
A Review of the Joint Institute for Marine Observations (JIMO)

A Report to the NOAA Science Advisory Board

by

The JIMO Review Team

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Executive summary

JIMO is an outstanding practitioner in selected areas of earth science that support the NOAA mission. JIMO's fellows are uniformly first-rate and very competent scientists. The institute has been very successful in acting as a mechanism for NOAA support of SIO research and has been a leader in developing relationships between the UC-system and NOAA. Other JIs might well benefit from its experience. The linkages between NOAA program elements and the JI facilitate program initiation, long-term program support of NOAA missions, and transition efforts from research to operations.

The strengths of JIMO were assessed to be:

- the quality of the institute's research and its fellows
- leveraging of local/state resources in support of NOAA goals
- the diversity of science and education/outreach programs
- linkages to international programs, *e.g.*, ABC, ARGO, GEWEX
- its nascent role as an integrator of UC earth system science
- the efficiency and speed of program initiation
- the strong partnering with some NOAA programs
- the substantial value provided to NOAA by the overall JIMO effort.

The following challenges for JIMO were identified:

- completion and assessment of several programs by 2008
- sustaining the Institute's highly leveraged scientific agenda
- broadening agenda into biogeochemical cycles
- governance and management structure
- strategic planning process
- succession of fellows and institute leadership
- preparing for the CI re-competition process
- leveraging of UC relationships

JIMO is a non-traditional application of the JI framework, in that its principal partners are the NOAA Climate Office and NMFS, rather than [OAR] research labs. Therefore, NOAA should articulate its expectations for such JI relationships in order to facilitate their planning and management.

JIMO was judged to be a successful Joint Institute that is worthy of NOAA's continued support. The reader should review the background science documentation for an overview of a truly high quality science program. The body of this document addresses the challenge areas.

Completion and assessment of several programs by 2008

JIMO is a major participant and partner in NOAA's contributions to the global ocean observing system. In particular, the ARGO project, the high density VOS XBT lines, and surface drifter projects greatly benefit from JIMO contribution. A clear implementation timeline has been established within the Climate Observation and Services Program with completion of the aforementioned networks in the 2007 to 2008 timeframe. There is some uncertainty about how these networks will be sustained by NOAA once they reach operational status. Because of JIMO's intellectual and logistic contributions to date, it is imperative that the JIMO fellows engage in dialog with the appropriate NOAA entities about their role in sustaining the observing system. This consultation should go beyond the traditional interactions through OAR/OGP, occurring instead through the "new" NOAA structure of strategic themes to engage the line offices traditionally tasked with operational activities. JIMO has excelled in using the operational observations in fundamental studies, in continued R&D on the observing systems and infrastructure, and in increased applications of the global observations; however, JIMO will have to articulate its future role in these areas when these ocean observing systems become operational.

JIMO should exert its intellectual leadership in several other areas where there is a community wide change in research approaches. Examples include new prediction schemes for ENSO, forecasting of regional precipitation and full ecosystem approaches to fisheries problems. These are areas where JIMO fellows have been on the forefront and must continue to contribute to address the changing paradigms. In particular, some research areas that held promise a decade ago such as medium range forecasting of weather and precipitation will need a wholesale reassessment on their feasibility. These issues need to be clearly articulated to researchers and managers, and new approaches must be sought.

While JIMO is cognizant of the completion schedules of various observational components and recognizes the important changes in methodologies and research thrusts, the review did not bring out any clear strategy or innovative thought on these issues that are paramount to future successes of the Institute and NOAA.

Recommendation: JIMO should provide guidance to NOAA and SIO/UC in transitioning of ocean observation programs from research to operations, and in changing approaches to pertinent science questions.

Sustaining the Institute's highly leveraged scientific agenda

Since its inception JIMO has grown to be a significant dimension (~\$25M/>20% of the SIO extramural budget in the last fiscal cycle) of the SIO research program and a major player in NOAA mission supporting science with contributions to observations, modeling, fisheries, regional impacts, outreach and education. JIMO has a diverse suite of programs, ranging from small single PI efforts to large multi-participant programs, with a mixed focus on observations, analysis and societal impacts. This suite of programs has grown during a period of expanding federal support. The challenge for JIMO (and SIO) will be to sustain this web of individually driven programs in a period of contracting federal budgets, increased competition and changing priorities and mechanisms in NOAA. NOAA has adopted a structured planning and budgeting process (known as PPBES), that rewards performance based on meeting pre-defined metrics. This process is relatively new and could be in conflict with JIMO culture and approach. The appropriate NOAA elements and JIMO must establish mechanisms to facilitate mission-based planning.

Recommendation: JIMO and SIO should examine the evolving NOAA structured planning and budgeting approaches and reposition JIMO so that it can adapt accordingly.

Broadening agenda into biogeochemical cycles

JIMO is at the forefront of observational climate and fisheries research but lacks several components for comprehensive earth system research. Such interdisciplinary research has not been funded by NOAA in the past and JIMO needs to bring this deficiency to OAR attention. Most notable, considering the world-class expertise within the UC system and SIO, in particular, is the absence of vigorous research within JIMO on biogeochemical cycles and their response to climate variability and change. While the physical system and fisheries response is well understood, it is the connection of these two through nutrients, carbon, and lower trophic level interaction that should be further developed to successfully transition into earth system research. An area where this potential could be realized is in the ocean observing systems efforts (where JIMO is involved). Taking an integrated and holistic approach where the California current system is studied from the basic physics to higher-level ecosystem functions through the true integration of the various observing efforts under JIMO (PaCOOS, SCCOOS, and CalCOOS) could position JIMO and the region as a true leader in the earth system research and observations field.

Recommendation: JIMO should develop a plan to utilize JIMO, SIO and UC human capital in a comprehensive earth system approach to global problems including biogeochemical processes

Governance and management structure

JIMO operates with a “flat” structure and involves a number of centers each with their own separate governance and review mechanisms. While this structure has not hindered JIMO’s scientific productivity in the past, the review panel believes that it is not adequate for guiding JIMO into the future. According to the MOU between NOAA and Scripps establishing JIMO, there are plans for an Executive Board and a Council. In JIMO’s case, these mechanisms do exist but appear to only function when there is a need (e.g., in advance of a review meeting) but do not play any role in the management of JIMO or its centers on an on-going basis. The review panel has based its conclusion on an observation that the terms of reference for these bodies are not being followed, since there is no documentation of minutes available to us showing recommendations from these bodies concerning approval of policies, evaluations, etc. The lack of involvement of the JIMO’s Executive Board and Council in JIMO operations as advisors and advocates has left the JIMO Director with an overly large burden of carrying JIMO into the future. It has also reduced the avenues for JIMO to formally engage NOAA elements and Scripps/ UC components in strategic discussions. JIMO needs to review the roles of these bodies and to make them fully functional. Within JIMO, all PIs are designated as fellows but not accorded any role beyond that of PIs with any other NOAA grant. These fellows represent a major intellectual resource that could make more substantial contributions to the development of JIMO if more opportunities were created. It is recommended that a group of fellows be given a leading role in developing a strategic plan for JIMO (next challenge).

Recommendation: Review management structure, roles and responsibilities of the Executive Board, Council and Fellows, and, provide the JIMO Director with assistance in areas with needs.

Strategic planning process

JIMO resists the concept of following a “master plan” and takes advantage of being nimble by not building expectations in any area until funding is available. The review clarified that an explicit strategic planning process beyond the 5-year budget cycle does not exist although there was a philosophy of hiring the best experts possible that led to some setting of directions in the Institute. While this philosophy has been successful for JIMO interactions with the Office of Global Programs (and now the Climate Program Office) it is difficult for other NOAA entities to take full advantage of JIMO’s capabilities due to the absence of a strategic plan. This lack may also be a serious complication in gaining support for a JIMO coordination role for the entire UC system (This was assumed to be a goal from the documentation that was submitted to the review panel, but was not

a goal in the original MOU). As JIMO pursues its intentions to become a lead for Earth sciences within Scripps and the UC system, and move into the area of “operational” science it will be essential for it to develop a strategic plan and to communicate that plan to NOAA, to JIMO employees and to the UC system. Furthermore, in these days with tougher competition for resources and increased accountability, NOAA needs to ensure that its Joint Institutes have an explicit plan and research successes can be reported against that plan.

There are a few elements for a strategic plan in terms of the themes outlined in the 2001-2006 proposal to NOAA. Some other areas for development were presented at the review meeting. However, these do not constitute a strategic plan, nor do these limited and fragmented statements indicate why some issues are priorities and not others, nor do they show how JIMO will take advantage of the tremendous untapped potentials for integration that exist within its ongoing and planned activities. The proposal process, which is the source of much of JIMO’s funding, ensures that there is a close connection between JIMO activities and the NOAA strategic plan. However, this connection has not been clearly articulated at the Institute level in terms of a vision and goals, nor is there an indication that JIMO scientists collectively have taken ownership of a vision for the institute. A commitment to developing a strategic plan is needed along with a process for developing the plan that ensures buy-in by the JIMO fellows, the UC fellows, and appropriate NOAA entities. This plan should clearly outline the vision for JIMO based on an analysis of NOAA needs and the strengths of JIMO and its fellows, the priorities for its scientific directions (with investigations), the synergies that arise from bringing these scientific activities together in one virtual center, and the process whereby NOAA will benefit from these activities.

Recommendation: Develop and implement a strategic plan for JIMO, which is consistent with NOAA and SIO objectives (and plans).

Succession of fellows and institute leadership

JIMO and its host institution, UCSD Scripps Institute of Oceanography, have long been known for the quality researchers and personnel that it brings to any research project. Given the non-traditional JI framework that JIMO follows concerns about the long-term succession of this research and the developed relationships between NOAA and SIO programs and personnel are apparent to the review panel. Many of the JIMO senior researchers and professors are later in their careers, including many of the researchers that have made the JIMO research so exemplary. Demographics bear this out: 28 of the 45 fellows presently supported by JIMO are over 50 years of age - potentially leading to a high turnover in the next 10-15 years. To ensure continuation of the excellent relationships, especially as JIMO considers the next phase of the relationship through both the potential recompetition and the next five year plan, the review

panel would recommend that JIMO examine how the Institute plans for the long term support of these activities from the personnel side through better succession planning or other means. Succession planning needs to include JIMO leadership and how to choose and support the next director in a way that positions the Institute for the challenges ahead for JIMO, SIO and NOAA. As part of this examination, the limited female representation among the fellows (5 of 45) and lack of females among the more senior research positions that are supported by JIMO funding (i.e. the research oceanographers, professors, and academic and research scientists and specialists) should be a particular focus.

Recommendation: Develop and implement a plan to recruit and retain leading scientists, fellows, and leaders in JIMO.

Preparing for the CI re-competition process

The NOAA-wide recompetition of the JIs presents JIMO with major opportunities and challenges. Opportunities include an ability to restructure relationships with NOAA entities, revision of themes, broadening of governance, inclusion of other UC campuses, etc. There are also a number of challenges: the absence of a strategic plan and a related mission-based accomplishment matrix, development of a initiation process for new themes/programs, reconciliation of NOAA's expectations for JIs, and succession needs for JIMO fellows and leadership.

The review panel encourages SIO management to review JIMO's contribution to the SIO mission and interact with the JIMO strategic planning process. Furthermore, SIO should review the governance and succession challenges facing JIMO: these could benefit from institutional attention and support.

Recommendation: Develop and implement a strategic plan that supports NOAA and SIO objectives.

Leveraging UC Relationships

While the existing JIMO relationships with other UC campuses appear to work well where they occur, providing benefit to the Institute, the UC campuses involved and NOAA, further opportunities for expanding these relationships and the subsequent benefits should be examined. Documentation provided to the review panel states that a specific JIMO objective is to "foster collaborative research between NOAA and the University of California (UC) scientists." While the stated objective and subsequent discussions in the briefing material imply that JIMO serves this role presently, it appeared to the review panel that this role occurs more in an *ad hoc* or need-based manner than as a planned or proactive

role for JIMO and the greater UC system. In addition, most of the cross campus projects have been instigated at the request of NOAA program personnel who were searching for a way to bring UC campus collaboration to partner with NOAA. The panel does see the enormous benefits of a stronger JIMO-UC relationship to both JIMO and NOAA and holds the idea of multi-campus representation and service as a model for other Joint Institutes to examine.

In planning for future directions of JIMO, JIMO needs to decide what are the benefits of a broader role to the institution and partners, whether this is an appropriate continuing role for JIMO, whether it has the capacity in its existing structure (administratively, scientifically and institutionally) to truly engage the broader UC system, and if so, how to more effectively promote this opportunity to the other UC campuses. Suggestions for issues that might need addressing if JIMO determines to take on the inclusion of the greater UC system include: determination of changes to the MOU that may include the agreement to be between the entire UC system and NOAA (with SIO continuing to act as fiscal agent); inclusion of other UC campuses, investigators and fellows in any subsequent planning for the Institute, including the next 5-year plan, any potential recompetition for the Joint Institute, and any strategic planning efforts ; and expansion of efforts to proactively improve awareness among the other UC campuses of JIMO's role, opportunities, and benefits.

Recommendation: JIMO should review its relationship to the broader UC system, and determine the appropriate role, benefits and methods for JIMO in broadening its involvement with other UC campuses.

Final Thoughts

JIMO is an institute that is illustrative of a new mode of interaction with NOAA elements. It has made it to adolescence with a lot of momentum and good prospects for the future. It is facing challenges in the next 5-year cycle, principally driven by the evolution of NOAA and SIO, but also due to the need to sustain its current momentum.

The review panel much appreciated the preparation for this review done by the JIMO staff and wishes to thank them for the thorough briefing materials, their rapid response to requests and their hospitality. This was a very well run site review.

Acronym List

ARGO	Array for Real-time Geostrophic Oceanography
ABC	Atmospheric Brown Cloud
CALCOOS	California Coastal Ocean Observing System
CI	Cooperative Institute
ENSO	El Nino-Southern Oscillation
GEWEX	Global Energy and Water Cycle Experiment
JI	Joint Institute
JIMO	Joint Institute for Marine Observations
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OAR	Oceanic and Atmospheric Research
PACOOS	Pacific Coast Ocean Observing System
PPBES	Planning, Programming, Budgeting and Executing System
SCCOOS	Southern California Coastal Ocean Observing System
SIO	Scripps Institution of Oceanography
UC	University of California
VOS	Voluntary Observing Ship
XBT	eXpendable BathyThermograph

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Dr. Otis Brown is currently the Dean of the Rosenstiel School of Marine and Atmospheric Science, University of Miami; and a professor in the Division of Meteorology and Physical Oceanography. He is one of the world's experts in studying the ocean through observations obtained from instruments aboard earth-orbiting satellites. Dr. Brown has participated in research cruises throughout the world including the Atlantic and Indian Oceans and the Arabian Sea. He has over 100 scientific publications and has received national recognition from notable scientific organizations such as NASA, the American Association for the Advancement of Science, the American Meteorological Society and the American Geophysical Union. As a professor at The Rosenstiel School Dr. Brown has mentored students, fellows and faculty and built one of the Nation's leading programs in remote sensing. As a member of the NOAA's Science Advisory Board, the Southeastern Universities Research Association Board of Trustees, and other high-level scientific steering committees, he has and continues to play an important role in leading our nation's ocean research program.

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Dr. Lawford is the director of the International Gewex Projects Office (IGPO). His primary responsibilities, under the guidance of the GEWEX SSG, is to lead the development of the project elements and oversee their international coordination and implementation. He has worked towards developing specific strategies and proposals that address the application of GEWEX results to water resource issues, which provide for the development of closer working relationships with water resource managers and the water resources community. Previously, Rick worked at the Office of Global Programs (OGP) as the program manager for the Global Energy and Water Cycle Experiment (GAPP). His work at GAPP was to show how it contributed to the second phase of GEWEX's hydrometeorological mission to demonstrate "skill in predicting changes in water resources on time scales up to seasonal as part of a climate prediction system." Specifically, Rick's work at GAPP provided more emphasis to quantify land memory processes and predictability, study monsoon and orographic processes that control precipitation patterns over the USA, develop prediction systems, and link continental research to the global perspectives that are so crucial to GEWEX and other WCRP initiatives

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Rebecca is a senior program analyst for the National Ocean and Atmospheric Administration (NOAA) Coastal Services Center in California. In her role, she serves as the California Regional Coordinator for NOAA Ocean Service (NOS) programs. She is the program manager for the west coast regional ocean observing systems, from Alaska to Southern California, and also serves to identify information needs for marine and coastal resource managers in the region and connect these needs with NOS science and technical assistance capabilities. Ms. Smyth has a Bachelor of Science from Boston College, graduating summa cum laude and member of Phi Beta Kappa with a degree in Environmental Science and minor in Russian and Eastern European Studies. Her Masters of Science from the University of Massachusetts focused on coastal issues in the Russian Black Sea Region. She began her career at NOAA as a John A. Knauss Sea Grant Fellow in NOAA Ocean Service headquarters in Silver Spring, Maryland, where she continued to work on strategic planning for coastal and marine science and management programs in NOS and NOAA and on legislative issues for the same programs. She was selected as NOS professional (non-supervisory) employee of the year in 2000. She is a member of the Marine Technology Society and The Coastal Society and also belonged to the Washington DC chapter of the Women's Aquatic Network. Ms. Smyth is also the coauthor of two forthcoming papers on ocean observing system capabilities and applications; one focusing on NOAA ocean observing capabilities in Alaska and the other on economic and management applications for surface currents measurement along the California coast.

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summer schools, and as past chair of US SOLAS. He serves on the joint SOLAS-IMBER implementation plan on carbon cycle research. He has been member of the steering committees of the last three international conferences on air-sea gas transfer across the water surface.

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Tom Schroeder has directed the Joint Institute for Marine and Atmospheric Research (JIMAR) at the University of Hawaii since 1995. JIMAR supports collaborative ventures involving University and NOAA scientists in a broad range of topics including equatorial oceanography, tsunami and other long-period ocean waves, climate, tropical meteorology, fisheries oceanography and coastal processes. His personal expertise is in tropical weather and climate. He has served previously as Chair of the American Meteorological Society Committee on Severe Local Storms and its Board on Women and Minorities . He currently is Vice-Chair of the Board on Oceans and Atmospheres of the National Association of State Universities and Land Grant Colleges (NASULGC).