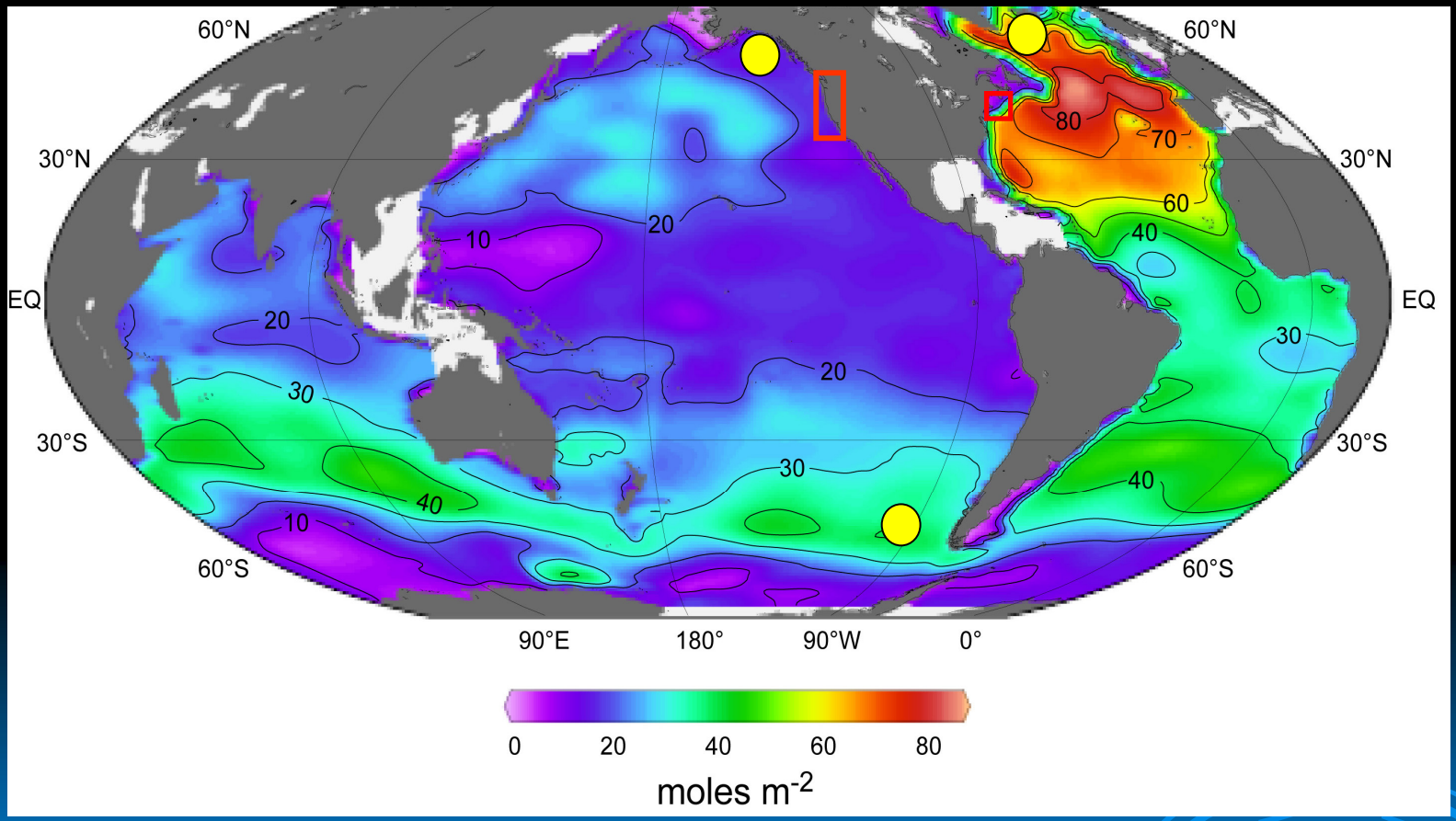
ORION, the OOI, and OCB
July 2007

Global, Regional, and Coastal Sites



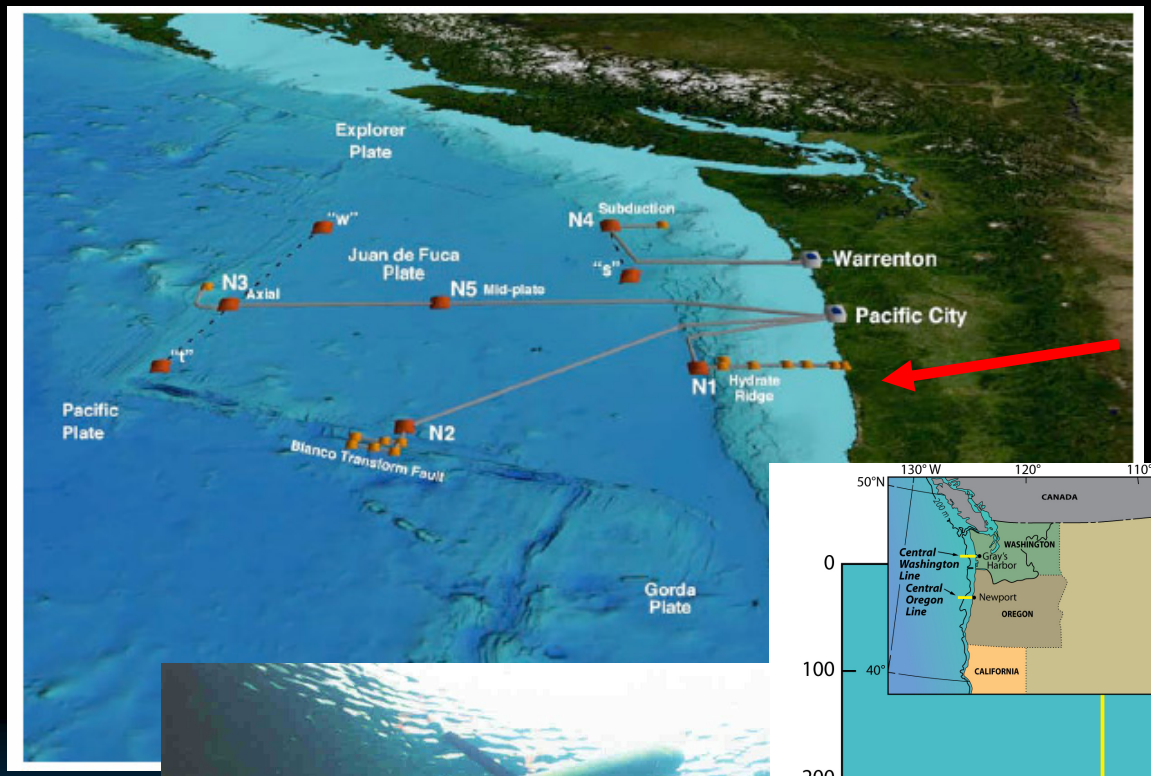
Recommendation from Steering Committee, June 2007

- The OOI should emphasize fewer, more capable nodes over more numerous, less capable nodes (i.e., with traditional capability)

- Focus on high latitude sites

- Consider increasing the spatial footprint, using secondary moorings and gliders

Coastal Cabled Endurance Array



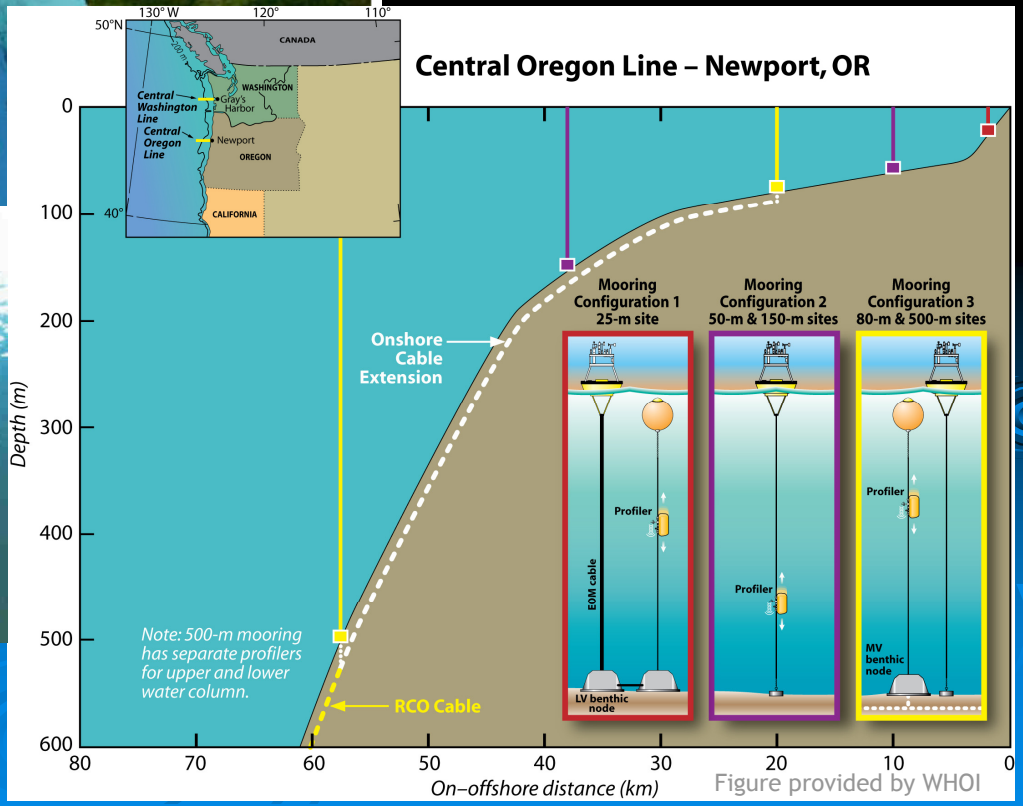
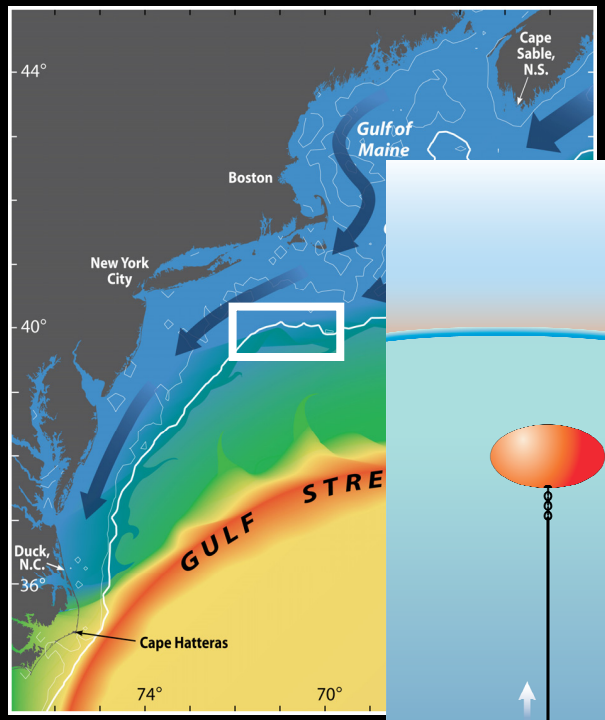
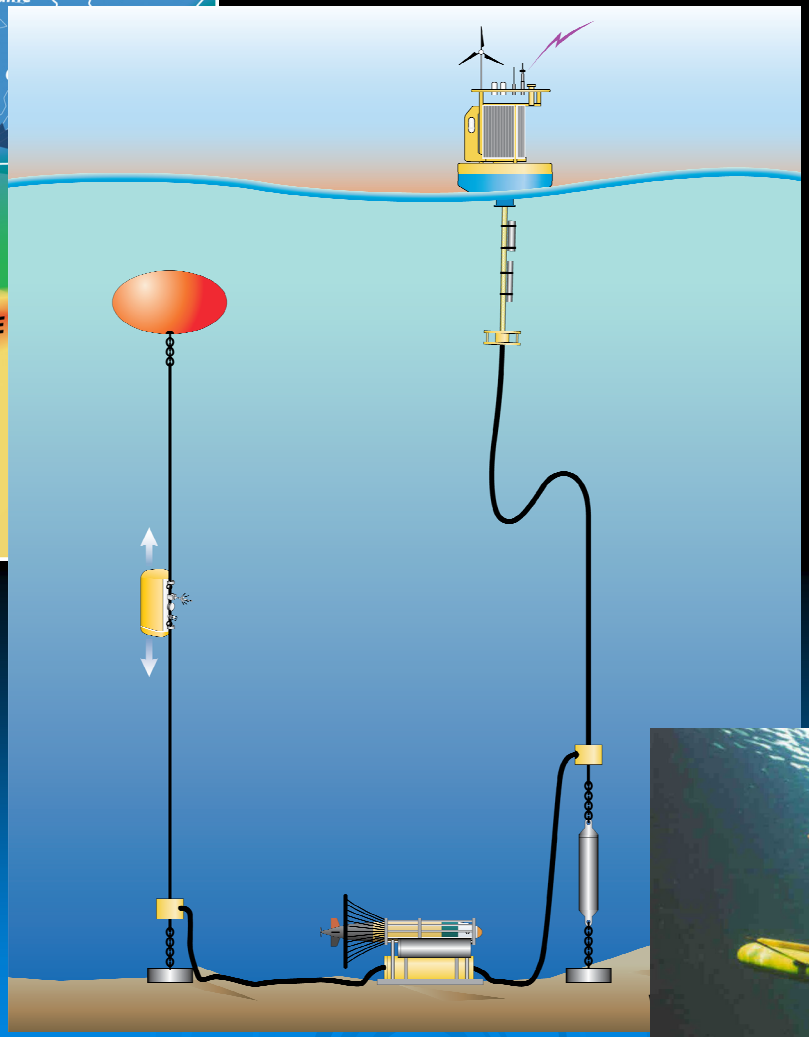


Figure provided by WHOI

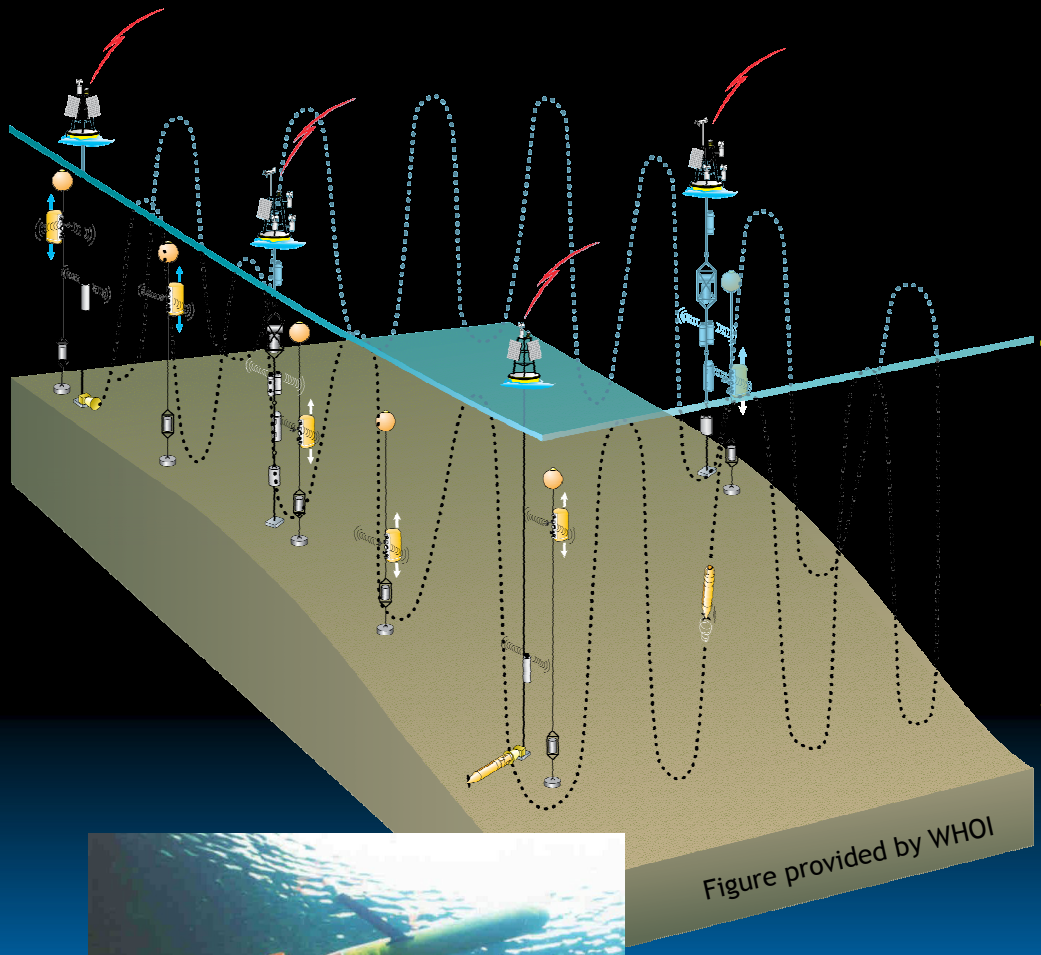
Coastal Pioneer Array





- Surface buoys using wind/solar power and satellite communication
- EOM cable to profiling mooring and AUV docking station on the sea floor
- 20-40 W to instrumentation

Coastal Pioneer Array



- Two-way satellite communication (20-30 Mb/d)
- Profiling moorings (data transfer: 2-10 Mb/d)
- Acoustic repeater moorings (not shown)
- AUVs – Autonomous, adaptive, synoptic sampling
- AUV docking stations
- Gliders sampling far-field variability

Science Question: What is the ocean's role in storing carbon via the solubility and biological pumps? What factors influence variability in the strength and efficiency of the biological pump?

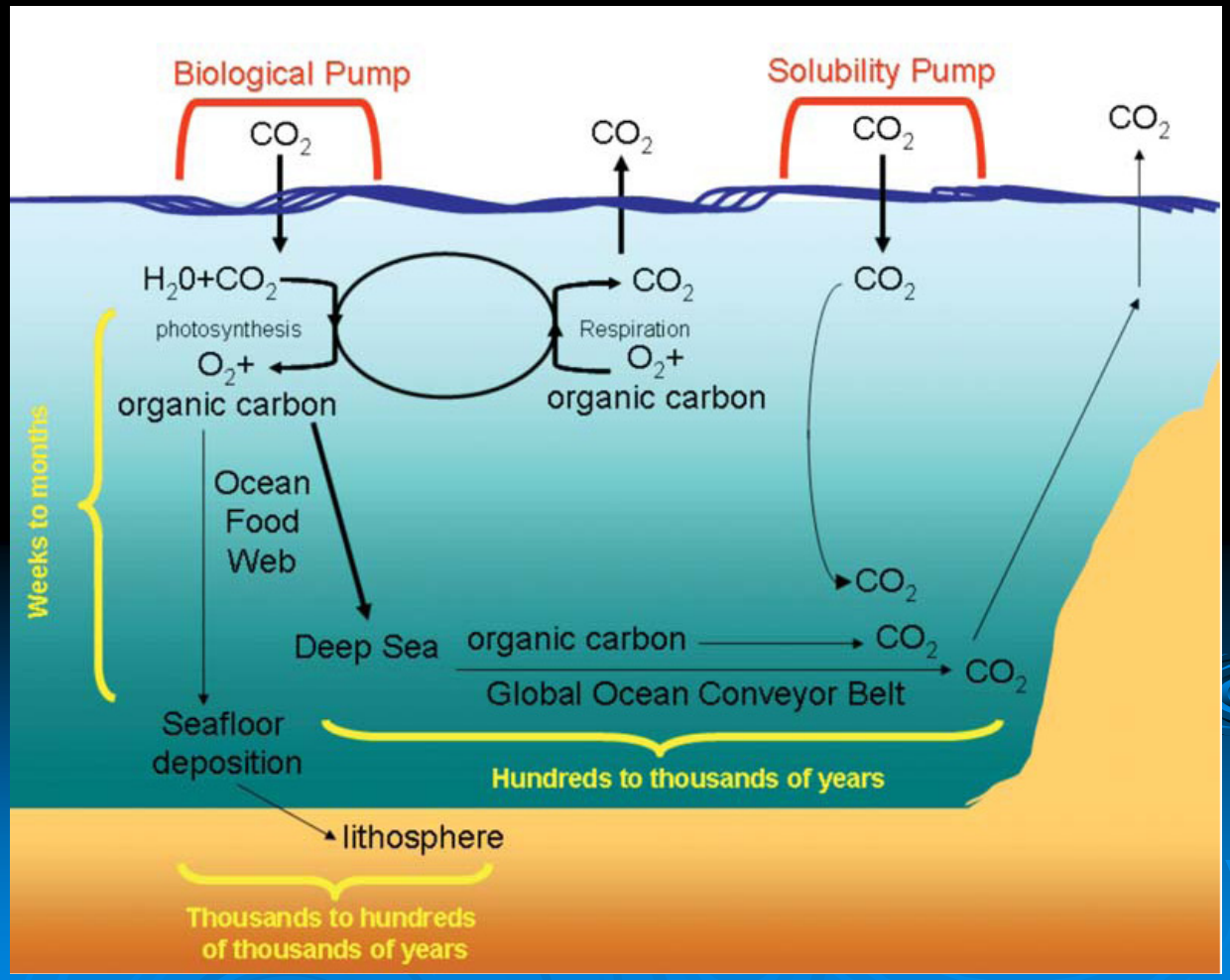
General statement of the problem and sampling approach:

Multidisciplinary topic

Processes
Episodic
Non-linear

Vertical scale
Air-sea interface
Water column
Sea floor

Temporal Scales
Minutes
Seasonal
Interannual
Decadal



Required Sensors

Air/sea sensors (meteorology, gas exchange)

Following is a combination of fixed and profiling measurements through water column:

Velocity: ACMs, ADCP, VADCP

CTD

O2

PAR (irradiance)

nutrients: nitrate, nitrite, phosphate, silicate, iron

pH

Optical backscatter, transmissometer, fluorescence, CDOM (bulk particulate concentration, chlorophyll) hyper-spectral resolution absorption and attenuation (ac-s; phytoplankton functional groups)

Zooplankton imaging system (e.g., SIPPER)

Multi-frequency acoustic echosounder (zooplankton size distribution)

Microbial characterization (e.g., Environmental Sample Processor [ESP])

Bubble size distribution (acoustic resonator, slant range sonar, hydrophone)

Directional wave spectra - ADCP

Optics for particle size distribution (i.e., small vs.large phytoplankton, marine snow aggregates; e.g., LIST)

Zooplankton acoustic echosounder

Broadband acoustic transceiver for tomography, navigation, and ambient sound

Fish/squid echosounder

Broadband passive hydrophones (whales, wind, rain, integrated bubble volume)

Acoustic modem (communication, navigation)

Other sensors are desirable including a flow cytometer, mass spectrometer