

Ocean Reference Time-Series Moorings: Acoustics

By

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Reference Time-Series Science Team Meeting

3-5 April 2003

Outline

1. My purpose here – facilitate information exchange - ref time series mooring and acoustical oceanography, network
2. Science rationale - acoustics
3. Proposed ALOHA Observatory mooring – one step in development
4. More plans in North Pacific - ATOC
5. Acoustical oceanography planning efforts
6. Concluding remarks

Scientific Rationales

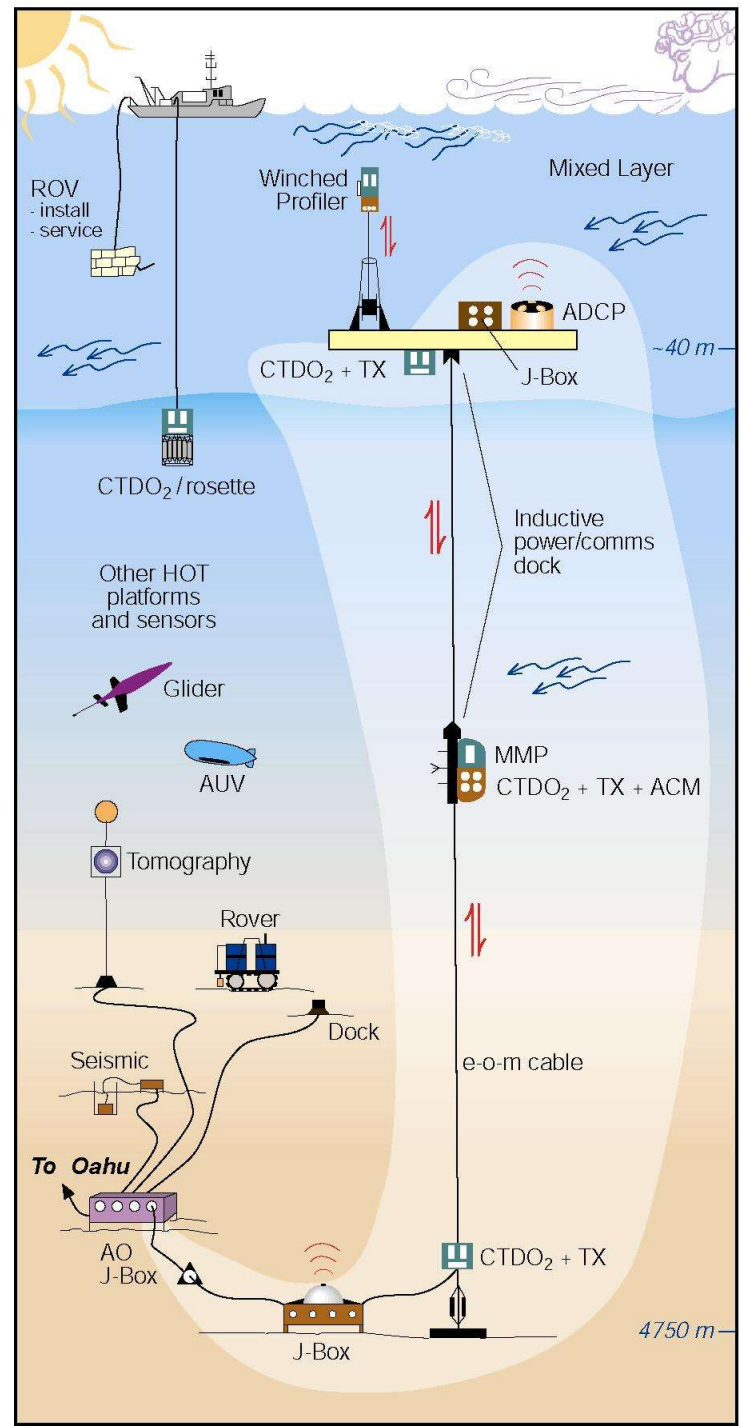
- Ocean circulation and variability over wide range of spatial and temporal scales
 - Small, mesoscale, climate/basin
 - Physical properties – temperature, velocity, ...
 - Sampling – Nyquist, physical access, ...
- Surface fluxes – wind/gas/bubbles and rain
- Marine life
 - micro to mega fauna
 - basics to behavior
- T-phases
- Other ...

ALOHA Mooring Sensor Network and Adaptive Sampling

- NSF proposal
 - submitted 6 March 2003 – SENSORS program
 - With Roger Lukas and Emmanuel Boss
 - Use MMP with bio-optics to adaptively sample water column
 - Attach EOM subsurface mooring to ALOHA Observatory (AO)
 - Includes EOM cable, MMP docking
 - J-boxes on subsurface float and at base – **power, comms**
 - Upward looking ADCP on subsurface float
 - Learn how to zero in on features of interest – real-time comms
 - Fulfill time series requirements

ALOHA Observatory Mooring

NSF Proposal
March 2003



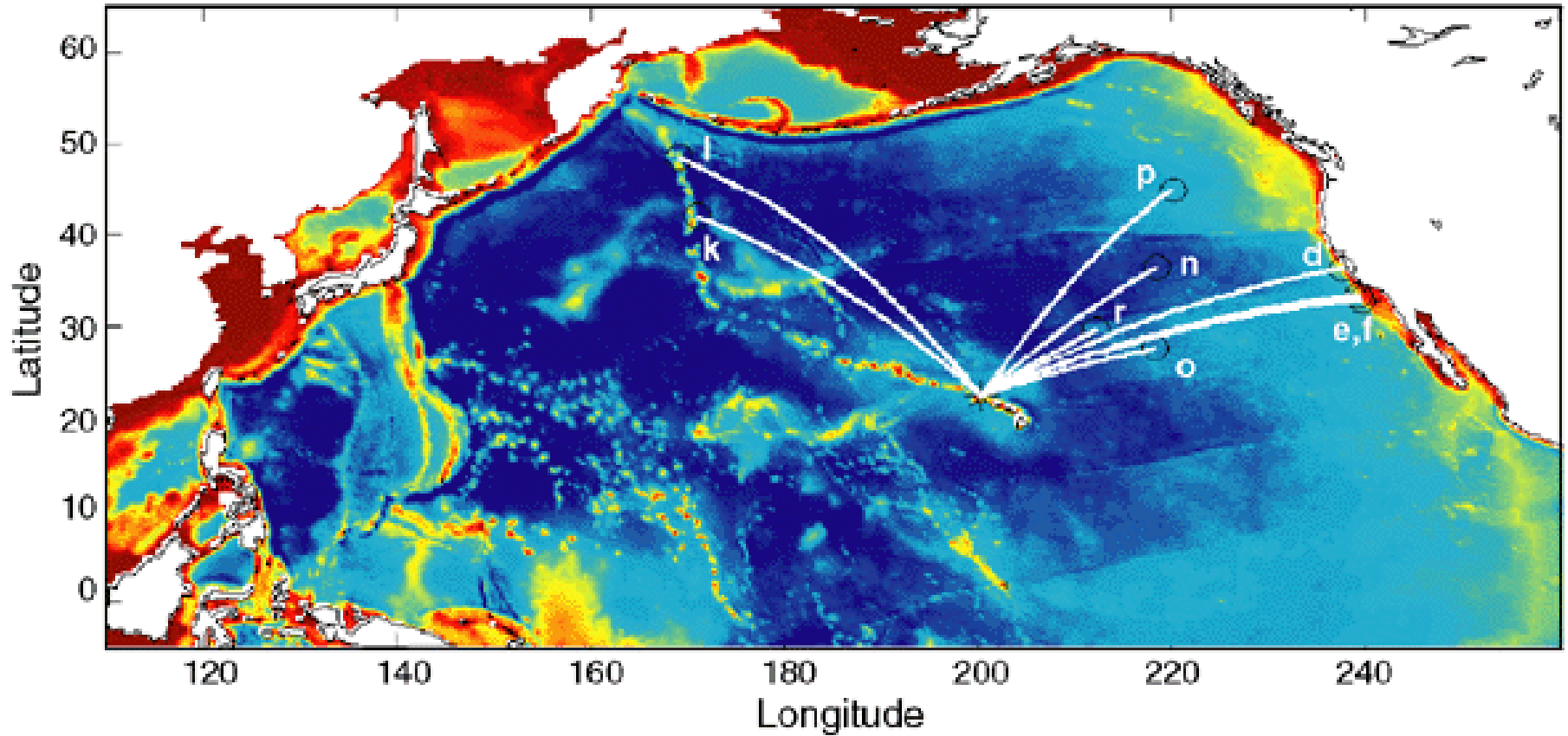
ALOHA Mooring Sensor Network: Next steps

- Add more bio-optical and other sensors
- Add winched profiler for upper 200 m
- ROV serviceable
- Another EOM mooring with fixed sensors (e.g., tomography, acoustic rain, wind, gas transfer, T-phase, marine animals)
- Other nearby sensors (e.g., IES, HEF, BBL ADCP/T-S, bottom rovers, ...)
- Work towards a coherent measurement program at AO: HOT, MOSEAN, Weller NOAA, etc.

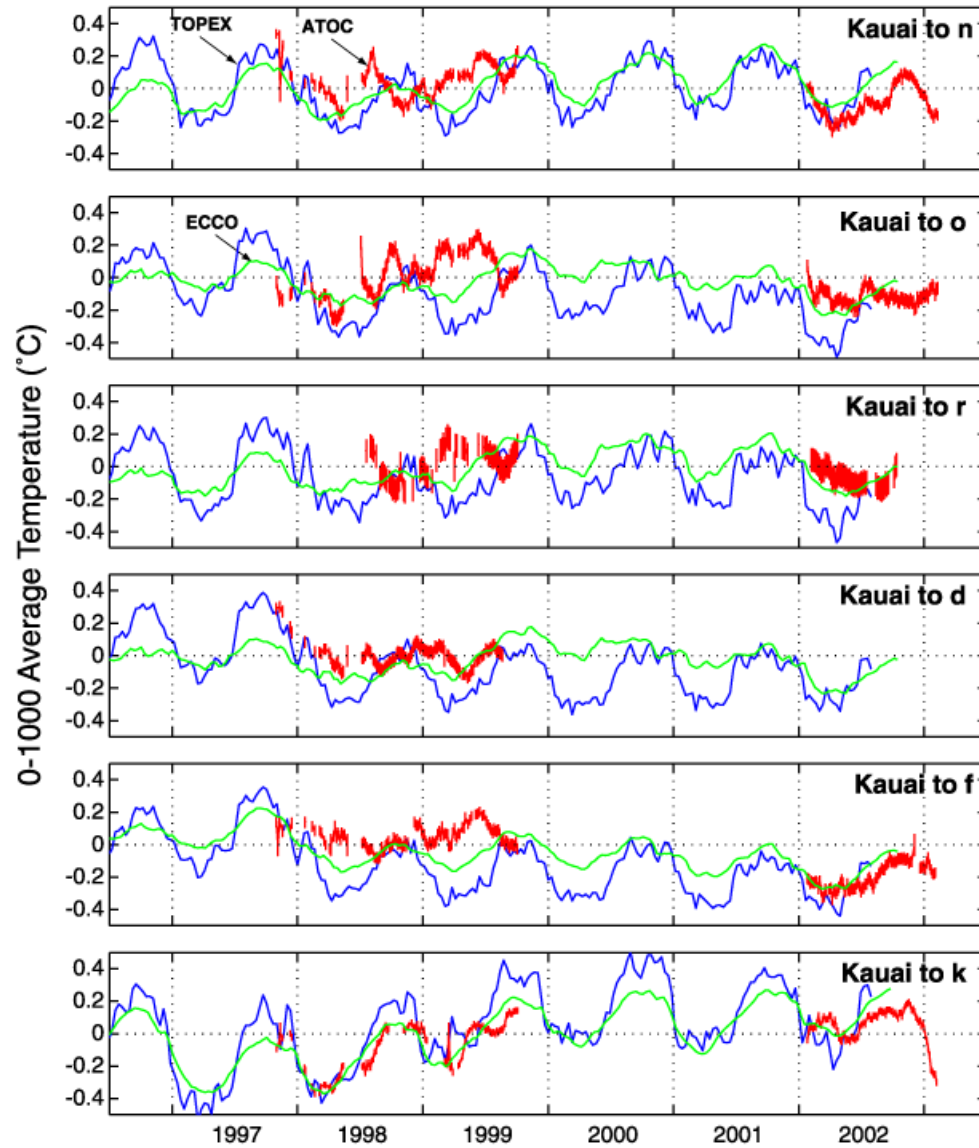
Other North Pacific Efforts

- H2O (mid-way Hawaii – California)
 - add acoustic/tomography mooring(s)
 - Is there interest in a reference time series site there or planned?
- MARS – Monterey Accelerated Research System
 - Acoustic receiving array – ATOC, Calif current
 - Eventually acoustic source
- PAPA – NOPP/ATOC demonstration
- NPAL
 - upcoming experiment, long term Navy interest
 - Continues ATOC – see last CLIVAR newsletter

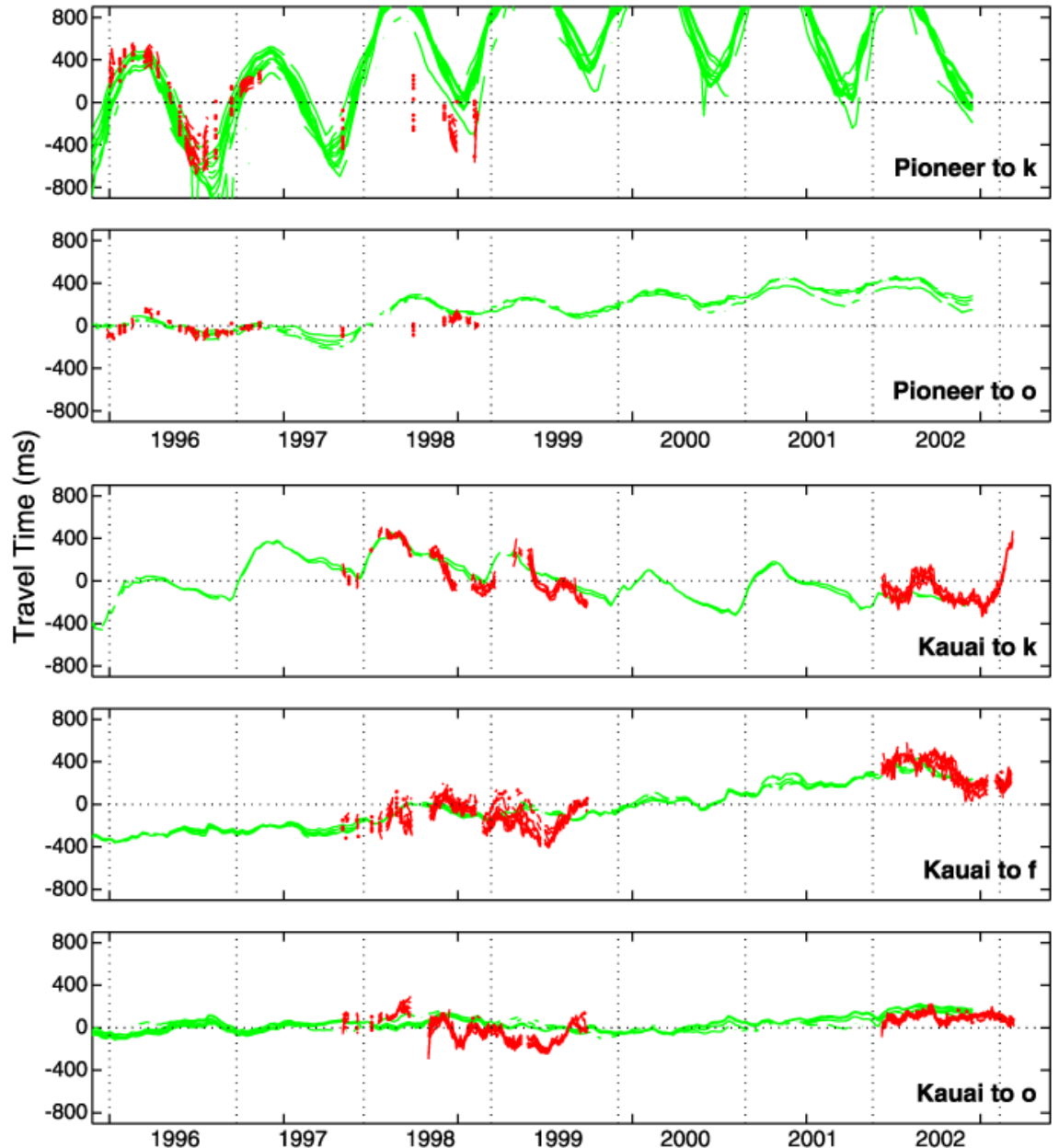
Present ATOC Array



Present
Time
series
March
2003
0-1000 m
Temp



Present
Time
series
March
2003
travel
times –
measured
and ECCO



Acoustic approaches - 1

Simultaneously:

- Acoustic navigation - Underwater GPS
 - Acoustic communications
 - Acoustical oceanography
- Nested infrastructure of broadband transmitters + receivers + ...

Other ...

Acoustic approaches - 2

- Platform navigation with passive hydrophone receivers
 - Better float information (velocity, deep, ...)
 - Track auvs, gliders, rovers, animals
- Acoustic tomography – fixed s/r, moving r
- Acoustic comms – when satellite comms not an option
- The acoustic spectrum

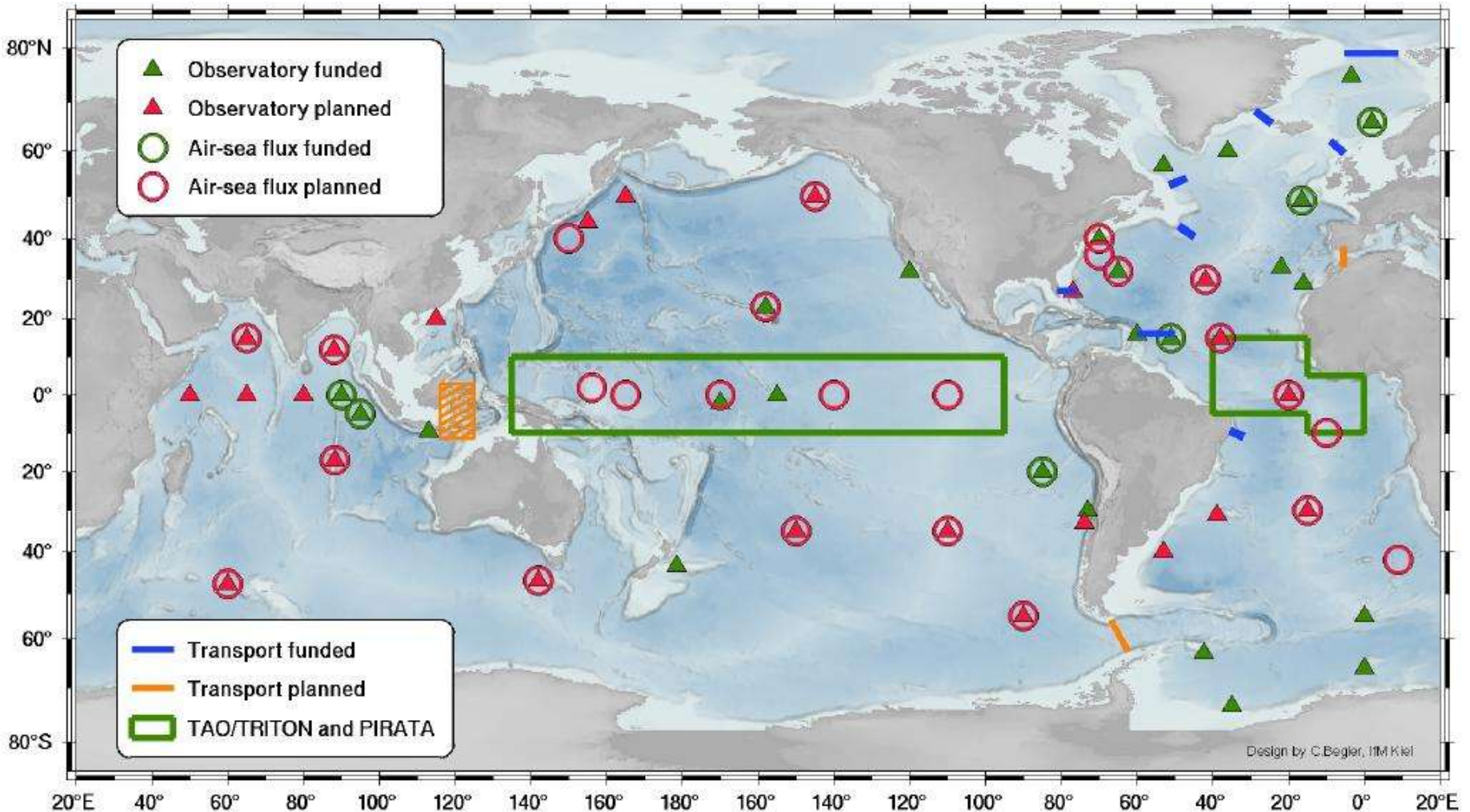
Other ...

Acoustic network sites

Need to start planning

- A fair degree of flexibility in location
- Ocean signals of interest
- Bathymetry blocking
- Ocean sound speed structure, noise, logistics, etc.
- Sharing/interdisciplinary nature is essential – DEOS, RefTimeSeries, etc

GEO, DEOS, et al.



ASA AO Committee

Integrated Acoustics Systems for Ocean Observations

- Web page – AO
- Co-chairs – Bruce Howe, Jim Miller
- White paper in preparation
- ***Workshop***
 - ***19-20 Sep 2003 San Diego (tentative)***
- Lead to
 - Contribute to OOI workshop 5-9 Jan 2004
 - Acceptance by CLIVAR, GOOS, etc.

Concluding remarks

- See acoustics as one link connecting point and spatial measurements
- Address siting issues – with other interdisciplinary users
- Must work towards synergies – science, technology, programs