



Corvallis Workshop – August 2000

**Assessment of Future Science Needs
in the Context of the Academic
Oceanographic Fleet**

Workshop Goals

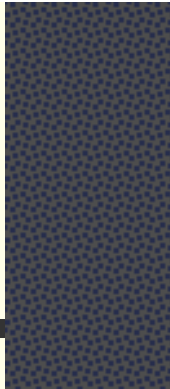
- Provide science “needs” framework to inform the fleet renewal process
- Identify approaches that may be used to address science questions over next two decades
- Identify platform capabilities required to meet science needs
- Examine role of vessels and trends in vessel use in context of other observational platforms

Major Science Themes (as examples)

- Better Observations in Selected Environments
 - Coastal Oceans
 - Ice-edge, ice-covered
 - High-latitude Open Ocean
 - Sea floor: mapping, spreading centers, sediments
 - Air-Sea Interactions
 - Benthic Boundary Layers

Major Science Themes (as examples)

- Interdisciplinary Studies
 - Expeditionary Scale Research
 - Mesoscale/Finescale/High Resolution (time and space)
 - Biodiversity
 - Coupled observation-modeling systems
- Perturbation Experiments
 - Natural and/or Deliberate
- Fixed Location Observations/Experiments
 - Long time series



Scientific needs (observational and experimental) of ocean science over the next two decades require the implementation of:

Remote observational systems with robust sensor suites (limited to a few variables)

Satellites (color, temp, winds, currents, etc)

Long-term moorings

Drifting (single depth and vertically cycling) platforms

Autonomous vehicles

(some of this is already in place)

Science Needs, continued

Vessels to provide deployment/recovery/service for moorings, drifters, vehicles

Improved capabilities for handling untethered objects

Acoustically quiet

Improved heavy weather capabilities

Increased use of AUVs, ROVs and submersibles

(some new vessel construction probably needed here)

Science Needs, continued

Vessels that function as primary observational and experimental platforms

Improved capabilities for handling untethered objects

Acoustically quiet

Improved heavy weather capabilities

Undisturbed sampling in/around air-sea interface

Increased use of AUVs, ROVs and submersibles

(some new vessel construction probably needed here)

Science Needs, continued

Vessels that can meet the expanded needs of the marine geology community (growth in ODP)

increased coring capacity (expanded site survey needs)

sea flooring mapping

seismic systems

increased use of AUVs, ROVs and submersibles

(some new vessel construction needed here)



Science Needs, continued

Global high-bandwidth communication capability (transition from cell phones to internet)

Between remote sensor suites and land-based or ship-based laboratories

Vessel-vessel and vessel-laboratory data communications

(commercial technological advances can be moved quickly into ocean science – already in progress)



Science Needs, continued

Rapid response capability within the oceanographic fleet

Have vessels/remote systems that are available to respond to “events” detected by observational program

Implies excess capacity will be available

(Places a new set of challenges on ship scheduling system)

Vessel capabilities needed for the future: (1)

- Acoustically-quiet vessels for improved communication and tracking of autonomous vehicles;
- Greater stability to work in a wider range of sea states;
- Sheltered, ice-free decks for operations at high-latitudes;
- Undisturbed sampling of ocean surface, air-sea interface, and levels just above and below the interface;
- Improved launch/recovery operations for remote systems, whether towed or untethered (AUVs);

Vessel capabilities needed for the future: (2)

- Ice-hardened ships as climate change drives more research in marginal ice zone areas;
- Clean sampling handling during perturbation experiments (trace elements, etc);
- Improved and expanded shipboard laboratory space;
- Improved sea-floor mapping, coring;
- High-speed data communication to shore, ships, deployed instruments.

Conclusions

- New observational tools will *extend* the reach of the fleet, but *will not replace* or reduce the fundamental use of vessels to conduct basic observational and experimental research at sea
- These trends will lead to *increased* demand for shiptime

Conclusions

- Vessel capabilities must be extended to meet the needs of new systems and approaches
- We recommend a community evaluation of “general-use” versus “specific-use” vessels in the fleet

Conclusions

- Expanded time/space scales of resolution of observations will lead to scientific demand for “event-scale” studies of ocean processes
- We therefore recommend a thorough evaluation of the ship scheduling process