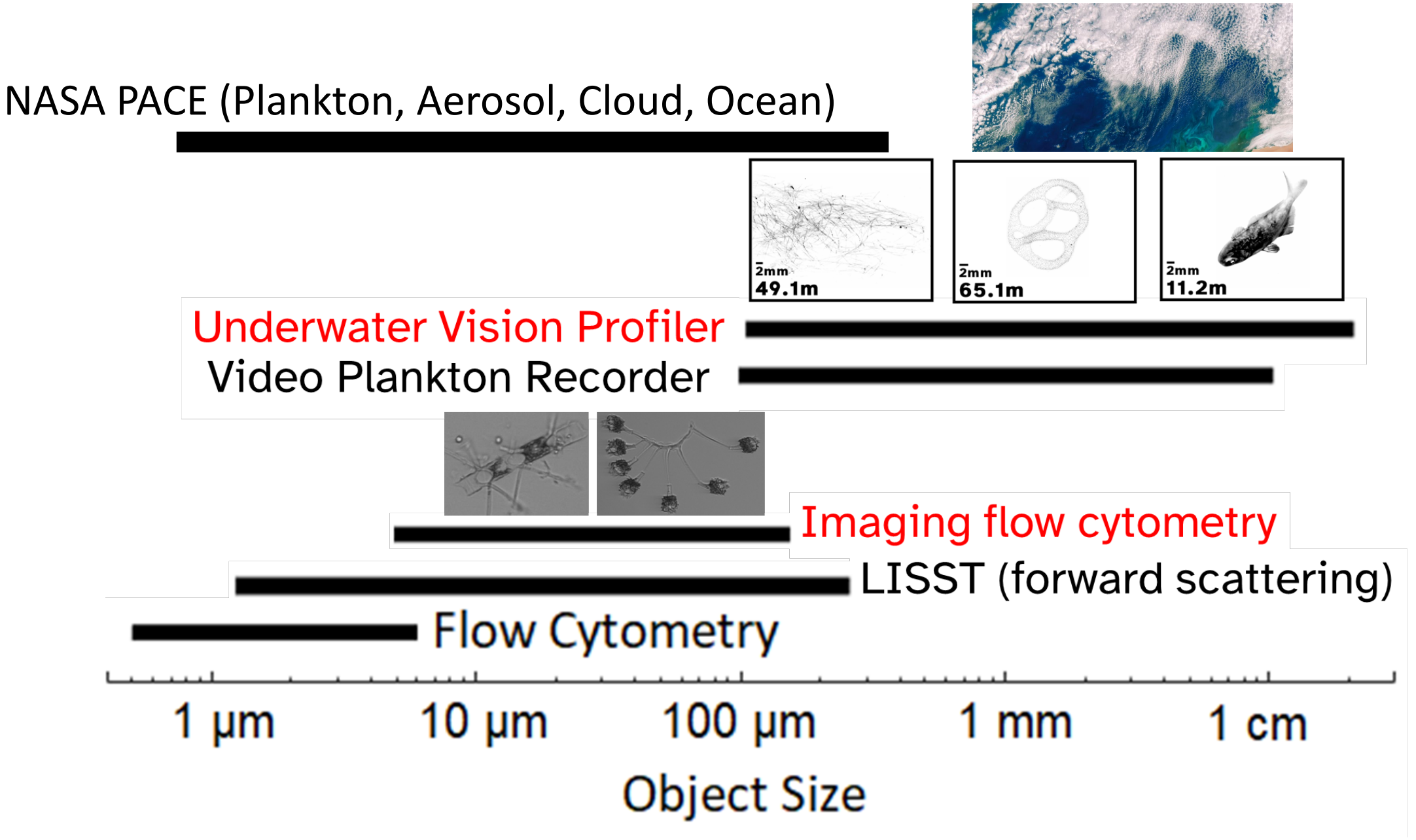


Long term trends not captured by satellite-based models (CAFÉ, VGPM, CbPM = various ‘flavors’ of production models)

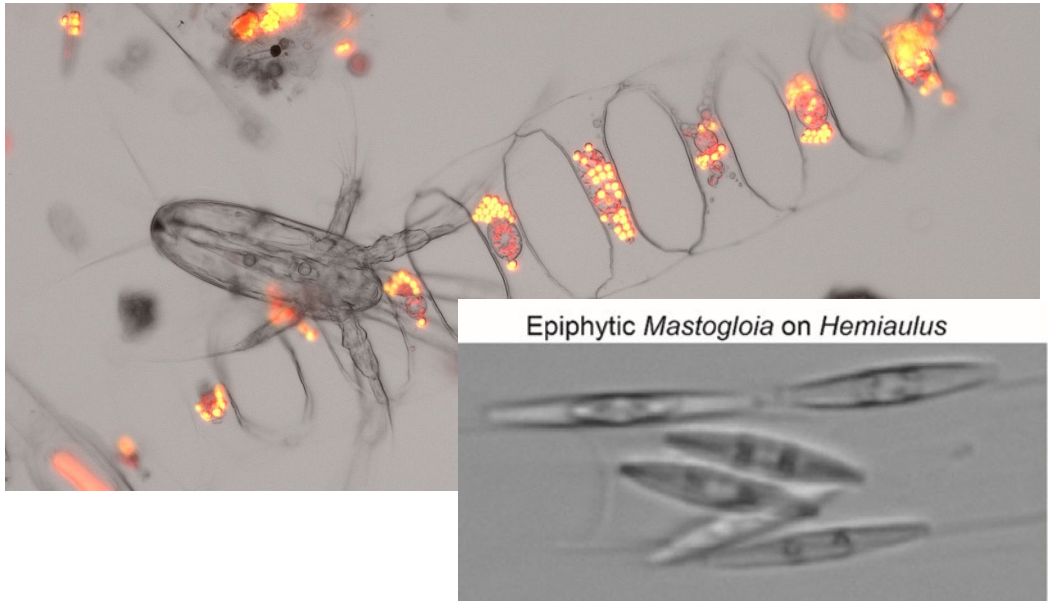


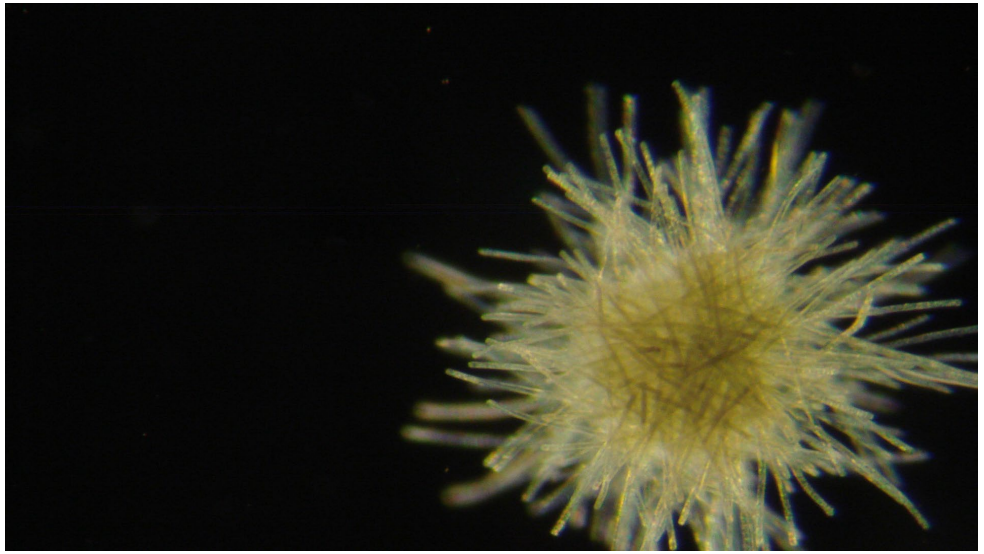


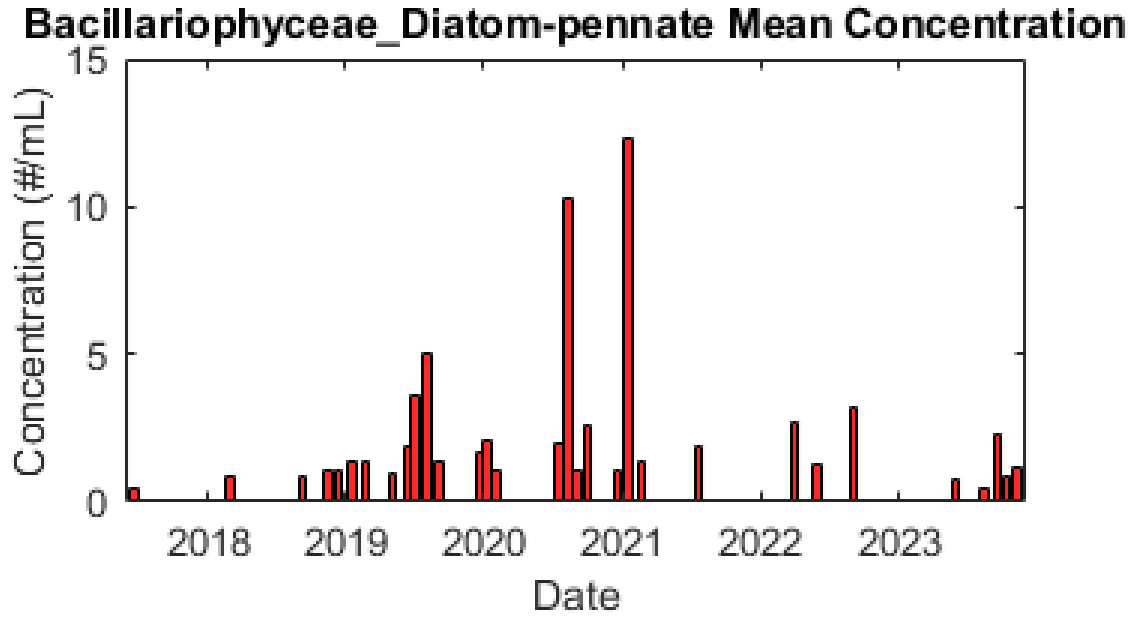
Incorporation of emerging biogeochemical observing technologies into HOT

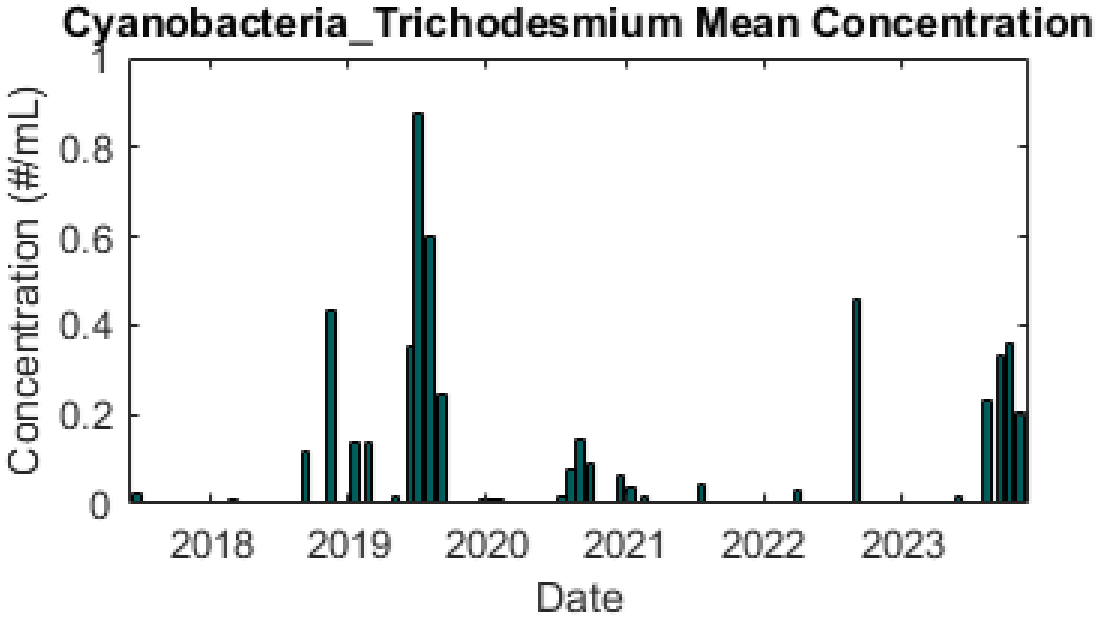


New technology and imaging are spurring discovery of new organisms



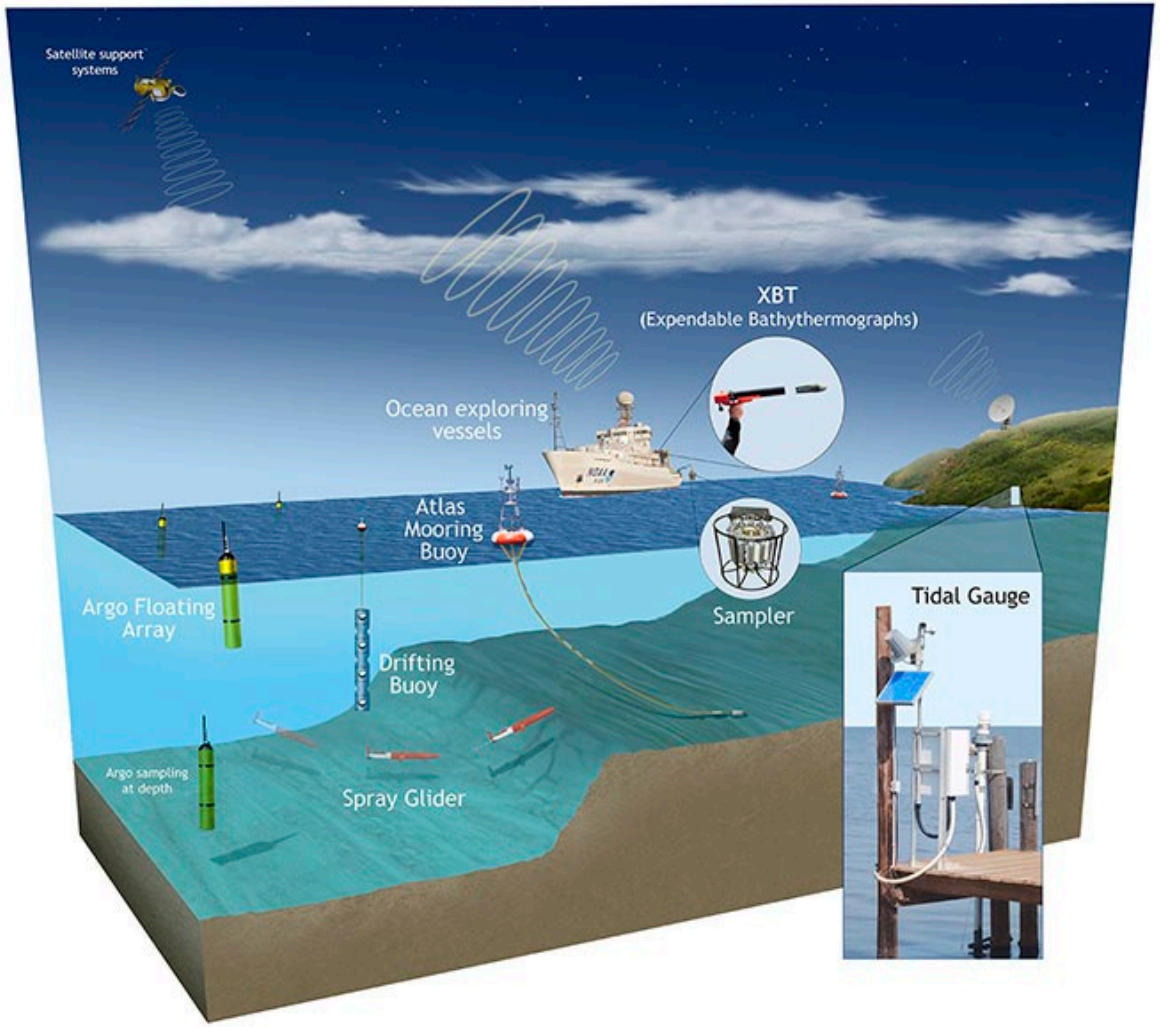


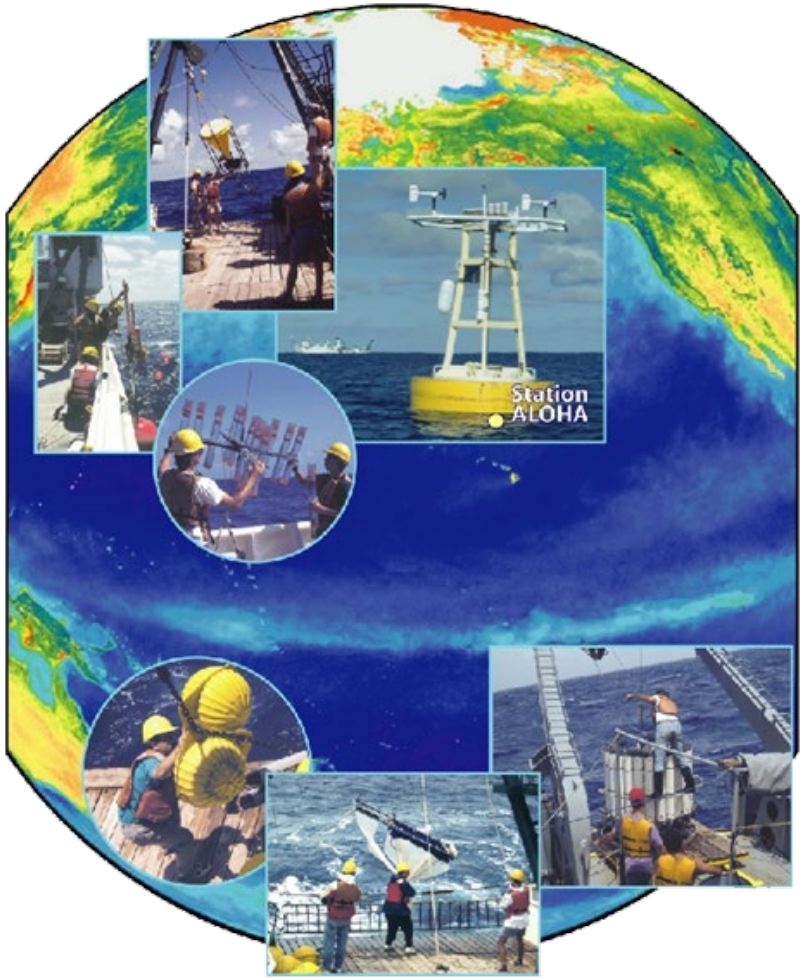




What do I consider the largest unmet research priorities/gaps?

The HOT program is a gathering place and testbed for new technology – integration is the challenge





The US Academic Research Fleet is not ‘right-sized’

Endurance (days)-
Science berths (#)

Current Academic Research Fleet

50 d/30-35

Global Class

Thompson-1991
(U. Washington)

Revelle-1996
(UCSD)

Atlantis-1997
(WHOI)

Langseth-2006
(LDEO)

Sikuliaq-2014
(Alaska)

40 d/20-25

Ocean Class

Endeavor-1993
(Rhode Island)

Kilo Moana-2002
(Hawaii)

Atlantic Explorer
– 2006
(BIOS)

Armstrong-2014
(WHOI)

Sally Ride-2014
(UCSD)

30 d/15-20

Regional Class

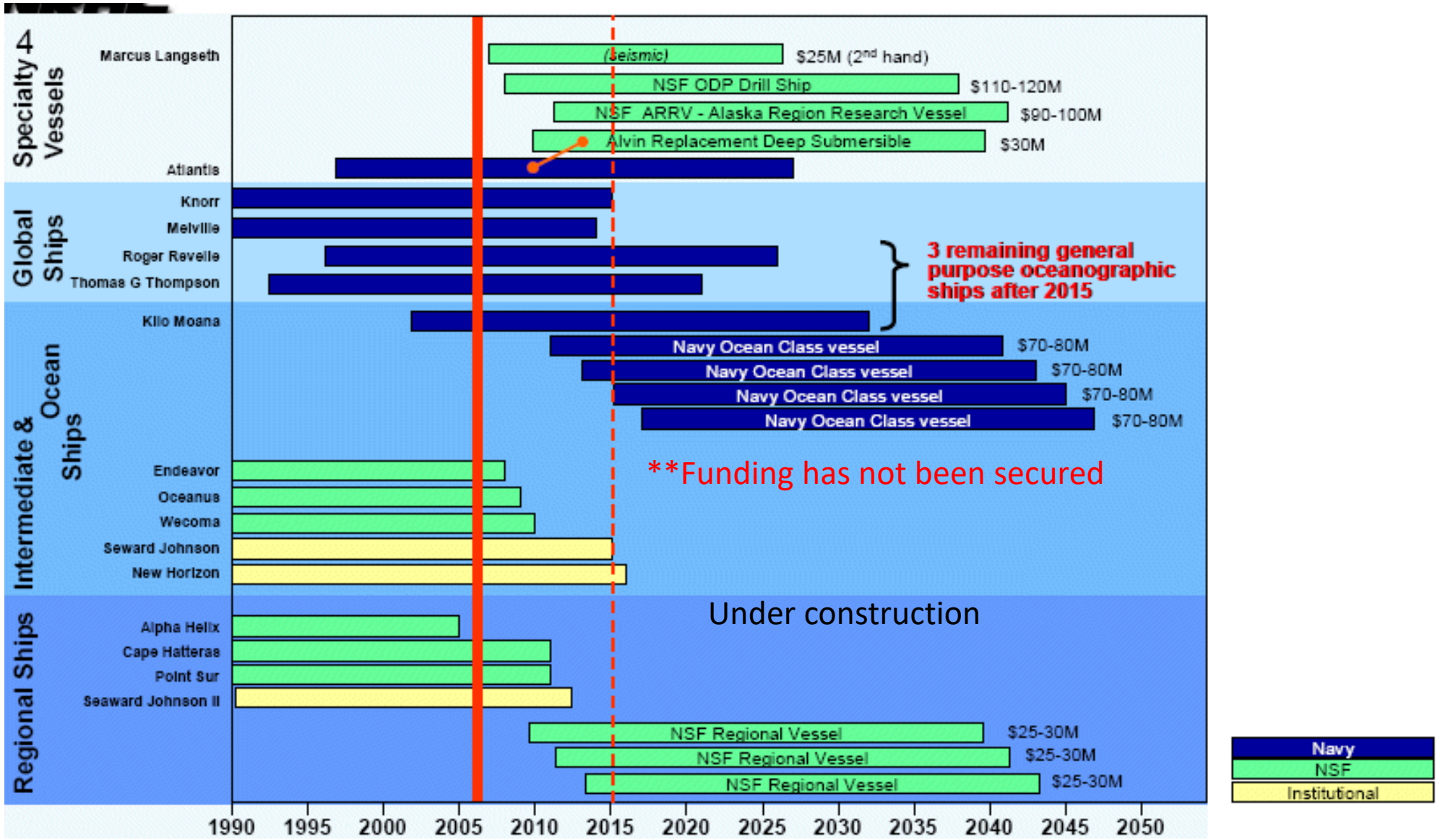
Sharp - 2005
(Delaware)

Taani- Under Construction
(Oregon State)

Gulf/Atlantic RCRV
- Under Construction

The plan as of 2001: UNOLS Fleet Renewal National Plan

There is a dire need for global/ocean class vessels



Ocean time-series studies are impacted by the decline in fleet capacity; via interruptions in once regularly-spaced monitoring of time-series stations and moored research platforms, which limits our capacity to measure ecological and biogeochemical change.

	Main Deck Area (ft^2)	Stbd Rail Length* (ft)	Total Labs	Berthing Capacity	Endurance (days)
% Δ	-31%	-48%	-25%	-35%	-18%

Percentage change in capabilities after global class RVs Knorr and Melville were retired and replaced with ocean class RVs Sally Ride and Neil Armstrong (UNOLS Fleet Improvement Committee)

What do I consider the largest unmet research priorities/gaps?

- Continued access to the sea via ships (there is simply no autonomous substitute)
- Models, metrics, and personnel capable of integrating across scales and disciplines
- Sustained support for open ocean monitoring and data assimilation into climate models (can we predict the change we see)