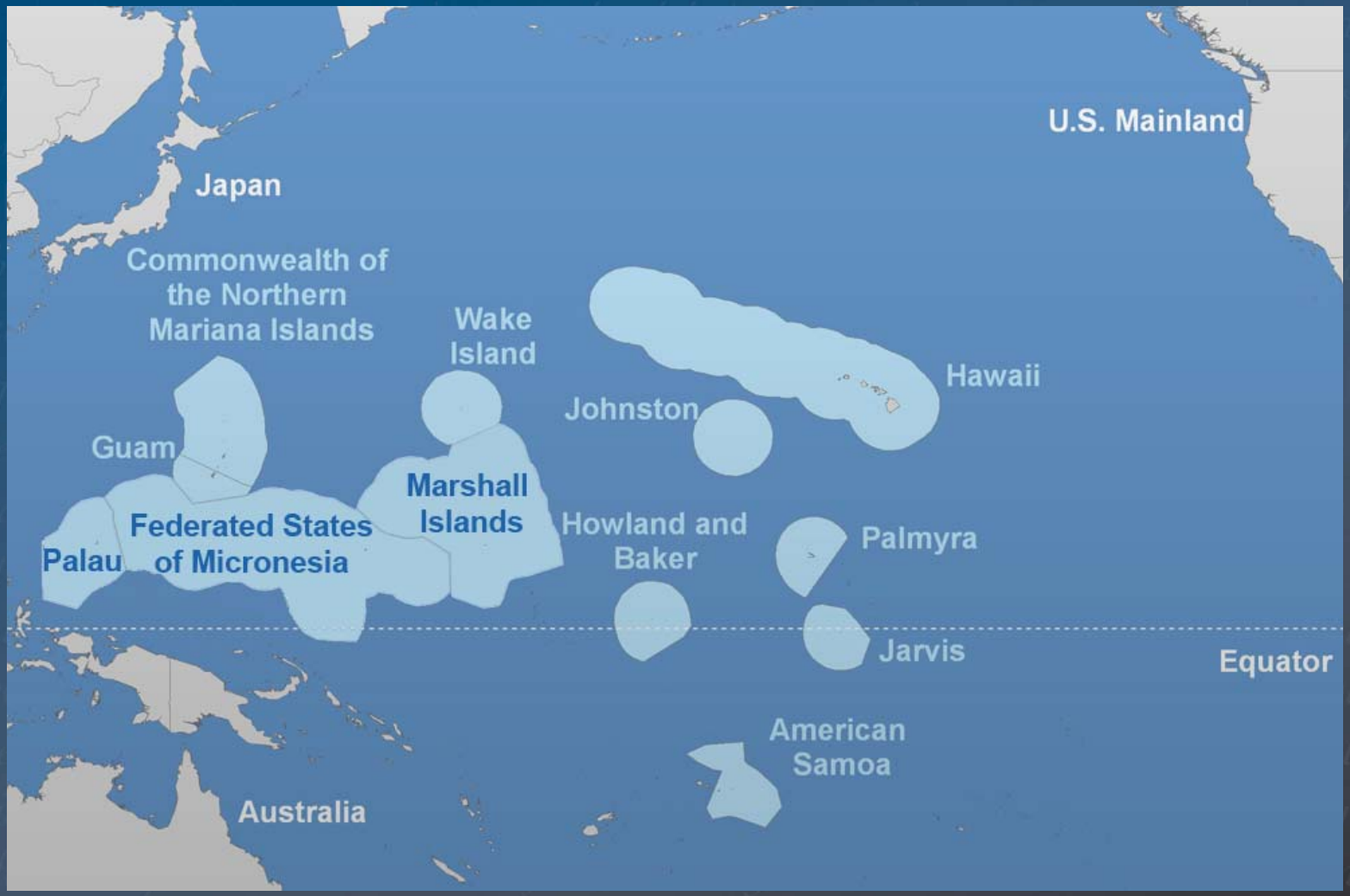
NOAA IOOS Program Office Regional Status Assessment for PacIOOS

12 June 2008

Brian Taylor, Chris Ostrander

RA Location and Constituents



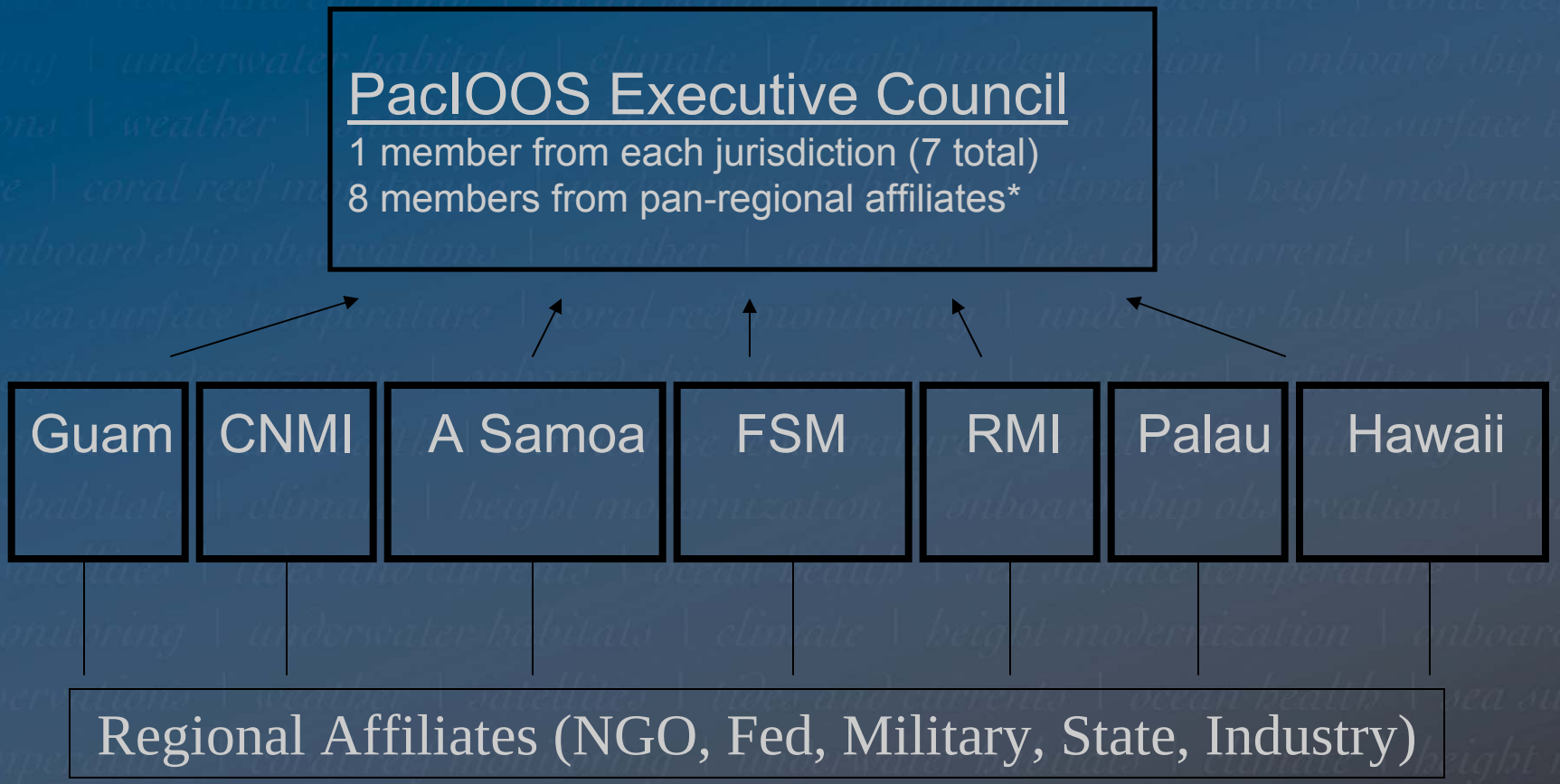
RA Personnel

- RA Investigators
  - Brian Taylor, Dean, SOEST
  - Alexander Shor, Associate Dean for Research, SOEST
  - Margaret McManus, Associate Professor, SOEST
  - Jim Potemra, Assistant Specialist, SOEST
  - Darren Okimoto, Extension Leader, Hawaii Sea Grant
  - Eric Wong, East-West Center
- RA Coordination
  - Chris Ostrander, PacIOOS and HiOOS Coordinator, SOEST (12 mos.)
  - Maria Haws, Pacific Islands Coordinator, Hawaii Sea Grant (4 mos.)
  - Simon Ellis, Western Pacific Coordinator, Hawaii Sea Grant (3 mos.)
  - Marcie Grabowski, Education/Outreach Coordinator, SOEST (12 mos.)

RA Personnel

- Pacific Liaisons (2 months salary each)
  - Jason Biggs, University of Guam, Guam
  - John Starmer, Coastal Resources Management Office, Commonwealth of the Northern Mariana Islands
  - David Idip, Palau Automated Land and Resource Information System, Republic of Palau
  - Donald Hess, College of the Marshall Islands, Republic of the Marshall Islands
  - Ben Namakin, Conservation Society of Pohnpei, Federated States of Micronesia
  - Ephraim Temple, American Samoa Community College, American Samoa

RA Proposed Governance and Structure



***Example Pan-Regional Affiliate Sectors:** Military, Federal Agencies, Environmental NGOs, Tourism, Transportation, Living Marine Resource, Technology contractors, Education NGOs

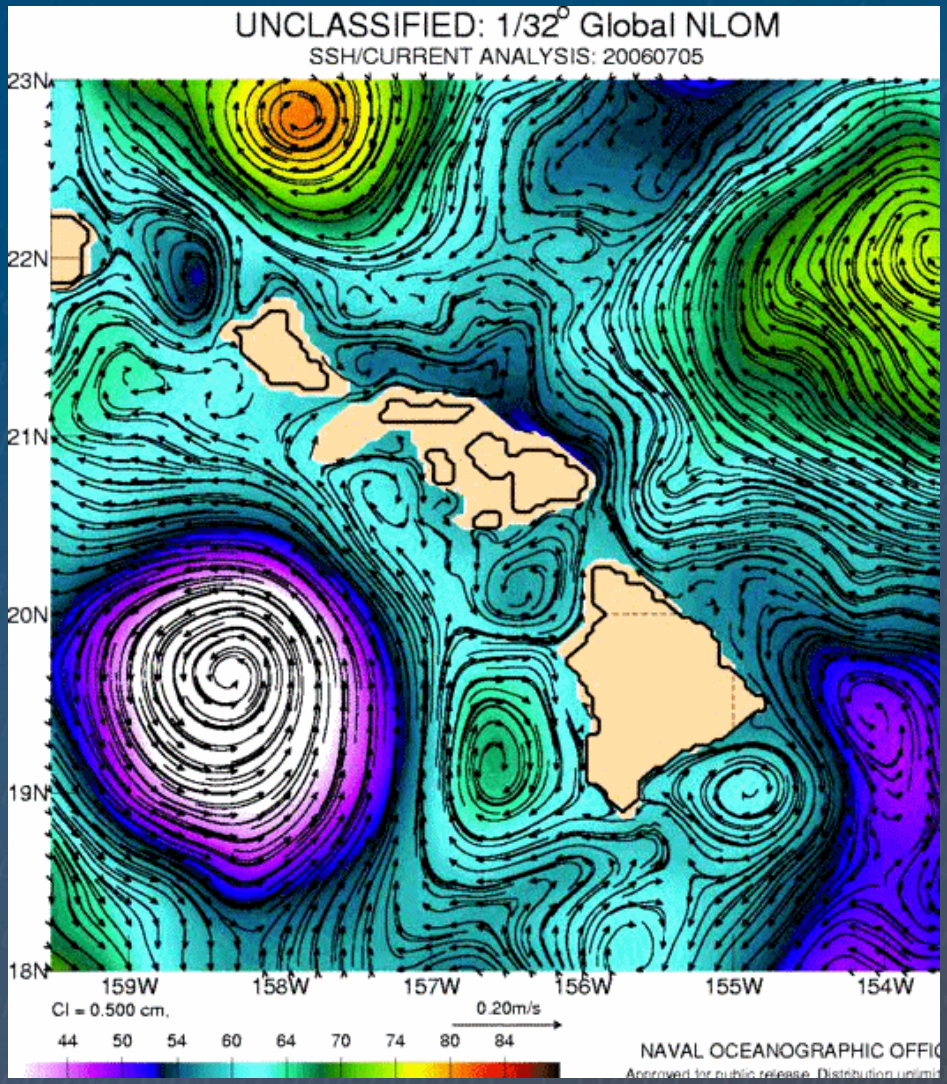
Stakeholder Engagement

- Broad Range of Stakeholder types
  - Government: US Military, US and other Federal, Territory, State, County
  - NGOs: Environmental, Education, Tourism, Recreation
  - Industry: Shipping, Tourism, Fishing, Transportation, Technology
- Key stakeholder groups or individuals
  - Region is large and diverse. Unifying needs expressed through interregional agencies, companies, and NGOs
  - Most implementation is local

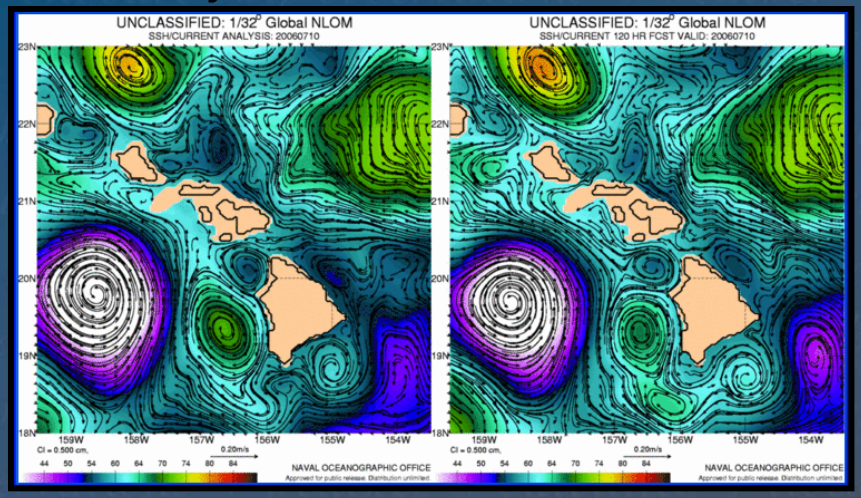
Stakeholder Engagement

- Key Issues of Importance:
  - Climate change (sea level rise, erosion)
  - Declining fisheries and ecosystems
  - Coastal water quality (point and non-point source pollution, sedimentation)
  - Sea state

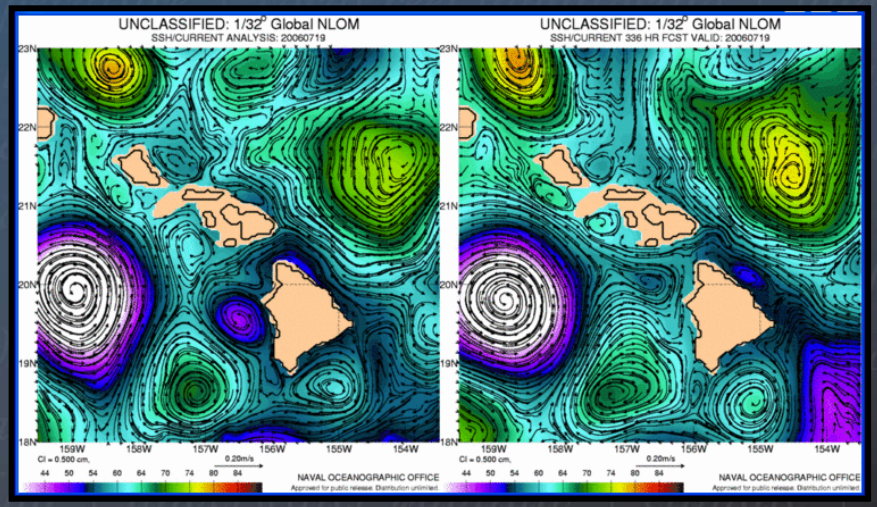
Dynamic Ocean Forecasts at Operational Scales

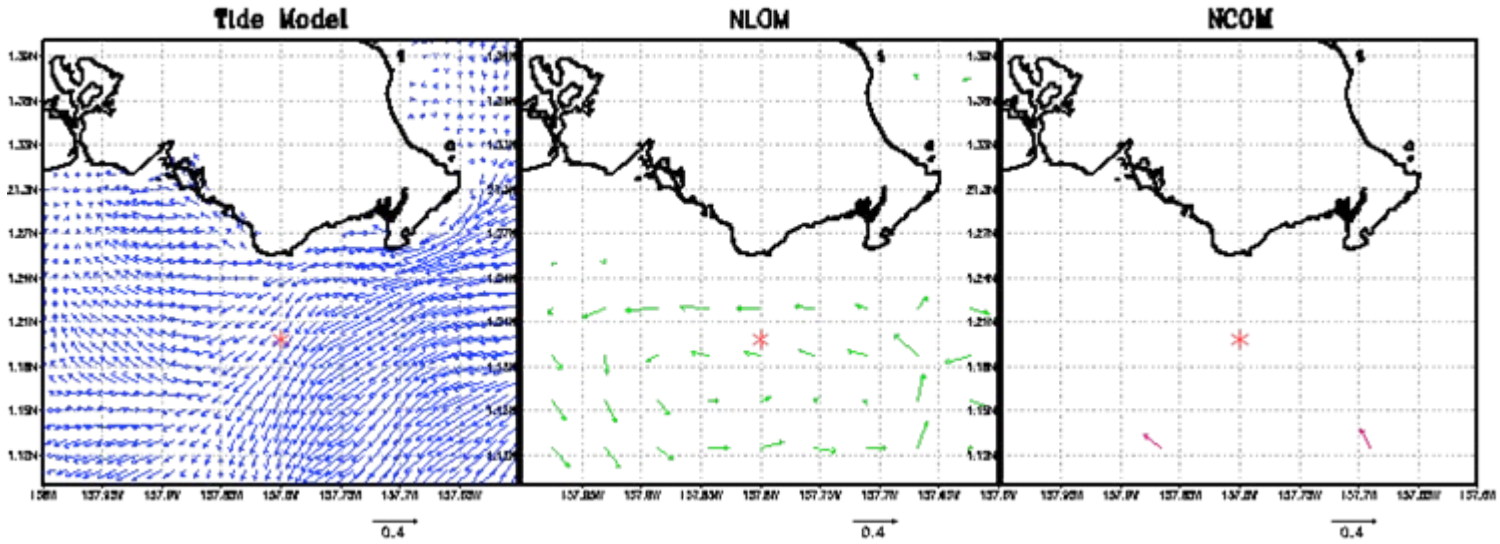


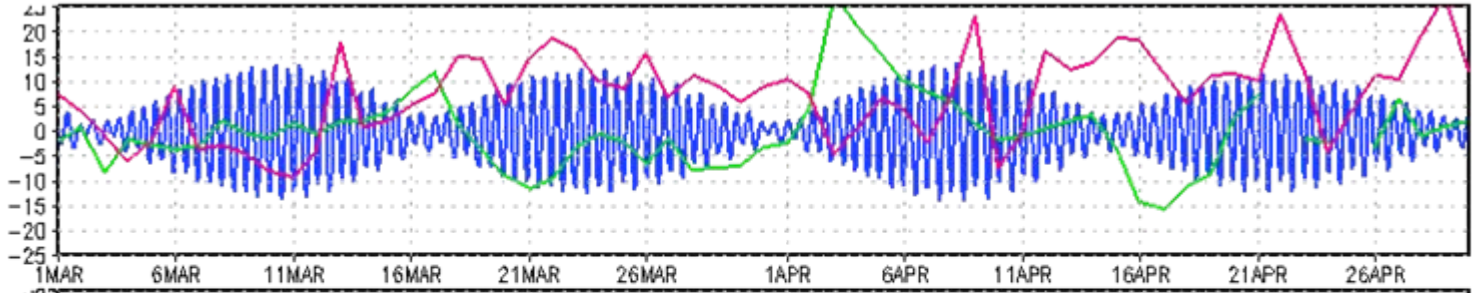
Analysis 10 Jul **5 Day Forecast**



Analysis 19 Jul **14 Day Forecast**




Tide Model
NLOM
NCOM
0.4
0.4
0.4


20
15
10
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−20
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1MAR
6MAR
11MAR
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1APR
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11APR
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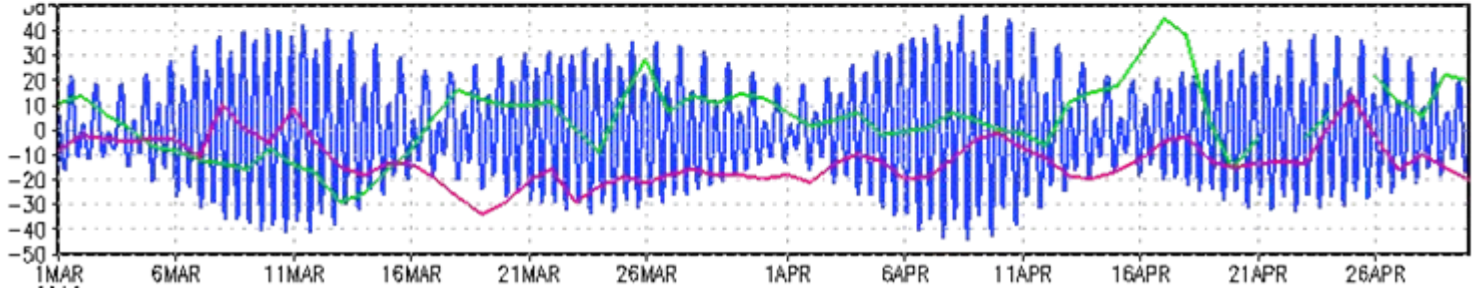
21APR
26APR


40
30
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−40
−50
1MAR
6MAR
11MAR
16MAR
21MAR
26MAR
1APR
6APR
11APR
16APR
21APR
26APR

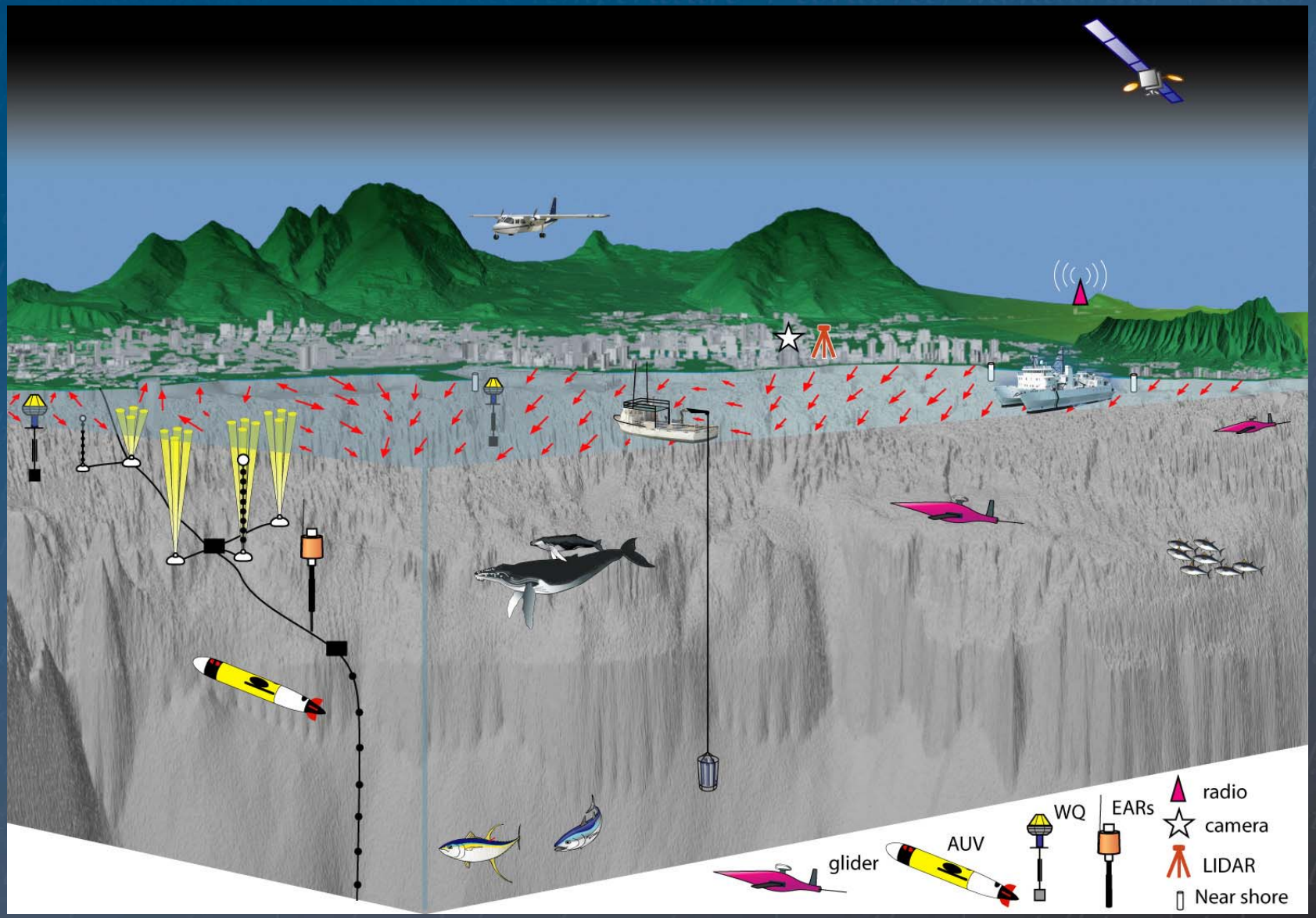
Stakeholder Engagement

- Support from stakeholders
  - Archived and real-time data (fisheries, physical, bathymetry, biological) region-wide
  - Funding
  - Education and outreach partnerships
  - Generation of new data sets (modeling, new monitoring)
  - Visualization and management of data

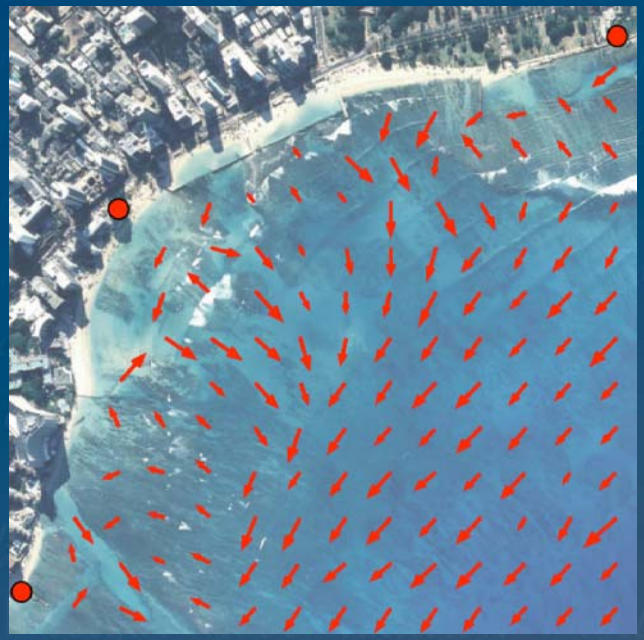
Current Activities and Funding

- A summary of key activities in the region that are related to or support IOOS, including those not funded by NOAA IOOS
  - Other efforts in region managed by:
    - UH/SOEST and other academic institutions
    - Federal agencies (NASA, USACE, USGS, NSF, NOAA)
    - Military (Navy, NAVO)
    - International NGO's (Conservation International, Nature Conservancy, CCN)
    - Multi-national programs (SPREP, SOPAC, ARGO)
    - Dozens of smaller scale private and NGO ventures

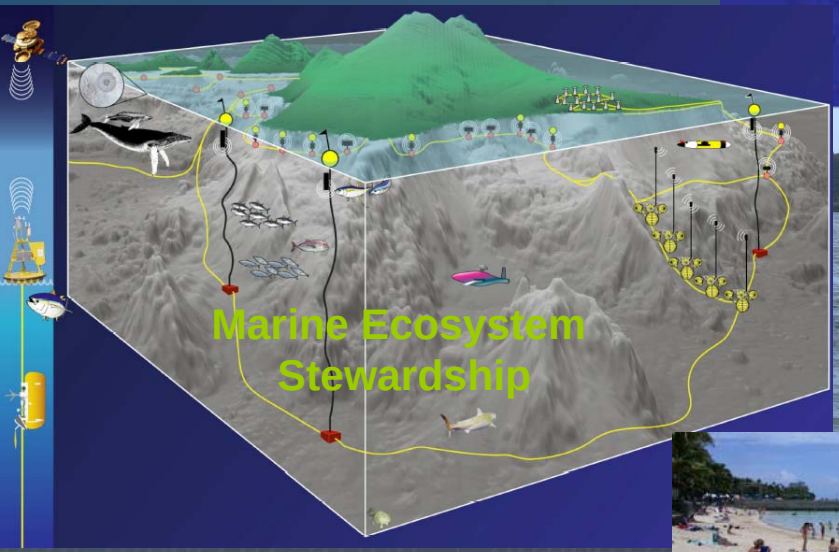
Current Activities: HiOOS

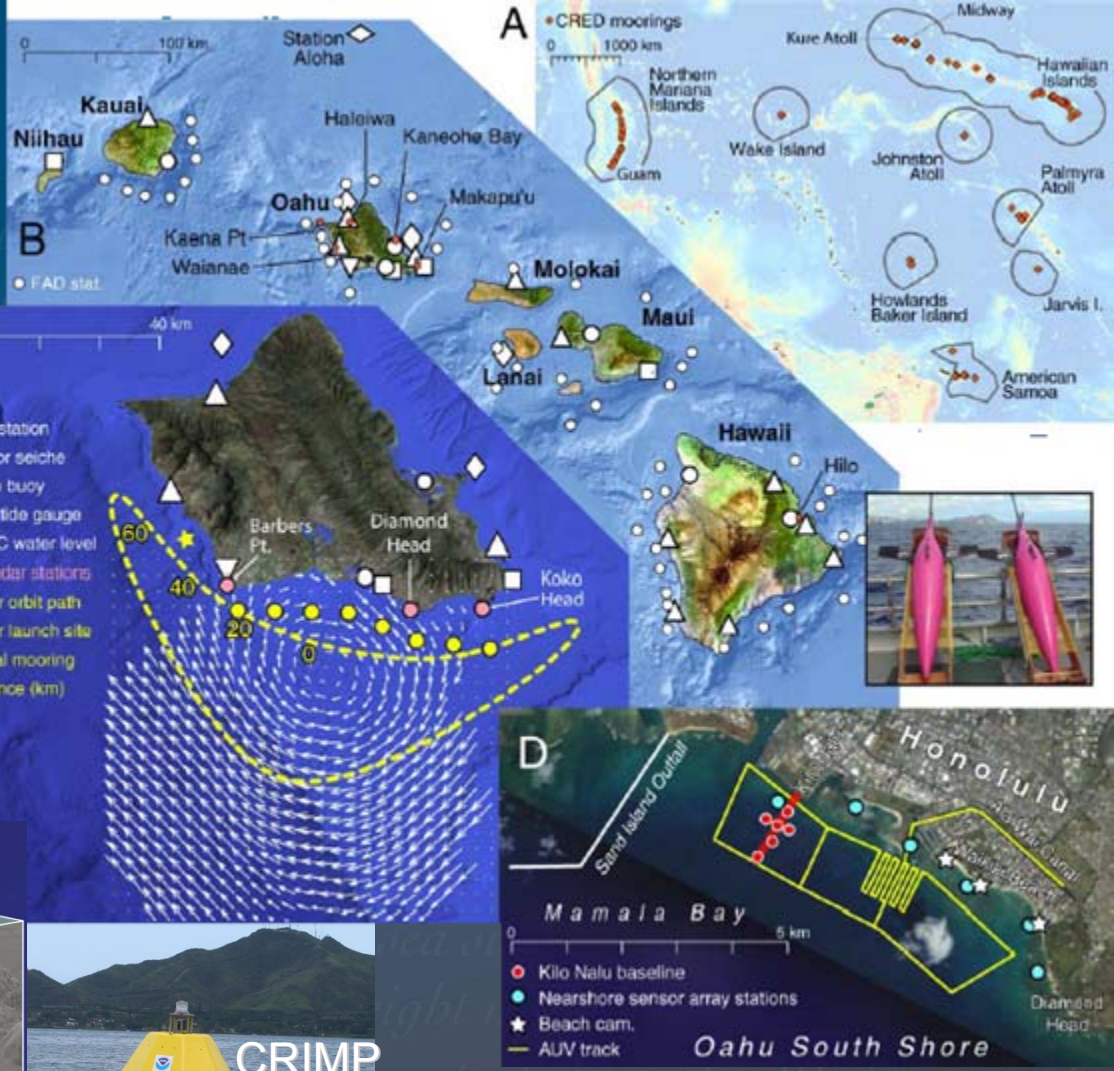


Coastal Resiliency



Coastal Sea-State & Forecast

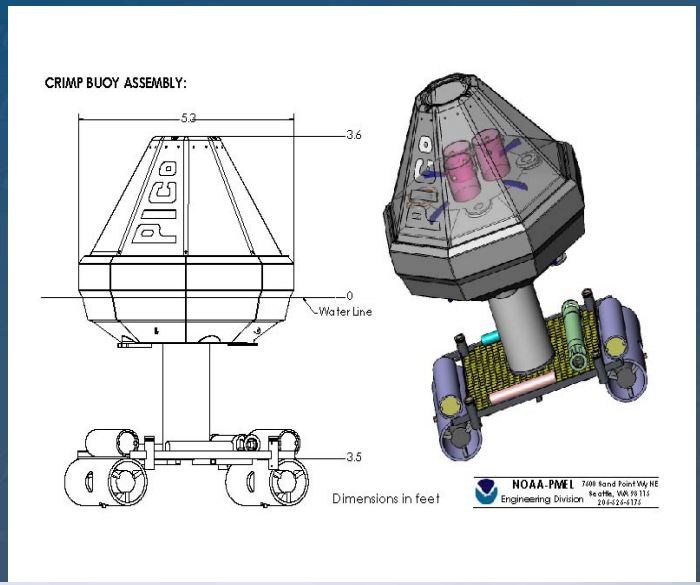




Clean, Safe, Productive Ocean & Resilient Coastal Zone

Water Quality: CRIMP CO_2

- Multiparameter sondes (Conductivity/Salinity, T, pH, DO, Chl-a, Turb) at 10 minute frequency
- CO_2, O_2 sensors, CTD every 3 hours
- Climate from NWS, CI
- Data telemetry by Iridium to PMEL (daily plot updates on NOAA website)
- Synoptic profiles (Chl-a, Cond/Sal, DO, pH, Turbidity at multiple sites)
- Water samples for lab analyses



HiOOS Focus Areas

Water Quality Sensing

- Technology
  - Thermal Infrared Imagery (TIR)
  - Nutrient sensors
  - Chemical and biological sensors
  - Shipboard surveys
- Monitor and inform public on:
  - Sewage spills
  - Harmful algal blooms
  - Storm plumes
  - Beach water quality

Coastal Resiliency

- Technology
  - Digital elevation models
  - Remote sensing
  - Aerial imaging
  - Ocean-state measurements
  - T-LIDAR
- Product areas:
  - Coastal erosion
  - Inundation by tsunami, high tide, storm surge, sea-level rise
  - Beach safety

Sea-State and Forecast

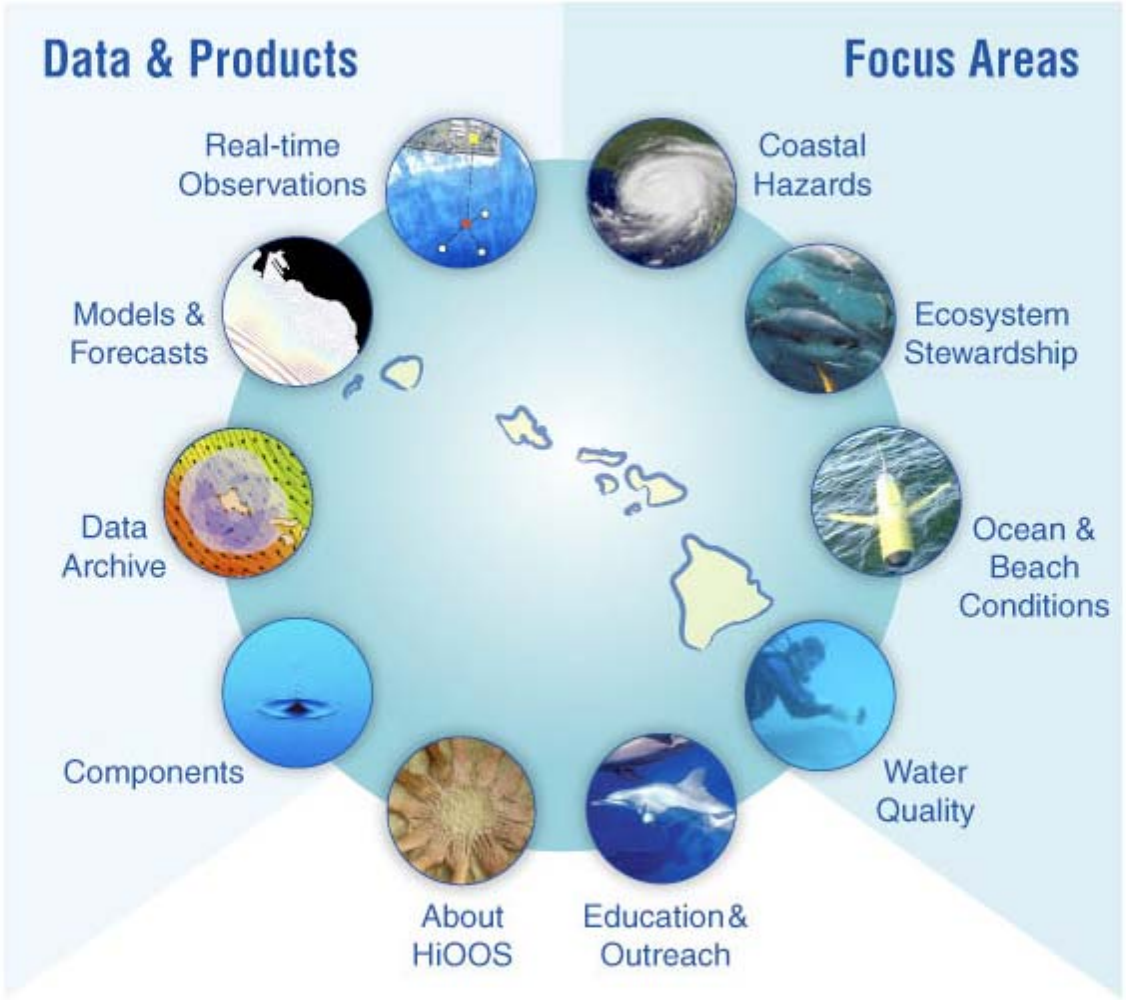
- Technology
  - HF Radio
  - Gliders
  - Modeling
  - Wave buoys
  - Remote sensing
  - Shipboard surveys
  - Coastal cameras
  - Cabled observatories
- Monitor, model, predict:
  - Circulation
  - Waves
  - Coastal run-up
  - Water levels
  - Pollutant tracking
  - Search and Rescue

Marine Ecosystem Stewardship

- Technology
  - Passive acoustic recorders (EARs)
  - Passive and active tagging of pelagics (Sharks, Whales, Tuna, Seals, Turtles)
  - Instrumented Fish Aggregation Devices
- Product areas:
  - Fishing and marine mammal forecasts
  - Evaluation of long-term climate change on populations
  - Vessel intrusions into MPA's

i ka nānā no a ike • by observing we learn

HiOOS • Hawai'i Ocean Observing System



HiOOS in the News

- 23 September 2007: **Impact of sea-level rise on Hawai'i** in the *Honolulu Star-Bulletin*

Featured Products

Beach Safety

Going to the beach today? **Learn more about beach conditions...**

Fish Locations

Going fishing in Hawaiian waters? **Learn more about fish locations ...**

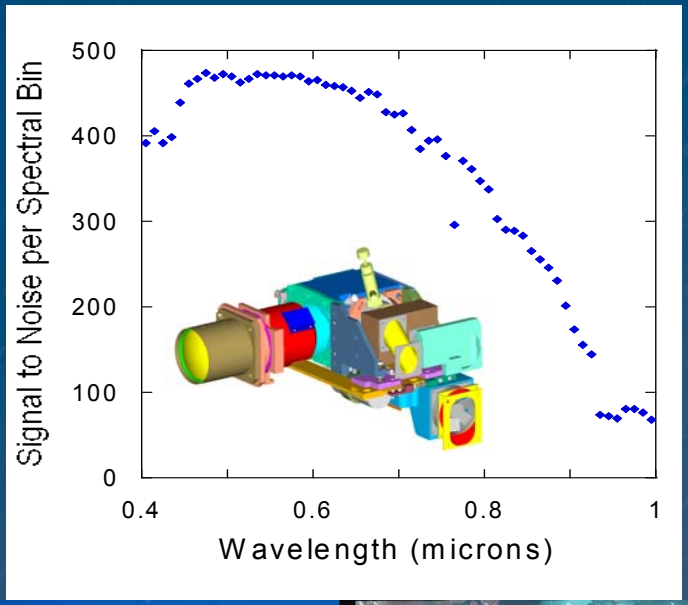
Water Quality

Getting in the water on the south shore? **Learn more water quality ...**

Sea State

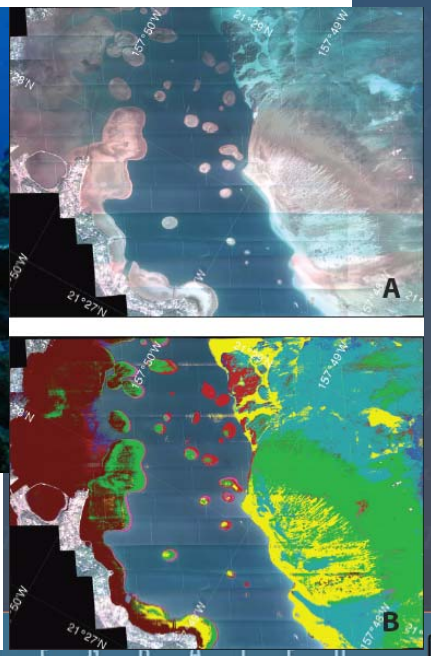
Going surfing or sailing today? **Learn wind and wave conditions ...**

Hyperspectral Imaging of the Coastal Ocean



HAWAII SPACE FLIGHT LABORATORY

Reef Health & Ecology

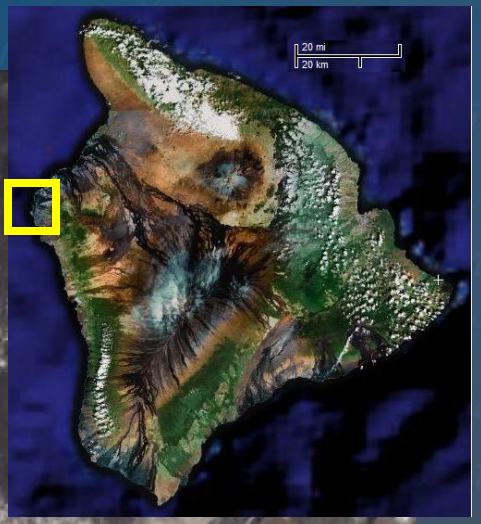


IOOS INTEGRATED OCEA

SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY
UNIVERSITY OF HAWAI'I AT MĀNOA

HAWAI'I SPACE GRANT CONSORTIUM
NASA

Kona Ocean Monitoring Network – KOMNet



200 ft
50 m

d=30m
Hydrophone

3 Hydrophone +
ADCP + T-Chain
d=30m

100m

d=80m
150m
Hydrophone

20m
Node
d=20m

100m

150m

Shore
Station

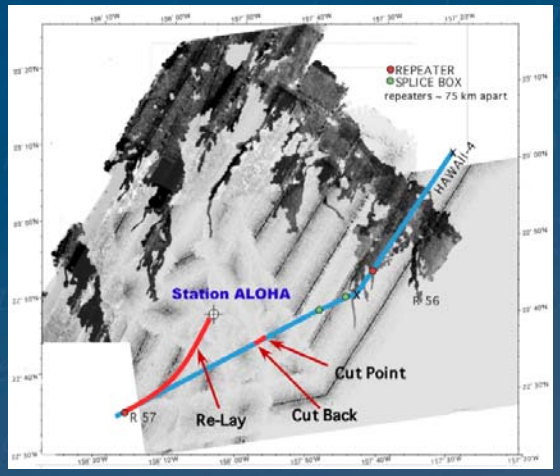
ISLA

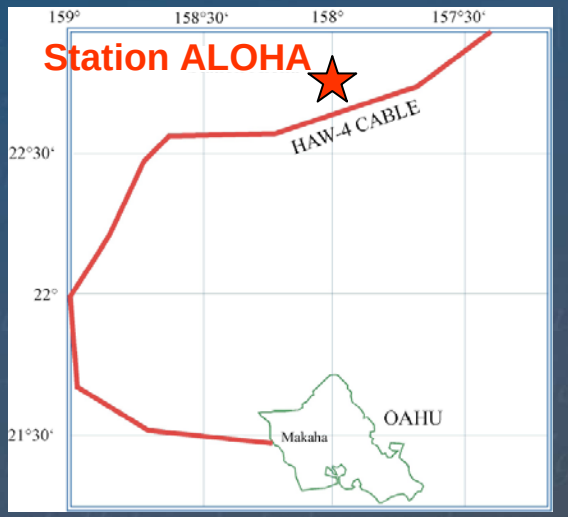
100m

Hydrophone
d=30m

Upper ocean mooring

Weller (WHOI) & Lukas



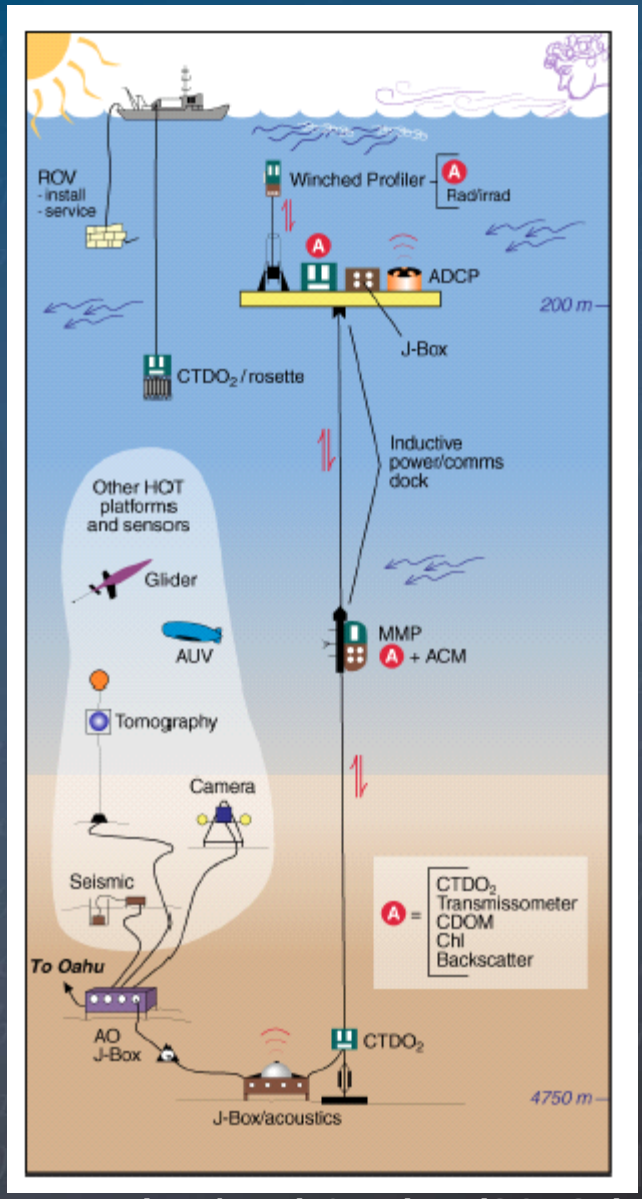


ALOHA Cabled ocean Observatory

Duennebier

Building on 18 years of Hawaii Ocean Time-series shipboard observations (Karl & Lukas)

Cabled profiling mooring

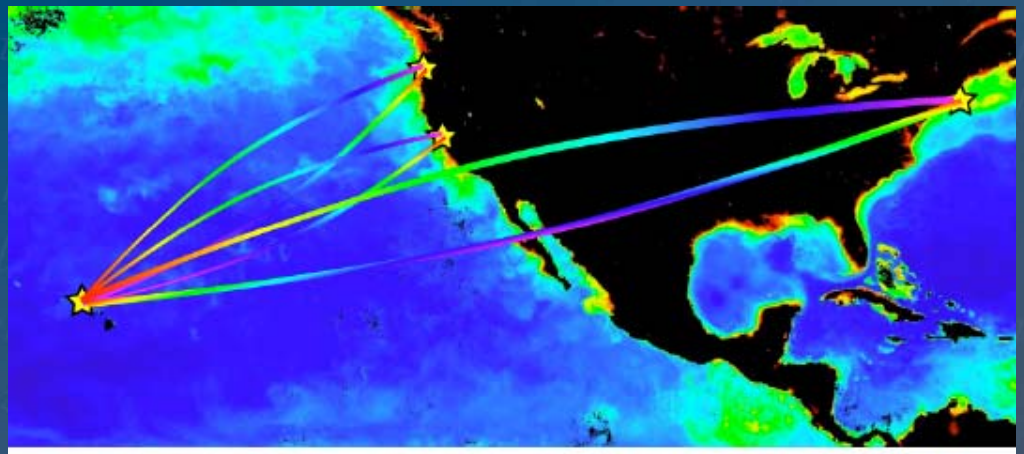


Howe (UW/APL) & Lukas (SOEST)

center for microbial oceanography: research and education

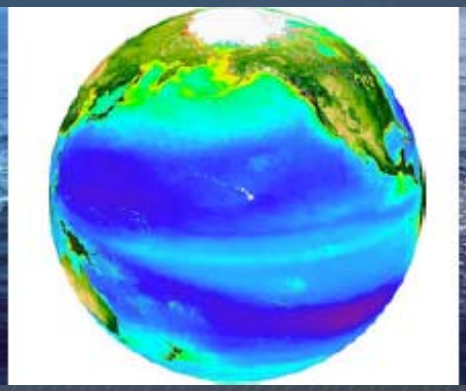
C·more

linking genomes to biomes



UC Santa Cruz · Massachusetts Institute of Technology · Woods Hole Oceanographic Institution 1930 · OSU Oregon State University · MBARI · soest School of Ocean and Earth Science and Technology

NSF



apdrc

Welcome to the Asia-Pacific Data-Research Center

New
Data
Partners
Projects
Servers
Tutorials

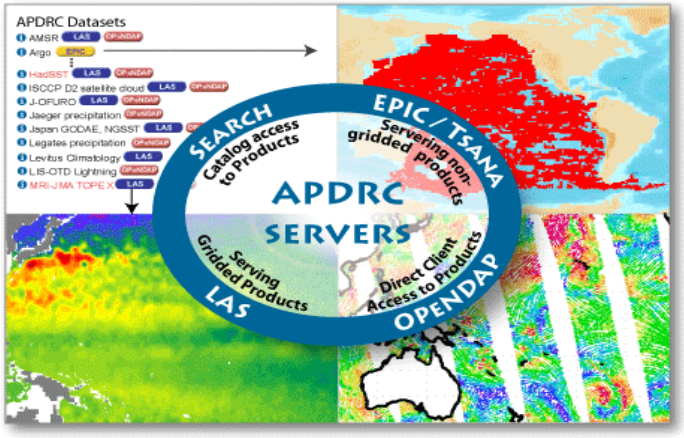
The APDRC is building towards a vision of one-stop shopping of climate data and products for our users.

Our mission is to increase understanding of climate variability in the Asia-Pacific region by developing the computational, data management, and networking infrastructure necessary to make data resources readily accessible and usable to researchers and general users; and by undertaking data-intensive research activities that will both advance knowledge and lead to improvements in data preparation and data products.

Easy Access to Data and Products via the APDRC Servers

(atmospheric, oceanic, air-sea flux, and terrestrial)

Search for datasets — EPIC for non-gridded products



LAS for gridded products — GDS server, Aggregation server

Questions or Comments?

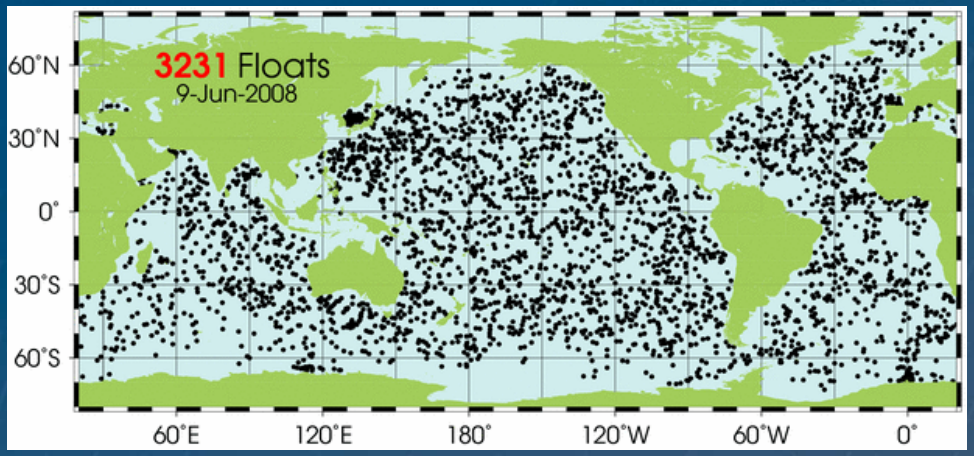
Search APDRC

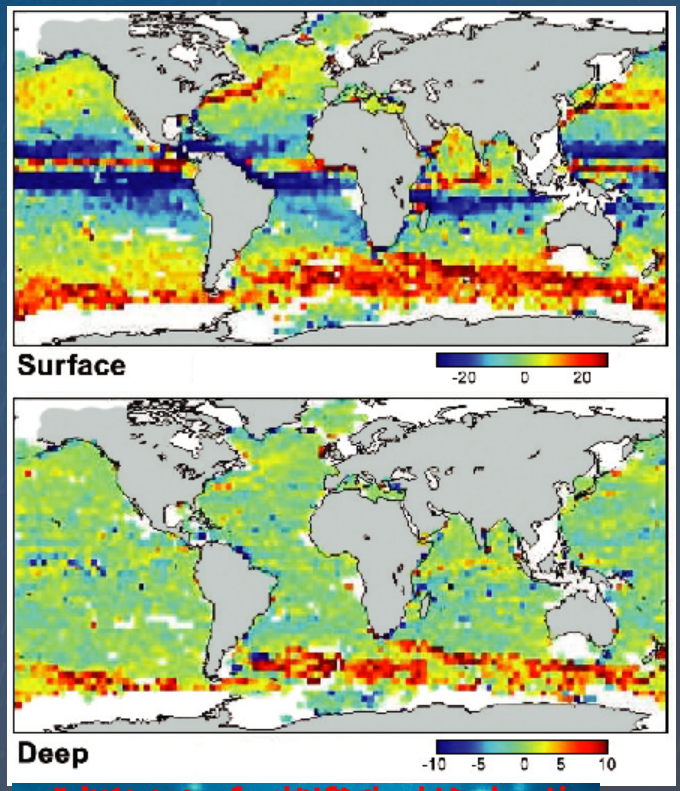
Address: Pacific Ocean Science and Technology Bldg., Room 401, 1680 East-West Road, University of Hawaii, Honolulu, Hawaii 96822 (see map)
Phone: (808) 956-5019; **Fax:** (808) 956-9425.

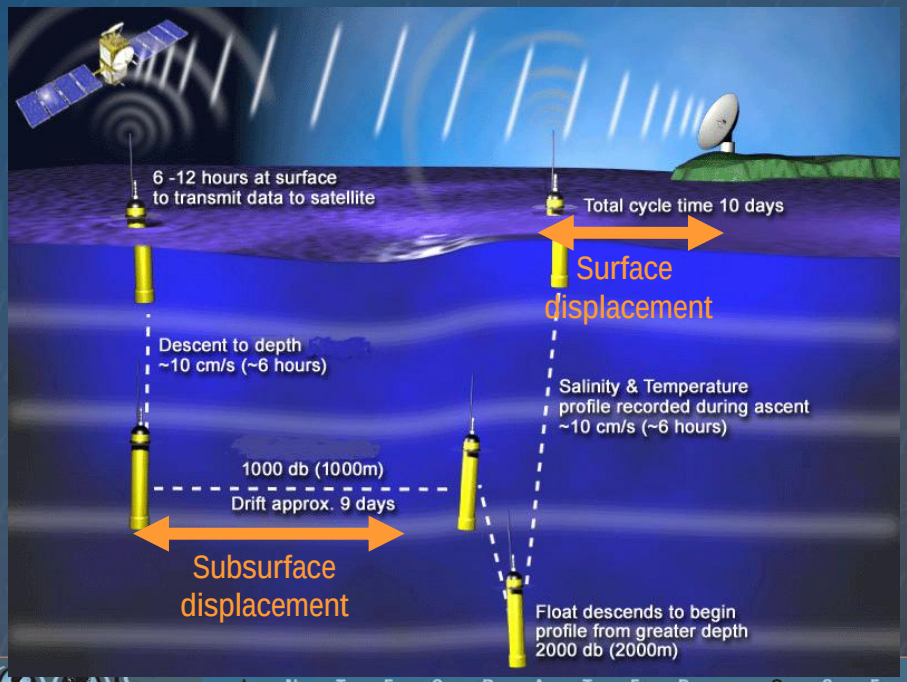
Last Modified: January 17, 2006

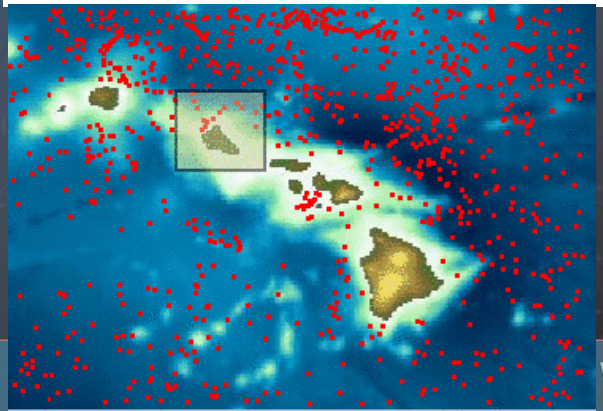
Dataset of Deep and Surface Velocities Computed from Argo: Le YoMaHa

Konstantin Lebedev, Hiroshi Yoshinari, Nikolai A. Maximenko, and Peter W. Hacker



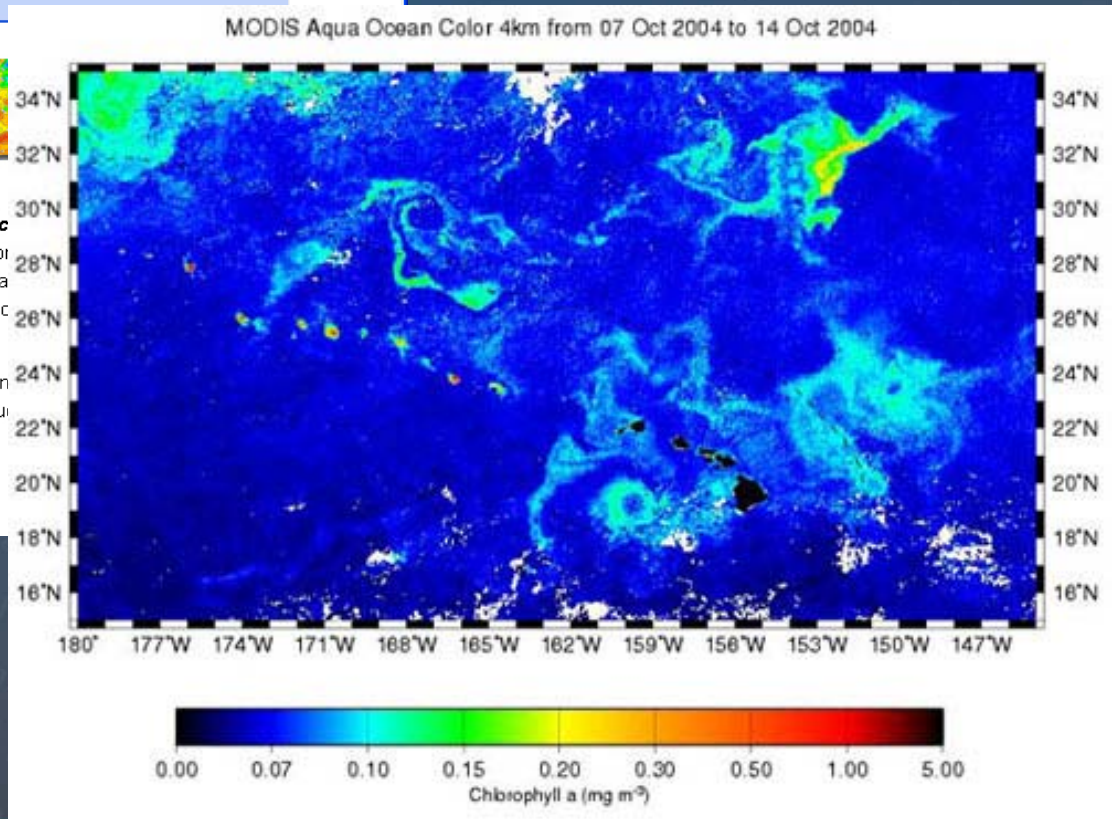






980
Profiles
In 8 yrs.

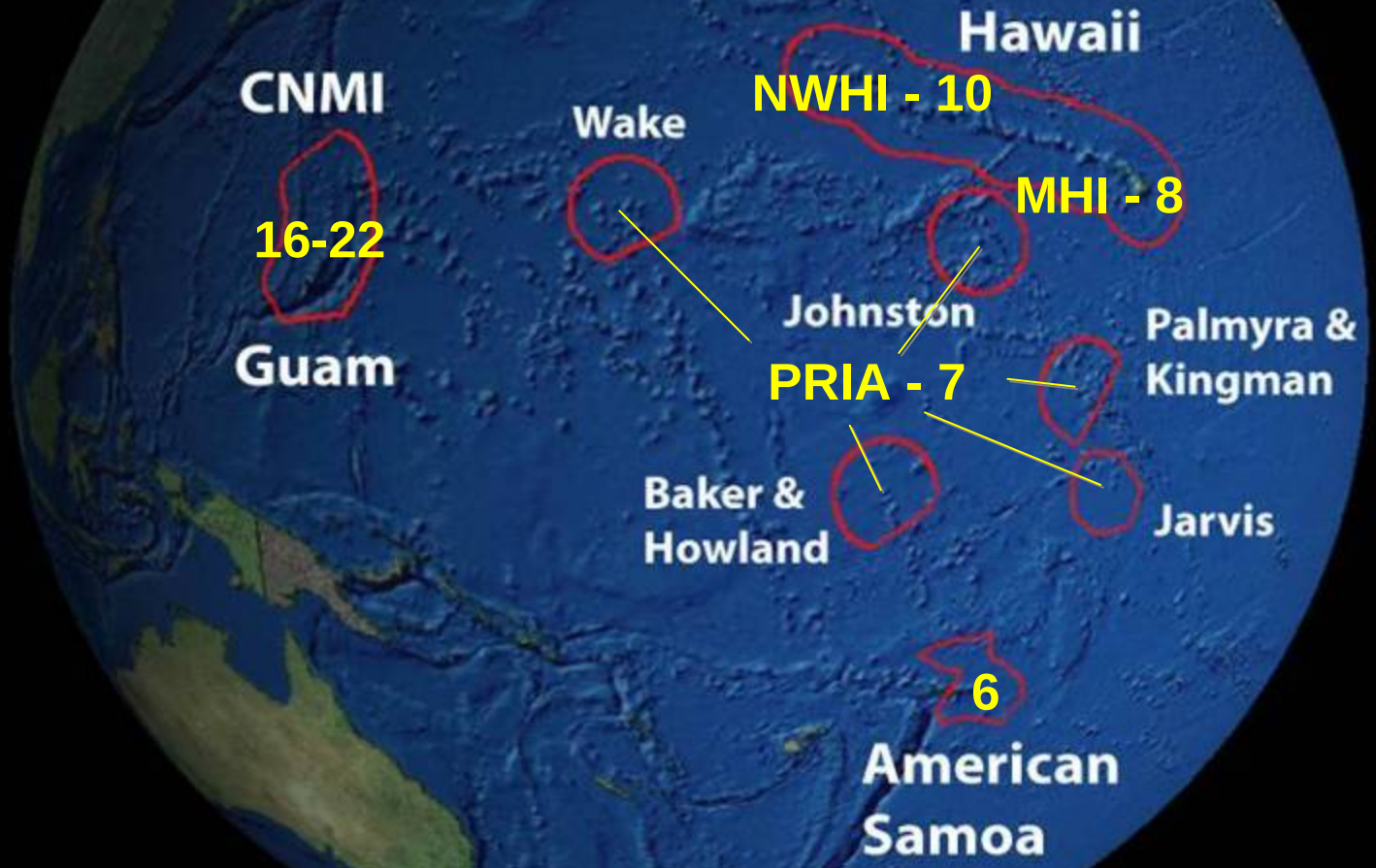
Current Activities: NOAA PIFSC



The Pacific Islands Region

Pacific RAMP

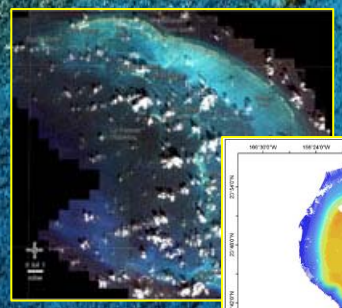
Integrated Ecosystem Assessment and Monitoring, Habitat Mapping, and Oceanographic Observations



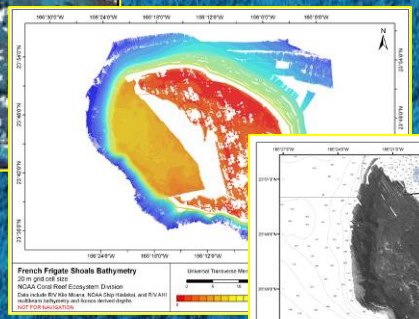
Baseline surveys of ~50 islands, atolls, and banks across diverse biogeographic, environmental, and anthropogenic gradients

A Layered GIS Approach to Benthic Habitat Mapping

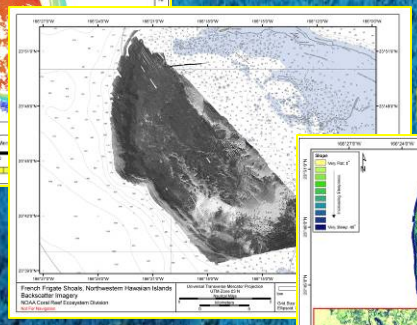
IKONOS or Land Sat Imagery



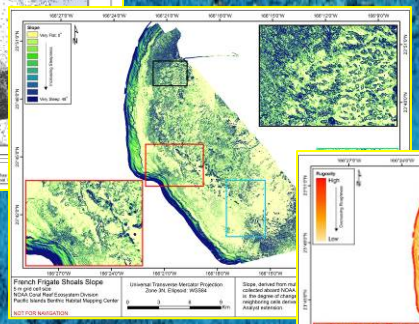
Multibeam Bathymetry & Estimated Depths



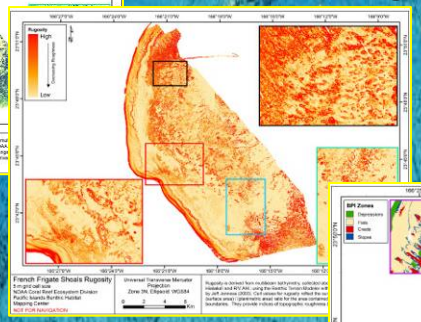
Multibeam Backscatter



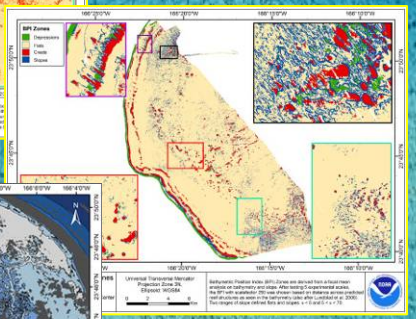
Slope



Rugosity

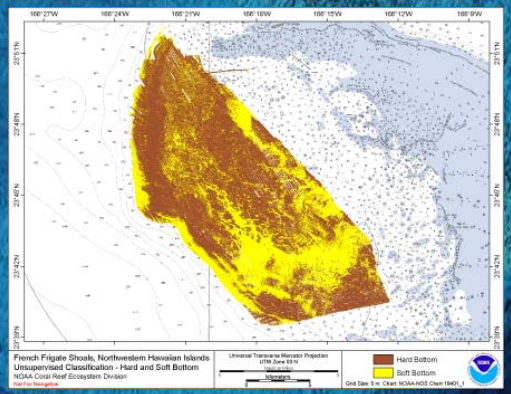


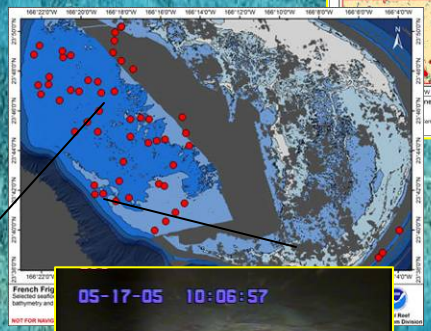
Bathymetric Position Index



Appropriate layers used for supervised and unsupervised classifications: e.g. hard/soft

Integrated GIS Project

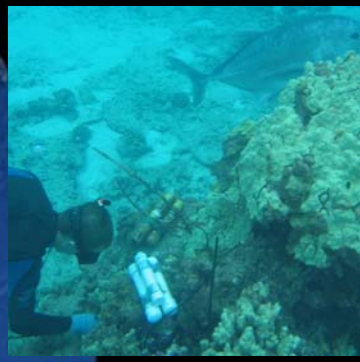


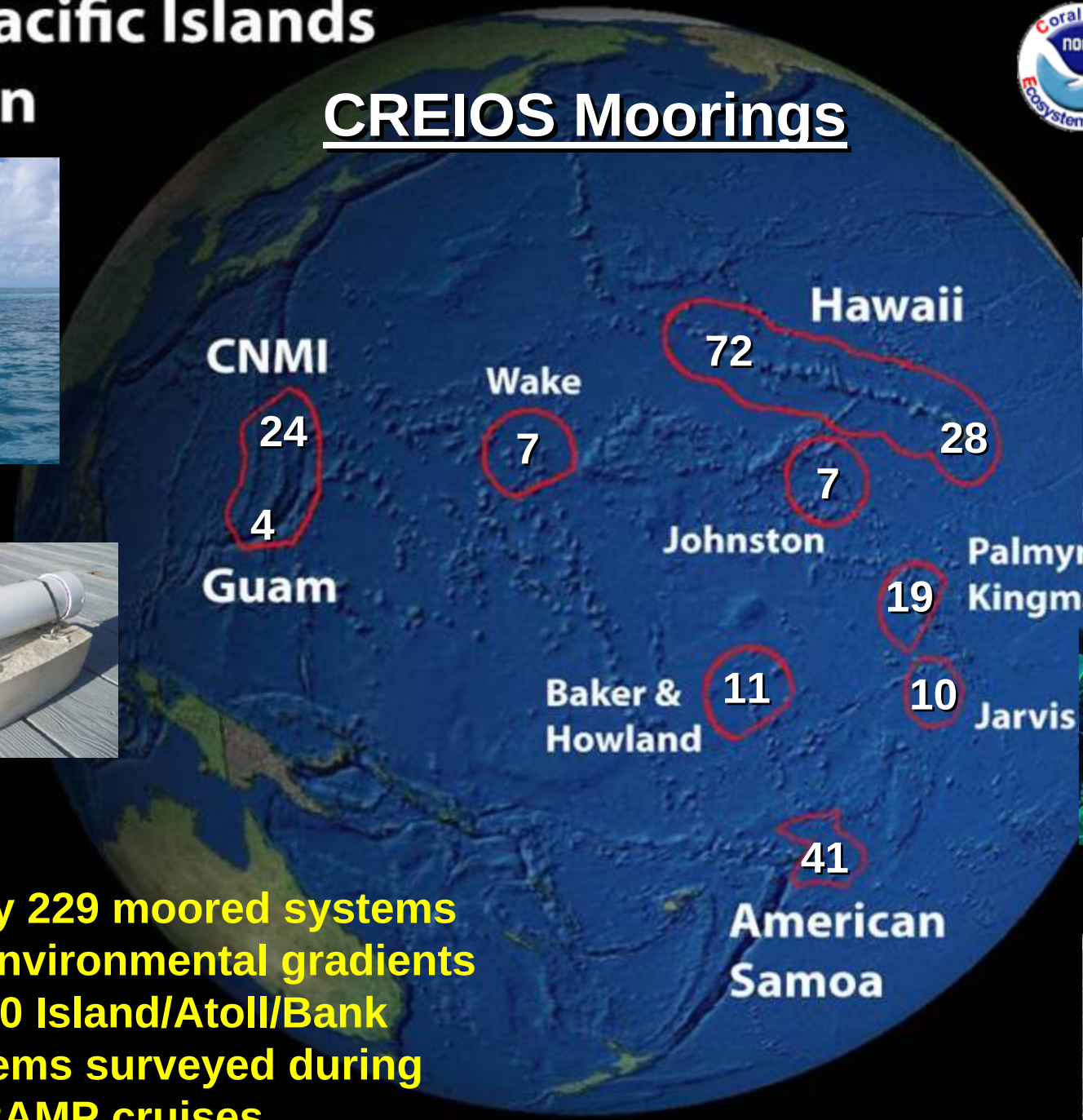


Optical Data and Linked Positions

The Pacific Islands Region

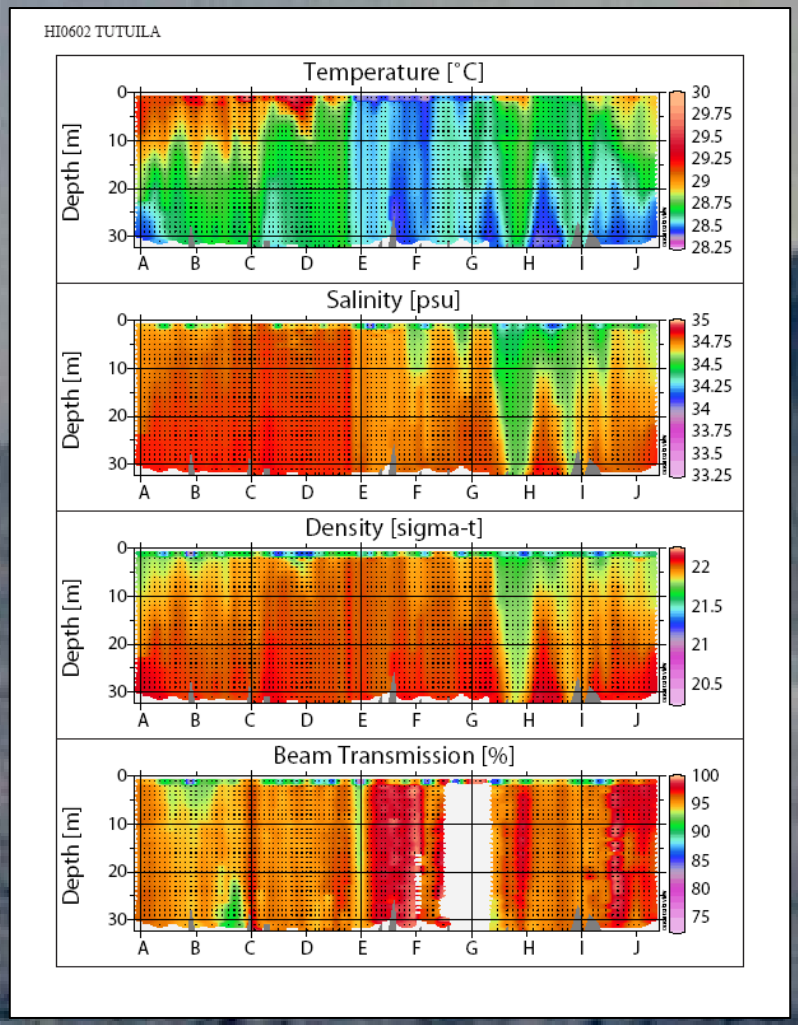
CREIOS Moorings

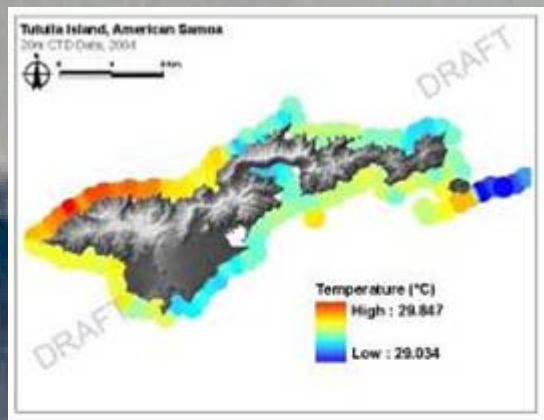


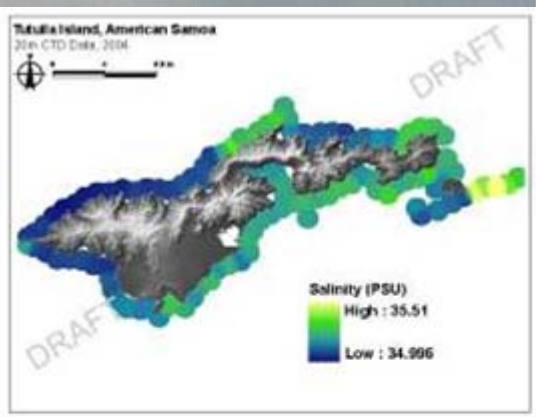


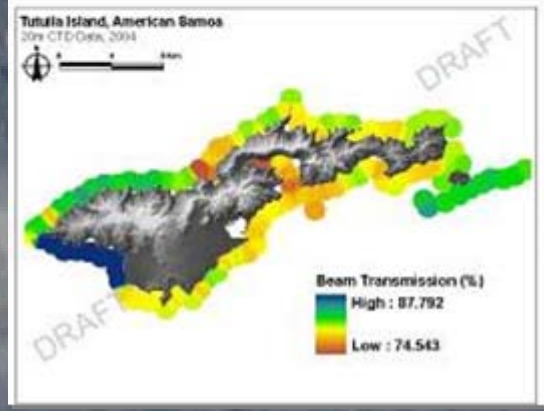
Presently 229 moored systems across environmental gradients of the ~50 Island/Atoll/Bank Ecosystems surveyed during Pacific RAMP cruises

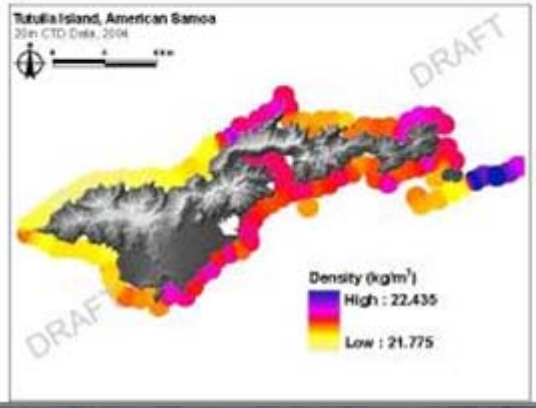
Oceanography/Water Quality



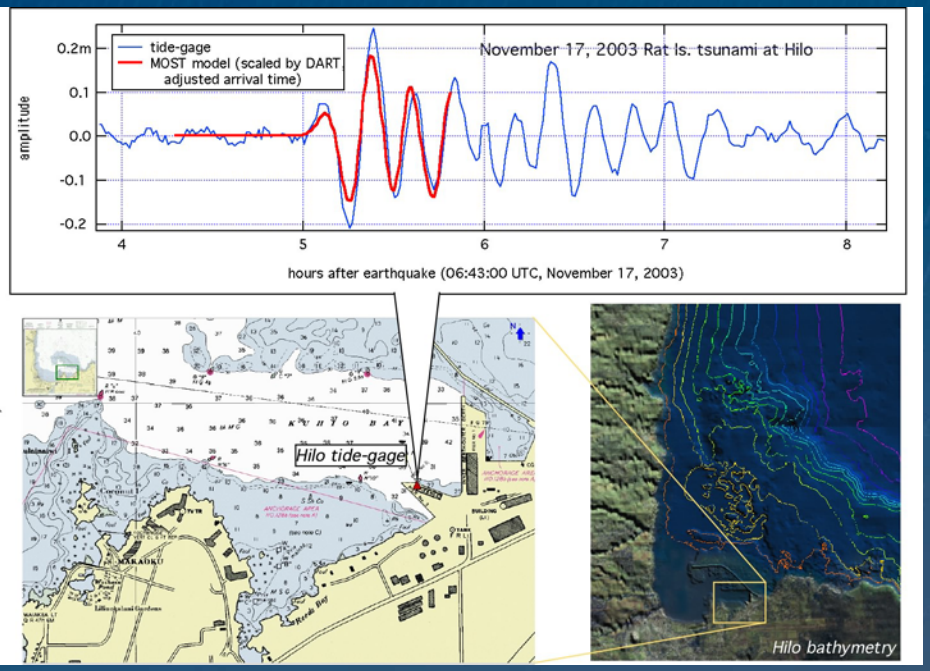






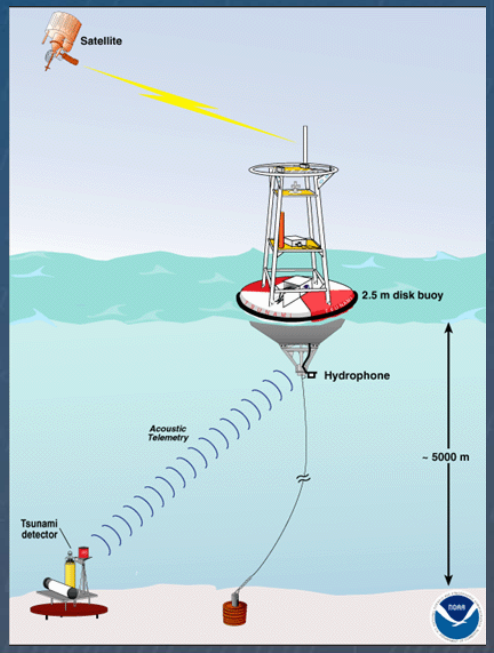


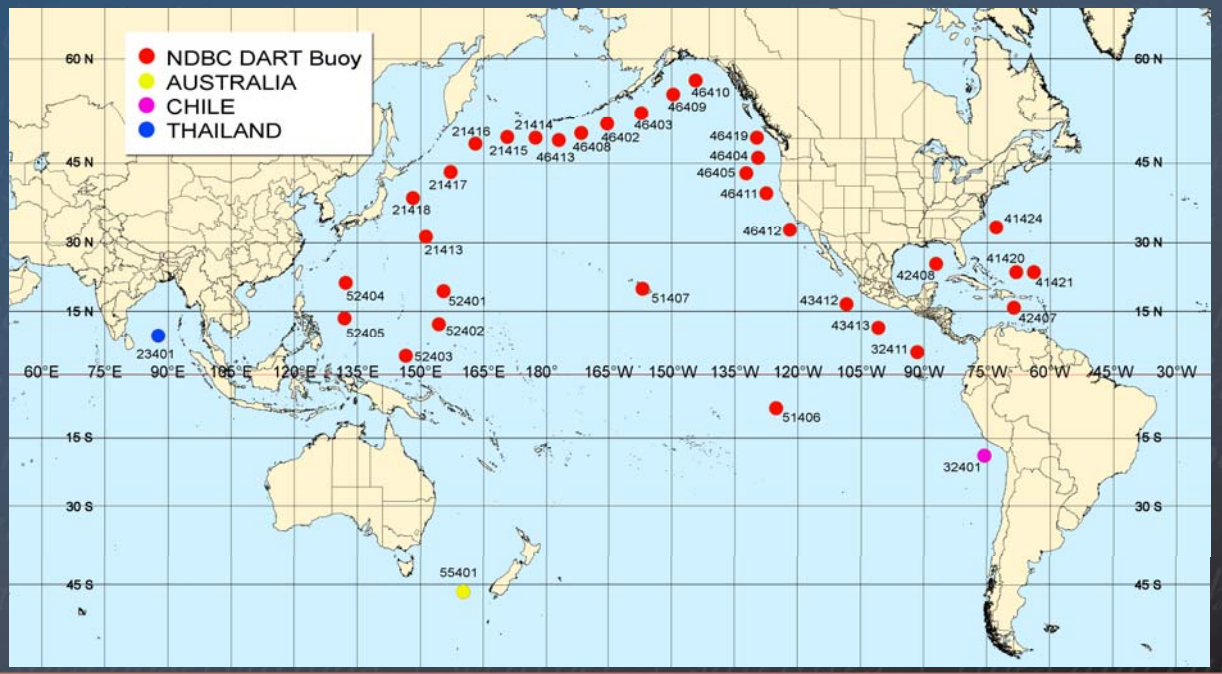
Coral Reef Ecosystem Monitoring Report for American Samoa: 2002-2006 (in Review)



Pacific Tsunami Warning Center

DART Buoy Array





Current Activities and Funding

- Interaction/joint work with other federal agencies
  - USACE: Waverider buoys
  - USCG: SAR buoys, modeling, HF Radio
  - NSF/ONR: Kilo Nalu
- How can NOAA IOOS best support you in engaging other Federal agencies?
  - Advocacy
  - Expression of importance of Pacific region to agencies with representation out here--we often get overlooked
  - Agency communication chains (ie, who do our regional contacts within various federal agencies need to talk to at a national level to leverage available resources?)

Current Activities and Funding

- Sources of funding
  - NOAA IOOS
    - RA Coordination (PacIOOS)
    - Regional Implementation (HiOOS)
  - C & C of Honolulu ($50k for DMAC, pending)
  - C & C of Honolulu, Sea Engineering ($500k for observations, through UH/Sea Engineering)
  - C & C of Honolulu, Oceanit ($800k for observing, through Oceanit)
- RA plans/efforts to supplement IOOS dollars with funding from other sources
  - SOEST ($300k) match for HiOOS equipment
  - Six faculty positions from the state ($750k/annual)
  - Plans to leverage partnerships with industry, state, and regional NGO's

RA Coordination: Cooperative Agreements

- Timeline
  - SOEST subcontracted from EWC
    - Began work on PacIOOS and HiOOS Coordination October, 2007
- SOEST Milestones (FY 07)
  - Staff Hawaii Coordinator and Education/Outreach Specialist - Completed
  - Identify and engage stakeholders in Hawaiian region for participation in pilot project (HiOOS) - Ongoing
  - Conduct HiOOS stakeholder workshop to determine local needs- Completed
  - Canvas Pacific Islands and conduct region meetings to gauge interest in ocean observing, identify contacts, and obs. needs - Completed
  - Identify and contract six U.S. Pacific Islands liaisons - Completed
  - Begin dialogue on PacIOOS governance with “all-hands” meeting in Hawaii - Completed

RA Implementation: Cooperative Agreements

- Timeline
  - SOEST funded for PacIOOS pilot project (HiOOS)
    - Began work on HiOOS implementation September, 2007 (prior to arrival of NOAA funds).
- Milestones (FY 07)
  - SeaGlider deployed in coastal Hawaiian waters - Completed
  - T-LIDAR surveys at Waikiki and Waimea beaches - Ongoing
  - Beach camera deployed in Waikiki - Completed
  - Regional wave model in operation - Completed
  - Wave state products on-line - Completed
  - Atmospheric model in operation - Completed
  - Wind map products on-line - Completed
  - Sea-level trends/heights on-line - Completed

RA Implementation: Cooperative Agreements

- News:
  - New websites for HiOOS and PacIOOS launched April, 2008
    - Growing distribution of printed materials to public agencies and groups
  - Education items
    - Through a partnership with the Outrigger hotel group we are hosting:
      - A public lecture series to allow for researcher interaction with the public and education of the visiting and local population on aspects of the ocean that effect our daily lives
      - Media breakfast with media outlets, PacIOOS leadership, and select researchers to begin propagation of print, broadcast, and web-based stories on the PacIOOS region observing system.
    - Additional lecture series being sponsored for researchers through NOAA Sea Grant
  - SOEST/PacIOOS are represented on the Executive and Working Groups of the Hawaii Ocean Resources Management Plan.

RA Coordination: Cooperative Agreements

- What will change with the new RA grant in FY08?
  - New funding will allow us to:
    - focus more intently on Pacific Islands engagement and begin implementing the agreed upon initial governance plan for the PacIOOS region.
    - send individuals through the insular region in the coming year(s) and build capacity through training of data/product use, instrument implementation, assessment of continued needs, and evaluation of a formal governance system.
    - allow for dedicated planning of observing system expansion to Pacific Islands in next funding cycle with an “low-island” atoll-based model of an observing system in Majuro. This will create two living marine laboratories, a high-island model in Hawaii and an atoll-based model in the Marshall Islands.
- New directions, partners, etc.?
  - re-evaluating our modeling program and will investigate running a basin-scale model with nested high-res regions.

RA Future Development

- Proposed objectives of the RA:
  - plans for the near-term FY08-12
  - Establish agreements for initial PacIOOS governing council
  - Conduct stakeholder workshops in all Pacific islands jurisdictions
  - Expand data management capabilities throughout Hawaii and the Pacific Islands
  - Develop and deploy atoll-based observing system
  - Maintain and expand high-island observing system (HiOOS)

RA Future Development

- Top four priorities for development
  - Maintain and expand high-island observing (HiOOS) ~$5-10 million/yr
  - Develop atoll-based observing system (Majuro) ~$3-5 million/yr
  - Expand data assimilating modeling capacity to address regional needs (~$1 million/yr)
  - Build capacity in region to self-monitor and address site-specific management questions ($2 million/yr)

RA Future Development

- RA views on performance metrics
  - We are still developing RA----not yet formally organized. Value of blanket national metrics?
  - Metrics must reflect actual funding.
  - Proposed deliverables are an appropriate metric for success as region develops and organizes.
  - National Office & RAs are not experts in socio-economic impact studies.

RA Views on Regional and National IOOS

- RA needs with regard to the integration of regional and national planning efforts
  - Coordination and leveraging of national programs being implemented in the region.
- RA expectations for development of the “national backbone” of observations
  - Program office identification and RA concurrence of what the national backbone is
  - Adequate funding to sustain 24/7 operations

Cross-regional Coordination

- Discuss potential coordination with other IOOS RAs:
  - AOOS and PacIOOS both share a need for reliable basin scale Pacific models and interoperability between nested regional models.
    - Interest has been expressed by both the US Navy (Pacific Command and Pacific Fleet) and the National Weather Service about pursuing cooperation among the regions and the agencies.

Best Practices and Lessons Learned

- What are some “good ideas” or best practices that you can share with other RAs?
  - Stakeholder buy-in is key to project success
  - Leverage resources and synchronize projects when possible
  - Keep communication lines open and development transparency with stakeholders and interested parties

Parting Thoughts

- What support or information do you need from NOAA that you are not currently receiving?
  - Program office realization and acknowledgement of unique Pacific challenges
  - Proper representation of the region in official NOAA and NFRA images, publications, and presentations.
  - Commentary on continued budget decreases and viability of ocean observing? What does NOAA see for future of funding?

Parting Thoughts

- How can NOAA IOOS best receive regular updates or information from the RAs?
  - Quarterly “best three” ppt slides of RA and partner achievements.
  - More visibility and understanding of the benefits of the national system will require its greater implementation.