

WORLD METEOROLOGICAL ORGANIZATION

**INTERGOVERNMENTAL OCEANOGRAPHIC
COMMISSION (OF UNESCO)**

DATA BUOY COOPERATION PANEL

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TWENTY-SEVENTH SESSION

ITEM: 1.3

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REPORT ON DECISIONS OF WMO AND IOC EXECUTIVE BODIES

(Submitted by the Secretariat)

Summary and purpose of the document

This document provides information on the results of the IOC Twenty-Sixth Assembly and WMO Sixteenth Congress that were held during the intersessional period, with highlights decisions and issues relevant to the Panel.

ACTION PROPOSED

The Panel will review the information contained in this report and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

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- Appendices:**
- A. WMO and IOC Resolution on Data Buoy Vandalism
 - B. Resolution XXVI-8 – Strengthening and Streamlining GOOS
 - C. WMO Polar Activities
 - D. IOC Resolution XXVI-7 – Global Coordination of Early Warning and Mitigation Systems for Tsunami and other Sea-Level-Related Hazards

-A- DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

11.3.1 Twenty-Sixth Session of the IOC Exec Assembly

11.3.1 The IOC Secretariat representative reported on the outcome of the Twenty-Sixth session of the IOC Assembly (Paris, France, 22 June – 5 July 2011)¹. In particular, the Panel noted the following decisions of the IOC Assembly and urged its members to take them into account when developing their activities in support of the Panel (**action; Panel members; ongoing**):

- (i) Recognition of the problem of vandalism on data buoys, and adoption of Resolution XXVI-6 - Data Buoy Vandalism: Incidence, Impact and Responses;
- (ii) The need to free up and streamline the timely exchange of data, to identify gaps in the existing observation, processing and dissemination networks, and to undertake routine performance assessments regarding Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related Hazards. The Assembly adopted Resolution XXVI-7 - Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related Hazards;
- (iii) Strengthening and Streamlining GOOS through Resolution through Resolution XXVI-8. S. This will effectively replace the Intergovernmental Committee for GOOS (I-GOOS), the GOOS Scientific Steering Committee and subsidiary bodies by a single GOOS Steering Committee from 1 January 2012;
- (iv) Through Resolution XXVI-9 – Designation of IOC-WMO Regional Marine Instrument Centres, the Assembly approved the designation process for IOC-WMO Regional Marine Instrument Centres (RMICs), and established two RMICs in Tianjin, China, and Mississippi, USA.

11.3.2 Sixteenth WMO Congress

11.3.2.1 The WMO Secretariat representative reported on the outcome of the sixteenth Session of the WMO Congress (Cg-XVI, Geneva, Switzerland, 16 May - 3 June 2011)². In particular, the Panel noted the following decisions of the WMO Sixteenth Congress and urged its members to take them into account when developing their activities in support of the Panel (**action; Panel members; ongoing**):

- (v) Support to ongoing JCOMM priority activities. See agenda item 11.2 for the Panel's discussion in this regard.
- (vi) The need to address the requirements of the Global Framework for Climate Services (GFCS),
- (vii) The need to develop Capacities of Members through the JCOMM Partnership for New GEOSS Applications Concept (PANGEA). See agenda item 6.4 for the Panel's discussion in this regard.
- (viii) Implementation of WIGOS during the next financial period (2012-2015). See agenda item 11.5 for the Panel's discussion in this regard.
- (ix) The need to develop the new Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP), taking into account the Vision for the GOS in 2025, WIGOS and GFCS, to guide Members in the implementation of their national observational programmes. See agenda item 11.4 for the Panel's discussion in this regard.
- (x) The development of WMO Polar Activities, including the development of the Global Cryosphere Watch (GCW), the establishment of the new Antarctic Observing Network (AntON), and the new Global Integrated Polar Prediction System (GIPPS), as well as the support to the International Polar Decade (IPD) Initiative.
- (xi) Support to the establishment of an international forum of users of satellite data telecommunication systems. This issue is further discussed under agenda item 11.5

1: http://www.jcomm.info/index.php?option=com_oe&task=viewEventRecord&eventID=523

2: http://www.wmo.int/pages/mediacentre/press_releases/pr_920_en.html

(WIGOS).

- (xii) Concerns expressed about data buoy vandalism, and adoption of Resolution 4.4/2 (Cg-XVI). See agenda item 9.4 for the Panel's discussion in this regard.

11.3.2.2 The Panel agreed that it should continue to be involved in Capacity Building activities, including through the regular organization of PANGEA workshops while noting that the success of such workshops was heavily depending on voluntary contributions from developed countries through the WMO Voluntary Cooperation Programme (VCP).

11.3.2.3 The Panel noted Cg-XVI request to the Secretary-General to facilitate a systematic survey of marine meteorological and oceanographic observations to assess the strength and weaknesses of Member countries thus allowing interested Members to provide targeted assistance to those in need. The Panel agreed that JCOMMOPS could contribute to this exercise and requested the Technical Coordinator to investigate how this could be realized in the view to make a proposal at the next Panel Session (**action; TC DBCP; DBCP-28**).

11.3.2.4 The Panel agreed that it should continue to contribute to the development of WIGOS by providing assistance, as required, on (i) instrument standards and practices issues, (ii) data and instrument/platform metadata exchange, and (iii) quality management issues.

- B - BACKGROUND INFORMATION

1. Twenty-Sixth Session of the Intergovernmental Oceanographic Commission of UNESCO (IOC) Assembly

1.1 The Twenty-sixth session of the IOC Assembly was held in Paris, France, from 22 June to 5 July 2011. Data buoy issues arose a number of times, particularly with regard to the vandalism problem. The Assembly also discussed a number of other matters of which the Panel should be aware.

Data Buoy Vandalism: Incidence, Impact and Responses

1.2 As part of its discussion of High Level Objective 1 (HLO 1), Prevention and Reduction of the Impacts of Natural Hazards, the Assembly took careful note of the DBCP/ITP analysis of vandalism issues (DBCP Technical Document No 41), as a result of which significant fractions of the moored buoy network may be out of action at any given time. The Assembly recognized the importance of the affected platforms in serving many different applications, from disaster warning to climate study, and asked member states to implement a range of measures, from education to vandalism-resistant design, to help improve the integrity of the networks. In this context, it also recognized the opportunities being afforded by possible next generation submarine telecommunication cables as vehicles for environmental monitoring and disaster warning. Finally, it adopted a resolution (XXVI-6) to promote action with regard to vandalism, and undertook to present the DBCP/ITP paper at the UN General Assembly in order to heighten awareness of the problem and stimulate a response at the highest level. Resolution XXVI-6 - Data Buoy Vandalism: Incidence, Impact and Responses - is attached within Appendix A.

Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related Hazards

1.3 Further discussion under HLO1 was devoted to the need to free up and streamline the timely exchange of data, to identify gaps in the existing observation, processing and dissemination networks, and to undertake routine performance assessments. This latter action was addressed to JCOMM, but in due course will devolve to the DBCP and the ITP. Resolution XXVI-7 - Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related

Hazards - can be found at Appendix D.

Strengthening and Streamlining GOOS

1.4 In response to growing concerns about the effectiveness of the GOOS governance structure, and to the emergence of new ideas about how to structure ocean observation as a result of the post-OceanObs09 Task Team on an Integrated Framework for Sustained Ocean Observation, the Assembly adopted a resolution that will effectively replace the Intergovernmental Committee for GOOS (I-GOOS), the GOOS Scientific Steering Committee and subsidiary bodies by a single GOOS Steering Committee from 1 January 2012. Resolution XXVI-8 – Strengthening and Streamlining GOOS – is attached as Appendix B.

Designation of IOC-WMO Regional Marine Instrument Centres

1.5 Through Resolution XXVI-9 – Designation of IOC-WMO Regional Marine Instrument Centres, the IOC Assembly approved the process proposed by JCOMM for the designation of new RMICs, and established two RMICs in Tianjin, China, for the Asia Pacific Region, and Mississippi, USA for the WMO Regional Association IV. See also agenda item 11.5 (WIGOS) for further details on RMICs.

2. Sixteenth World Meteorological Organization (WMO) Congress

2.1 The sixteenth WMO Congress (Cg-XVI) was held in Geneva, Switzerland, from 16 May to 3 June 2011. The following decisions of Cg-XVI are of particular interest to the Panel.

Marine Meteorology and Oceanography Programme (MMOP)

2.2 Cg-XVI emphasized the importance of the Marine Meteorology and Oceanography Programme (MMOP), implemented through the work of JCOMM, which is structured into three Programme Areas and a number of cross-cutting activities, aimed at improving overall marine and ocean service delivery capacities of Members. It noted the long-term objectives of MMOP, including its traditional activities for Maritime Safety Services, as well as the new priorities in the implementation of an integrated marine meteorological and oceanographic observing and data management system. Cg.XVI adopted Resolution 4.4/1 (Cg-XVI) – Marine Meteorology and Oceanography Programme.

2.3 Taking into account the work achieved or underway, Cg-XVI noted and supported the ongoing priority areas for JCOMM, as detailed in the Strategic and Operating Plans:

- (a) To enhance support for the WMO Integrated Global Observing System (WIGOS), through continuing implementation of the initial ocean observing system – both in situ and remote sensing - specified by the Global Climate Observing System (GCOS) and endorsed by the OceanObs09;
- (b) To develop standards/best practices in the marine community through the IODE-JCOMM Standards Process, as well as update of the related manuals, guides, and catalogues, in support of the WMO Information System (WIS);
- (c) To extend marine services for: (1) safety-related marine meteorological services, including provision of sea state and sea ice in MSI; (2) coastal storm surge and inundation forecasting in response to increased risks associated with global climate change; and (3) operational ocean forecasting with clear definition of operational ocean observation requirements; and also to develop a range of marine and ocean climate services in support of the Global Framework for Climate Services;

- (d) To continue support for capacity building through education, training and technology transfer, implemented through all Programme Areas.

WMO Integrated Global Observing System (WIGOS)

2.4 Cg-XVI decided to implement WIGOS through Resolution 11.3/1 (Cg-XVI) "Implementation of the WMO Integrated Global Observing System (WIGOS)". Through Resolution 3.1.4/3 (Cg-XVI), congress also approved the process proposed by JCOMM for the designation of new RMICs, and established two RMICs in Tianjin, China, for the Asia Pacific Region, and Mississippi, USA for the WMO Regional Association IV. Issues relevant to WIGOS are discussed in document 11.5.

Global Observing System (GOS)

2.5 Cg-XVI recognized that the World Weather Watch (WWW) continues to be the "core" operational infrastructure facility for all WMO Programmes as well as for many international programmes of other agencies. It reaffirmed that the WWW Programme, with the evolving development of its observing, information and data-processing and forecasting components, continues to be the backbone Programme of WMO that not only accomplishes its goals through the coordinated efforts of Members, but also directly contributes to cross-cutting activities. Cg-XVI agreed that the WWW should provide a fundamental contribution to all WMO priority areas, namely, the GFCS, Disaster Risk Reduction, the WIGOS, the WIS, Capacity Building and Aeronautical Meteorology, and considered updated description of the WWW Programme. Cg-XVI stressed the need to ensure that support for the WWW Programme reflects the highest priority attributed to that Programme and is sufficient to carry out its important activities in order to fulfil and sustain the core activities of the Organization. It agreed on the purpose, scope and main long-term objectives of the WWW and adopted Resolution 3.1/1 (Cg-XVI) "World Weather Watch Programme for 2012-2015".

2.6 Cg-XVI reaffirmed that the Global Observing System (GOS) should continue its fundamental mission in providing, through coordinated efforts of Members, timely, reliable and consistent meteorological data to meet the national, regional and global requirements. It emphasized that GOS would become one of the core components of the WIGOS and that implementation of WIGOS would build upon and add value to it in fulfilling requirements of WMO and WMO co-sponsored Programmes in an effective and efficient way. In view of the growing significance of the GOS operations, Congress adopted Resolution 3.1.1/1 (Cg-XVI). Cg-XVI defined the purpose and scope of the Global Observing System (GOS) as following:

- (a) The GOS provides, from the Earth and from outer space, observations of the state of the atmosphere and ocean surface for the preparation of weather analyses, forecasts, advisories and warnings, and for climate and environmental studies and activities carried out under programmes implemented by WMO and by other relevant international organizations. It is operated by National Meteorological Services (NMSs), national or international satellite agencies, and involves several consortia³ dealing with specific observing systems or specific geographic regions;
- (b) GOS systematically evolves, through the RRR process, into a composite cost-effective system with its subsystems providing interoperable data and information based on the agreed upon standard practices. GOS is services driven observing system in support of the NMSs mandates;
- (c) GOS put special emphasis on meeting the requirements of monitoring the climate and the environment, in collaboration with partner organizations, to improve understanding of climate processes and to enable increasingly beneficial climate and environmental studies and services;
- (d) Areas of emphasis in the implementation of GOS may differ in individual countries, but common standards, cost-effectiveness, data interoperability, long-term sustainability and

3: Examples are EUMETNET, AMDAR, ASAP, DBCP, EUMETSAT

innovative collaborative arrangements among Members are the key aspects of the future design and operation of the observing networks.

2.7 Cg-XVI requested the Commission for Basic Systems:

- (e) To develop the new Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP), taking into account the Vision for the GOS in 2025, WIGOS and GFCS, to guide Members in the implementation of their national observational programmes;
- (f) To pursue its leading role in the technical planning and development of the GOS in close collaboration with relevant technical commissions in support of all WMO and related international Programmes and initiatives;
- (g) To assist Members and regional associations in continued evolution of the global observing systems;
- (h) To develop a mechanism to assess the performance of OSEs and OSSEs undertaken by Member countries and to communicate the benefits earned thereby, to other Member countries.

Global Framework for Climate Services (GFCS)

2.8 The Global Framework for Climate Services (GFCS) initiated by WCC-3⁴ is seeking to integrate climate observations, research, assessments and predictions in order to generate information and services required for factoring climate variability and change into socio-economic decision-making. This should in turn permit to boost climate adaptation, which is intended to bridge the gap between climate information providers and users.

2.9 An Intergovernmental Meeting for the High-level Taskforce on the Global Framework for Climate Services was held in Geneva from 11 to 12 January 2010, and provided Terms of Reference and membership for the High-Level Taskforce⁵ of the GFCS *inter alia* to (i) develop the components of GFCS and define the roles, responsibilities, and capabilities of the elements within the GFCS; (ii) develop options for governance of the GFCS, ensuring its intergovernmental nature, and provide a reasoning for the preferred option(s); and (c) outline a plan for the implementation of the GFCS.

2.10 Findings and recommendations from the High-Level Taskforce⁶ have been presented to Cg-XVI. Cg-XVI supported the general proposal of the Taskforce that the international community would make, consistent with its ability to do so, a significant investment in the implementation of the GFCS (Recommendation 1). Cg-XVI noted with interest the eight Principles provided in Recommendation 2, encouraging their use in the implementation of the Framework. Cg-XVI adopted Resolution 11.1/1 (Cg-XVI) – Response to the Report of the High-Level Taskforce on the Global Framework for Climate Services. Cg-XVI in particular decided to endorse the broad thrust of the High-level Taskforce's Report. It entrusted the WMO Executive Council with the responsibility of developing proposals, with the involvement of relevant stakeholders including other UN bodies, for consideration by an Extraordinary Session of the World Meteorological Congress with the participation of all relevant stakeholders including other UN bodies. These proposals to address the (i) development of the draft implementation plan for the GFCS; and (ii) establishment of the draft Terms of Reference and Rules of Procedure for the Intergovernmental Board and its substructures based on the draft implementation plan.

2.11 Cg-XVI requested the Secretary-General to organize an Extraordinary Session of the World Meteorological Congress in 2012 with participation of all relevant stakeholders including other UN bodies, to review and adopt the draft implementation plan for the GFCS for subsequent consideration by the Intergovernmental Board, and to adopt the Terms of Reference and Rules of

4: <http://www.wmo.int/wcc3>

5: http://www.wmo.int/hlt-gfcs/index_en.html

6: http://www.wmo.int/hlt-gfcs/downloads/HLT_book_full.pdf

Procedure of the Intergovernmental Board.

WMO Polar Activities

2.12 WMO Polar activities have been guided by the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS), which is an IPY Legacy. Cg-XVI agreed that WMO needs to continue to have a focus on polar observations, research and services to meet its responsibilities on regional and global weather, climate, water and related environmental matters, and adopted Res.11.9/4 (Cg-XVI) - WMO Polar Activities. EC-LXIII re-established EC-PORS to continue these activities. Cg-XVI adopted six resolutions related to polar observing networks or IPY legacy topics.

2.13 Cg-XVI supported the need to establish an observational framework for Polar Regions, including the "Third Pole" (Himalaya and Tibetan Plateau) that balances space-based observations with in situ measurements while developing a methodology to address new observational requirements, including the identification of key polar variables from both a research and services perspective. Cg-XVI agreed that operational and research observing networks in Polar Regions should be integrated within the framework of the WMO Integrated Observing System (WIGOS) and the WMO Information System (WIS), be enhanced to include cryosphere related variables, especially as related to the development of the Global Cryosphere Watch (GCW).

2.14 Cg-XVI supported the establishment of a Polar Space Task Group (PSTG) for coordinating, across research and operational agencies, the planning, processing and archiving of Earth observation data sets. EC-PORS will oversee these future developments.

2.15 More details on WMO Polar Activities including the new Antarctic Observing Network (AntON), the new Global Integrated Polar Prediction System (GIPPS), the International Polar Decade (IPD) Initiative, and the Global Cryosphere Watch (GCW) are provided in Appendix C.

International forum of users of satellite data telecommunication systems

2.16 Cg-XVI supported establishment of an international forum of users of satellite data telecommunication systems covering a wide user base, and to address remote data communication requirements - including tariff negotiations as needed - for automatic environment observing systems coordinated through WMO and partner organizations such as IOC and FAO. This issue is further discussed under agenda item 11.5 (WIGOS).

Data buoy vandalism

2.18 Cg-XVI expressed its concern about the significant occurrence of intentional or unintentional damage to platforms used for ocean observation and marine scientific research, such as moored buoys essential for climate monitoring and storm surge and tsunameters and tide gauges necessary for tsunami early warning. Cg-XVI noted UN General Assembly Resolutions 64/71 and 64/72, which expressed concern about the issue, and which called on Member States, UN bodies, and Regional Fishery Management Organizations to take appropriate action to protect such platforms, as well as similar actions to be undertaken in the coming 26th IOC Assembly session. It recognized with concern that the rate of damage was highest in the Indian Ocean, with over half the 36 tsunameters in the newly established Indian Ocean Tsunami Warning and Mitigation System and adjacent seas network suffering at least one damage event in the last four years, resulting in over 18 platform-years of data loss and gaps in early warning coverage across the region. Cg-XVI therefore urged Members to help promote understanding of the impacts of such vandalism, which seriously undermined efforts to establish national and regional ocean hazard warning systems, and to coordinate with relevant organizations to take necessary action. It adopted Resolution 4.4/2 (Cg-XVI) on the topic (Appendix A).

Capacity Building

2.19 Cg-XVI recognized the increased need for marine meteorological and other appropriate oceanographic observations to address the requirements of the Global Framework for Climate Services (GFCS), and urged Members to provide resources towards the further development of the global ocean observing system. It requested the Secretary-General to facilitate a systematic survey of marine meteorological and oceanographic observations to assess the strength and weaknesses of Member countries thus allowing interested Members to provide targeted assistance to those in need. Considering the substantial benefits expected for all parties in strengthening the partnership between developed countries and developing countries with regard to the implementation of the ocean observation systems, and the use of the collected data, Congress requested developed countries to consider providing support to capacity-building workshops and other technical capacity building activities related to ocean observation systems to be organized by JCOMM within the JCOMM Partnership for New GEOSS Applications Concept (PANGEA).

Appendices: 4

APPENDIX A

WMO AND IOC RESOLUTION ON DATA BUOY VANDALISM

1) WMO RESOLUTION 4.4/2 (CG-XVI)

Resolution 4.4/2 (Cg-XVI) - DATA BUOY VANDALISM: INCIDENCE, IMPACT AND RESPONSES

THE CONGRESS,

Noting:

- (1) UN General Assembly Resolutions on Oceans and Law of the Sea (A/Res/64/71, paragraph 172) and on Sustainable Fisheries (A/Res/64/72 paragraph 109) that urged States, appropriate UN agencies and relevant organizations to take necessary action and adopt measures to protect ocean data buoy systems and cooperate to address intentional and unintentional damage to platforms used for ocean observation and marine scientific research, such as moored buoys and tsunameters,
- (2) The *Abridged Final Report with Resolutions of the Sixty-second Session of the Executive Council* (WMO-No. 1059) which, inter alia, expressed concern about the significant occurrence of intentional or unintentional damage to ocean observing systems, and urged Members to help promote understanding of the impacts of such damage, that seriously undermine efforts to establish national and regional ocean hazard warning systems,
- (3) IOC Resolution XXV-13 on Global Coordination of Early Warning and Mitigation Systems for Tsunamis and other Sea-Level Related Hazards, which recognized the value of collecting and exchanging data and information, and which called for:
 - (a) An inventory and assessment of the problem of ocean observing platform vandalism globally,
 - (b) An assessment of the impacts of such vandalism, including on the functionality of tsunami warning systems,
 - (c) Information on the annual cost of ocean observing platform vandalism to Member States,
 - (d) Recommendations for IOC and Member State action,
- (4) The Data Buoy Cooperation Panel (DBCP) and International Tsunameter Partnership (ITP) Technical Document (TD) No. 41, Data Buoy Vandalism – Incidence, Impact and Responses,
- (5) Resolution 11.3/1 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System (WIGOS),

Acknowledging that:

- (1) Members and the global community increasingly rely on a rapidly expanding ocean observing network of critical infrastructure, necessary to detect storm surges and tsunamis and to improve understanding of weather, climate, and ecosystems,
- (2) Ocean data buoy networks are an integral component of a sustainable, integrated, and comprehensive global ocean observing system serving multiple applications, and have proved essential to provide timely and geographically-specific data for decision making,

- (3) Moored ocean buoy stations are especially susceptible to human-caused damage, which has resulted in extensive outages and data loss, often at critical times,

Recognizing that vandalism and damage to ocean observing networks takes many forms including from ship impacts, incidental damage, direct exploitation of moorings as fish aggregation devices, intentional damage, and theft,

Encouraged by:

- (1) Recent action of the Western and Central Pacific Fisheries Commission, the Inter-American Tropical Tuna Commission, and the Indian Ocean Tuna Commission to protect moored ocean observing systems including regional and local education and training;
- (2) The Regional Workshop on Establishing a Cooperative Mechanism for Protection of Met-ocean Data and Tsunami Buoys in the Northern Indian Ocean Region (May 2011), which had made important recommendations regarding possible new legal instruments on the topic;
- (3) The fourth meeting of the IOC Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-IV, Paris, March 2011), which, inter alia, proposed to the 26th IOC Assembly to adopt a resolution on the topic of vandalism of ocean data buoys and tsunameters;

Urges Members and **invites** relevant International and Intergovernmental Organizations:

- (1) To develop, in collaboration with educators and the global media, communication plans to raise awareness of the critical value of ocean observation, and to promote education and outreach, especially with recreational and commercial fishers, to broaden support of community stakeholders, enable proactive engagement at regional and local scales, and raise public literacy for ocean observing network-derived services and disaster risk reduction benefits;
- (2) To adopt additional strategies for the strengthening of ocean observing networks and systems and other damage prevention and mitigation practices, including the enhanced engineering of station and infrastructure design;
- (3) To work with the Food and Agricultural Organization (FAO) and regional fisheries management organizations and bodies, especially those with the competence to manage highly migratory fisheries, to educate and encourage stakeholders to adopt binding measures to prevent and minimize vandalism and damage to ocean observing networks and data systems;

Requests the Secretary-General and **invites** the Executive Secretary of UNESCO/IOC:

- (1) To promote collection of more consistent and systematic statistics on vandalism, to increase capture and exchange of damage records and performance measures for ocean observing networks, and to conduct comprehensive cost-benefit assessments and risk-value analyses taking into account life, health, social and economic impacts of vandalism and damage to ocean observing networks and data systems;
- (2) To encourage and assist, where appropriate, the development of specific regional efforts and solutions in addressing the vandalism of ocean data platforms;

- (3) To present the Report on Ocean Data Buoy Vandalism - Incidence, Impact and Responses, to the United Nations General Assembly, with a view to promoting an integrated UN approach to address this critical issue.

2) IOC RESOLUTION XXVI-6

IOC Resolution XXVI-6 - DATA BUOY VANDALISM: INCIDENCE, IMPACT AND RESPONSES

The Intergovernmental Oceanographic Commission,

Noting:

- (i) UN General Assembly Resolutions on Oceans and Law of the Sea (A/Res/64/71, paragraph 172) and on Sustainable Fisheries (A/Res/64/72, paragraph 109), which urged States, appropriate UN agencies and relevant organizations to take necessary action and adopt measures to protect ocean data buoy systems and cooperate to address intentional and unintentional damage to platforms used for ocean observation and marine scientific research, such as moored buoys and tsunameters,
- (ii) the *Abridged Final Report with Resolutions of the Sixty-second Session of the WMO Executive Council* (WMO-No. 1059) which, *inter alia*, expressed concern about the significant occurrence of intentional or unintentional damage to ocean observing systems, and urged Members to help promote understanding of the impacts of such damage, which seriously undermine efforts to establish national and regional ocean hazard warning systems,
- (iii) Resolution XXV-13 on Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related Hazards, which recognized the value of collecting and exchanging data and information, and which called for:
 - (a) an inventory and assessment of the problem of ocean observing platform vandalism globally
 - (b) an assessment of the impacts of such vandalism, including on the functionality of tsunami warning systems
 - (c) information on the annual cost of ocean observing platform vandalism to Member States
 - (d) recommendations for IOC and Member State action,
- (iv) the Data Buoy Cooperation Panel (DBCP) and the International Tsunameter Partnership (ITP) Technical Document (TD) No. 41, Data Buoy Vandalism – Incidence, Impact and Responses,
- (v) WMO Resolution 15 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System (WIGOS),
- (vi) WMO Resolution 25 (Cg-XVI) – Data Buoy Vandalism: Incidence, Impact and Responses,
- (vii) Resolution EC-XXXI.4, “Support of Efforts to Reduce Vandalism of Oceanographic Equipment at Sea”,

Acknowledging that:

- (i) Member States and the global community increasingly rely on a rapidly expanding ocean observing network of critical infrastructure, necessary to detect storm surges and tsunamis and to improve understanding of weather, climate, and ecosystems,
- (ii) ocean data buoy networks are an integral component of a sustainable, integrated, and comprehensive global ocean observing system serving multiple applications, and have proved essential to provide timely and geographically specific data for decision making,

- (iii) moored ocean buoy stations are especially susceptible to human-caused damage, which has resulted in extensive outages and data loss, often at critical times,

Recognizing that vandalism and damage to ocean observing networks take many forms including from ship impacts, incidental damage, direct exploitation of moorings as fish aggregation devices, intentional damage, and theft,

Encouraged by:

- (i) recent action of the Western and Central Pacific Fisheries Commission, the Inter-American Tropical Tuna Commission and the Indian Ocean Tuna Commission to protect moored ocean observing systems, including through regional and local education and training,
- (ii) the Regional Workshop on Establishing a Cooperative Mechanism for Protection of Met-ocean Data and Tsunami Buoys in the Northern Indian Ocean Region (Chennai, India, May 2011), which made important recommendations regarding possible new legal instruments on the topic,
- (iii) the fourth meeting of the IOC Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-IV, Paris, 21–22 March 2011), which, *inter alia*, proposed to the IOC Assembly at its 26th Session to adopt a resolution on the topic of vandalism of ocean data buoys and associated underwater instrumentation,

Urges Member States and **invites** relevant international and intergovernmental organizations:

- (i) to develop, in collaboration with educators and the global media, communication plans to raise public awareness of the critical value of the services provided by ocean observation networks and warning systems, and of the related disaster risk-reduction benefits; promote education and outreach, especially to recreational, artisanal, and commercial fishers; broaden support of community stakeholders, and enable proactive engagement at regional and local scales;
- (ii) to adopt strategies for the strengthening of ocean observing networks and systems and other damage prevention and mitigation practices, including the enhanced engineering of station and infrastructure design;
- (iii) to work with the Food and Agricultural Organization of the United Nations (FAO) and regional fisheries management organizations and bodies, as appropriate, especially those with the competence to manage highly migratory species, to educate and encourage stakeholders to adopt binding measures to prevent and minimize vandalism and damage to ocean observing networks and data systems;

Requests the Executive Secretary and **invites** the Secretary-General of WMO:

- (i) to promote the collection of more consistent and systematic statistics on vandalism;
- (ii) to increase capture and exchange of damage records and performance measures for ocean observing networks;
- (iii) to conduct comprehensive cost-benefit assessments and risk-value analyses taking into account life, health, social and economic impacts of vandalism and damage to ocean observing networks and data systems;
- (iv) to encourage and assist, where appropriate, the development of specific regional efforts and solutions in addressing the vandalism of ocean data platforms;

- (v) to present the Report on Ocean Data Buoy Vandalism – Incidence, Impact and Responses, to the United Nations General Assembly, with a view to promoting an integrated UN approach to address this critical issue.
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APPENDIX B

RESOLUTION XXVI-8

STRENGTHENING AND STREAMLINING GOOS

The Intergovernmental Oceanographic Commission,

Recalling IOC Resolutions XVI-8 establishing the Global Ocean Observing System (GOOS) and XXIII-5 establishing Terms of Reference of the Intergovernmental Committee for the Global Ocean Observing System (I-GOOS) and the GOOS Scientific Steering Committee (GSSC),

Noting:

- (i) the progress in the implementation of the GOOS Climate module as reported to the UN Framework Convention on Climate Change (UNFCCC) at Cancun, December, 2010 (GOOS report No.184),
- (ii) the Framework for Ocean Observations⁷ developed by the task team set up by the OceanObs'09 Conference (Venice, 21-25 September 2009)
- (iii) paragraph 36a of the Johannesburg Plan of Implementation (World Summit on Sustainable Development, 2002), which called for expanded observation of the global ocean and coastal seas, and the planned assessment of the progress to date and the remaining gaps in sustainable development and the implication for oceans at the United Nations Conference on Sustainable Development (RIO+20).

Reaffirming that the Global Ocean Observing System (GOOS) is a priority for the IOC,

Considering:

- (i) that observations of the oceans are critical to the provision of maritime safety services, including in addressing the obligations of Member States under the International Convention for the Safety of Life at Sea (SOLAS), and to disaster risk reduction, in particular in coastal areas subject to marine natural hazards such as tsunamis and storm surges,
- (ii) the importance of systematic ocean observations to ensure that the target adopted by the Tenth Conference of the Parties of the Convention on Biodiversity (CBD, Nagoya, 2010) 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem benefits, can be conserved through an effectively and equitably managed, ecologically representative and well connected network of protected areas,
- (iii) the importance of sustained oceanographic observations to global climate monitoring, research and prediction, to the planned improved future delivery of climate services under the Global Framework for Climate Services (GFCS), to the provision of environmental services in general and to operational ocean prediction and related services,
- (iv) that sustained observations are critical to manage ocean biodiversity and ecosystems, as well as to global monitoring and assessment of ocean carbon, ocean acidification and the marine environment generally, including in particular the UN regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects (the "UN Regular Process"),

- (v) the need to increase the number of IOC Member States active in GOOS implementation, and to develop their capacity to participate in and benefit from GOOS,

Considering further:

- (i) the formation in 1999 of Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (JCOMM) as a joint mechanism for coordinating ocean observations between IOC and WMO and GOOS' continuing participation in the WMO Integrated Global Observing System (WIGOS),
- (ii) that UNEP, in particular its Regional Seas Programme, is a priority user for GOOS observations, products and services,
- (iii) that engagement of the oceanographic research community in development of GOOS can benefit from cooperation with the International Council for Science (ICSU),
- (iv) that the IOC Regional Subsidiary Bodies and the GOOS Regional Alliances are important mechanisms for GOOS implementation,

Recognizing the need to broaden the scientific remit of GOOS and to simplify its governance,

Having Considered the summary report from I-GOOS-X (Paris, June 2011),

Decides to:

1. recommit to GOOS, building on existing achievements, by:
 - (i) focusing on GOOS as a holistic system encompassing global, regional and coastal observations and products;
 - (ii) integrating all available observational data;
 - (iii) aligning GOOS with a Framework for Ocean Observing⁸ oriented to an essential ocean variable approach;
 - (iv) promoting GOOS' essential role in providing observations and products to inform actions taken under global conventions such as UNFCCC, including its emphasis on adaptation, (including data for) consideration of natural hazards; CBD, and SOLAS, and regional conventions such as the UNEP Regional Seas Conventions and Action Plans; as well as the UN Regular Process;
 - (v) reinforcing global participation through increased extrabudgetary support for capacity development, especially in Africa, Small Island Developing States and Least Developed Countries;
2. streamline and strengthen the governance of GOOS by:
 - (i) reconfirming IOC as lead sponsor responsible for GOOS; WMO, UNEP and ICSU as cosponsoring organizations, and cooperation with other committed organizations which contribute to and/or benefit from GOOS;
 - (ii) confirming that the IOC Governing Bodies, through appropriate arrangements, become the bodies directly responsible for governance of GOOS;

- (iii) dissolving I-GOOS, the GOOS Scientific Steering Committee, and its subsidiary panels on 31 December 2011;
- (iv) creating the GOOS Steering Committee with effect from 1st January 2012;
- (v) reinforcing cooperation with the IOC Regional Subsidiary Bodies, and with other relevant bodies including the GOOS Regional Alliances, as a means for coordination and implementation;
- (vi) adopting the terms of reference for the GOOS Steering Committee appended to this resolution;

Decides Further that,

- (i) the GOOS Steering Committee will be comprised of up to 15 members. Five experts will be appointed by Member State "Electoral Groups" during the IOC Assembly, one from each group. These five experts will have, in addition to their technical expertise, the role of providing policy advice and guidance to the Steering Committee, consistent with that of the IOC Governing Bodies. The five members elected at the I-GOOS X (20 June 2011, Paris) will serve as the representatives for the Electoral Groups until the 27th Session of the Assembly;
- (ii) the Executive Secretary, in consultation with the IOC Officers, and the co-sponsors, will appoint up to 10 scientific and technical experts based on relevant expertise, giving due consideration to geographical and gender balance;
- (iii) the GOOS Steering Committee will regularly assess its own performance in relation to its terms of reference. The GOOS Steering Committee will report annually on its implementation and progress to the IOC Governing Bodies;

Urges Member States to commit to support the sustained operation of GOOS;

Notes that the financial implications on the Regular Programme budget of the strengthening and streamlining of GOOS will be cost neutral and will not exceed the envelope formerly allocated to I-GOOS and GSSC;

Requests the Executive Secretary to ensure the required support for the effective operation of the GOOS Steering Committee.

Annex to Resolution XXVI-8

Terms of Reference for the GOOS Steering Committee (Group of Experts)

Acting under the guidance and governance of the Intergovernmental Oceanographic Commission Governing Bodies, and with the active participation and support of Member States, the GOOS Steering Committee will carry out intersessional activities to:

- (i) identify the essential ocean variables to observe, and develop and update as necessary the scientific, technical and implementation plans and targets for GOOS, for approval of the IOC Governing Bodies and partners;
- (ii) monitor, promote, and provide guidance on development and operation of GOOS in accordance with agreed implementation plans;
- (iii) regularly assess the performance of GOOS in providing users with fit-for-purpose data and information products;
- (iv) identify and encourage research and operational programmes to enhance and improve GOOS;
- (v) advise on developing the capacity of all Member States to participate in and benefit from GOOS.

The GOOS Steering Committee will appoint a Chair from amongst its own membership.

The GOOS Steering Committee will produce a biennial Workplan for consideration by the IOC Governing Bodies and adoption by the Assembly. The Workplan will also be shared with other cosponsors. This Workplan will clearly identify dedicated resources and commitments necessary for each Workplan element. In executing the elements of the plan endorsed and resourced by the IOC Governing Bodies, and/or extrabudgetary sources, the GOOS Steering Committee will be supported by a GOOS Project Office within the IOC Secretariat.

The GOOS Steering Committee will have the authority to create and dissolve time limited panels according to the IOC rules of procedure within limits of resources available.

The chairs of appropriate coordinating and implementing bodies, both within and outside IOC, will be invited to participate in an *ex-officio* capacity. Such bodies would include, for example, subsidiary panels, the GOOS Regional Council, IODE and JCOMM.

The GOOS Steering Committee members can serve up to two consecutive two-year terms.

The GOOS Steering Committee may invite observers to its meetings.

Within the limits of resources available, the GOOS Steering Committee shall preferably meet annually face to face immediately preceding IOC Governing Body meetings.

APPENDIX C

WMO POLAR ACTIVITIES

1. WMO Polar activities have been guided by the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS), which is an IPY Legacy. Cg-XVI agreed that WMO needs to continue to have a focus on polar observations, research and services to meet its responsibilities on regional and global weather, climate, water and related environmental matters, and adopted Res.11.9/4 (Cg-XVI) - WMO Polar Activities. EC-LXIII re-established EC-PORS to continue these activities. Cg-XVI adopted six resolutions related to polar observing networks or IPY legacy topics.
2. Cg-XVI supported the need to establish an observational framework for Polar Regions, including the “Third Pole” (Himalaya and Tibetan Plateau) that balances space-based observations with in situ measurements while developing a methodology to address new observational requirements, including the identification of key polar variables from both a research and services perspective. Cg-XVI agreed that operational and research observing networks in Polar Regions should be integrated within the framework of the WMO Integrated Observing System (WIGOS) and the WMO Information System (WIS), be enhanced to include cryosphere related variables, especially as related to the development of the Global Cryosphere Watch (GCW).
3. Cg-XVI supported the establishment of a Polar Space Task Group (PSTG) for coordinating, across research and operational agencies, the planning, processing and archiving of Earth observation data sets. EC-PORS will oversee these future developments.

Antarctic Observing Networks

4. It was agreed to integrate all Antarctic networks into an Antarctic Observing Network (AntON) that will comprise all operational stations, all of which should produce climate messages, and adopted Res.11.9/1 (Cg-XVI) - The Antarctic Observing Network. Cg-XVI acknowledged the important contributions of other organizations, such as the University of Wisconsin, who fund and operate over half of these stations as automatic weather stations (AWS). The *Manual on the Global Observing System* (WMO-No.544) was reviewed, and Res.11.9/2 (Cg-XVI) - Amendments to the *Manual on the GOS*, Volume II - Regional Aspects - The Antarctic was adopted.
5. There was concern that data from many Antarctic stations funded by research agencies are not available in real-time and, therefore, are not available to NWP systems. It noted that the high communication cost involved in using Iridium satellites is also a limiting factor. EC and the Secretary-General, in collaboration with CBS and JCOMM, are to investigate possible ways to reduce such costs through an international forum of users of satellite data telecommunication systems. It was also recognized that WIS would provide a suitable environment for collection and dissemination of data from research observing stations.

Polar Prediction System

6. Cg-XVI agreed to embark on a multi-year endeavour to develop a Global Integrated Polar Prediction System (GIPPS), capable of providing information to meet user needs for decision making on timescales from hours to centuries. The global benefits of such a system includes enabling service delivery and developing observing strategies in Polar Regions, and in addressing key uncertainties in weather, climate, water and related environmental variability and change, thereby improving global prediction while contributing to DRR and GFCS. Cg-XVI viewed GIPPS, as an IPY Legacy to benefit the global community.
7. GIPPS shall engage RA's, TC's, relevant international organizations and academic research communities in the development of such a system. Congress adopted Res.11.9/3 (Cg-XVI) – GIPPS. In this regard, EC-PORS should develop a scalable, detailed strategic plan, laying out a path

that WMO will take to identify and address gaps in our scientific understanding of polar processes, improve data and service delivery, and promote or establish national research programmes. TC's and RA's were requested to support the work of the EC-PORS through the coordinated international research, development and implementation of GIPPS and to advise on possible future governance structures.

8. "Services" are an important driver that anchors the work of WMO Polar Activities and EC-PORS will develop a comprehensive description of the global community's polar service requirements and articulate the value to be delivered. Service requirements will impact both observational and modelling requirements in Polar Regions, and through mechanisms such as Polar Regional Climate Centres and Polar Climate Outlook Forums contribute to GFCS and by the GIPPS.

International Polar Decade Initiative

9. A Workshop on International Polar Decade (IPD) Initiative, which included representatives from key international environmental organizations, leading polar associations and institutions, was held in April 2011 in St. Petersburg, Russian Federation. Participants unanimously supported an IPD initiative. Cg-XVI agreed that the IPD planning should continue to maintain momentum generated by IPY2007-2008, to engage existing programmes and available resources, and to align them with the targeted set of objectives that would take a decade to advance. It also agreed that any scientific efforts under the auspices of an IPD must be aligned to meeting broad societal needs such as WMO desired societal outcomes and be anchored on delivering better, more reliable scientific information to inform risk-based decision and policy making activities in the Polar Regions. The climate component of an IPD would have the potential to strongly contribute to the implementation of the GFCS.

10. Topics suggested as part of the scientific focus of an IPD included optimization and development of observational methods, systems and networks in the Polar Regions. Cg-XVI pointed out that many elements of the IPY networks and initiatives described in the IPY Summary (<http://www.icsu.org/publications/reports-and-reviews/ipy-summary/ipy-summary>) could provide the building blocks for a comprehensive polar observing system in IPD and emphasized that early establishment of data management arrangements and an open and free data access policy should be one of the first steps of IPD preparation if the initiative is to be launched. Continued support for existing data centers and related IPY legacy initiatives and the early WIS involvement will be essential and necessary elements of the IPD.

11. A critical milestone will be the Montreal 2012 IPY Conference at which a draft IPD Concept Document would be reviewed, corresponding community decisions recommended, and possible commitments expressed. WMO will participate in drafting the Concept Document and must ensure observational issues of importance to WMO are adequately considered. Cg-XVI approved the WMO participation in the International Polar Decade should this initiative be endorsed by relevant international organizations as key stakeholders. It requested EC, through EC-PORS, to review and approve the IPD Concept Document at its sixty-fourth session with a view of determining modalities and the level of WMO participation in the initiative. Res.11.9/5 – International Polar Decade Initiative was adopted by Cg-XVI.

Global Cryosphere Watch (GCW)

12. Cg-XVI agreed that WMO needs to have a focus on global cryosphere issues to provide authoritative information to meet Members' responsibilities on regional and global weather, climate, water and related environmental matters, and adopted Res.11.9/6 (Cg-XVI) - Global Cryosphere Watch (GCW). The GCW Implementation Strategy was approved by Cg-XVI (see Appendix B). Many aspects of integrated cryosphere observing and associated tasks to achieve

this are articulated in the Strategy. Currently, 35 countries from all six Regions have indicated their desire to be involved in GCW development. The Norwegian Meteorological Institute has initiated a prototype web portal for GCW which is WIS compliant and would be interoperable with NMHS and external cryospheric data centres. Cg-XVI also noted that GCW would be an important contribution of WMO to a potential IPD, if this were to be initiated, and to GFCS. GCW will be a component of WIGOS and be WIS compliant. EC-PORS will continue oversight of GCW.

APPENDIX D

RESOLUTION XXVI-7

GLOBAL COORDINATION OF EARLY WARNING AND MITIGATION SYSTEMS FOR TSUNAMIS AND OTHER SEA-LEVEL-RELATED HAZARDS

The Intergovernmental Oceanographic Commission,

Recalling Resolution XXV.13 and Resolution EC-XLIII.6 on Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level-Related Hazards,

Having considered the reports of the recent sessions of the Intergovernmental Coordination Groups for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-VI), the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS-VII), the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-VIII), the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXIV), and the report of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-IV),

Being concerned by:

- (i) the loss of life, destruction, and extensive social and economic impact of the recent earthquake and tsunami disasters in Chile, Haiti, Indonesia, Japan, New Zealand, Samoa, American Samoa, and Tonga,
- (ii) the long-term durability, sustainable operation and maintenance of a global tsunami and other sea-level-related hazards warning and mitigation system, especially as donor and Member State support diminishes with time after major events,

Recognizing the very short lead-times and difficulty in providing near-field tsunami warning in recent events,

Noting that many lives have been saved because of the progress made in warning and mitigating the impact of both near- and far-field tsunamis,

Further noting the progress in establishing Regional Tsunami Service Providers (RTSP) to replace the Interim Advisory Service (IAS) in the Indian Ocean,

Re-emphasizing:

- (i) the critical need for high-resolution bathymetric and topographic data in marine and coastal areas to support enhanced warning and preparedness of vulnerable communities and critical facilities through more detailed inundation forecasts and assessments,
- (ii) that failure to share and exchange hazard-relevant data or the delayed access to real-time data limits the ability to protect communities at risk and undermines mitigation of impact and the preparedness, to save lives and protect property,

Welcomes with appreciation the extra-budgetary contributions from Member States, including Small Island Developing States (SIDS), toward meeting the High Level Objectives (HLOs) toward implementing early warning and mitigation systems in the four regions;

Further welcomes the publication of the “Compendium of Definitions and Terminology on Sea-level-Related Hazards, Disasters, Vulnerability and Risks in a Coastal Context” (IOC Technical Series, 91);

Endorses the reports of ICG/CARIBE-VI, ICG/NEAMTWS-VII, ICG/IOTWS-VIII and ICG/PTWS-XXIV, and **approves** the recommendations contained therein;

Accepts the summary report of TOWS-WG-IV and **approves** its recommendations, in particular:

- (i) continuation of the TOWS-WG Inter-ICG Task Teams on Disaster Management and Preparedness, and on Tsunami Watch Operations;
- (ii) establishment of a TOWS-WG Inter-ICG Task Team on Hazard Assessment Related to Highest Potential Tsunami Source Areas;

Decides to continue the TOWS-WG for the next inter-sessional period with the existing terms of reference and membership;

Urges Member States to:

- (i) maintain support for development and maintenance of tsunami and sea-level-related warning and mitigation systems, including community education and preparedness;
- (ii) openly exchange in real time all relevant existing and new forms of data essential for tsunami and related hazard warning and mitigation in agreement with the IOC Oceanographic Data Exchange Policy;
- (iii) submit post-tsunami and post-earthquake field survey data to affected nations and the World Data Centre System in a timely manner;
- (iv) include participation of representatives of Disaster Management Offices (DMOs) in national delegations to the ICG meetings and their inter-sessional activities to facilitate further integration of relevant science, warning operations and emergency management;
- (v) nominate a 24/7 Tsunami Warning Focal Point (TWFP) and provide updated information to the Executive Secretary, if they have not yet done so, to formally identify a national point of responsibility for the receipt of, and response to, threat information provided by Regional Tsunami Service Providers (RTSPs);

Invites Member States to increase their extra-budgetary contributions to the IOC to provide the needed resources for the priorities identified by TOWS-WG and ICGs and to meet IOC HLOs and agreed Work Plans;

Instructs the TOWS-WG:

- (i) to periodically review and update the “Compendium of Definitions and Terminology on Sea-level-Related Hazards, Disasters, Vulnerability and Risks in a Coastal Context”, especially when significant changes are made to definitions, **noting** the offer of the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) to assist;
- (ii) to complete the analysis of the impact of data gaps on tsunami detection and forecast timeliness, accuracy and effectiveness;
- (iii) to develop and implement, in consultation with the Executive Secretary, a coordinated Communications and Outreach Plan, including a focus on media education;
- (iv) to develop Global Risk Assessment Guidelines, utilizing those developed in the IOC Manuals and Guides, 52 *Tsunami Risk Assessment and Mitigation for the Indian Ocean*, including further emphasis on risks associated with marine impacts;

Further instructs:

- (i) the International Oceanographic Data and Information Exchange (IODE) Committee, in cooperation with relevant international agencies, to provide a report to the TOWS-WG on availability of other ocean hazard data types relevant to sea-level hazards;
- (ii) JCOMM, through the Global Sea Level Observing System (GLOSS) and the Data Buoy Cooperation Panel (DBCP), in consultation with the World Meteorological Organization (WMO) and ICGs, to establish routine performance monitoring of sea level networks for warning and mitigation systems for tsunami and other sea-level-related hazards;

Encourages the Executive Secretary and Member States to work together to build capacity in all aspects of tsunami warning and mitigation systems, in particular establishment and maintenance of observing systems, utilization of data and community preparedness;

Requests the Executive Secretary to:

- (i) transmit the completed or interim findings of the TOWS-WG Inter-ICG Task Teams to the ICGs, DBCP and GLOSS;
 - (ii) facilitate establishment of the Caribbean Tsunami Information Centre (CTIC), supported by the host country and extra-budgetary contributions;
 - (iii) assist coordination among all regional Tsunami Information Centres, to optimise resources and existing capabilities in capacity building, especially those of the International Tsunami Information Centre (ITIC);
 - (iv) enable tsunami-related documentation available through the IOC Tsunami web site to also be available by topic according to the main pillars and foundations identified for tsunami warning and mitigation systems;
 - (v) continue to coordinate International Tsunami Survey Teams, following formal requests from affected countries and seek nominations for Member State participation through Tsunami National Contacts (TNC);
 - (vi) reinforce the IOC coordinating role in warning and mitigating systems for tsunami and other sea-level-related hazards, including with the UN International Strategy on Disaster Reduction Members, the International Union of Geodesy and Geophysics, Comprehensive Test Ban Treaty Organisation, and the International Atomic Energy Agency (IAEA);
 - (vii) ensure technical activities of IOC Tsunami Unit and ICG secretariats be developed and undertaken in consultation with the TOWS-WG and relevant Working Groups of ICGs.
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APPENDIX E

RESOLUTION XXVI-8

STRENGTHENING AND STREAMLINING GOOS

The Intergovernmental Oceanographic Commission,

Recalling IOC Resolutions XVI-8 establishing the Global Ocean Observing System (GOOS) and XXIII-5 establishing Terms of Reference of the Intergovernmental Committee for the Global Ocean Observing System (I-GOOS) and the GOOS Scientific Steering Committee (GSSC),

Noting:

- (iv) the progress in the implementation of the GOOS Climate module as reported to the UN Framework Convention on Climate Change (UNFCCC) at Cancun, December, 2010 (GOOS report No.184),
- (v) the Framework for Ocean Observations⁹ developed by the task team set up by the OceanObs'09 Conference (Venice, 21-25 September 2009)
- (vi) paragraph 36a of the Johannesburg Plan of Implementation (World Summit on Sustainable Development, 2002), which called for expanded observation of the global ocean and coastal seas, and the planned assessment of the progress to date and the remaining gaps in sustainable development and the implication for oceans at the United Nations Conference on Sustainable Development (RIO+20).

Reaffirming that the Global Ocean Observing System (GOOS) is a priority for the IOC,

Considering:

- (vi) that observations of the oceans are critical to the provision of maritime safety services, including in addressing the obligations of Member States under the International Convention for the Safety of Life at Sea (SOLAS), and to disaster risk reduction, in particular in coastal areas subject to marine natural hazards such as tsunamis and storm surges,
- (vii) the importance of systematic ocean observations to ensure that the target adopted by the Tenth Conference of the Parties of the Convention on Biodiversity (CBD, Nagoya, 2010) 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem benefits, can be conserved through an effectively and equitably managed, ecologically representative and well connected network of protected areas,
- (viii) the importance of sustained oceanographic observations to global climate monitoring, research and prediction, to the planned improved future delivery of climate services under the Global Framework for Climate Services (GFCS), to the provision of environmental services in general and to operational ocean prediction and related services,
- (ix) that sustained observations are critical to manage ocean biodiversity and ecosystems, as well as to global monitoring and assessment of ocean carbon, ocean acidification and the marine environment generally, including in particular the UN regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects (the "UN Regular Process"),
- (x) the need to increase the number of IOC Member States active in GOOS implementation, and to develop their capacity to participate in and benefit from GOOS,

Considering further:

- (v) the formation in 1999 of Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (JCOMM) as a joint mechanism for coordinating ocean observations between IOC and WMO and GOOS' continuing participation in the WMO Integrated Global Observing System (WIGOS),

- (vi) that UNEP, in particular its Regional Seas Programme, is a priority user for GOOS observations, products and services,
- (vii) that engagement of the oceanographic research community in development of GOOS can benefit from cooperation with the International Council for Science (ICSU),
- (viii) that the IOC Regional Subsidiary Bodies and the GOOS Regional Alliances are important mechanisms for GOOS implementation,

Recognizing the need to broaden the scientific remit of GOOS and to simplify its governance,

Having Considered the summary report from I-GOOS-X (Paris, June 2011),

Decides to:

1. recommit to GOOS, building on existing achievements, by:
 - (i) focusing on GOOS as a holistic system encompassing global, regional and coastal observations and products;
 - (ii) integrating all available observational data;
 - (iii) aligning GOOS with a Framework for Ocean Observing¹⁰ oriented to an essential ocean variable approach;
 - (iv) promoting GOOS' essential role in providing observations and products to inform actions taken under global conventions such as UNFCCC, including its emphasis on adaptation, (including data for) consideration of natural hazards; CBD, and SOLAS, and regional conventions such as the UNEP Regional Seas Conventions and Action Plans; as well as the UN Regular Process;
 - (v) reinforcing global participation through increased extrabudgetary support for capacity development, especially in Africa, Small Island Developing States and Least Developed Countries;
2. streamline and strengthen the governance of GOOS by:
 - (i) reconfirming IOC as lead sponsor responsible for GOOS; WMO, UNEP and ICSU as cosponsoring organizations, and cooperation with other committed organizations which contribute to and/or benefit from GOOS;
 - (ii) confirming that the IOC Governing Bodies, through appropriate arrangements, become the bodies directly responsible for governance of GOOS;
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 - (vi) adopting the terms of reference for the GOOS Steering Committee appended to this resolution;

Decides Further that,

- (i) the GOOS Steering Committee will be comprised of up to 15 members. Five experts will be appointed by Member State "Electoral Groups" during the IOC Assembly, one from each group. These five experts will have, in addition to their technical expertise, the role of providing policy advice and guidance to the Steering Committee, consistent with that of the IOC Governing Bodies. The five members elected at the I-GOOS X (20 June 2011, Paris) will serve as the representatives for the Electoral Groups until the 27th Session of the Assembly;
- (ii) the Executive Secretary, in consultation with the IOC Officers, and the co-sponsors, will appoint up to 10 scientific and technical experts based on relevant expertise, giving

- due consideration to geographical and gender balance;
- (iii) the GOOS Steering Committee will regularly assess its own performance in relation to its terms of reference. The GOOS Steering Committee will report annually on its implementation and progress to the IOC Governing Bodies;

Urges Member States to commit to support the sustained operation of GOOS;

Notes that the financial implications on the Regular Programme budget of the strengthening and streamlining of GOOS will be cost neutral and will not exceed the envelope formerly allocated to I-GOOS and GSSC;

Requests the Executive Secretary to ensure the required support for the effective operation of the GOOS Steering Committee.

Annex to Resolution XXVI-8

Terms of Reference for the GOOS Steering Committee (Group of Experts)

Acting under the guidance and governance of the Intergovernmental Oceanographic Commission Governing Bodies, and with the active participation and support of Member States, the GOOS Steering Committee will carry out intersessional activities to:

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- (iii) regularly assess the performance of GOOS in providing users with fit-for-purpose data and information products;
- (iv) identify and encourage research and operational programmes to enhance and improve GOOS;
- (v) advise on developing the capacity of all Member States to participate in and benefit from GOOS.

The GOOS Steering Committee will appoint a Chair from amongst its own membership.

The GOOS Steering Committee will produce a biennial Workplan for consideration by the IOC Governing Bodies and adoption by the Assembly. The Workplan will also be shared with other cosponsors. This Workplan will clearly identify dedicated resources and commitments necessary for each Workplan element. In executing the elements of the plan endorsed and resourced by the IOC Governing Bodies, and/or extrabudgetary sources, the GOOS Steering Committee will be supported by a GOOS Project Office within the IOC Secretariat.

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The GOOS Steering Committee members can serve up to two consecutive two-year terms.

The GOOS Steering Committee may invite observers to its meetings.

Within the limits of resources available, the GOOS Steering Committee shall preferably meet annually face to face immediately preceding IOC Governing Body meetings.
