

Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies



JOINT SCIENTIFIC COMMITTEE

**JSC Ocean Observing System
Development Panel (OOSDP)**

Tenth Session

Paradise, Texas, USA
3-7 October 1994

In this Series, entitled

Reports of Meetings of Experts and Equivalent Bodies, which was initiated in 1964 and which is published in English only, unless otherwise specified, the reports of the following meetings have already been issued:

1. Third Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
2. Fourth Meeting of the central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
3. Fourth Session of the Joint IOC-WMOCCPS Working Group on the investigations of 'El Niño' (*Also printed in Spanish*)
4. First session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
5. First session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
6. First session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
7. First Session of the Joint CCOP(SOPAC)-IOC Working Group on South Pacific Tectonics and Resources
8. First session of the IODE Group of Experts on Marine Information Management
9. Tenth session of the Joint CCOP-IOC Working Group on Post-IDOE Studies in East Asian Tectonics and Resources
10. Sixth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
11. First Session of the IOC Consultative Group on Ocean Mapping (*Also printed in French and Spanish*)
12. Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ships-of-Opportunity Programmes
13. Second session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
14. Third Session of the Group of Experts on Format Development
15. Eleventh session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
16. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
17. seventh Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
18. Second Session of the IOC Group of Experts on Effects of Pollutants
19. Primera Reunión del Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y Parte del Océano Pacífico frente a Centroamérica (*Spanish only*)
20. Third Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
21. Twelfth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
22. Second session of the IODE Group of Experts on Marine Information Management
23. First Session of the IOC Group of Experts on Marine Geology and Geophysics in the Western Pacific
24. Second session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources (*Also printed in French and Spanish*)
25. Third Session of the IOC Group of Experts on Effects of Pollutants
26. Eighth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
27. Eleventh Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (*Also printed in French*)
28. Second session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
29. First Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
30. First Session of the IOC-IBRIB Group of Experts on Recruitment in Tropical Coastal Demersal Communities (*Also printed in Spanish*)
31. Second IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity programmes
32. Thirteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asia Tectonics and Resources
33. Second session of the IOC Task Team on the Global Sea-Level Observing System
34. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
35. Fourth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
36. First Consultative Meeting on RNODCs and Climate Data Services
37. Second Joint IOC-WMO Meeting of Experts on IGOSS-IODE Data Flow
38. Fourth Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
39. Fourth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
40. Fourteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics end Resources
41. Third Session of the IOC Consultative Group on Ocean Mapping
42. Sixth Session of the Joint IOC-WMO-CCPS Working Group on the Investigations of "El Niño" (*Also printed in Spanish*)
43. First session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
44. Third Session of the IOC-UN(OALOS) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
45. Ninth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
46. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
47. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
48. Twelfth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
49. Fifteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
50. Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity programmes
51. First Session of the IOC Group of Experts on the Global Sea-Level Observing System
52. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean
53. First Session of the IOC Editorial Board for the International Chart of the Central Eastern Atlantic (*Also printed in French*)
54. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (*Also printed in Spanish*)
55. Fifth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
56. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
57. First Meeting of the IOC *ad hoc* Group of Experts on Ocean Mapping in the WESTPAC Area
58. Fourth Session of the IOC Consultative Group on Ocean Mapping
59. Second Session of the IOC-WMO/IGOSS Group of Experts on Operations end Technical Applications
60. Second Session of the IOC Group of Experts on the Global Sea-Level Observing System
61. UNEP-IOC-WMO Meeting of Experts on Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change
62. Third Session of the IOC-FAO Group of Experts on the Programme of Ocean Science in Relation to Living Resources
63. Second Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
64. Joint Meeting of the Group of Experts on Pollutants and the Group of Experts on Methods, Standards and Intercalibration
65. First Meeting of the Working Group on Oceanographic Co-operation in the ROPME Sea Area
66. Fifth Session of the Editorial Board for the International Bathymetric and its Geological/Geophysical Series
67. Thirteenth Session of the IOC-IHO Joint Guiding Committee for the General Bathymetric Chart of the Oceans (*Also printed in French*)
68. International Meeting of scientific and Technical Experts on Climate Change and Oceans
69. UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System
70. Fourth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity programmes
71. ROPME-IOC Meeting of the Steering Committee on Oceanographic Co-operation in the ROPME Sea Area
72. Seventh Session of the Joint IOC-WMO-CCPS Working Group on the Investigations of 'El Niño' (*Spanish only*)
73. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (*Also printed in Spanish*)
74. UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs
75. Third Session of the IODE Group of Experts on Marine Information Management
76. Fifth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
77. ROPME-IOC Meeting of the Steering Committee for the Integrated Project Plan for the Coastal and Marine Environment of the ROPME Sea Area
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81. Fifth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity programmes

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Development Panel (OOSDP)**

Tenth Session

Paradise, Texas, USA
3-7 October 1994

IOC/JSC-OOSDP-X/3
Paris, 2 December 1994
English only

This report is a continuation of the series of OOSDP Meeting Reports I through IX that were initially published under a Committee on Climatic Changes and the Ocean (CCCO) cover. Until 31 December 1992 the OOSDP was a joint body of the ICSU-WMO Joint Scientific Committee (JSC) and the SCOR-IOC CCCO, With the agreement of IOC to become a co-sponsor of the WCRP, the activities of the CCCO were subsumed by the JSC including sole oversight of the OOSDP.

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1. WELCOME

1 The tenth and last session of OOSDP was held at the Garrett Creek Ranch Conference Center, Paradise, Texas, 3-7 October 1994. Chairman Worth Nowlin welcomed the participants (see Annex II). Except for R. Weller, who was at sea, all other Panel members were present (McPhaden was unavoidably delayed until 5 October). Invited guests were NOAA Administrator and Under Secretary of Commerce for Oceans and Atmosphere D. James Baker, Melbourne Briscoe (NOAA/NOS), and Ed Harrison (NOAA/PMEL).

2. REVIEW AND ADOPTION OF THE AGENDA; WORKING DOCUMENTS

2 Participants were invited to comment on the provisional agenda. Nowlin outlined the key issues as he saw them. The goals and subgoals had to be revisited; the distinctions between them needed sharpening. The prioritization of elements and the backup rationale needed refinement. More emphasis was needed on models and on products. The text covering emerging technologies was not adequate, Closure on the approach to section VIII on synthesis had to be reached. Decisions on modifications suggested by reviewers had to be agreed and incorporated. Two new draft background papers on sea ice and CO₂ inventories were ready and a third on the Indian Ocean, nearly so, for review by the Panel.

3 After discussion on these items, the Panel adopted the agenda as given in Annex 1. In roughing out a timetable for the agenda, it became clear that the work needing to be accomplished at this meeting could easily more than fill the five scheduled days. Accordingly, it was decided to forego the usual presentations of national reports and reviews of activities related to GOOS -- a staple of previous meetings -- and concentrate all available time on the final report. The Panel's attention was brought, however, to several recent publications: "A Review of U.S. Planning for the Global Ocean Observing System" produced by the National Research Council; a report titled "Oceanography" produced by the OECD Megascience Forum on the meeting held in Tokyo, 28-30 September 1993, emphasizing operational oceanography; and two supplements to the GCOS Draft Space Plan entitled "Time Coverage for Space Observations of Some Variables of Relevance to GCOS" by Alain Ratier (CNRS), and "Space Instruments for Climate" by Naoto Matsuura (NASDA). The latter contains details of individual instruments listed in the GCOS Draft Space Plan.

3. CONSIDERATION OF REVIEWERS COMMENTS ON FINAL REPORT DRAFT D4

4 In accordance with the scheduled plan, Draft D4 was mailed to 71 selected individuals in August 1994 for review. By the time of the meeting 21 responses had been received. Annex III contains the names and affiliations of those who sent written comments. The Panel fully recognized that reviewing this complex document was no small undertaking. The effort by those who made the commitment was therefore all the more appreciated.

5 As could be expected, the reviews ranged in length, depth, and specificity. On the whole, comments were thoughtful and constructive. They provided valuable fresh viewpoints. Considerable effort was devoted during the meeting to revising the report to accommodate suggested changes. Each review was discussed individually. For the more substantive ones, the discussion was led by a Panel member, or other meeting participant, assigned to consider the review and recommend necessary actions. After discussion, the agreed actions were incorporated into the text by that individual. Editorial changes that could not be completed during the meeting were to be finished as soon as possible thereafter.

6 Some generally expressed comments were:

- (i) lack of attention to modeling and data assimilation;
- (ii) structure of the report, particularly clarity of direction;
- (iii) inconsistencies in the text and in the impact-feasibility diagrams;
- (iv) more detailed consideration of dimethyl sulphide;
- (v) length;
- (vi) key recommendations and priorities hard to find;
- (vii) need for an executive summary;
- (viii) need for some consideration of the target group;
- (ix) repetitiveness;
- (x) some bias in material used.

7 The Panel has been fully conscious of the length problem but believed that a complete treatment of the subject was warranted. Most reviewers who lamented the report's length also concluded that the quality of the scientific background provided in the report, in the end, dictated its length. A total rewrite by a single individual, well acquainted with the material covered, might yield a somewhat shorter document, but would not likely result in a significant shortening and might well introduce bias unsatisfactory to the Panel. It is planned that the executive summary (not yet written at the time of this meeting and thus not seen by reviewers) will go a long way to satisfy this and the target audience criticisms. Still, an effort was made to respond to these and the other comments through improvements in the structure of the report by reorganizing and rewriting major parts, by including more complete subsection titles and on each page running subheads, by including more diagrams and summary tables, and by stating up front what the report is intended to be as well as not be. Consideration was also given to including an index to help in finding one's way in the report.

8 To correct technical or scientific shortcomings brought out in the reviews, new text was written on the spot when the expertise was available among the meeting participants or, if not, outside experts were to be invited to provide appropriate text.

9 All in all, dealing with the reviews brought many issues to light that resulted in rewriting of sections to be more consistent, to emphasize some inadequately presented concepts, to relate goals more clearly to the backup text, and to provide improved supporting rationale for the priorities illustrated in the diagrams presenting impact versus feasibility for each subgoal.

10 A new final section was constructed that prioritizes all subgoals and measurements. Recommendations were summarized there as well.

4. EMPHASIS ON USE OF MODELS

11 A key issue raised by many reviewers was the lack of emphasis on the use of models. This oversight was unintended. From the beginning, the Panel's stance was quite the opposite--a strong modeling component was considered to be an integral part of the observing system, a conclusion that led to making modelling the subject of the first in the series of OOSDP background reports. The prominence given to models in the background document probably led to a subliminal belief that the subject had been satisfactorily dealt with in the report. To help rectify matters a decision was made to add a new subgoal specific to modelling, and to add to section V, a new subsection discussing the role of models and emphasizing the reciprocally beneficial interactions that occur in the assimilation of observational data. These recurring interactions are considered vital for the mutual development of models and assimilation techniques as well as the observing system itself.

12 References to the use of models in other sections of the report were also reviewed with an eye to addressing this oversight and modifying them as appropriate and necessary.

5. RECONSIDERATION OF SUBGOALS

13 After having let the subgoals gestate since they were initially drafted two years ago, it became clear from a fresh reading that some revisions were now in order, particularly with subgoals 3a (dealing with changes in transports of heat, fresh water and carbon) and 3b (dealing with inventories of same), and 4a (to provide climatologies of key variables); the wording for these needed clarification. Similarly, a review of the feasibility-impact diagrams and their relationships to the goals revealed some problems and inconsistencies. Further, it was discovered when attempting to rank the observational elements in importance/timing, that the exercise would be facilitated if 1b (on data needed to estimate surface fluxes) were divided into two subgoals that separated wind stress (certainly observable on a global basis with existing technology) from heat and freshwater fluxes (not straightforward on a global basis). This exercise and related discussions regarding Section VI (Information Management) led to including timeliness of data delivery as a practical constraint in subsection III.C.

14 The required changes were agreed to and completed during the meeting.

6. DEVELOPING TECHNOLOGIES

15 It was agreed at the outset of the meeting that the treatment of this subject needed strengthening. The entire subsection VII.B on Enabling Technologies was revisited with the intent of restructuring. In the end, it was decided to regroup technologies into existing, developing and potential, and to add more examples to each category. Some sense of relative costs for alternative measurement methods was provided by indicating whether the costs are mainly one-time (capital) or recurring. Indications were given for existing technologies which should be improved for use in an ocean observing system for climate.

16 Other suggestions surfaced for improvements in other parts of the report dealing with this subject: an expanded treatment of building on existing technologies; more emphasis to be woven in the text on advances to be made from evolutionary technology development as distinct to those from revolutionary change.

7. PRIORITIZATION; THE SYNTHESIS CHAPTER

17 Section VIII, the final chapter in the report, was conceived as the place where concepts developed in the first seven chapters would be knit together. Some work had already been devoted to this chapter, but it was left for this last meeting to fully develop its scope and form.

18 In this chapter, all the observational elements recommended to support each subgoal are considered. Factors considered included: feasibility and importance of making a measurement on a global basis, some sense of costs, communications and logistics requirements, state of the technology, timing requirement (from the sense of the immediacy for initiating a measurement), the anticipated benefit and the scientific impact attributable to a particular measurement for achieving one or more of the climate subgoals (with some sense of other module needs as well), and state of readiness and capability, both politically and technically to undertake a particular measurement on an operational basis. For each subgoal, the observational elements are ranked regarding their impact on attaining the subgoal versus their feasibility--a mixture of the previous factors.

19 The Panel decided to bite the bullet and include a table giving a priority ranking to the subgoals. This was done with great reluctance since all the subgoals are considered important. The Panel was painfully aware, however, that in the real world the proposed system would not be implemented fully and at once, and that others would make priority decisions if the OOSDP demurred on those grounds.

- 20 Consonant with the reviewer recommendations to accomplish the above with more summarizing tables and diagrams, a cross-cutting table was agreed upon that lists the subgoal, the priority of measurements that are presently practical as well as those that are presently technology-limited, identifies the other subgoals these measurements would serve, and credits the added use received from other observations specified for other subgoals.
- 21 One last overall look at the priority question rekindled a restiveness surrounding long-term time series and how to satisfactorily prioritize them high enough within the adopted framework. Without question, the very few ocean time series in existence have proven immensely valuable for climate studies. The report recognizes this and calls for more ocean time series (stations, sections, or surveys), although at less than highest priority using the adopted scheme. Yet, few scientists would argue against continuing, on a high priority basis, the few still in existence or establishing strategically located new ones. On the other hand, nations have shown little inclination to support them. Since the payoff is far in the future, it is too easy, with the immediacy of other needs, to recurrently postpone them till "next year". This issue will remain as a challenge for a follow on group to ponder--perhaps by the climate assessment activity recommended in the following paragraph.
- 22 It was decided that this chapter should also look ahead and elaborate on the broader aspects of the conceptual design by examining mechanisms and activities to optimally utilize the data acquired by the observing system. Consideration of this forward look led to a discussion on where the dividing line should be, i.e., where the climate ocean observing system ends and related activity begins (e.g., prediction centers, climate assessment, model development and validation). This was followed by a conceptual discussion on an envisioned assessment activity -- who would do it (ECMWF-like centers?) what would they do (make climate assessments and develop the climate assessment science?), who would be the users of the assessment (IPCC, GOOS, GCOS?). The outcome was a decision to include a recommendation in this chapter for the establishment of a permanent centre (or centres) for the regular and routine assessment of the ocean climate system. The centre would focus on examining and, where necessary, re-examining the total observing system data set for signatures of significant long term change. This activity would be responsible for improving the "information content" of the historical data base. (Note: this is different from the evaluation unit which is seen as the watchdog of the smooth functioning and orderly updating of the observing system itself).
- 23 The Chapter VIII outline finally shaped up as follows:
- A. Observing system elements vs subgoals.
 - 1. Contributions of elements to subgoals (the cross-cutting table).
 - 2. Feasibility and impact of observations to individual subgoals.
 - B. Immediate subgoals and needed observations.
 - 1. Recommended priority subgoal.
 - 2. Priority of observational elements.
 - 3. Evaluation Unit.
 - C. The broader conceptual design,
 - 1. Climate assessment activity (leads to a global data assimilation system).
 - 2. Model improvement and validation.
 - 3. Numerical prediction,

8. REVIEW OF BACKGROUND REPORTS

- 24 The latest drafts of two new background reports were available for the Panel's review: one titled "Sea ice in the global climate system" by Ian Allison and Richard Moritz, the other "An ocean observing system to monitor global ocean carbon inventories" by Douglas Wallace. Discussions were complimentary; it was agreed the authors should proceed with the preparation of final drafts. Some enhancements to the OOSDP report were added based on material from these reports. A revised draft of the last remaining background report on the Indian Ocean by the WCRP Indian Ocean Climate Studies Panel (lead author: J. Stuart Godfrey) was being prepared with an anticipated completion date in November,

9. EXECUTIVE SUMMARY AND WRAP-UP

- 25 Effort before and during the meeting had been nearly exclusively concentrated on reacting to the reviewer comments and improving the consistency and coherency of the basic report. Much was accomplished at Garrett Creek but considerable writing and editing remained to be done at the close of the meeting. George Needler agreed to return to Texas A&M for two weeks following the meeting and work with Worth Nowlin to do the bulk of it. Nowlin proposed to have a new draft assembled, ready for Panel members to review before the end of October. He expected a short turn-around for this review in order to stick to the schedule for completing the final draft. James Baker provided ideas for the Executive Summary. Nowlin agreed to prepare a draft.

ANNEX I

AGENDA

1. **WELCOMING**
2. **REVIEW AND ADOPTION OF THE AGENDA; WORKING DOCUMENTS**
3. **CONSIDERATION OF REVIEWERS COMMENTS ON FINAL REPORT DRAFT D4**
4. **EMPHASIS ON USE OF MODELS**
5. **RECONSIDERATION OF SUBGOALS**
6. **PRIORITIZATION; THE SYNTHESIS CHAPTER**
7. **DEVELOPING TECHNOLOGIES**
8. **REVIEW OF BACKGROUND REPORTS**
9. **EXECUTIVE SUMMARY AND WRAP-UP**

ANNEX II

LIST OF PARTICIPANTS

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ANNEX IV

GLOSSARY OF ACRONYMS AND SPECIAL TERMS

ALACE	Autonomous Lagrangian Circulation Explorer
BMRC	Bureau of Meteorology Research Centre (Australia)
CCCO	Committee on Climatic Changes and the Ocean (SCOR-IOC)
CD	Compact Disk
CENR	Committee on Environment and Natural Resources (USA)
CFC	Chloro-Fluoro-Carbons
CLIVAR	Climate Variability and Prediction Programme (WCRP)
CNRS	"Centre National de la Recherche Scientifique"
COARE	Coupled Ocean-Atmosphere Response Experiment (TOGA)
CSIRO	Council for Scientific and Industrial Research Organization (Australia)
CTD	Conductivity-Temperature-Depth probe
DOE	Department of Energy (USA)
E	Evaporation
ECMWF	European Centre for Medium-Range Weather Forecasting
ENSO	El Niño Southern Oscillation (USA)
EPA	Environmental Protection Agency (USA)
ERBE	Earth Radiation Budget Experiment
GCM	General Circulation Model
GCOS	Global Climate Observing System
GEEP	Group of Experts on Effects of Pollutants (IOC-IMO-UNEP)
GEWEX	Global Energy and Water Cycle Experiment
GIPME	Global Investigation of Pollution in the Marine Environment (IOC)
GLOSS	Global Sea-Level Observing System
GOOS	Global Ocean Observing System
GTS	Global Telecommunication System
HOTO	Health of the Oceans
ICSU	International Council of Scientific Unions
IGBP	International Geosphere-Biosphere Programme
I-GOOS	IOC-WMO-UNEP Committee for the Global Ocean Observing System
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IPCC	Intergovernmental Panel on Climate Change
ISCCP	International Satellite Cloud Climatology Project
JGOFS	Joint Global Ocean Flux Study (SCOR-IOC)
J-GOOS	Joint Scientific and Technical Committee for GOOS
JMA	Japanese Meteorological Agency
JPO	Joint Planning Office (GCOS)
JSC	Joint Scientific Committee for the WCRP
JSTC	Joint Scientific and Technical Committee (for GCOS)
LMR	Living Marine Resources
LW	Long Wave
MIZ	Marginal Ice Zone
NASA	National Aeronautics and Space Administration (USA)
NASDA	National Space Development Agency (Japan)
NMC	National Meteorological Center (USA)
NOAA	National Oceanic and Atmospheric Administration (USA)
NOS	National Ocean Service (NOAA)
NSF	National Science Foundation (USA)
NSTC	National Science and Technology Council (USA)
NWP	Numerical Weather Prediction
OECD	Organization for Economic Co-operation and Development

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OOS	Ocean Observing System
OOSDP	Ocean Observing System Development Panel (JSC)
P	Precipitation
PMEL	Pacific Marine Environmental Laboratory (NOAA)
SCOR	Scientific Committee on Oceanic Research (ICSU)
SSG	Scientific Steering Group
STA	Science and Technology Agency (Japan)
SW	Short Wave
TOGA	Tropical Ocean and Global Atmosphere Programme (WCRP)
TAO	Tropical Atmosphere-Ocean Moored Buoy
TOPEX-POSEIDON	Ocean Topography Experiment (Satellite Altimetry)
ULS	Upward Looking Sonars
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VOS	Voluntary Observing Ship
WCRP	World Climate Research Programme
WDC	World Data Centre
WGNE	Working Group on Numerical Experimentation
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment (WCRP)
WWW	World Weather Watch
XBT	Expendable Bathythermograph

82. Second Meeting of the UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs
83. Seventh session of the JSC Ocean Observing System Development Panel
84. Fourth Session of the IODE Group of Experts on Marine Information Management
85. Sixth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series
86. Fourth Session of the Joint IOC-JGOFS Panel on Carbon Dioxide
87. First session of the IOC Editorial Board for the International Bathymetric Chart of the Western Pacific
88. Eighth Session of the JSC Ocean Observing System Development Panel
89. Ninth Session of the JSC Ocean Observing System Development Panel
90. Sixth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
91. First Session of the IOC-FAO Group of Experts on OSLR for the IOCINCWIO Region
92. Fifth Session of the Joint IOC-JGOFS CO₂ Advisory Panel Meeting
93. Tenth Session of the JSC Ocean Observing System Development Panel (OOSDP)