



Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

The ad hoc Advisory Group for IOCARIBE-GOOS

Third Session
1 – 5 April 2001
Miami, USA

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Abstract

The third session of the ad hoc Advisory Group for IOCARIBE-GOOS took place on the premises of the Atlantic Oceanographic and Meteorological Laboratory (AOML) of the US. National Oceanic and Atmospheric Administration (NOAA) in Miami between April 2 and 5, 2001. The main purpose of the meeting was to review the draft chapters of "*The Case for IOCARIBE-GOOS*", which is the strategic plan for IOCARIBE-GOOS. The strategic plan will be finalized for presentation to the IOCARIBE meeting planned for Mexico in 2002. Prior to that a regional workshop should be held to develop an appropriate set of pilot projects; initial topics might be, for instance, (i) modelling and analysis; and/or (ii) data and information management.

The meeting was timed to take advantage of the occurrence in Miami on April 3-5 of the Oceanology International (OI) 2001 Americas meeting. During a day-long OI session entitled "*Caribbean Sea and Gulf of Mexico Regional GOOS Symposium*", on April 5th, the draft strategic plan for IOCARIBE-GOOS was presented to the wider community for the first time so as to obtain feedback that would help to improve the plan. The Symposium was well attended and feedback was strongly positive. The papers from the Symposium will be published in a special issue of an appropriate Caribbean science journal.

(SC-2002/WS/13)

* Translated into French and Spanish

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- I. AGENDA
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1. OPENING

The Co-Chairs of the ad hoc Advisory Group for IOCARIBE-GOOS, Guillermo Garcia-Montero and Douglas Wilson, opened the meeting at 09:15 hours on Sunday April 1st, thanking all participants for attending the meeting, kindly hosted by the National Oceanic and Atmospheric Administration (NOAA) in its Atlantic Oceanographic and Meteorological Laboratory (AOML).

The list of participants is given as Annex II.

Doug Wilson began by reminding participants that the main purpose of the gathering was to review the draft chapters of *“The Case for IOCARIBE-GOOS”*, which was in effect the strategic plan for IOCARIBE-GOOS. The completion of the draft chapters in time for the meeting signaled that we were making significant progress. Guillermo Garcia-Montero reminded participants that the meeting was timed to take advantage of the occurrence in Miami on April 3-5 of the Oceanology International (OI) 2001 Americas meeting. The draft strategic plan for IOCARIBE-GOOS would be presented to the wider community for the first time during the OI meeting, in a day-long “Caribbean Sea and Gulf of Mexico Regional GOOS Symposium” on April 5th, so as to obtain feedback that would help to improve the plan. Many of the other sessions of the OI Americas meeting, and the associated meeting of The Oceanography Society (TOS), would also be useful in providing new insights that would be likely to influence the development of the plan.

During the Advisory Group meeting, the Director of the AOML, Kristina Katsoros, welcomed the participants to the Laboratory. She recalled that all of the countries in the IOCARIBE region shared the same body of water, and in order to understand how it works and to forecast its effects and changes, those countries needed to share ideas, people and technology. The IOCARIBE region is an important focus for NOAA and the AOML, and the strategic plan produced by the Advisory Group would help to indicate where and how resources would best be focused to achieve common goals.

On behalf of IOC, Colin Summerhayes, Director of the GOOS Project Office, thanked participants for their attendance, and thanked the local organizers, in particular Doug Wilson and his assistant Gletys Guardia-Montoya, for making the arrangements for the meeting. Alan Duncan of the IOCARIBE Secretariat informed the meeting that the IOC had just appointed Dr. Cesar Toro (currently with OCEANOR in Norway) to Head the IOCARIBE Secretariat. Dr. Toro would take up his duties within a couple of months. As Dr. Toro was expected to attend the OI meeting, Colin Summerhayes was asked to pass him a copy of the report of the Havana meeting of the Advisory Group, and to introduce him to the members. The Members agreed that they should start working with Dr. Toro right away on the strategic plan. They also hoped that Dr. Toro would take on much of the responsibility for co-ordinating and finding resources for the development of IOCARIBE-GOOS.

Action 1: (i) Co-chairs and GPO to involve Dr. Toro in the further development of the strategic plan; (ii) GPO Director to give a copy of the Havana report to Cesar Toro, and introduce him to the Advisory Group.

2. ADMINISTRATIVE ARRANGEMENTS

Gletys Guardia-Montoya explained the logistical arrangements, and the plan for a social event with the Symposium speakers on the evening of Wednesday April 4th. Arrangements were made for access to computers and electronic mail.

2.1 ADOPTION OF THE AGENDA

The provisional agenda (Annex I) was adopted.

2.2 DESIGNATION OF THE RAPPORTEUR

Gletys Guardia-Montoya was appointed to serve as the Rapporteur for the Session.

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

Doug Wilson introduced the main documents, which included (i) a copy of the report of the last meeting of the advisory group (Havana, December 2000), which is now being printed, plus (ii) copies of the draft chapters of *“The Case for IOCARIBE-GOOS”* that had been received to date. Missing chapters were tabled to make a complete set of chapters, including the latest version of chapter 7.

Colin Summerhayes introduced a 1992 report by G. Narayana Swamy, on “A Physical Oceanographic Research Plan for the Caribbean, with Special Reference to Trinidad and Tobago”, which had been produced for the Institute of Marine Affairs of Trinidad and Tobago, with sponsorship from the Commonwealth Science Council and the Indian Council of Scientific and Industrial Research. It was considered that this document would provide useful background information for the design of the eventual observing system, and copies were made for the participants.

Action 2: Gletys Guardia-Montoya to copy the Dr. Swamy’s report to participants.

Doug Wilson explained that to make the most of the opportunity presented by the OI Americas meeting the Group would meet in full session on April 1 and 2, would meet with the speakers from the IOCARIBE-GOOS Symposium on the evening of April 4, would participate in the Symposium on April 5, and would have a wrap-up session on the evening of April 5. Participants were encouraged to attend other OI conference sessions and visit the OI Americas exhibits on April 3 and 4.

3. DRAFT STRATEGIC PLAN FOR IOCARIBE-GOOS

3.1 THE CASE FOR IOCARIBE-GOOS

3.1.1 General Discussion

In the USA, considerable efforts have been made in very recent years to develop a national approach to ocean observing in the context of GOOS. These have led to the creation of an Integrated Ocean Observing System (IOOS) involving the partners in the National Oceanographic Partnership Programme (NOPP). Further information is available on the NOPP web site at www.nopp.org. In this context, Doug Wilson reported that he had recently attended a meeting on the establishment and design of an East Coast Observing System. The focus of the meeting, which was attended by academic institutions, government agencies and funding agencies, had been to develop a pilot-observing programme for the east coast of the USA. The idea was to create a network of linked research observatories, including for instance:

LEO (the Rutgers Long-term Ecosystem Observatory),
GoMOOS (the Gulf of Maine Ocean Observing System),
The South Atlantic Bight Synoptic Offshore Observational Network.

This networked system would be a US contribution to GOOS. At that meeting it had been decided to start with something simple that was achievable in a short time frame (say one to two years), to prove the concept. The initial focus would be on measurements of sea-level and waves in relation to storm response, leading to the development of a useful product dealing with coastal erosion forecasting. The participants in the network would learn from their initial experience, and go on to develop something more comprehensive in due course. Other elements of the US IOOS include for example the Gulf of Mexico Ocean Monitoring System (see *Oceanography*, v.13, no. 2, 2000), which is a potential building block for IOCARIBE-GOOS.

This presentation led to a discussion on what was needed to develop GOOS in the IOCARIBE area. The first priority was to make decision makers aware of why a regional operational oceanographic system was needed, and of the benefits that might accrue from it. For this a strategic plan – *“The Case for IOCARIBE-GOOS”* – was needed. The IOC’s Regional Sub-commission office in Cartagena, Colombia, would be expected to help to develop and implement the strategic plan.

The meeting agreed that since GOOS is co-sponsored by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) as well as by the IOC, the IOCARIBE-GOOS

documents should be copied to the UNEP and WMO focal points in the region, as well as to the IOC ones, to get everyone working together across the region.

Action 3: GPO Director to work with the WMO and UNEP Secretariats to see that the IOCARIBE-GOOS documents reached WMO and UNEP focal points.

Colin Summerhayes reported that efforts had been made to persuade a representative of the Cartagena Convention office in Jamaica to attend the Miami meeting, but without success.

IOCARIBE-GOOS must capitalize on existing systems where possible. It was noted that, as along the east coast of the USA, there already are some successful observing elements in the IOCARIBE region, including for instance the CEPAC project on sea-level measurements in relation to climate change. There had been some difficulties in getting the CEPAC project to work as intended, and lessons needed to be drawn from that and applied in establishing IOCARIBE-GOOS. It was noted that CEPAC was a time-limited project that was due to end soon. This raised the question of how to sustain observing systems for the long-term.

It was pointed out that although sea-level measurements were regarded as being of high priority for Caribbean states, and despite requests having been made in the past, the Global Sea-level Observing System (GLOSS) had not provided any training in sea-level measurements for the region.

Action 4: GPO Director to pass a request to the 7th meeting of GLOSS, in Honolulu (April 2001), for an appropriate training course to be held soon in the Caribbean.

It was agreed that in setting up an IOCARIBE-GOOS the current institutional structures must be taken into account.

In addition, responsibilities must be assigned to individuals to ensure that someone is looking after a particular element in the system. Equally, there should be clear objectives and milestones for the development of each element, so that its performance can be monitored in an appropriate way.

Another requirement for success is the appointment of scientific leaders who can build bridges between the scientific community and policy makers.

Finally, the meeting recognized that small island nations in the region may find it difficult to participate in, contribute to, and benefit from a regional observing system, because they had few skilled people and commonly suffered from a rapid turnover of those people, which affected their ability to commit to long-term activities.

3.1.2 Reviews of Individual Chapters

The meeting agreed that good progress had been made, and that when the document was complete it would represent a significant step forward for co-ordination in the wider Caribbean region covered by IOCARIBE. It was also agreed that other models for GOOS should be examined to ensure that the IOCARIBE-GOOS strategic plan drew on the best information available. Examples include the European plans for BOOS (Baltic Operational Oceanographic System), NOOS (Northwest shelf Operational Oceanographic System), the US Plans for an IOOS (Integrated Ocean Observing System), and the Mediterranean Forecasting System Pilot Project (MFSPP).

Action 5: GPO to provide these documents to the Members of the Advisory Group.

It was agreed that the document should start with a Foreword by Patricio Bernal, and should feature an Executive Summary written in language appropriate for policy makers. Each chapter should begin with an *Abstract* of the main findings. A map of the IOCARIBE region without showing the boundaries of Exclusive Economic Zones (EEZs) should be included as a front piece. Other figures should only be included only if they have very high quality and carry an important message. If figures are included they will be only in black and white.

Action 6: IOCARIBE Secretariat to provide a complete map of the IOCARIBE region, including the appropriate parts of northern Brazil.

Action 7: Alan Duncan Garcia to provide the formal written description of the IOCARIBE region.

Since each chapter is being modified with the help of members of the advisory group, including the Director GPO, it makes sense for the authors to be listed in the front of the document as a team led by the two co-chairs, rather than having individual names associated with each chapter.

The principal editors will be the two co-chairs and the Director GPO. The next version of the document, which should be produced at latest by the end of June, will be the first complete draft. It will be labeled Version 1, and circulated to a review panel comprising mainly the speakers in the IOCARIBE-GOOS session of the Oceanology International (OI) Americas conference, to obtain feedback before final modifications and eventual publication as a GOOS report. The OI Americas sessions should provide the Chapter authors with useful additional information to help in the revisions of the Chapters.

Action 8: Members to suggest additional names for the editorial board.

Action 9: the following schedule to be followed in finalizing the document:

- (i) Members to provide revised versions of their chapters to Gletys Guardia-Montoya by end April;
- (ii) Gletys to combine the chapters to form Version 1 of the document, and to circulate it to the Advisory Group and for comment (1st week in May);
- (iii) The three editors to incorporate feedback comments as appropriate, and produce Version 2, including Foreword and Executive Summary, by end May;
- (iv) The editors to circulate the document to the Advisory Group and the review group in mid May for comment by end June, to incorporate the comments and finalize the draft by end July, to check it with the Advisory Group by mid August, and to submit it to the GPO by end August for publication.

There is a need to insert information about tsunamis throughout the report.

Action 10: Doug Wilson to ask George Maul to insert information about tsunamis throughout the report.

3.1.2.1 Chapter 1: IOCARIBE-GOOS Definition

The definition of IOCARIBE-GOOS should be moved from the back of the chapter to the Abstract. The chapter should start with a section labeled “The Basics of GOOS”, which would begin with the present section 2.3 – which says what GOOS is. That should be followed by a statement that says that GOOS is operational oceanography, then by new text explaining what operational oceanography is. The new text should be condensed from the paper by Colin Summerhayes and Ralph Rayner “proceedings of Potsdam Conference”. It should be followed by the present section 2.5, spelling out the “Vision, Mission and Objectives of GOOS”. These changes mean that section 2.1 can be dispensed with.

The next section could then be labeled “Background”, and would use the text from the present section 1 “Introduction” and section 2 “GOOS”, between which there is some repetition that can be removed in the combination.

Action 11: Guillermo Garcia to revise Chapter 1.

3.1.2.2 Chapter 2: Assessment of Needs

This chapter should be re-titled “Assessment of Needs and Responses”. It should follow the outline in the GOOS Strategic Plan. This means starting with the “Needs” sections on (i) Environmental Protection, and (ii) Vulnerability, and following them by one on “Responses”, which would embrace much of the present lead-in sections of the first draft. There should be more emphasis on the broad requirements “Needs” of the

user community, consistent with the fact that GOOS is an end-to-end system. Tsunami warning should be added as a user need.

Action 12: Ruben Aparicio and Colin Summerhayes to rewrite Chapter 2, with Colin Summerhayes providing an initial revision consistent with the approach in the GOOS Strategic Plan.

Action 13: Advisory Group members to provide Ruben Aparicio with information about user needs for tsunami warnings in the IOCARIBE region.

There would be no need for a map of the Wider Caribbean region showing EEZ boundaries. The list of countries on the present page 1 of the draft would not be needed.

Table 1 should be extended by the addition of data from Hurricane Gilbert, which will be supplied by Guillermo Garcia.

Action 14: Guillermo Garcia to provide data on Hurricane Gilbert for Chapter 2.

3.1.2.3 The Design of IOCARIBE-GOOS

The design principles should not be repeated at the beginning of this chapter – it is enough to cross-refer back to their presentation in Chapter 1.

While it is necessary to state that an essential feature of the design is to capitalize on existing systems, the Existing Observing System elements do not need to be spelled out in detail in this Chapter; thus this present section of the text should be moved to Chapter 4 (Implementation). The RONMAC Project should be inserted in this section when it is moved.

Some text about the Jacksonville meeting and the establishment of an east coast observing system for the USA should be inserted in the introduction to the section on Pilot Programmes.

The design chapter should also include a statement about the design of the Gulf of Mexico ocean observing system, since this falls within the IOCARIBE-GOOS region. However, once that statement is written it may fall more appropriately in Chapter 4.

The pilot projects should be grouped in relation to the more coastal and more open ocean user needs set out in Chapter 2. The importance of open ocean elements in providing boundary conditions for and influence on coastal systems should be brought out more clearly. The Global Ocean Data Assimilation Experiment and its associated Argo pilot project should be mentioned in the section on pilot projects.

Action 15: Doug Wilson to rewrite Chapter 3, with reference to the US Integrated Ocean Observing System and the Intra-American Seas Initiative as appropriate.

3.1.2.4 Implementation and Integration

The text on page 1 should be labeled “Introduction”. The second page of the present draft contains an extensive section that is more appropriate for the chapter on design, and should be moved to section 2. It comprises a set of three bullet points and the paragraph immediately above and the one immediately below them.

The implementation section effectively begins with the first paragraph on page 3 of the present text, and should be labeled section 2. The subheading “The Planning Phase” becomes section 2.1.

The section on Existing Systems from Chapter 2 should be inserted after the first paragraph in the section labeled “The Initial Observing System Phase”. A statement is needed comparing the present observing system elements with those in the international GOOS Initial Observing System. From this it should be clear that some key elements are missing, like Ship-of-Opportunity Programme (SOOP) lines measuring subsurface

temperature and salinity, for example, while others, like GLOSS stations measuring sea-level, are quite well represented.

Action 16: Artemio Gallegos to rewrite Chapter 4.

3.1.2.5 IOCARIBE-GOOS Products

Appropriate subheadings need to be added. The section on data products from the middle of page one of the initial draft should be moved to chapter 6 (Data). Sections need to be added on User Scenarios, and on Examples of Products, including tsunami warnings. Most of the information is available in the GOOS Products and Services Bulletin on the GOOS web site. Some useful information may also be found in the report of the 1st GOOS Users' Forum.

Dr. Gloria Batista of the Foundation Amistad, Panama, attended the meeting as an observer on April 2nd. She told the Group what Panama was doing to preserve the marine environment in the new Panama Canal area. Representing 'the user community' she asked what IOCARIBE-GOOS would to meet her needs. The question generated a lively debate on how to obtain information about the needs of the many different user communities throughout the IOCARIBE area, which was continued on April 5th (see section 4, below).

Action 17: Artemio Gallegos and Colin Summerhayes to rewrite Chapter 5, with Colin Summerhayes providing an initial revision incorporating User Scenarios and Products.

Action 18: Advisory Group members to consider that revision, and think about what scenarios and products should be added that are particularly relevant to the IOCARIBE region.

3.1.2.6 Data and Information Management

The present chapter draws heavily on the published data and information management plan of the Joint GOOS-GCOS-GTOS Data and Information Management Panel (J-DIMP). However, just recently the GOOS Steering Committee approved a data and information management plan for GOOS, and it is that document that should be used as the basis for this chapter.

Action 19: Colin Summerhayes to send the GOOS Data and Information Management Plan to Doug Wilson for him to use as the basis for a rewrite of Chapter 6.

3.1.2.7 National and Regional Development

Section 1 of this chapter should be entitled "Rational", and go as an initial statement following the Executive Summary. It needs to be merged with some of what is presently in chapter 1. The list of chapters given on page 2 is not required.

The statement on the membership of National GOOS Co-ordinating Committees (NGCCs) should be expanded to include the focal points of WMO and UNEP. In addition Guillermo Garcia will provide additional text to precede the list of activities that NGCCs will be expected to do.

Action 20: Guillermo Garcia to provide text on NGCCs to Hazel McShine.

The "National User Needs" section needs to be strengthened.

Action 21: Alejandro Gutiérrez will send a document on this topic to Hazel McShine for her to draw on in rewriting the "User Needs" section, and to Antonio Rowe for him to draw on in addressing capacity building needs.

The section on Regional Policy is too elaborate.

Action 22: Colin Summerhayes to work with Hazel McShine on a rewrite of the "Regional Policy" section.

The part of section 2.3.2 on the needs identified by the 1st GOOS Users' Forum is mostly about capacity building, and so should be moved to Chapter 8.

Action 23: Antonio Rowe to incorporate in Chapter 8 the section on “needs identified by the 1st GOOS Users' Forum”.

The section on the “Association of Caribbean States” should include a statement about transport as a priority. The section on UNEP initiatives should be expanded to become one on UN initiatives, including WMO and IMO. The Concluding Statement should move to the Abstract.

Action 24: Hazel McShine to revise Chapter 7.

3.1.2.8 Training and Capacity Building

The section on the “national approach” (5.3) should be deleted, as it duplicates material in Chapter 7. Section 6 should be deleted, as it is not evident that IOCARIBE-GOOS will require a separate Capacity Building Panel apart from the IOCARIBE-GOOS Steering Committee. Annex A should be deleted, and replaced by a cross reference to the GOOS Capacity Building Principles document which contains examples of activities envisaged as being included in capacity building.

There is a need to include new material that has recently been produced for the GOOS Capacity Building Implementation Strategy.

Action 25: Colin Summerhayes to work with Antonio Rowe to incorporate appropriate material from the GOOS Capacity Building Implementation Strategy.

There is also a need to make this chapter consistent with previous statements about the requirements of the IOCARIBE region for contributions from the IOC's TEMA (Training, Education and Mutual Assistance) programme.

Action 26: Guillermo Garcia to provide Antonio Rowe with IOCARIBE-TEMA document.

Action 27: Antonio Rowe to revise Chapter 8.

3.1.2.9 Technology Development

The text of the Technology Chapter was not available.

Action 28: Gletys Guardia-Montoya to provide members and Director GPO with copies of the text of the Technology Chapter before end April.

Action 29: Members and Director GPO to provide feedback by end April, for Antonio Rowe to finalize the revision to Chapter 9.

3.1.2.10 Resources

This chapter needs to be revised to follow the outline in the GOOS Strategic Plan.

Action 30: Ruben Aparicio and Guillermo Garcia to rewrite Chapter 10, with Guillermo Garcia providing an initial revision consistent with the approach in the GOOS Strategic Plan.

3.1.2.11 Effective Co-ordination

The Concluding Statement should be moved to the Abstract. Raising funds should be primarily a regional responsibility led by the IOCARIBE Secretariat, with support from the GPO as appropriate.

3.2 PILOT PROGRAMMES

The participants agreed that once the strategic plan is published, a regional workshop should be held to develop an appropriate set of pilot projects, starting with the list in Chapter 3. Ideally this meeting should be held before the next IOCARIBE meeting, but this could mean that it is held immediately before, and back-to-back with that meeting, which will be in Mexico probably in 2002. The workshop should focus on a project or limited number of projects that are both simple and do-able within a short, one- to two-year time frame, so as to gain credibility for the IOCARIBE-GOOS concept. Initial topics might be, for instance, (i) modelling and analysis; and/or (ii) data and information management.

Action 31: Doug Wilson and Guillermo Garcia to draft a proposal for a regional workshop on pilot projects, in consultation with the GPO and the IOCARIBE Office, and to begin to solicit funding for the meeting.

3.3 INVENTORY QUESTIONNAIRE

Gletys Guardia-Montoya reported on progress in developing the inventory of ongoing (mainly operational) activities throughout the region. A questionnaire was devised based on the one used for the Western Indian Ocean Marine Applications Project (WIOMAP). It was sent in English and Spanish to a wide circulation list (245 people, universities or institutions) developed from various regional listings. Many telephone calls were made to ensure that the people on this list were appropriate. Advisory Group members were asked to supply lists of national contacts, but not all have yet complied. It will be useful to sort the list by country so that members can see who is missing.

Action 32: Gletys Guardia-Montoya to sort the list by country and supply it to Advisory Group Members.

Action 33: Advisory Group members to supply lists of national contacts to Gletys Guardia-Montoya for the questionnaire.

Additional information could come for example from the GLOSS list of contacts, and from the Latin American Association of Marine Scientists (ALICMAR).

Action 34: Doug Wilson to supply the GLOSS list of contacts.

To ensure that the questionnaires are returned without too much delay it was suggested (i) that the form be put on the IOCARIBE-GOOS web site (and/or GOOS web site), for people to fill it in there; (ii) that a reminder e-mail be sent, with a deadline for response; and (iii) that the IOCARIBE focal points be asked to help get responses from the contacts in their countries.

Action 35: Gletys Guardia-Montoya to put the questionnaire onto the IOCARIBE-GOOS web site; to send an e-mail reminder, with a deadline for response; and to ask IOCARIBE focal points to help to get responses.

It was clear that the work is taking longer than expected when the contract for the job was agreed. A contract extension may be needed.

Action 36: Director GPO and Doug Wilson to consider an extension to the contract, and to check on the possibility of funding it.

Once the inventory is complete it will become an information document for the IOCARIBE-GOOS Steering Committee to use to ascertain where the gaps are that need filling, and as the basis for obtaining agreement as to which of the existing systems belong in IOCARIBE-GOOS. The inventory will have to be evaluated by a subgroup of the Steering Committee, as one of the initial steps towards conversion of the strategic plan into an implementation plan. The inventory will also help to inform the participants in the proposed pilot project workshop (see 3.2 above).

4. OCEANOLOGY INTERNATIONAL (OI) AMERICAS STATUS REPORT

Doug Wilson reported that as required by the Havana meeting he had organized the IOCARIBE-GOOS session of the conference programme for the OI Americas meeting. The session was entitled “Caribbean Sea and Gulf of Mexico regional GOOS Symposium”, and took place on April 5. In addition there were three IOCARIBE-GOOS talks on April 4th. The full programme including the talks on both days was as follows:

April 4:

- IOCARIBE-GOOS, a Regional Ocean Observing System for the Caribbean Sea and Gulf of Mexico (Doug Wilson);
- National Capability in Marine Topics of Relevance to IOCARIBE-GOOS: the Venezuelan Case (Ruben Aparicio);
- Cuba: Towards a More Integrated Management of Marine and Coastal Resources (Guillermo Garcia).

April 5:

- IOCARIBE-GOOS Strategic Plan Introduction (Guillermo Garcia and Doug Wilson);
- The Coastal Components of the Ocean Observing System (Tom Malone);
- National IOCARIBE-GOOS: Venezuela (Ruben Aparicio);
- National GOOS: Cuba (Roberto Perez);
- Development of an Ocean Observing System for the Gulf of Mexico (Worth Nowlin);
- IOCARIBE Observation Needs: The Value of Remote-Sensing in Integrating Regional Assessments (Frank Muller-Karger);
- Drifting Buoys in the Caribbean Sea and the Gulf of Mexico (Doug Wilson);
- Regional High Frequency Radar Applications (Jack Harlan);
- Numerical Ocean Modelling for IOCARIBE-GOOS (Julio Sheinbaum);
- Health of the Ocean Problems and Solutions (Tony Knap);
- Sea-level and Temperature in IOCARIBE Regional Global Ocean Observing System (George Maul);
- Key Issues for the Protection and Sustainable Use of the Coral Reefs of Cuba and the Wider Caribbean (Pedro Alcolado);
- Caribbean and Gulf of Mexico Climate and Storms (Chris Mooers and Chris Landsea);
- Oceanographic Information for Fisheries in the Small Caribbean States (Robin Mahon);
- IOCARIBE-GOOS: Social, Cultural and Economic Relationships (Bob Bowen);

As agreed at the Havana meeting, it is intended to publish the papers from this meeting in an appropriate journal.

Action 37: Doug Wilson and Guillermo Garcia to arrange publication of the IOCARIBE-GOOS papers from OI Americas.

The session was very well attended by up to 70 people, and generated some stimulating discussion. Clearly there are many existing foundations on which to build a successful IOCARIBE-GOOS.

4.1 SEAKEEPERS PROGRAMME

In addition to the papers given above, Tom Houston was invited to give a presentation on the work of the International SeaKeepers Society. This is a non-profit Society, which works to protect the ocean by equipping luxury yachts and other vessels and platforms around the world with sophisticated ocean and atmosphere monitors. The monitors gather data and transmit it by satellite to the international scientific community (e.g. physical data goes via the WMO's Global Telecommunications System – GTS- to appropriate operational centres). The monitors collect data on meteorological conditions, sea surface temperature, salinity, pH, oxygen (redox levels), ocean colour (dissolved organic matter), water clarity (turbidity) and phytoplankton (chlorophyll) levels; they can also measure a suite of heavy metals if required. Many of the luxury yachts spend a lot of time in the Caribbean. In addition some luxury cruise ships that operate in the Caribbean have been equipped with the monitors. One of them also has a NOAA suite of sensors aboard, including an ADCP. In the future, buoys and piers will be equipped (e.g., through an “adopt-

a-buoy” programme). Thus SeaKeepers activities hold out the promise of increasing the monitoring network in Caribbean waters. The WMO and the IOC have already given their blessing to the SeaKeepers programme, which is regarded as an addition to the VOS and SOOP programmes of JCOMM.

4.2 POST SESSION DISCUSSION

In the post-session discussion the Advisory Group welcomed the participation and the wise advice of Patricio Bernal, Executive Secretary of the IOC. The Advisory Group noted that most of the contributions had concerned science-push rather than user-pull. Clearly there is a need to engage the user community to ensure that an appropriate set of products guides the development of the observing system. As noted in section 6.1 of the report of the second session of the Coastal GOOS Panel (Curitiba, November 1998), once the key issues have been identified (such as preserving and restoring healthy ecosystem, or managing resources for sustainable use, or mitigating coastal hazards, or safe and efficient marine operations, the subsequent steps are: (i) defining (with users) the final product (which could be a prediction, among other things); (ii) identifying the numerical or conceptual models needed to operate on the data to obtain the desired result; (iii) determining the model variables (i.e., what the model will predict); (iv) determining the model inputs (the observations needed to make the predictions). The rule is to start with the product and then work backwards to find out what observing system is required to get it. Determining the user needs, and specifying the data and products required to satisfy these needs is the first step in the exercise.

The Group recognized that many countries in the region had done some kind of user survey. One of the tasks of the Steering Committee would be to extract that information and integrate it to produce a picture of regional needs as a first step in determining what IOCARIBE-GOOS should do. A mechanism is needed to obtain user input and convert it into action. Such a mechanism is needed to convince governments and other stakeholders of the potential benefits of investing in IOCARIBE-GOOS. Nevertheless it was recognized that IOCARIBE-GOOS will likely not be responsible for ALL operational oceanography in the region. Many other activities will go on in parallel that are different but complementary.

Action 38: Colin Summerhayes and Artemio Gallegos to expand the Chapter 5 (Users Needs) to address the question of finding out what users want, and to provide advice on how that information should be built into the strategic plan and the implementation plan.

The Advisory Group agreed that the major goal of IOCARIBE-GOOS should be to create a collective effort among the nations of the Caribbean to enable the development of operational oceanography on national and regional scales, with a long-term permanent observing system being used to address societal issues for the benefit of a wide user community. This is an evolutionary process in which we are starting to build capability and credibility. Some individual nations in the region have already begun moving along this path, but even those that are most advanced along it, like the USA, have difficulty in bringing together all the stakeholders so as to achieve an integrated approach to designing and implementing an ocean observing system.

Dr. Bernal suggested that the builders of IOCARIBE-GOOS should take heart from the success of the equivalent body in the Baltic (the Baltic Operational Oceanographic System, or BOOS), where the configuration of water bodies and countries is somewhat similar to that in the Caribbean. Product delivery from the integrated Baltic system benefits all countries, as could product delivery from an integrated Caribbean/Gulf of Mexico system.

Dr. Bernal noted that the community was building up, spurred on by the efforts of the Advisory Group, which, in effect, is providing the de facto leadership of a new network. Success would not happen overnight. It had taken some years for the Baltic system to evolve to its present successful level. However, in that region, individual nations had now agreed to put their faith in a collective forecasting system – implying a high level of trust. A similar shared institutional response would be well suited to the Caribbean environment. Delivering initial success by means of a relatively easily achievable pilot demonstrator project was considered the ideal initial approach.

The Advisory Group thanked Doug and his team for the hard work they had put in to making this meeting a success, including their efforts to fund the speakers.

5. REVIEW OF ACTIONS FROM HAVANA MEETING

Most of the actions from the Havana meeting had been completed or are ongoing. Action is still outstanding against some of those listed in section 12 of the report of the Havana meeting. Reconsideration of these items led to several new actions, as shown below. Some items had proved impossible to implement, like recruiting a Colombian member to the Group (Havana Action VII. 42).

With regard to Havana Action VII. 40, the regional meteorological office for WMO region 4 is located in Trinidad. With regard to Havana Action VII.39, discussions at MarCUBA 2000 about the possibilities of instrumenting Voluntary Observing Ships, making oceanographic measurements with XBTs to improve hurricane and climate forecasting, came to naught.

Action 39: (modified from Havana Action I.1 and III.19): (i) Trinidad and Tobago and Costa Rica to work to bring national meteorological agencies into the IOCARIBE-GOOS community; (ii) GPO to work with Peter Dexter to contact Caribbean meteorological agencies as the basis for engaging them in IOCARIBE-GOOS.

With regard to Havana Action II.10, the strategic plan will provide the means of advising IOCARIBE Member States on the formation of national GOOS co-ordinating committees (see Action 47, below).

With regard to Havana Action III.17 (iii), the Cartagena Convention is not considering including a new protocol on Biodiversity, which appears to be covered by its present set of protocols.

Action 40: (modified from Havana Action III.17 (i) and (ii): GPO to continue to work with Nelson Andrade (UNEP) to consider how IOCARIBE-GOOS may be designed to provide data and information in support of the Cartagena Convention, and to find out what data are being collected for the Cartagena Convention, and where.

Action 41: (modified from Havana Action III.26): GPO to continue to work with Paul Geerders by e-mail to discuss developing GODAR in the IOCARIBE-GOOS context.

Action 42: (modified from Havana Action III.29): Alan Duncan will send the Havana report to IOCARIBE Officers to inform them about the modifications to the Terms of Reference of the Advisory Group.

Action 43: (modified from Havana Action IV.30): Ruben Aparicio will inform the GPO about the national Venezuelan GOOS group after his meeting in April with the relevant people.

Action 44: (modified from Havana Action VI.38): Gletys Guardia-Montoya will send out the Technology Questionnaire developed by Antonio Rowe.

Action 45: (modified from Havana Actions VIII. 43, 46, and 47 and Havana Action VII.39): The two Co-chairs will (i) consider the need for and possible locations of high density SOOP lines in the Caribbean; (ii) consider encouraging joint proposals between oceanographers and meteorologists to resource combined VOS/SOOP lines; (iii) consider developing a pilot project to instrument present VOS with XBTs; and (iv) compile a comprehensive ship route map for the Caribbean, using data from NOAA, IMO and other sources as the basis for creating a SOOP/VOS programme for IOCARIBE-GOOS.

Action 46: GPO to circulate draft report to participants.

Action 47: Co-Chairs to present the IOCARIBE-GOOS strategic plan to IOCARIBE.

6. OTHER BUSINESS

The draft report of the meeting will be circulated to Advisory Group members for comment.

7. ADOPTION OF THE REPORT

The action list was approved by the group during the meeting, and the report was approved later by the group through e-mail contact.

8. DATE AND PLACE FOR THE NEXT MEETING

The next meeting of the Advisory Group will be in association with the next meeting of IOCARIBE, at which time the necessity for continuation of the activities of the Advisory Group in support of the goals of the Steering Group for IOCARIBE-GOOS will be examined, and the Advisory Group co-chairs will formally present the strategic plan to IOCARIBE.

9. CLOSURE

The meeting closed at (20:00 hours on Thursday April 5th), with the Co-Chairs thanking participants for their hard work during the session.

10. LIST OF ACTIONS

I. All Members

1. to suggest additional names for the editorial board;
2. to provide revised versions of their chapters to Gletys Guardia-Montoya by end April;
3. to provide Ruben Aparicio with information about user needs for tsunami warnings in the IOCARIBE region;
4. to consider the revision to chapter 5, and think about what scenarios and products should be added that are particularly relevant to the IOCARIBE region;
5. to provide feedback by end April, for Antonio Rowe to finalize the revision to Chapter 9;
6. to supply lists of national contacts to Gletys Guardia-Montoya for the questionnaire;
7. Trinidad and Tobago and Costa Rica to work to bring national meteorological agencies into the IOCARIBE-GOOS community.

II. Co-Chairs (with or without GPO)

8. with GPO to involve Dr. Toro in the further development of the strategic plan;
9. with GPO to incorporate feedback comments as appropriate, and produce Version 2, including Foreword and Executive Summary, by end May;
10. with GPO to circulate the document to the Advisory Group and the review group in mid May for comment by end June, to incorporate the comments and finalize the draft by end July, to check it with the Advisory Group by mid August, and to submit it to the GPO by end August for publication;
11. to draft a proposal for a regional workshop on pilot projects, in consultation with the GPO and the IOCARIBE Office, and to begin to solicit funding for the meeting;
12. to arrange publication of the IOCARIBE-GOOS papers from OI Americas;
13. to (i) consider the need for and possible locations of high density SOOP lines in the Caribbean; (ii) consider encouraging joint proposals between oceanographers and meteorologists to resource combined VOS/SOOP lines; (iii) consider developing a pilot project to instrument present VOS with XBTs; and (iv) compile a comprehensive ship route map for the Caribbean, using data from NOAA, IMO and other sources as the basis for creating a SOOP/VOS programme for IOCARIBE-GOOS;
14. to present the IOCARIBE-GOOS strategic plan to IOCARIBE.

III. GPO

15. to give a copy of the Havana report to Cesar Toro, and introduce him to the Advisory Group;
16. to work with the WMO and UNEP Secretariats to see that the IOCARIBE-GOOS documents reached WMO and UNEP focal points;
17. to pass a request to the 7th meeting of GLOSS, in Honolulu (April 2001), for an appropriate training course to be held soon in the Caribbean;
18. to provide these documents on BOOS, NOOS, US-IOOS, and MFSP to the Members of the Advisory Group;
19. to send the GOOS Data and Information Management Plan to Doug Wilson for him to use as the basis for a rewrite of Chapter 6;
20. to work with Hazel McShine on a rewrite of the regional Policy section;
21. to work with Antonio Rowe to incorporate appropriate material from the GOOS Capacity Building Implementation Strategy;
22. to work with Artemio Gallegos to expand the Chapter 5 (Users Needs) to address the question of finding out what users want, and to provide advice on how that information should be built into the strategic plan and the implementation plan;
23. to work with Peter Dexter to contact Caribbean meteorological agencies as the basis for engaging them in IOCARIBE-GOOS;
24. to continue to work with Nelson Andrade (UNEP) to consider how IOCARIBE-GOOS may be designed to provide data and information in support of the Cartagena Convention, and to find out what data are being collected for the Cartagena Convention, and where;
25. to continue to work with Paul Geerders by e-mail to discuss developing GODAR in the IOCARIBE-GOOS context;
26. to provide an initial revision of Chapter 2 consistent with the approach in the GOOS Strategic Plan, then to rewrite the chapter with Ruben Aparicio;
27. to provide an initial revision of Chapter 5 incorporating User Scenarios and Products, then to rewrite the chapter with Artemio Gallegos;
28. to circulate draft report to participants.

IV. Ruben Aparicio

29. to inform the GPO about the national Venezuelan GOOS group after his meeting in April with the relevant people.

V. Gletys Guardia-Montoya

30. to combine the revised chapters to form Version 1 of the document, and to circulate it to the Advisory Group for comment (1st week in May);
31. to provide members and Director GPO with copies of the text of the Technology Chapter before end April;
32. to sort the list by country and supply it to Advisory Group Members;
33. to put the questionnaire onto the IOCARIBE-GOOS web site; to send an e-mail reminder, with a deadline for response; and to ask IOCARIBE focal points to help to get responses;
34. to send out the Technology Questionnaire developed by Antonio Rowe;
35. to copy Dr. Swamy's report to participants.

VI. Antonio Rowe

36. to incorporate in Chapter 8 the section on needs identified by the 1st GOOS Users' Forum;
37. to revise Chapter 8.

VII. Guillermo Garcia

- 38. to provide data on Hurricane Gilbert for Chapter 2;
- 39. to provide text on NGCCs to Hazel McShine;
- 40. to provide Antonio Rowe with IOCARIBE-TEMA document;
- 41. to provide an initial revision of Chapter 10 consistent with the approach in the GOOS Strategic Plan, and then to rewrite chapter 10 jointly with Ruben Aparicio;
- 42. to revise Chapter 1.

VIII. Doug Wilson

- 43. to rewrite Chapter 3, with reference to the US Integrated Ocean Observing System and the Intra-American Seas Initiative as appropriate;
- 44. to supply the GLOSS list of contacts to Gletys Guardia-Montoya;
- 45. to consider an extension to the contract, and to check on the possibility of funding it;
- 46. to ask George Maul to insert information about tsunamis throughout the report.

IX. Artemio Gallegos

- 47. to rewrite Chapter 4.

X. Alan Duncan

- 48. to provide a complete map of the IOCARIBE region, including the appropriate parts of northern Brazil;
- 49. to provide the formal written description of the IOCARIBE region;
- 50. to send the Havana report to IOCARIBE Officers to inform them about the modifications to the Terms of Reference of the Advisory Group.

XI. Alejandro Gutiérrez

- 51. to send a document to Hazel McAshine for her to draw on in rewriting the User Needs section, and to Antonio Rowe for him to draw on in addressing capacity building needs.

XII. Hazel McShine

- 52. to revise Chapter 7.

ANNEX I

AGENDA

- 1. OPENING**
- 2. ADMINISTRATIVE ARRANGEMENTS**
 - 2.1 ADOPTION OF THE AGENDA
 - 2.2 DESIGNATION OF THE RAPPORTEUR
 - 2.3 CONDUCT OF THE SESSION, TIMETABLE, AND DOCUMENTATION
- 3. DRAFT STRATEGIC PLAN FOR IOCARIBE-GOOS**
 - 3.1 THE CASE FOR IOCARIBE-GOOS
 - Group discussion of draft; comments & editing;
 - Provide reference list for each chapter to indicate comprehensive coverage;
 - Complete final document after April meeting feedback, by end June 2001, for I-GOOS and IOC Assembly.
 - 3.2 PILOT PROGRAMMES
 - New proposals for pilot programmes;
 - Discussion of pilot programmes.
 - 3.3 QUESTIONNAIRE
 - Discussion and preliminary results.
 - 3.4 OTHER ELEMENTS OF THE CASE FOR IOCARIBE-GOOS
 - IOCARIBE National GOOS status reports
- 4. OCEANOLOGY INTERNATIONAL AMERICAS STATUS REPORT**
 - Review of the proposed speakers programme and related activities in OI Americas;
 - Arrange for draft strategic plan to be copied and distributed at Miami IOCARIBE-GOOS session;
 - Arrange for the full set of papers from the IOCARIBE-GOOS session to be published in an appropriate journal (e.g. *Caribbean Jl. Mar. Sci.*) or by NOAA.
- 5. REVIEW OF ACTIONS FROM HAVANA MEETING**
- 6. IOCARIBE NATIONAL (OI) GOOS STATUS REPORTS**
- 7. OTHER BUSINESS**

Break for OI Americas Meeting 3-4 April

IOCARIBE GOOS Special Session 5 April, 0830-1630

Reconvene pm April 5, Riande Continental Hotel
- 8. OI DISCUSSION (AG AND ANY SPEAKERS THAT WISH TO ATTEND)**
- 9. FUTURE ACTIONS REQUIRED**
- 10. ADOPTION OF THE REPORT**
- 11. DATE AND PLACE OF THE NEXT MEETING**

ANNEX II

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ANNEX III

LIST OF ACRONYMS

ADCP	Acoustic Doppler Current Profiler
ALICMAR	Latin American Association of Marine Scientists
AOML	Atlantic Oceanographic and Meteorological Laboratory
Argo	Global Array of Profiling Floats (not an acronym)
BOOS	Baltic Operational Oceanographic System
COOP	Coastal Ocean Observations Panel
EEZ	Exclusive Economic Zone
EuroGOOS	European GOOS
GCRMN	Global Coral Reef Monitoring Network
GLOSS	Global Sea-level Observing System
GODAE	Global Ocean Data Assimilation Experiment
GODAR	Global Ocean Data Archaeology and Rescue
GOOS	Global Ocean Observing System
GPO	GOOS Project Office
HOTO	Health of the Oceans
I-GOOS	Intergovernmental Committee for GOOS
IGOS	Integrated Global Observing Strategy
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOCARIBE-GOOS	IOC Sub-Commission for the Caribbean and Adjacent Regions GOOS
IODE	International Oceanographic Data and Information Exchange
IOOS	Integrated Ocean Observing System
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
J-DIMP	Joint GOOS-GCOS-GTOS Data and Information Management Panel
MarCUBA	5 th Congress on Marine Sciences, Cuba (December 2000, Havana)
MedGOOS	Mediterranean GOOS
NEAR-GOOS	N.E. Asian Region GOOS
NGCC	National GOOS Co-ordinating Committee
NOAA	National Oceanic and Atmospheric Administration (USA)
NOC	National Oceanographic Committees
NOPP	National Oceanographic Partnership Programme
NOOS	Northwest shelf Operational Oceanographic System
OI	Oceanology International
OOPC	Ocean Observations Panel for Climate
PIRATA	Pilot Research Array in the Tropical Atlantic
RAMP	Rapid Assessment of Marine Pollution
RONMAC	Red de Observacion del Nivel del Mar para America Central [Water Level Observation Network for Latin America (NOAA and partners)]
SOOP	Ship of Opportunity Programme
TAO	Tropical Atmosphere Ocean Array
TEMA	Training, Education and Mutual Assistance Programme
TOS	The Oceanography Society
UN	United Nations
UNEP	United Nations Environment Programme
VOS	Voluntary Observing Ship
WIOMAP	Western Indian Ocean Marine Applications Project
WMO	World Meteorological Organization
XBT	Expendable Bathythermograph