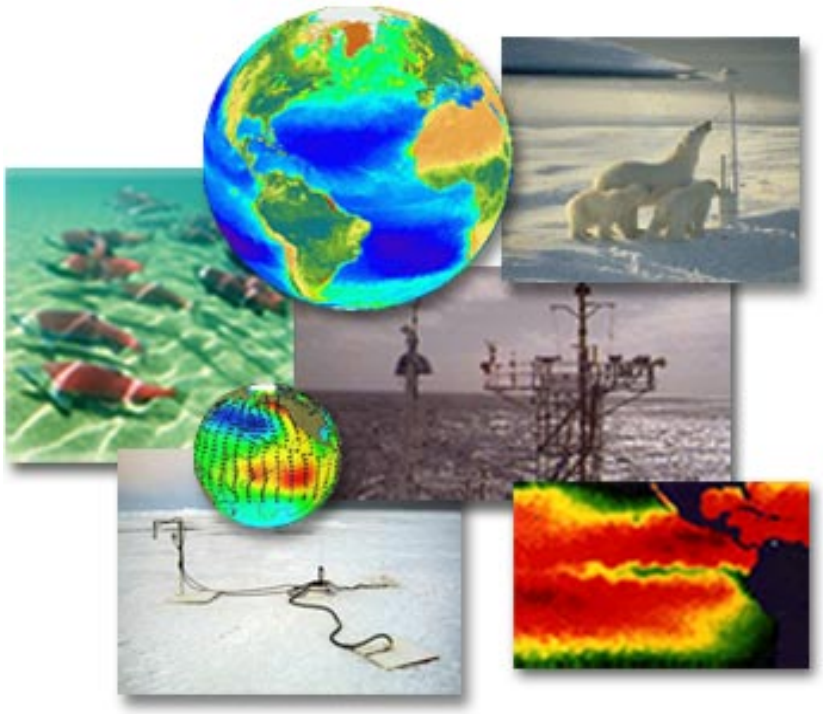
NOAA Review

Joint Institute for the Study of the Atmosphere and Ocean



JISAO

University of Washington

Seattle, Washington

April 19-20, 2005

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JISAO Review Agenda

April 19-20, 2005

Tuesday, April 19, 2005

Time	Event	Leader	Location
8:00 - 8:45 am	Review Panel Executive Session *(this might happen at hotel where continental breakfast is served or at SCC)*	Review Team	WT/SCC
9:00 - 9:15 am	Welcome by UW Administration	Craig Hogan	SCC- CN
9:15 - 10:15 am	Welcome/Overview of JISAO and collaborating organizations	Mike Wallace	SCC
10:15 - 10:45 am	Coffee, View posters		SCC
10:45 am-12:00 pm	Meeting with JISAO Senior Fellows		SCC-CN
12:00 – 1:00 pm	Lunch (unhosted)		
1:00 – 2:30 pm	Committee Executive Session, or Meeting/ Discussion with JISAO and NOAA/PMEL, AFSC & NWFSC directors	Review Team	SCC-350
2:30 – 4:45 pm	Scientific Research and Education Outreach Activities	Mike Wallace, et al.	SCC-CN
5:00 – 6:00 pm	Executive Session	Review Team	SCC-350
5:00-6:00 pm	Informal meeting with Rick Rosen, NOAA/OAR	Mike Wallace, et al.	SCC-CN
6:15 – 8:45 pm	Reception and dinner hosted by JISAO and the Office of Research	All	PT

Meeting Location Key:
FSH = Fishery Sciences Building, 1122 NE Boat Street, Seattle, WA 98105
JISAO = offices at 4909 – 25th Avenue NE, Seattle, WA 98195 (1st floor conference room)
PMEL= 7600 Sand Point Way NE, Building 3, Seattle, WA 98115
MSB = Marine Sciences Building, Southwest Campus across from SCC
PT = Portage Bay Café, 4140 Roosevelt Way NE, Seattle, WA 98105
SCC-CN = UW South Campus Center, Crow's Nest, room 354 (south central campus)
SCC-350 = UW South Campus Center, room 350
WT = Watertown Hotel, 4242 Roosevelt Way NE, Seattle, WA 98105

Wednesday, April 20, 2005

Time	Event	Leader	Location
8:00 am	Pick up Review Team	Mike Wallace	WT
8:30 – 9:30 am	Meeting with Chairs, Directors and Deans	" "	FSH 203
9:30 – 10:15 am	Tours of UW Oceanography and Fisheries buildings	" "	
10:30 – 11:30 am	Outreach	Ed Miles	JISAO
11:30 am – 12:30 pm	Committee Executive Session receive responses to overnight issues	Review Team	JISAO
12:30 – 1:30 pm	Lunch (unhosted)		
1:30 – 4 pm	Report writing and deliberations	Review Team	JISAO
4 pm	Debrief (optional)	Review Team	JISAO

Meeting Location Key:
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About the Reviewers

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Dr. Ned Cyr received his Ph.D. from the University of South Carolina in 1991. Prior to his current position as Chief of the NOAA Fisheries (NMFS) Marine Ecosystems Division, he was employed as a Fisheries Biologist with the NMFS Office of Protected Resources and as an International Affairs Specialist with NOAA's Office of the Deputy Assistant Secretary for International Affairs. His areas of interest include fisheries oceanography, climate effect on marine fisheries, ecosystem approaches to fisheries research and management, and development and implementation of large-scale ecosystem monitoring and assessment programs. Dr. Cyr also serves as Manager of NOAA's Climate and Ecosystem Program.

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Dr. James L. Kinter III is Director of the Center for Ocean-Land-Atmosphere Studies (COLA) where he manages all aspects of basic climate research conducted by the Center. Dr. Kinter's research includes studies of atmospheric dynamics and predictability on seasonal and longer time scales. Of particular interest in his research are prospects for prediction of El Niño and the extratropical response to tropical sea surface temperature (SST) anomalies using general circulation models of the Earth's atmosphere. Dr. Kinter is also an Associate Professor in the Climate Dynamics Ph.D. Program of the School of Computational Sciences at George Mason University, where he has responsibilities for curriculum development and teaching atmospheric dynamics, as well as advising Ph.D. students. After earning his doctorate in geophysical fluid dynamics at Princeton University in 1984, Dr. Kinter has served as a National Research Council Associate at NASA Goddard Space Flight Center, and as a faculty member of the University of Maryland (teaching faculty 1984-1987; research faculty 1987-1993) prior to joining COLA. Dr. Kinter has served on many national review panels for both scientific research programs and supercomputing programs for computational climate modeling. A full resume is available on request.

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Dr. Galen McKinley is an ocean biogeochemist who uses global and regional models to understand the ocean carbon cycle and global carbon cycle. Her current research foci are the interactions of physical and biogeochemical processes in the ocean; interannual variability in air-sea CO2 fluxes; and the use of inert gases both to improve our understanding of gas exchange and deep mixing, and to better represent these processes in models. Dr. McKinley received her PhD in Climate Physics and Chemistry from MIT in 2002. She worked as a consultant to the Mexican National Institute of Ecology from 2002-2003. From 2003-2004, she was a post-doc at Princeton University. Most recently, Dr. McKinley has joined the faculty of the Department of Atmospheric and Oceanic Sciences at the University of Wisconsin Madison. Her website, http://www.aos.wisc.edu/~galen/, has additional information about her background, research interests and publications.

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After receiving his Ph.D. in Fluid Physics and Geophysical Fluid Dynamics in 1973 from the University of Washington, Dr. Pietrafesa joined the faculty at North Carolina State University and was made Full Professor in 1980. He has served as the Head of the Department of Marine, Earth and Atmospheric Sciences, Director of the University Honors Council and Dean for Research and Director of the Center for Severe Storms in the Southeast. Presently he is Director of the Office of External Affairs, College of Physical and Mathematical Science and Director of the NOAA Cooperative on Climate and Weather Impacts on Society and the Environment. His research and publications are diverse and include system wide modeling of wind and density driven circulation in coastal and estuary systems, coastal and inland flood forecasts, the interaction between the atmosphere and ocean in storm genesis and modification, interactively wave- current coupled modeling, tropical cyclone intensity modeling, and the climatology of the frequency of occurrence and tracks of tropical cyclones both in the Atlantic and Pacific, coastal sea level, extra-tropical cyclones, precipitation and river discharge. He discovered the mechanisms for the topographic deflection of the Gulf Stream and creation of the Charleston Trough and coined the air-sea interaction term “buoyancy stress”. Recent foci are on the linkages between weather and climate and human disease, end to end modeling of physical through human systems and building a real time reporting coastal air-sea observing network offshore of the Carolinas. He is widely published, his research awards total more than $22M, and his service includes being Chair of the Science Advisory Board of NOAA, Chair of the USA-Peoples Republic of China Steering Committee on Virtual Collaboratories, Chair, NASULGC Board on Oceans and Atmosphere, Chair of the Council on Ocean Affairs, the precursor to CORE, a member of the AGU Public Policy Committee, and a member of the Board of Trustees of UCAR.

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Robert A. Weller received his Ph.D. in 1978 from Scripps Institution of Oceanography. He is the Director of the Cooperative Institute for Climate and Ocean Research at Woods Hole Oceanographic Institution (WHOI), and has worked at WHOI since 1979. His research focuses on atmospheric forcing (wind stress and buoyancy flux), surface waves on the upper ocean, prediction of upper ocean variability, and the ocean's role in climate. He has served as the Secretary of the Navy Chair in Oceanography. He has been on multiple mooring deployment cruises and has practical experience with ocean observation instruments. Dr. Weller has served on several NRC committees over the years, including the recent Committee to Review the U.S. Climate Change Science Program Strategic Plan and the Committee on Implementation of a Seafloor Observatory Network for Oceanographic Research, he was also a member of the Board on Atmospheric Sciences and Climate. He is currently serving on the NRC Committee on Strategic Guidance for NSF's Support of the Atmospheric Sciences. He also serves on the NOAA Climate Observing System Council and the UNESCO/World Climate Research Program's Ocean Observations Panel for Climate. He is author or coauthor of over 75 research papers.

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Science Plan

1-A What is the scientific (not programmatic) vision for the Institute?

The Joint Institute for the Study of the Atmosphere and Ocean (JISAO) fosters collaborative research between scientists from the National Oceanic and Atmospheric Administration (NOAA) and the University of Washington (UW) on a broad range of topics of concern to residents of this nation and, in particular, the Pacific Northwest.

- By making available the diverse array of scientific and technical expertise and specialized research facilities that reside within the NOAA research laboratories in Seattle and within UW, JISAO enhances the research capabilities of individual scientists at these institutions.
- By capitalizing on UW's extraordinary strength in the geosciences and its degree granting authority, JISAO facilitates the training of the next generation of NOAA's scientists. Conversely, by offering them the opportunity to participate in NOAA research, JISAO enriches educational opportunities for its students.

- By developing ties with government agencies and industries in the state of Washington and throughout the Pacific Northwest, JISAO assists NOAA in tailoring its climate forecasts and assessments to meet the needs of stakeholders.

1-B How is it related to the NOAA Strategic Plan?

JISAO research themes are defined in terms sufficiently broad to encompass the wide range of mutual interests of NOAA scientists and UW geosciences faculty. Over the 28-year history of JISAO, the only practical limitation on the scope of the research has been the availability of NOAA funding which, in turn, is determined by NOAA's research priorities.

The current NOAA strategic vision was formulated after the latest Cooperative Agreement was approved. Nevertheless, JISAO's vision and current research priorities mirror NOAA's priorities. Here we offer three examples.

1. NOAA declares its commitment to maximizing the benefits of its products and services in terms of the improvement of our Nation's environment, public safety and economy.[1] JISAO addresses the environment through its Climate, Environmental Chemistry and Marine Ecosystem themes. It addresses public safety through tsunami research conducted under its Coastal Oceanography theme. It addresses the issues relevant to the economy of Alaska and the Pacific Northwest through the fisheries recruitment conducted under its Marine Ecosystems theme and, on a longer time scale, through the research and outreach of its Climate Impacts Group (CIG).

2. JISAO research reflects the same "end-to-end" strategy as the NOAA Plan, i.e.:

   (i) **Monitor and Observe**:

   JISAO has worked with PMEL to:

   - design, establish and maintain the TOGA TAO array in tropical oceans,
   - deploy a global network of Argo floats,
   - demonstrate the feasibility of tsunami monitoring,

[1] United States Department of Commerce, National Oceanic and Atmospheric Administration,. "New Priorities for the 21st Century – NOAA's Strategic Plan – Updated for FY 2005-FY2010." (2004): 1. www.spo.noaa.gov/pdfs/NOAA%20Strategic%20Plan.pdf

- track the increasing acidity of the oceans in response to the buildup of atmospheric carbon dioxide,
- establish a baseline for monitoring changes in concentrations of aerosols and trace gases.

Through JISAO, NOAA has supported the monitoring of Arctic sea-ice, and the development of unmanned sea-gliders that have potential for improving the quality of ocean monitoring.

(ii) **Describe and understand**:

Descriptive and process-oriented studies constitute a large part of JISAO's research portfolio. Included in this category are exploration of hydrothermal vents on the sea floor, documentation of climate change in the Arctic and long-term changes in the marine ecosystem in the Gulf of Alaska.

(iii) **Assess and predict:**

(iv) Some of the JISAO senior fellows participated in the 1996 and 2001 assessment reports of the Intergovernmental Panel on Climate Change (IPCC) and they are involved in the preparation of the 2006 report. The Climate Impacts Group (CIG) conducted an assessment of the impacts of global warming in the Pacific Northwest for the NOAA Climate Prediction Assessment Workshop: Research and Applications on Use and Impacts, Alexandria, Virginia, 2002. Research conducted in JISAO has supported the development of a predictive capability for El Niño and for tsunamis.

(v) Engage, advise and inform:

The Climate Impacts Group (CIG) devotes a substantial part of its activities to engaging leaders in public administration and private industry in dialogue on short- and long-range climate issues. The CIG houses the Washington state climatologist's office. Many of the JISAO senior fellows serve on advisory committees for the National Research Council and various federal agencies, including NOAA. Some are participating in the Fourth Annual Assessment of the Intergovernmental Panel on Climate Change.

3. JISAO's themes, and the research conducted under those themes, are closely aligned with NOAA's strategic plan. Approximately 3/4 of JISAO's NOAA funding is directed toward the Climate theme under NOAA's ***Goal 2: "Understand Climate Variability and Change to Enhance Society's Ability to Plan and Respond."*** JISAO's marine ecosystems research falls under ***Goal 1: "Protect Restore, and Manage the Use of Coastal and Ocean Resources through an Ecosystem Approach to Management."*** Its tsunami research relates to ***Goal 3: "Serve Society's Needs for Weather and Water Information."***[2]

[2] The PMEL tsunami website at http://www.pmel.noaa.gov/tsunami/ provides information and background on the cooperative effort of the national Tsunami Hazard Mitigation project.

4. A cross-cutting theme in JISAO research is the impacts of climate variations upon marine ecosystems and particularly upon fisheries in the Gulf of Alaska and the Bering Sea. In the current fiscal year, funding for that activity through NOAA accounts for $500,000 of JISAO's NOAA-funded research activity.

5. JISAO research on hydrothermal vents addresses a key ecosystem mission goal in NOAA's 5-year plan (http://nrc.noaa.gov/Docs) "*Study ocean phenomena—such as hydrothermal vents, methane and other gas hydrates, seafloor spreading zones, submarine volcanism, and subduction zones—to ascertain the potential for generating coastal earthquakes, tsunamis, greenhouse gases, fisheries habitats (seamounts), new islands; to advance the understanding of ocean chemistry and the water column/seafloor interface; and to discover and subsequently analyze the potential of marine natural products for biomedical and commercial applications.*" JISAO research on submarine volcanic systems and their hydrothermal vents directly addresses this mission through the examination of chemistry, geology, and microbiology of hydrothermal systems.

   The five year plan also points out that "NOAA's mission includes investigation of the oceans for the purpose of discovery and the advancement of knowledge," and that "NOAA will support multidisciplinary teams of Scientist-Explorers on voyages of discovery to map and characterize ocean areas, develop a more thorough understanding of ocean dynamics and interactions, develop new sensors and systems, and communicate to stakeholders how and why unlocking the secrets of the ocean will benefit current and future generations." JISAO research is directly involved in oceanic exploration through a program of exploring the world's submarine volcanoes in search of hydrothermal activity and its associated macro- and micro-biological communities.

   NOAA support of JISAO hydrothermal vents research is currently $329,248 (including $29,043 non-cooperative agreement funding), while non-NOAA (NSF) funding is $213,345. Additional leveraging is provided by sharing the costs of facilities and fieldwork with UW projects funded by other agencies, most notably the

NEPTUNE project, directed by Professor John Delaney, which is designed to monitor deep-sea volcanic activity on the Juan de Fuca Ridge in the northeast Pacific Ocean

1-C What are the goals and objectives?

Within the context of the broad goals stated in NOAA's strategic plan, JISAO's research objectives are:

Marine Ecosystems

- To conduct interdisciplinary research to better understand the linkages between physical, chemical and biological processes in the marine environment.
- To study the impacts of climate variations and change on the ecosystems of the Bering Sea and Gulf of Alaska.
- To quantify and understand spatiotemporal distributions, dynamics, and interactions of aquatic organisms.
- To implement designs and technologies that accurately map, count, size, and identify distributions of aquatic organisms.
- To conduct research that helps quantify and separate the roles that climate and humans have on ecosystem dynamics.
- To develop tools that can aid in the prediction of climate and human impacts on ecosystem dynamics.

Climate

- To improve seasonal to interannual forecasts and assessments of decadal climate variability.
- To monitor and predict the uptake of carbon dioxide by the oceans and the consequences of that uptake upon marine ecosystems.
- To better define the sources, sinks, transformations and transport of atmospheric aerosols and trace gases that have the potential to impact climate.
- To better understand the causes and consequences of climate change in the Arctic.
- To define the environmental and societal consequences of climate variability and climate change over the Pacific Northwest.

Weather and water

- To provide more accurate and timely tsunami warnings.

- To more precisely define the risks associated with tsunamis and to help society to minimize them.

Ocean Exploration

- To understand the morphology and biogeochemistry of hydrothermal vent systems.

Cross-Cutting

- To assess how much of the decade-to-decade variability in fisheries recruitment is climate-induced and how much is human-induced.
- To develop and improve tools for managing, analyzing, visualizing and sharing atmospheric and oceanographic data.

Education and outreach

- To promote and facilitate the use of climate information by managers, planners and policy analysts in the Pacific Northwest.
- To support and enhance environmental education at the University of Washington by offering unique learning experiences to students and through indirect cost returns and volunteer efforts.
- To serve on scientific advisory committees.

1-D What scientific criteria are used to measure progress in accomplishing these goals and objectives?

- The ability to cite specific discoveries or other accomplishments that represent significant progress toward achieving stated goals, i.e., "success stories" in the NOAA vernacular. Among the notable accomplishments of JISAO scientists are:
    - design and implementation of the TOGA TAO Array
    - elucidating processes essential to the workings of the ENSO cycle
    - identifying dynamically important climate patterns (the Pacific Decadal Oscillation and the Arctic Oscillation)
    - quantifying of the rate of uptake of carbon by the oceans and the associated decline in pH
    - determining composition and optical properties of atmospheric aerosols downwind of major population centers
    - promoting the use of climate data by decision makers in the Pacific Northwest
    - developing an “end-to-end” tsunami prediction system

- Traditional academic metrics:
    - numbers of refereed publications in well regarded journals (Appendix 8)
    - citation rates for the more widely-cited research publications (Appendix 9)
    - awards and honors bestowed on scientists affiliated with JISAO (see Appendix 10)
    - success in competing for research funding

1-E What are the major scientific themes?

Marine Ecosystems

- Impact of climate variability on the Bering Sea and Gulf of Alaska marine ecosystems
- Linkages between physical, chemical and biological processes in the marine environment
- Spatiotemporal distributions, dynamics, and interactions of aquatic organisms
- Quantitative description of the distributions of aquatic organisms
- Distinguishing between climatic and human impacts on ecosystem dynamics
- Prediction of climatic and human impacts on ecosystem dynamics

Climate

- Seasonal-to-interannual climate prediction
- Climate change in the Arctic
- Impacts of climatic variability and change on the Pacific Northwest

Environmental Chemistry

- The carbon cycle
- Aerosols and trace gases
- Hydrothermal vents

Coastal Oceanography

- Tsunamis

1-E-1 How were they identified?

A JI's research themes are defined by the intersection between NOAA's mission and the research expertise of the faculty of the university with which the institute is affiliated. When JISAO was established about 28 years ago, its senior fellows voted to adopt just two themes: Climate and Estuaries. Building on the shared interest of over a dozen NOAA/PMEL and UW scientists in NOAA's EPOCS program, JISAO developed a modest, but highly successful program of research

under the Climate theme, as evidenced by the accomplishments listed above. JISAO's Estuaries theme was chosen largely on the initiative of UW scientists in hopes that NOAA would expand its extramural research support in this area. That hope has not been realized, and consequently, Estuaries has not thrived as an organizing theme in JISAO research. During the 1980s, Environmental Chemistry was added as a third research theme in response to the growing research activity in this area both at PMEL and at UW. In the context of NOAA's strategic plan, research on the carbon cycle, trace gases and aerosols has been subsumed under the Climate goal.

With the appointment of Eddie Bernard as PMEL Director in 1983, tsunami and hydrothermal vents emerged as research themes within the laboratory. Several UW faculty in the School of Oceanography share an interest in vents research, which has been pursued in JISAO under its Environmental Chemistry theme. Due to the lack of NOAA extramural funding, there has been little direct involvement of UW academic faculty in NOAA-funded research in this area. Tsunami research has been justified under JISAO's Estuaries theme, which has been broadened to "Coastal Oceanography".

In the absence of NOAA extramural funding for hydrothermal vents and tsunami research, a second mode of cooperative research between NOAA and UW has emerged. The original Memorandum of Understanding between NOAA and UW that was the basis for the establishment of JISAO in 1977 provided for the appointment of Institute Scientists, "who would hold appointments either as University research faculty or as senior exempt staff." Although the Institute Scientist title has never been used officially, several JISAO staff members function in that role: i.e., they serve as principal investigators on grant proposals submitted to federal agencies through the University of Washington. In all cases but one, these individuals hold appointments, not only as JISAO professional staff, but also as affiliate faculty at the University of Washington. UW schools or departments grant affiliate faculty appointments only in cases in which that individual's research expertise is viewed as being of direct benefit to their faculty and students. Two JISAO staff members with interests in hydrothermal vents presently hold affiliate faculty appointments in the School of Oceanography, and one staff member with interests in tsunamis has recently been granted an appointment in the Department of Earth and Space Science.

1-E-2 Which themes/sub-themes are near completion?

JISAO has changed the name of research themes, but it has never completely phased out a theme, nor is it on the verge of doing so. Nonetheless, there are areas in which the level of activity

and interest has declined significantly. A generation ago, most JISAO scientists were physical oceanographers and dynamical meteorologists. Much of their research was devoted to equatorial ocean wave dynamics and learning about the coupling between the tropical ocean and the global atmosphere. Although some basic research continues in those areas, much of the emphasis in NOAA's strategic planning has shifted toward supporting national and international efforts in climate monitoring, data assimilation, and assessment of global change in the atmosphere and oceans. Research priorities within JISAO have gradually shifted in the same direction. There is less emphasis on fluid dynamics for its own sake than there was a generation ago and more on the interplay of dynamical, physical, chemical and biological processes. In a similar manner, research on the coastal zone has become much more interdisciplinary.

1-E-3 What are the emerging thematic areas?

Areas of growing emphasis in JISAO within the past decade are climate impacts (embodied in the Climate Impacts Group (CIG), directed by Professor Ed Miles) and climate change in the Arctic. Another area that is likely to grow in the next few years is tsunami research.

For about a decade, JISAO has been struggling to find its niche in research in marine ecosystems. The UW School of Aquatic and Fishery Sciences (SAFS) has many faculty with interests in this area and NOAA has four different research laboratories that are all potential partners. The obstacles are the lack of extramural NOAA funding to motivate UW faculty involvement and the amount of effort required to build a sense of community among scientists working at four different institutions. To exploit the opportunities in this area, we need to establish modes of UW/NOAA collaboration that are viewed as being beneficial to both parties, but don't require significantly increased amounts of NOAA funding.

UW's Program on Climate Change (PCC), established in 2000, has served as a focal point for lively exchanges between students, faculty, and PMEL scientists with interests in paleoclimate research. Although it has nothing to offer in the way of identifiable products for NOAA’s stakeholders, paleoclimate research is intellectually stimulating, and it is providing a more solid theoretical framework for interpreting contemporary climate variations and trends and their impacts on ecosystems. Like ocean exploration, the study of paleoclimate seeks to expand our knowledge of the past, present and future of the planet on which we live. Regardless of whether JISAO ever designates it as one of its formal research themes, paleoclimate research is bound to influence the

way in which JISAO climate research is framed and the way in which it connects with UW faculty and students.

Scientific Partnerships

1-F-1 What is your relationship to the OAR laboratories and to other NOAA entities?

JISAO's "host" laboratory is the Pacific Marine Environmental Laboratory, located three miles away from the UW campus in NOAA's Western Regional Headquarters. Thirteen JISAO senior fellows are PMEL scientists. UW and PMEL collaborate on all of JISAO's research themes. Of the approximately 74 professional staff with JISAO appointments, 53 are housed at PMEL.

JISAO has much more limited connections with NOAA's Alaska Fisheries Science Center (AFSC) and National Marine Mammals Laboratory (NMML), which are both collocated with PMEL in NOAA's Western Regional Headquarters and with its Northwest Fisheries Science Center (NWFSC) located about a mile away. The most substantive connection is with AFSC, which houses six JISAO postdoctoral research associates funded by NOAA's National Marine Fisheries Service (NMFS). Post-doc research topics include: fisheries acoustics; variability in the spatial distribution of demersal species along the West Coast of North America in response to climate changes and fishing; and, forage fishes in the western Gulf of Alaska – variations in productivity. The JISAO post-docs are supervised by UW School of Aquatic and Fishery Sciences faculty. Appendix 6 lists JISAO post-docs for the past five years.

1-F-2 What, if any, procedures do you have for joint planning?

Within the past year:

- The JISAO Director has met several times with PMEL Director Eddie Bernard and more regularly with Dennis Moore, Leader of the Ocean Climate Research Division, NOAA/PMEL, to discuss matters of mutual JISAO/PMEL interest, including future directions.
- The JISAO Director met with leading scientists at NOAA/AFSC to discuss the possibility of expanded collaboration.
- About a dozen other (both UW and PMEL) scientists met with OAR Director Rick Rosen and CCSP representative Chet Koblinsky to discuss future research directions The next day

the JISAO Director, Bernard, Rosen and Koblinsky continued the discussion on an excursion to Mt. Rainier.

- JI directors met at NOAA headquarters with Rosen, Koblinsky, and other NOAA officials to discuss matters of mutual interest, including future plans.
- The JISAO Director met with directors of two other JI's to discuss a possible future joint proposal for a NSF Science and Technology Center.
- The JISAO Director participated in two NOAA workshops devoted to long range science program planning: one on Arctic research and one on upper air observations.

Science Review

2. What are the institute's most recent scientific achievements and accomplishments?

The 2004 annual report is included in this briefing binder. Appendix 4 contains a complete listing of all projects by task funded under the current cooperative agreement. A few of the highlights are:

Climate

- deploying and maintaining key components of the Global Ocean Observing System in support of seasonal to interannual climate prediction and the monitoring of longer term natural and human-induced climate change; maintaining the Tropical Atmosphere and Ocean (TAO) array of moored buoys in the tropical Pacific and the Pilot Research Moored Array in the Tropical Atlantic (PIRATA). Data from TAO and related buoy arrays were provided to the scientific community via a state-of-the-art web site.

- constructing and field testing the "Seaglider", an autonomous undersea vehicle capable of carrying out over a thousand hydrographic sections to a depth of 1000 meters in a single voyage.

- analyzing data from the TAO array and a variety of other tropical atmosphere and ocean datasets, with emphasis on ENSO and other phenomena that contribute to year-to-year and decade-to-decade climate variability.

- coordinating a national effort to reduce the uncertainties in estimates of present and future greenhouse warming due to cloud feedbacks, in support on the U.S. Climate Change Science Program.

- characterizing climate change over the Arctic, and placing it in a long term historical context. Elements examined include sea-ice, extent of tundra, sea surface temperatures in the Bering and Beaufort Seas and the exchange of fresh water between the Arctic and North Atlantic Oceans. In some cases, causal linkages have been identified: for example the recent thinning and summertime retreat of sea-ice appears to be primarily wind-driven.

- elucidating the processes that contribute to long term variability of the Southern Ocean.

- assessing the impacts of climate variability and human-induced climate change on the availability of water and other resources in the Pacific Northwest, including trends in winter snow pack in mountainous regions.

- fostering the use of climate information in decision making related to water, power and fisheries; developing an experimental hydrological forecast system suitable for use over the western United States; reinstituting the office of State Climatologist for the state of Washington.

Environmental Chemistry

- estimating the amount of carbon that has accumulated in the World Ocean from the time of the Industrial Revolution up until 1994 as a result of the burning of fossil fuels and deforestation.

- estimating the rate of dissolution of calcium carbonate in the World Ocean. The estimated rate has proven to be high enough to raise concerns about the future health of coral reefs and other shell forming organisms.

- elucidating the processes that contribute to ENSO-related year-to-year variability in the rate of increase of atmospheric carbon dioxide and other carbon trace species.

- showing that year-to-year variations in the summer drawdown of atmospheric carbon dioxide over the Northern Hemisphere are correlated with the index of the Arctic Oscillation during the previous winter.

- participating in and synthesizing measurements from recent field campaigns designed to characterize the chemical composition of aerosols over specific regions such as the Indian Ocean, the western Pacific Ocean and New England; making automated measurements of dimethylsulfide (DMS) concentrations in sea water on board the R/V Ronald H. Brown

- hosting the International Global Atmospheric Chemistry Program Office.

- streamlining field measurements of isotopic hydrogen and developing a method for measuring the concentration and isotopic composition of formaldehyde in the atmosphere, and characterizing the spatial and temporal variability of these species.

Marine Ecosystems

- developing the computer code and infrastructure required to embed simple ecosystem models within physically based, grid-point models that resolve currents, regions of upwelling and downwelling, and the chemical makeup of ocean water with varying degrees of spatial resolutions, along with the software required to visualize the complex time varying spatial fields generated by these models.

- developing a suite of quantitative indicators for characterizing the status of the North Pacific ecosystem as it responds to climate variability and human intervention.

- evaluating the performance of the various statistical methods used to predict the recruitment of species such as walleye Pollock on the basis of environmental indicators.

- assessing whether climate variations may have contributed to the recent decline of Steller sea lion populations in the Aleutian Islands.

- obtaining and analyzing water samples from two hydrothermally active sites on the sea floor where conditions are quite different from those encountered in the better documented mid-ocean ridge (divergent plate margin) environment.

- participating in field expeditions in the Marianas Volcanic Arc, which provided the first direct observations of volcanic activity in the deep sea, overlapping hydrothermal and photosynthetic ecosystems, and the venting of liquid carbon dioxide.

- participating in a multi-year field program linking chemical and microbiological processes along the Juan de Fuca ridge.

Coastal Oceanography

- providing measurements in support of Project DART (Deep-ocean Assessment and Reporting of Tsunamis) and the U.S. National Tsunami Hazard Mitigation Program.

- developing community-specific inundation maps to assist states and municipalities in assessing tsunami hazards.

- developing the methodology for providing tsunami forecasts in real time to provide guidance in issuing warnings.

Cutting across JISAO's four themes is a suite of activities designed to facilitate access to JISAO datasets and research results. Included in this category are websites and a set of web-based tools for accessing, managing, graphically representing, visualizing, and interactively exploring today's voluminous multi-dimensional datasets.

Scientific presentations highlighting the major accomplishments of JISAO research during the past 5 years will be given at the Review.

Educational Outreach

3A What types of educational opportunities (K-12, undergraduate and graduate students) does the institute offer on an annual basis?

- JISAO offers K-12 activities in collaboration with NOAA science camps and other programs, as well as with UW departments. JISAO scientists housed at PMEL participate in several educational programs throughout the year, as described in the following section on outreach. The JISAO Climate Impacts Group has an extensive outreach program described at http://www.cses.washington.edu/cig/outreach/outreach.shtml.

- Annually for the past 5 years, Nate Mantua and Amy Snover, have taught a UW graduate course titled *"Climate Impacts on the Pacific Northwest"*. The class is cross listed with Atmospheric Science, School of Marine Affaris, Environment, and Earth and Space Sciences and typically serves students from a wide range of natural and social science disciplines. For instance, this year's class had 16 students from 10 different majors.

- Each year Professor Ed Miles, director of the CIG teaches graduate courses dealing with climate impacts and climate policy in the UW School of Marine affairs, and JISAO scientist, Nicholas Bond teaches the laboratory section of a weather analysis and forecasting class offered by the UW Department of Atmospheric Sciences.

- Weekly seminars of the CIG are open to UW students

- Nearly half the JISAO senior fellows teach undergraduate science classes as a part of their responsibilities as UW faculty members. Some of these courses are for non-science majors.

- Many of the JISAO senior fellows participate actively in the UW Program on Climate Change (PCC). Several of the JISAO Senior Fellows from PMEL have given PCC seminars.

- During the period of the current 5-year Cooperative Agreement, a total of 56 graduate research assistants have been funded for a portion of their time through JISAO. A list of

these students, their academic departments, supervisors and degrees is provided in Appendix 7.

- Six JISAO scientists have had a major role in the design and staffing of a week-long science camp for middle-school students held at the NOAA Sandpoint campus. Last year, the camp served approximately 60+, 7th and 8th graders from a variety of schools in the Seattle area.

- Five JISAO scientists participated at PMEL in the annual "Bring Your Child to Work Day," by engaging 17 children, 9 years and older, in various activities related to PMEL research areas and physical/chemical oceanography.

- One JISAO employee, with four NOAA employees, participated in the annual Expanding Your Horizons Math, Science and Technology Conference for Girls which served 45 high schools girls who were interested in learning more about careers in oceanography.

- JISAO employees also participated in various lectures at schools, job shows, student tours of PMEL and similar individual outreach efforts.

3-B What are the current and planned outreach activities?

- Outreach to managers, planners, politicians and the public at large, is a major part of the mission of JISAO's Climate Impacts Group (CIG). A complete description of their services and a listing of their outreach activities are shown on their website at http://www.cses.washington.edu/cig under "Outreach, Classes and Seminars."

- The Climate Impacts Group (CIG) also serves as a regular source for the media regarding the implications of global climate change (and global patterns of climate variability) for the Pacific Northwest (PNW). Details on this work are at http://www.cses.washington.edu/cig/outreach/media.shtml.

- In his role as state climatologist for the state of Washington, JISAO scientist, Philip Mote, devotes a substantial fraction of his time and effort to outreach.

- JISAO scientists devote substantial time to briefing the media on climate-related topics.

- Several JISAO scientists participated in a 2-day workshop for science journalists in Seattle in November 2004.

- In recent months the Tsunami Research Program has handled approximately 239 interviews and media contacts regarding the tsunami research at PMEL. Along with PMEL scientists, the JISAO scientists involved are: Vasily Titov, Jean Newman, Angie Venturato, Diego Arcas, Chris Chamberlin and T. Steele. More information is available at: http://www.pmel.noaa.gov/tsunami/

- Two JISAO senior fellows wrote issues for NOAA's publication series *"Reports to the Nation"*.

- JISAO scientists serve on a diverse array of advisory committees for the National Research Council, the federal government and various state and local agencies. For example, several JISAO senior fellows are involved in IPCC activities and the Tsunami Research Program works closely with state and local Emergency Management officials in Alaska, Washington, Oregon, California and Hawaii.

Science Management Plan

4-A How does the Institute identify new intellectual opportunities?

With respect to identifying new research opportunities JISAO operates from the bottom-up. Most JISAO scientists are at the forefront of their respective fields. They are usually better able to identify new intellectual opportunities than any formal mechanism that the Director might devise. JISAO's themes are sufficiently broad and NOAA's interests sufficiently well defined that few JISAO PI's need guidance in shaping their proposals.

JISAO is comprised of small de-facto research groups aligned with the goals and objectives listed in 1-C. Within those groups there is much informal discussion of intellectual opportunities.

Last year PMEL hosted a weekly "Developing a North Pacific Observing System Colloquium Series," in which many JISAO scientists participated. The purpose of this series was to discuss new intellectual opportunities aligned with this theme.

JISAO sponsors short term visitors proposed by JISAO senior fellows. The purpose of many of these visits is to stimulate discussion of promising intellectual opportunities.

During the past year there have been three events at which JISAO senior fellows, as a group, had the opportunity to brainstorm about future directions:

- A one-day retreat on the UW campus, June, 2004.
- A one-day meeting at PMEL, August, 2004, which was attended by PMEL Director Eddie Bernard, OAR Director Richard Rosen, and CCSP representative Chester Koblinsky.
- A UW PCC retreat, September, 2004. This retreat was devoted to Arctic research.

Most JISAO scientists also engage in strategic planning exercises in their laboratories or university departments and in the programs of the agencies that fund their research.

4-B What are some recent examples of intellectual opportunities?

- Exploit the new dataset from the Argo floats to enhance our understanding of the general circulation and year-to-year variability of the oceans. JISAO scientists Greg Johnson and Steve Riser have played an important role in the deployment of the floats and will be among the first to have access to the new dataset. Current information on Argo floats is at: http://floats.pmel.noaa.gov/ and http://flux.oceanwashington.edu/argo. The international web gateway is http://www.argo.net/

- Use unmanned vehicles to map the subsurface structure of the ocean in regions of the ocean where it is difficult to conduct shipboard operations. The seaglider, developed in Charles Eriksen's group, has been used extensively in a recent field campaign in the Davis Strait.

- Analyze data from recent cruises to determine the rate of buildup of carbon dioxide and other anthropogenic gases in the world ocean.

- Participate in research on the International Polar Year (IPY). A unique JISAO contribution is Kevin Wood's ongoing examination of the archives around the world to document conditions in the Arctic around the time of the first International Polar Year from 1881 – 1884. Information on this research is at http://www.arctic.noaa.gov/aro/ipy-1/

- Exploit recent advances in three-dimensional flow visualization. Albert Hermann has developed an inexpensive flow visualization technique and used it to track variations in the transports of juvenile salmon and their prey along the shelf of the Gulf of Alaska.

- Educate the public on tsunami preparedness. JISAO: Vasily Titov, Jean Newman, Angie Venturato, Diego Arcas, Christopher Chamberlin, T. Steele PMEL: Eddie Bernard, Frank Gonzalez, Hal Mofjeld, Marie Eble, Steve Hammond NOAA Corps: Misty Watson

- To identify the cause or causes of the recent decline in the population of Steller sea-lions in the Aleutian Islands. JISAO scientists, Carol Ladd and Sergei Rodionov, have examined the impacts of climate varability on the physical environment of the region, with a focus on properties related to the Steller sea-lion habitat.

4-C What is the strategy for new starts (projects, techniques, campaigns, etc.)?

The five-year Cooperative Agreement includes provisions for any new research project that might conceivably be proposed within the period that it is in force. Hence, in the preparation of the proposal, the net is cast widely in identifying potential PI's, and they are encouraged to think expansively about the projects that they might wish to propose. The amount requested in the last 5-year Cooperative Agreement was $65,139,416. The award notice lists the 5-year maximum amount of funding as $61,014, 473. To date, JISAO has received $46,972,954.

JISAO can provide "moral support" but it has no discretionary funds for supporting new research projects. The larger UW and PMEL research groups have some limited ability to transfer personnel among projects while proposals are pending. However, the success of new efforts depends on the availability of funding and the success of the PI in the funding competition.

This strategy has served JISAO well in the past. Even if it were deemed advisable to provide more institutional support for new startups, it's not obvious how this could be accomplished.

4-D How much of the institute resources are reserved for new opportunities and bright ideas?

JISAO has a budget of around $200,000 per year for postdocs and visitors, on which the university waives the indirect costs. This funding is sufficient to maintain one or two postdocs in residence at any given time. JISAO selects some postdocs whose research interests are within its Climate theme, but once selected, makes a point of granting them complete academic freedom. Other post-docs are affiliated with the Alaska Fisheries Science Center, as mentioned in section 1F1, pp. 13-14 above. Appendix 6 is a complete listing of JISAO post-docs for the past five years.

Indirect cost returns accruing from grants passing through JISAO are administered by the UW Office of Research, which uses them to fund the "Earth Initiative" whose goals and objectives are listed in the EI website because at http://www.uwei.washington.edu. Activities that the Earth Initiative supports include outreach and the preparation of innovative interdisciplinary proposals.

4-E What is the demographic structure of the institute's employees?

The following chart shows the current distribution of JISAO staff, by position classification and their gender, race, nation of origin and age.

JISAO Demographic Data
February, 2004

US and. Non-US Born	
US Born	105
Non-US Born	24
Total	**129**
Age	
19 and below	0
20-29	29
30-39	43
40-49	35
50-59	20
60 and above	2
Total	**129**

Years of Service	
Years	*Employees*
<1	16
1.0-1.9	17
2.0-2.9	19
3.0-3.9	6
4.0-4.9	5
5.0-5.9	2
6.0-6.9	3
7.0-7.9	0
8.0-8.9	1
9.0-9.9	1
10.0-14.9	2
15.0-24.9	8
25.0+	1
Total	**81**

4-F What is provided for human resources development? (Recruitment, Rewards, Training)

JISAO recently reorganized and instituted a new management structure for the supervision of JISAO staff, including those housed at PMEL. Supervisors are receiving training in the UW's Strategic Leadership Program (SLP) and are meeting on a regular basis with the JISAO administration to learn and share information about UW regulations and human resources management. Early feedback from staff has been favorable. Training on a variety of other topics is encouraged and is available to all staff through the UW's Training and Development office, as well as through other programs.

All staff salaries are reviewed on an annual basis in the spring during the regular UW merit increase process. This is usually an across-the-board 2-3% cost of living raise that is tied to performance, and the process requires that supervisors conduct performance reviews of all staff. There are several other methods to award salary increases and promotions, and these procedures are described on the JISAO administrative website at http://jisao.washington.edu/administrative.html. Adjustments are made as needed for outstanding work, performance of higher-level responsibilities and for purposes of equity within JISAO and between JISAO and University departments. Additional rewards include temporary salary increases or discretionary leave for staff who perform in a manner above and beyond the call of duty.

Throughout the first half of its history, JISAO had relatively few staff members and most of them were support scientists. In recent years, the number of staff has grown and among them are an increasing number of PhD graduates capable of working independently. To an increasing degree, these individuals are participating fully in the life of the Institute, including its leadership, and they are assuming responsibility for their own funding and the funding of support scientists who work with them. In effect, we have created a career track that is not unlike that of a university research faculty member with regard to responsibilities, financial compensation, and status in the community.

Critical to the upward mobility of these scientists is PI status on grant proposals, which normally requires that the individual hold an appointment as an affiliate faculty member in a UW department. Affiliate appointments are viewed by faculty and deans as a drain on a department unless the individual in question brings expertise, access to special facilities, or something else that the department values. Voluntary participation in departmental affairs is often viewed as a requirement for holding an affiliate appointment and, in practice, the active support of at least one influential academic faculty member is a de-facto requirement. At present, the following individuals hold affiliate faculty appointments and are allowed to serve as Principal Investigators on grants administered through the departments with which they are affiliated.

JISAO/PMEL Principal Investigators

- Nicholas Bond, Affiliate Associate Professor, Atmospheric Sciences;
- David Butterfield, Affiliate Assistant Professor, Oceanography;
- Joseph Resing, Affiliate Assistant Professor, Oceanography;
- Agusta Flosadottir, Affiliate Assistant Professor, Earth & Space Sciences;
- Albert Hermann, Affiliate Associate Professor, Oceanography
- Vasily Titov, Affiliate Assistant Professor, Earth & Space Sciences, pending approval
- Donald Denbo (no departmental appointment)

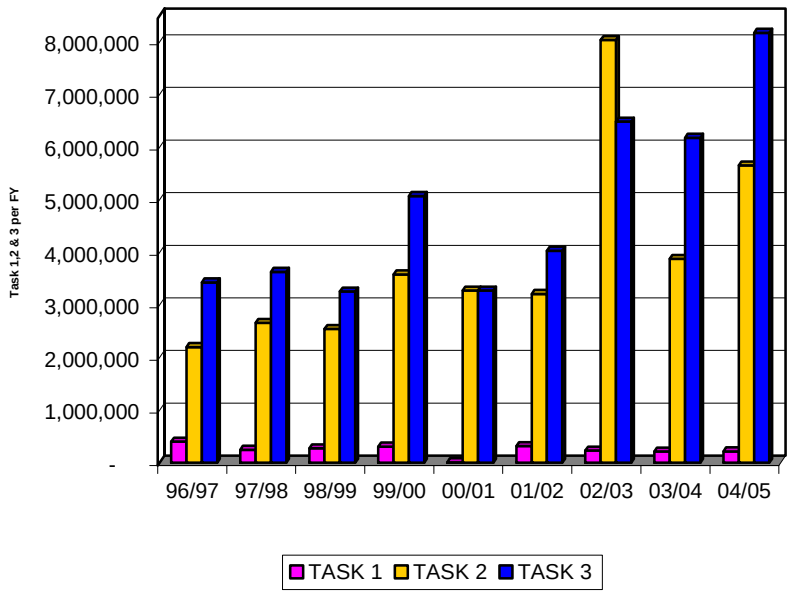
There are several other JISAO staff members who are equally well qualified to serve as PI's, but who do not have the time or inclination to participate in departmental affairs and/or who lack faculty sponsors.

4-G What is the state of financial health of the Institute?

As mentioned above, the Cooperative Agreement funding to date is $46,972,954. JISAO's funding, exclusive of the Cooperative Agreement, totals approximately $5.3m for the period 1999-present. In the Cooperative Agreement funding, Task I is JISAO's 'core program', to which the University contributes, and it supports, on average, two postdoctoral research associates on annual appointments, renewable for a second year. The NOAA contribution has increased only slightly over the 28 years of JISAO's history: as a fraction of JISAO's total budget, it has dropped by more than an order of magnitude. Nonetheless, JISAO still supports an active postdoc and visitors' program. By pooling its resources with the UW Program on Climate Change (PCC) last year, JISAO was able to recruit three postdocs: an ocean modeler with interest in marine ecosystems, an atmospheric chemist, and a paleo-oceanographer.

Task II serves as the vehicle for funding research scientists (UW professional staff), post-doctoral research associates and graduate students through the JISAO Cooperative Agreement. The Task II program supports directed, collaborative research efforts between NOAA and university scientists. Task III supports University of Washington research in areas compatible with the Institute's major research themes. Along with Task II, Task III programs serve as vehicles for funding research scientists (UW professional staff), postdoctoral research associates and graduate students. Task II budgets are subject to the "off campus" indirect cost rate of 26% and Task III budgets at the "on campus" rate of 52%. As documented in the figure below, these budgets grew during the late 1990s, while Task I remained small.

Fig. 1 JISAO Task 1, 2 & 3
Funding History 1996-2005



JISAO has a separate operating budget that it obtains from billing its services to the UW Office of Research, which pays them from indirect cost revenues generated from Task II and Task III activity. This year's bill is expected to be on the order of $420,000. This amount covers most administrative staff salaries, benefits and operations expenses.

The remainder of the indirect cost revenues generated by Task II budgets is used to fund the Earth Initiative, and that generated by Task III budgets (including those with JISAO PI's) is returned to the units that generated them.

To conclude, it can be said that the financial health of JISAO as an institution is not of major concern simply because no scientists other than Task I postdocs depend on it completely for research funding. The stresses resulting from the decreasing availability of research funding are experienced mainly at the PI level. Thus far, the PIs whose grants fund most of JISAO's research have been remarkably successful in competing for grants, but we are concerned about the future.

4-H How does the Institute intend to work toward accomplishing its financial goals?

The JIs collectively have engaged NOAA OAR Administration in a dialogue over the decline in the base funding that supports JISAO's Task I budget. NOAA has indicated that it is committed to

raising the level of base funding for JI's up to 7% of their total budget. If enacted, this change would roughly triple JISAO's Task I budget, revitalizing its postdoc and visitors' program.

JISAO will strive to ensure that its scientific programs will derive some benefit from the activities instituted under the Earth Initiative (EI), to which it contributes. It will also promote EI-sponsored outreach projects in which its scientists can be involved.

4-I Are there any issues interacting with NOAA that require attention?

1. **Recompetition** NOAA Administration has decided to recompete all its existing Cooperative Institutes within the next four years. The original set of NOAA-University cooperative agreements that formed the basis for establishing CIRES, JISAO and the other 15 or so CIs will be "sunsetted", and a new set of CI's will be established on the basis of an open competition. The new CIs will be funded for a 5-year period and funding will be renewable for a second period of up to five years, much like NSF Science and Technology Centers. The terms of the new cooperative agreements will be negotiable on a case-by-case basis. Hence, if UW chooses to propose for one of the new CIs, it will be free to redefine JISAO in any way it wishes. It can change its name, submit a joint proposal with other universities or private companies, realign itself with multiple NOAA "line offices" rather than predominantly with PMEL, change the indirect cost rate, "build in" the funding for a substantial postdoc and visitor program, or include a more prominent marine ecosystems component. RFPs for new CIs will be issued by NOAA, at the behest of its line offices. Just how this will work in practice remains to be determined. There are several independent factors that will render UW a strong competitor for a CI if it wishes to recompete.

   - Other than Boulder, there is probably no single city in the country with more NOAA laboratory activity than Seattle. In addition to PMEL, JISAO has substantial cooperation with the Alaska Fisheries Science Center at Sand Point, and the Northwest Fisheries Science Center less than mile from the campus. Another large NOAA facility in Seattle is the National Marine Mammal Laboratory at Sand Point.

   - UW is among the leading universities in environmental research. The research interests of many of its faculty are closely aligned with NOAA's interests.

   - Many NOAA scientists hold affiliate faculty appointments at UW.

- JISAO and UW have made a major investment in creating the infrastructure required for effective collaborations between the UW and NOAA.

- Several of the large research projects at PMEL are heavily dependent on the ~50 JISAO staff assigned to them.

- UW provides a vehicle for administering research assistantships and graduate degrees for staff involved in cooperative NOAA-UW projects.

- UW's off-campus indirect cost rate of 26% is highly competitive.

- JISAO's Climate Impacts Group enjoys a world class reputation that might be sufficient grounds for establishing a CI, even in the absence of the NOAA labs.

It will be in UW's interest to compete for CI status for the following reasons.

- Although CI status in no way guarantees NOAA research funding, it certainly facilitates NOAA-funded research at UW. It is our understanding that it difficult for NOAA to fund research projects at universities without CI's.

- JISAO enjoys a cordial working relationship with NOAA at all levels, and it values, and wishes to ensure the continuation of its cooperative research projects with the NOAA.

- Through a combination of direct fees and indirect cost revenues, a CI has the potential to fund a substantial post-doc and visitors program, to the mutual benefit of UW and NOAA.

- The existence of a CI makes NOAA expertise and facilities more accessible to UW faculty and students.

- A CI can provide valuable linkages to the research community beyond the university, and even beyond NOAA.

Recompeting to maintain a NOAA cooperative institute at UW clearly makes sense. The ability to reinvent JISAO offers some potential gains that would be difficult to achieve under the current existing cooperative agreement. Yet it is not without a certain degree of sadness that we relinqiuish our role as a full fledged partner in NOAA's research enterprise and assume the lesser role of stakeholder, beholden to NOAA's largesse and subject to the edicts of its administrators.

Any university that intends to propose to form a NOAA CI has reason to be concerned about some of the language in the guidance that NOAA has provided concerning the terms of reference for the recompetition of the cooperative institutes, posted on the Federal Register for public comment at **http://www.gpoaccess.gov/fr/index.html**, Vol. 70, No. 44, Tuesday, March 8, 2005, p. 11195. The length of the renewal period beyond the initial five-year grant could be substantially less than 5 years, and all but the "outstanding" CI's could be funded at a substantially reduced level during the renewal period. If the time between successive CI recompetitions is too short, it will be difficult to build and maintain the science teams needed to address long-term science issues.

Of particular concern to universities with existing CIs will be the first recompetition, which is likely to cause substantial anxiety on the part of the staff, whose jobs would be terminated in the event that a new CI is not established and funded in time to replace the one slated to be "sunsetted". Serious morale problems can probably be averted if the recompetition process is conducted expeditiously and if the results are announced at least a year before the scheduled termination of funding for the existing CI.

Another concern is the mounting pressure on the universities to manage CI affairs along the lines of a business model, with emphasis on short term goals and objectives, timelines, deliverables, service to clients, as opposed to the academic model, which emphasizes scientific excellence as determined by peer review and demonstrable contributions to the science relevant to NOAA's mission. Some of NOAA's top

administrators openly question whether basic research, or even applied research without specific short term timelines and deliverables, is worthy of NOAA support. If the business model becomes the dominant paradigm, hosting a NOAA CI may be prove to be more of a burden to a research university than it is worth.

2. **Future NOAA funding of the Climate Impacts Group** NOAA's strategic planning documents emphasize need for capacity building in state and local governments and social science integration in the use of environmental predictions and the management of ocean and coastal resources. In his role as Director of NOAA's Office of Global Programs, J. Michael Hall championed these causes. Hall's legacy to the Pacific Northwest is JISAO's Climate Impacts Group (CIG), which performs much of the outreach to state and local governments and the integration of human dimensions into problem formulation within JISAO. The CIG is not only providing climate services to NOAA's stakeholders in the Pacific Northwest: through its interactions with stakeholders, it is defining the very meaning of the term "climate services".

   With Hall's retirement and the decline of funding for OGP, there are bound to be pressures to divert extramural funding that has been used to fund CIG and other Regional Integrative Science Assessments (RISA's) to operationalizing climate services and incorporating them into the portfolio of the National Weather Service. It would be a major setback to JISAO and to NOAA's stakeholders in the Pacific Northwest if this were allowed to happen. The concept of what constitutes societally useful climate services is still in a formative stage. If it is operationalized too early, at the expense of efforts like CIG, it is likely to fail, and NOAA will have lost an important opportunity to serve society and an important opportunity to learn what its climate stakeholders really want.

4-J Are there any issues interacting with the University that require attention?

1. With the move of David Battisti and his students to the Department of Atmospheric Sciences in 2003, the level of activity on the first floor of the Lisa Li building, where JISAO is housed, has dropped to near the threshold of what constitutes a "critical mass". The postdocs and most of the students spend only about a day per week in the JISAO space. The advantages of the present off-campus arrangement is the availability of ample

office space, having the Climate Impacts Group in the same building, the availability of free parking, the freedom to appoint canine research associates, and proximity to an upscale shopping mall that houses what is reputed to be Starbucks' second busiest coffee shop in the world. The disadvantage is that the Lisa Li building is a mile away from the Atmospheric Sciences department and even farther away from the School of Oceanography. Although it will require sacrificing some of the present amenities, we acknowledge JISAO would be of more value to the UW community if it (including the CIG) could move into space on campus convenient to one of the units with which it is affiliated.

2. With an increasing number of JISAO professional staff qualifying for and aspiring to PI status, it is important that the various key players in the UW community agree upon criteria for it. At the request of the JISAO Director, the Vice Provost for Research has granted PI status to some senior-level staff, all but one of whom hold affiliate faculty appointments in UW schools or departments. Recently, PI status was granted to Donald Denbo, a specialist in atmosphere-ocean information technology, for whom the Director argued that there was no obvious "home department" in which there was a prospect of an affiliate appointment. Before considering the request, the Vice Provost requested external letters to establish Denbo's stature as an individual in the IT community, and the letters were favorable. There are several other JISAO professional staff who might warrant a similar exemption from the requirement of affiliate faculty status. The 5-year review might be a good opportunity to discuss this policy with the UW members of the Administrative Board and seek their concurrence.

3. JISAO needs the help of the Earth Initiative (EI) in providing a sound financial footing for the Climate Impacts Group (CIG), which is central to its education and outreach. In contrast to the academic units with which JISAO interacts, the CIG has no academic appointments of its own and relies almost exclusively on funding from grants. As noted in 4-D, JISAO has no discretionary funds of its own with which to subsidize the CIG: returns of indirect cost revenues on JISAO Task II research are administered by the Office of Research through the EI. Since the EI's mission is aligned closely with CIG's

education and outreach activities, it seems reasonable that the CIG should be a worthy candidate for EI support.