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GLOBAL/REGIONAL COORDINATION FOR INSTRUMENT ISSUES: WMO-IOC REGIONAL MARINE INSTRUMENT CENTRES (RMICS)

BACKGROUND MATERIAL

SUMMARY

CONTENT OF DOCUMENT:

Appendix A: WMO-IOC Regional Marine Instrument Centres: Summary

Appendix B: Legacy recommendations of the JCOMM Pilot Project for WIGOS

Appendix C: Recommendation 1 (JCOMM-III) – Establishment of WMO/IOC Regional Marine Instrument Centres

Appendix D: WMO Resolution 9 (Cg-XVI) - Designation of Regional Marine Instrument Centres

Appendix E: IOC Resolution XXVI-9 – Designation of IOC-WMO Regional Marine Instrument Centres (RMICs)

RELATED DOCUMENT:

JCOMM-4/Doc.6.2: Instruments and Methods of Observation

WMO-IOC REGIONAL MARINE INSTRUMENT CENTRES: SUMMARY

1. Background

As a response to the initiative by the WMO Fifteenth Congress to enhance the integration of the WMO observing system as a strategic objective of WMO, and the initiation of the development of the WMO Integrated Global Observing System (WIGOS), the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) has conducted a Pilot Project for the integration of marine meteorological and other appropriate oceanographic observations into WIGOS (See the legacy recommendations of the Pilot Project in Appendix A).

In doing so, JCOMM has promoted the development of a global network of WMO-IOC Regional Marine Instrument Centres (RMICs) as a means to integrate instrument best practices and related standards among the marine meteorological and oceanographic communities.

The Third Session of JCOMM therefore adopted Recommendation 1 (JCOMM-III) – WMO-IOC Regional Marine Instrument Centres, which defines Terms of Reference of an RMIC, including capabilities and corresponding functions, and a mechanism for formal WMO and UNESCO/IOC designation of an RMIC. Recommendation 1 (JCOMM-III) is reflected in Appendix B..

JCOMM-III also stressed that a regular review of the RMICs capabilities should be organized by JCOMM. It agreed that the established procedure for designing an RMIC should be included into the *WMO Guide to Meteorological Instruments and Methods of Observations* (WMO-No. 8) (http://www.wmo.int/pages/prog/www/IMOP/IMOP-home.html).

2. Purpose and role of the RMICs

RMICs are expected to facilitate the adherence of observational data, metadata, and processed observational products to a higher level of standards for instruments and methods of observation, by providing: (i) facilities for the calibration and maintenance of marine instruments and the monitoring of instrument performance; and (ii) assistance for instrument intercomparisons, as well as appropriate training facilities complementing what the manufacturers are also providing.

The role of RMICs with capabilities and corresponding functions is well described in the Terms of Reference listed in Annex 4.A of Part II, Chapter 4 of the WMO No. 8 and reproduced in Appendix B.

Regular training activities on marine meteorological and oceanographic instruments are organized at RMICs, as well as instrument intercomparisons.

3. Benefits to Members of RMICs

RMICs are contributing to the integration of marine meteorological and other appropriate oceanographic observations into WIGOS, and Members/Member States are expected to benefit from the network of RMICs in the following ways:

3.1 More cost-effective implementation and operations of the observing networks

RMICs will play a role in ensuring that standard instruments are used throughout national programmes participating in JCOMM. Through the use of standardized ocean observations equipment, and an enhanced cooperation with the manufacturers, it is expected that the manufacturers will be able to reduce the cost of the instruments. The use of standardized equipment and sharing among WMO-IOC RMICs can provide substantial savings in terms of

instrument calibration and intercomparisons, in particular for developing countries.

Better integration and cooperation between National Meteorological and Hydrological Services (NMHSs), oceanographic institutes, and other partners will facilitate synergies and the sharing of available resources for the implementation and operations of the observing networks. This can be realized through:

- Sharing of calibration infrastructures;
- Sharing of common observing platforms to serve multiple applications;
- Sharing logistical facilities and platform deployment opportunities;
- Sharing of facilities producing quality information;
- Sharing of resources for post-calibration, instrument evaluation, and investigation of detected problems, permitting the tuning of the technology;
- Sharing of resources for training and Capacity Building, permitting partners to be brought into the system and to make financial savings.

The manufacturers will be expected to provide expertise and to lend hardware for instrument intercomparisons as a contribution to the WMO-IOC RMICs. As the expertise and hardware will be provided by the manufacturers, the NMHSs will make a financial savings.

3.2 Technology innovations

Savings, in terms of technology innovation, can be made through more cost-effective equipment sold by manufacturers which provide equivalent or better quality observations. This will be realized by enhancing the cooperation with the manufacturers through the Association of Hydro-Meteorological Equipment Industry (HMEI) (http://www.hydrometeoindustry.org/) and the RMICs.

3.3 Better quality observations for improved applications

The quality of the observations will be enhanced as follows:

- Quality Management and documentation of processes, in accordance with the WMO Quality Management Framework (QMF), and the eight Quality Management Principles (http://www.iso.org/iso/iso9000-14000/understand/qmp.html) proposed by ISO.
- Better calibrated instruments through the use of facilities offered at the WMO-IOC RMICs.
- Better compliance to proposed standards, improved traceability of standards, better knowledge of the instrument uncertainties, and consistency/coherence of the observations thanks to routine collection of instrument/platform metadata, instrument intercomparison campaigns conducted through the RMICs, and assistance from the manufacturers, in particular through HMEI.
- Better placement of the instruments will be realized through recommendations to Members based on collection of appropriate instrument/platform metadata, and analysis of the information.

In addition, the activities above will allow the quality of the observations to be known and will also allow better estimation of the uncertainties. This will result in better knowledge of the end-product uncertainties.

4. Impact to Members/Member States of using RMICs

In order to comply with WIGOS requirements, it is necessary for those in charge of deploying and operating observing platforms at sea to do the following, in addition to their traditional activities in terms of instrument practices:

- Purchase observing platforms and instruments that comply with the standards and practices recommended by WMO and/or IOC as appropriate. Enhanced cooperation with

the manufacturers, through HMEI, will make sure that the manufacturers can provide such equipment.
- Calibrate instruments according to the recommended procedures. Assistance from WMO-IOC RMICs can be obtained if needed.
- When applicable, be familiar with, and use the recommended cost-effective practices regarding satellite data telecommunication.
- Routinely record the instrument/platform metadata and make them available to the wider community using recommended standards and protocols.
- Regularly participate in marine instrument intercomparisons campaigns by providing instruments, RMIC facilities, and/or expertise.
- Provide feedback and input to the JCOMM Expert Teams and Panels regarding instrument standards.
- Where possible, offer RMIC facilities to support developing countries in the regions.

5. Approval process for the RMICs

According to the Terms of Reference of the RMICs (Appendix B), governance for defining the functions and adoption of RMICs is proposed by JCOMM and endorsed by WMO and UNESCO/IOC Executive Councils.

The formal process proposed by the Pilot Project for adopting RMICs has been discussed and agreed upon at the Eighth Session of the JCOMM Management Committee, Paris, France, 16-19 November 2010. It was later endorsed by the WMO Sixteenth Congress (Resolution 9 – Cg-XVI) and the Twenty-Sixth IOC Assembly (Resolution XXVI-9). It is described in detail in Appendices C and D.

According to the process, candidate RMICs are required to produce a statement of compliance, list capabilities of the proposed centre, state the suite of instrument expertise offered, state the formal commitment to voluntarily host the centre, and demonstrate capability to JCOMM. A template for the formal statement of commitment to voluntarily host the centre is provided in JCOMM Technical Report No. 53.

The statement of commitment is to be submitted to the JCOMM Co-Presidents, who will then request the JCOMM Observations Coordination Group (OCG) to asses the functions and capabilities of the candidate RMIC.

Following possible agreement by JCOMM, the WMO and UNESCO/IOC Executive Councils (ECs) will be invited to accept and approve new RMICs. Upon approval by both ECs, the name of the RMIC will be listed in the *WMO Guide to Meteorological Instruments and Methods of Observations* (WMO-No. 8) as well as in a revised version of this JCOMM Technical Report No. 53.

6. The current network of RMICs

6.1 Existing RMICs

To date the following centres are acting as RMIC:

- RMIC for Regional Association IV: The National Data Buoy Centre (NDBC) of the National Oceanic and Atmospheric Administration (NOAA), Bay St. Louis, Mississippi, USA (http://www.ndbc.noaa.gov/). Established through WMO Resolution 9 (Cg-XVI) and IOC Resolution XXVI-9.

  The statement of compliance of the RMIC for Regional Association IV is provided in JCOMM TR No. 53.

A successful JCOMM training workshop on marine instrumentation for WMO Regional Association IV took place at NDBC from 13 to 15 April 2010 to prove the concept. The feedback received from the participants has been excellent, demonstrating the demand that exists in developing countries for more training on instrument practices and standards, quality assurance, marine observing programme management and operational aspects, and data exchange. The workshop initiated new collaborations with a view to improve availability of ocean observations from the Region, as well as the quality and traceability to standards of the corresponding data.

- RMIC for the Asia Pacific Region (and WMO Regional Association II): The National Centre of Ocean Standards and Metrology (NCOSM) of the State Oceanic Administration (SOA), Tianjin, China (http://www.ncosm.gov.cn/). Established through WMO Resolution 9 (Cg-XVI) and IOC Resolution XXVI-9.

  The statement of compliance of the RMIC for the Asia Pacific Region is provided in JCOMM TR No. 53.

  A successful JCOMM training workshop on marine instrumentation for the Asia Pacific Region took place at NCOSM from 11 to 13 July 2011.

6.2 Candidate RMICs

At JCOMM-III, Morocco expressed interest in eventually offering RMIC facilities at the National Meteorological Service(Morocco) for WMO Regional Association I (http://www.marocmeteo.ma/).

Members in other regions are invited to offer RMIC facilities. Members in regions where RMICs already exist and willing to offer RMIC facilities are also invited to seek cooperation with other RMICs in order to share responsibility and to avoid duplication of efforts (e.g. offering expertise for complementary suites of instruments).

LEGACY RECOMMENDATIONS OF THE JCOMM PILOT PROJECT FOR WIGOS

The legacy recommendations below, agreed by the joint Steering Group for the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS, are based on the Pilot Project achievements, identified pending issues, and lessons learned:

(1) The type of governance existing between WMO and IOC through JCOMM should be preserved, and the JCOMM activities related to marine meteorology and other appropriate oceanographic observations should play an active role in the WIGOS implementation phase, and eventually become part of WIGOS once it becomes operational.

(2) WMO and IOC Publications should be regularly reviewed based on the proposed methodology (Annex VII of the Project Report, JCOMM Pilot Project for WIGOS). This should be done by addressing harmonization of standards related to (i) Quality Control, (ii) the collection of instrument/platform metadata, (iii) instrument practices and intercomparisons, and (iv) satellite data telecommunication issues.

(3) WMO and IOC should act pro-actively to facilitate the collection, distribution (including in real-time, and through dedicated servers), and discovery of instrument/platform metadata. In particular, the depth of the SST (Sea Surface Temperature) and SSS (Sea Surface Salinity) measurements should be reported as accurately as possible for use in satellite products as appropriate.

(4) JCOMM should develop guidelines for marine instrument intercomparisons, publish then as JCOMM Technical Report, and provide input to the CIMO Guide accordingly.

(5) JCOMM should further develop the network of WMO-IOC Regional Marine Instrument Centres (RMIC) in all regions, promote their activities, conduct training workshops, and instrument intercomparisons.

(6) The cooperation with the manufacturers should be strengthened through HMEI.

(7) IODE should continue the development of the IODE ODP and interconnect with the WIS as a WIS DCPC.

(8) IODE should seek interoperability of the ODP with other (non IODE) ocean related data centres.

(9) JCOMM should work to increase the amount of oceanographic and marine meteorological data provided by data centres to the ODP and WIS.

(10) WMO and IOC should promote the IODE/JCOMM Standards process, seek harmonization of standards between WMO and IOC, and make sure that processes are documented.

(11) JCOMM should promote quality management in compliance with the WMO Quality Management Framework (QMF).

(12) WMO and IOC should promote establishment of an international forum of users of satellite data telecommunication systems.

(13) JCOMMOPS, which is providing support for the implementation, and monitoring of marine observing networks on a day to day basis should be strengthened.

(14) The JCOMM PANGEA concept should be supported to enhance partnership between developed and developing countries with regard to data use and implementation of ocean

observing networks.

(15) JCOMM should communicate information – based on this project report – about the benefits to various communities of the integration or marine and other appropriate oceanographic observations into WIGOS.

(16) JCOMM should be promoting pilot activities to evaluate how *in situ* and satellite based observing systems complement each other; in the view to make recommendations for the optimization of the *in situ* networks.

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RECOMMENDATION 1 (JCOMM-III) – ESTABLISHMENT OF WMO/IOC REGIONAL MARINE INSTRUMENT CENTRES

THE JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY

Noting:

(1) The JCOMM terms of reference, especially in relation to: (i) the development of observing networks; (ii) the provision of capacity-building to Member States; and (iii) assistance in the documentation and management of the data in international systems,

(2) WMO Resolution 30 (Cg-XV) – Towards enhanced integration between WMO observing systems,

(3) The final reports of the first and second sessions of the WMO Executive Council Working Group on the WMO Integrated Global Observing System and the WMO Information System,

(4) The final report of the ad hoc planning meeting for the JCOMM Pilot Project for the WMO Integrated Global Observing System (JCOMM/MR-No. 57),

(5) The final report of the meeting of the joint Steering Group for the IODE Ocean Data Portal and the JCOMM Pilot Project for WIGOS (JCOMM/MR-No. 59),

(6) The final report of the twenty-fourth session of the Data Buoy Cooperation Panel (JCOMM/MR-No. 61),

(7) The final report of the first session of the Sub-Group on WIGOS of the WMO Executive Council Working Group on the WMO Integrated Global Observing System and the WMO Information System,

(8) The final report of the seventh session of the JCOMM Management Committee (JCOMM/MR-No. 62),

(9) The final report of the fifth session of the JCOMM Ship Observations Team (JCOMM/MR-No. 63),

Noting further:

(1) The WIGOS Concept of Operations as adopted by the WMO Executive Council at its sixty-first session,

(2) The WIGOS Development and Implementation Plan as adopted by the WMO Executive Council at its sixty-first session,

(3) The Project Plan of the JCOMM Pilot Project for the WMO Integrated Global Observing System,

(4) The overarching Implementation Plan for the UNESCO/IOC-IODE Ocean Data Portal (ODP) and the JCOMM Pilot Project for the WMO Integrated Global Observing System,

(5) The proposal from the United States to run a Regional Marine Instrument Centre (RMIC) on a trial basis at the United States National Oceanic and Atmospheric Administration National Data Buoy Center,

Having considered:

(1) Members/Member States need for high quality marine meteorology and oceanographic measurements from the world oceans to address the requirements of WMO and UNESCO/IOC programmes and co-sponsored programmes,

(2) The need for facilities for the regular calibration and maintenance of marine instruments and the monitoring of instrument performance, on a regional basis in order to address adherence of ocean observations and associated metadata to high level standards for instruments and methods of observation,

(3) The need for documenting methods of measurements, for understanding biases introduced by each type of instrumentation, and for developing methods to correct such biases, in order to achieve delivery and use of coherent datasets,

(4) That RMICs would facilitate fulfilling these requirements,

(5) The role that RMICs could play with regard to instrument comparisons and evaluations, as well as for the training of marine meteorology and oceanography instrument experts,

Recognizing:

(1) The experience gained by the WMO Commission for Instruments and Methods of Observation regarding establishment and operations of Regional Instrument Centres (RIC) and World Radiation Centres and Regional Radiation Centres,

(2) The necessity of close coordination with the Commission for Instruments and Methods of Observation on establishing the network of RMICs to take into account the experience of establishing and operating the RICs and to avoid potential duplication of activities between RMICs and RICs,

(3) Expertise of Members/Member States with regard to marine meteorology and oceanography instrument best practices, as well as the dedicated facilities they operate,

(4) The excellent facilities and long experience of the National Data Buoy Centre regarding ocean instrument calibration, evaluation, and deployment,

Recommends:

(1) To establish a network of Regional Marine Instrument Centres and a mechanism for formal WMO and UNESCO/IOC designation of RMICs where:

   (a) Governance for defining the functions and adoption of an RMIC is proposed by JCOMM and endorsed by the WMO and UNESCO/IOC Executive Councils;

   (b) Candidate RMIC will be required to produce a statement of compliance, list capabilities of the proposed centre, state the suite of instrument expertise offered, state the formal commitment to voluntarily host the centre, and demonstrate capability to JCOMM;

   (c) Following possible agreement by JCOMM, the WMO and UNESCO/IOC Executive Councils will be invited to accept and approve new RMICs;

(d) Terms of reference of an RMIC will become part of the *Guide to Meteorological Instruments and Methods of Observations* (WMO-No. 8);

(2) That the terms of reference of an RMIC, including capabilities, and corresponding functions, should be as given in the annex to this recommendation;

(3) That the National Data Buoy Center of the United States undertake the functions of an RMIC on a trial basis and reports on the results to JCOMM with a view to eventually become an RMIC under the mechanism defined above;

Invites:

(1) Members/Member States to consider taking advantage of the RMIC resources offered by the National Data Buoy Center on a trial basis as appropriate;

(2) Members/Member States to consider proposing new RMICs as they see fit;

Requests the Secretary-General of WMO and the Executive Secretary of UNESCO/IOC to facilitate implementation of this recommendation and provide appropriate technical advisory assistance to Members/Member States concerned as required, in the operations of Regional Marine Instrument Centres.

Annex to Recommendation 1 (JCOMM-III)

TERMS OF REFERENCE FOR A WMO/IOC REGIONAL MARINE INSTRUMENT CENTRE

A WMO/IOC Regional Marine Instrument Centre (RMIC) should have the following capabilities to carry out their corresponding functions:

Capabilities:

(a) An RMIC must have, or have access to, the necessary facilities and laboratory equipment to perform the functions necessary for the calibration of meteorological and related oceanographic instruments deployed to address the common requirements of WMO and UNESCO/IOC marine-related programmes and co-sponsored programmes;1

(b) An RMIC must maintain a set of meteorological and oceanographic standard instruments or references and establish the traceability of its own measurement standards and measuring instruments to the International System of Units (SI);

(c) An RMIC must have qualified managerial and technical staff with the necessary experience to fulfil its functions;

(d) An RMIC must develop its individual technical procedures for the calibration of meteorological and related oceanographic instruments using its own calibration equipment;

(e) An RMIC must develop its individual quality assurance procedures;

(f) An RMIC must participate in, or organize, inter-laboratory comparisons of standard calibration instruments and methods;

1 Basically in situ geophysical instruments deployed in the surface marine environment or subsurface.

(g) An RMIC must utilize the resources and capabilities of its region of interest according to the region's best interests, when appropriate;

(h) An RMIC must apply international standards applicable for calibration laboratories, such as ISO/IEC 17025, to the extent possible;

(i) A recognized authority2 must assess an RMIC, at least every five years, to verify its capabilities and performance.

Corresponding functions:

(a) An RMIC must assist Members/Member States of its region in calibrating their national meteorological standards and related oceanographic monitoring instruments according to the RMIC capabilities;

(b) An RMIC must participate in, or organize, JCOMM and/or regional instrument inter-comparisons, following relevant JCOMM recommendations;

(c) An RMIC must make a positive contribution to Members/Member States regarding the quality of measurements;

(d) An RMIC must advise Members/Member States on enquiries regarding instrument performance, maintenance and the availability of relevant guidance materials;

(e) An RMIC must actively participate, or assist, in the organization of regional workshops on meteorological and related oceanographic instruments and measurements;

(f) The RMIC must cooperate with other RMICs in the standardization of meteorological and related oceanographic measurements and sensors;

(g) An RMIC must regularly inform Members/Member States and report, on an annual basis, to the JCOMM Management Committee on the services offered to Members/Member States and the activities carried out. JCOMM in turn should keep the Executive Councils of WMO and UNESCO/IOC informed on the status and activities of the RMICs, and propose changes, as required.

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2 JCOMM will be the body that formally proposes new RMICs and proposes any authority to do evaluations.

WMO RESOLUTION 9 (Cg-XVI) -
DESIGNATION OF REGIONAL MARINE INSTRUMENT CENTRES

THE CONGRESS,

Noting:

(1) Draft Resolution 11.3/1 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System ((WIGOS),

(2) The *Abridged Final Report with Resolutions of the Sixty-second Session of the Executive Council* (WMO-No. 1059), and Resolution 4 (EC-LXII) approving in particular Recommendation 1 (JCOMM-III), establishing WMO/IOC Regional Marine Instrument Centres (RMICs),

(3) The *Abridged Final Report with Resolutions and Recommendations of the Fifteenth Session of the Commission for Instruments and Methods of Observation* (WMO-No. 1049),

(4) The relevant sections of the *Guide to Meteorological Instruments and Methods of Observation* (WMO-No. 8),

(5) JCOMM TR No. 53 / WMO/TD-No. 1564, the WMO-IOC Network of Regional Marine Instrument Centres (RMICs),

Recalling that the Terms of Reference of an RMIC, including capabilities, and corresponding functions are defined in the WMO-No. 8, Part II, Annex 4.A,

Noting further:

(1) The proposals from USA and China to operate WMO-IOC Regional Marine Instrument Centres (RMICs) at the US National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Centre (NDBC), and the China State Oceanic Administration (SOA) National Centre of Ocean Standards and Metrology (NCOSM) respectively, for specific suites of instruments,

(2) The approval process for RMICs agreed by the JCOMM Co-presidents on behalf of the Commission, according to Regulation 76, and documented in JCOMM TR No. 53,

(3) The successful demonstration provided by the NDBC, USA, and NCOSM, China regarding their capability to operate an RMIC for Regional Association IV, and the Asia-Pacific region respectively, including statements of compliance in terms of RMIC capabilities and corresponding functions, in accordance with the procedures and criteria established by JCOMM,

Recognizing:

(1) Members need for high quality marine meteorological and oceanographic measurements from the world oceans to address the requirements of WMO and UNESCO/IOC programmes and co-sponsored programmes, and in particular those of the Global Framework for Climate Services,

(2) That the RMICs facilitate the fulfillment of these requirements, and help improving adherence and traceability of ocean observations and associated metadata to high level standards for instruments and methods of observation on a regional basis,

(3) The excellent facilities and long experience of the National Centre of Ocean Standards and Metrology, China, regarding ocean instrument calibration, evaluation, and testing,

Decides to establish WMO-IOC RMICs for Regional Association IV at the NDBC in Mississippi, USA, and for the Asia-Pacific region at the NCOSM in Tianjin, China, subject to a parallel approval by the 26th session of the IOC Assembly;

Requests the Secretary-General:

(1) In coordination with the Executive Secretary of the IOC, to promote a global coverage of Regional Marine Instrument Centres, particularly keeping in view the needs of developing and least developed countries, through resource mobilization efforts with Members/Member States having capacity, relevant partnering agencies in the United Nations system and development agencies;

(2) To update Annex 4.A, Part II, of the *WMO Guide to Meteorological Instruments and Methods of Observation* (WMO-No. 8) as follows:

- The following items (c) and (d) are added to paragraph 2:

(c) The establishment of RMICs is initiated by JCOMM, and the designation process is coordinated by JCOMM and the WMO/IOC Secretariat according to the process endorsed by JCOMM and documented In JCOMM Technical Report No. 53;
(d) Where more than one RMIC is established within a WMO and/or IOC Region, there should be coordination amongst the Centres to minimize duplication of services;

- In the table in paragraph 3, NDBC (Mississippi, USA) and NCOSM (Tianjin, China) are added to the list of designated RMICs for the Regional Association IV and the Asia-Pacific region respectively;

Requests the Co-presidents of JCOMM

(1) To ensure that the RMIC-related content of the WMO technical regulations, including the Guidelines documents, is reviewed and updated regularly by JCOMM, based on feedback from Members, advances in technology and evolving priorities for the Organization;

(2) To consult with the regional associations and their relevant working groups or other entities responsible for coordination of climate activities within the Regions, on all matters related to RMIC implementation;

Urges all Members to support RMIC activities, to use their facilities and to provide feedback to JCOMM on effectiveness, and possible improvement.

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IOC RESOLUTION XXVI-9 -
DESIGNATION OF IOC-WMO REGIONAL MARINE INSTRUMENT CENTRES

The Intergovernmental Oceanographic Commission,

Recalling IOC Resolution EC-XLIII.5 approving the Recommendation 1 (JCOMM-III), establishing IOC-WMO Regional Marine Instrument Centres (RMICs),

Noting:

(i) the results of the Pilot Project of the IOC-WMO Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) for WMO Integrated Global Observing Systems (WIGOS), including the proposed procedure for formal adoption of the RMIC (JCOMM Technical Report No.48),

(ii) the decision and recommendation at the Eighth Session of the JCOMM Management Committee (16–19 November 2010, Paris, France) on the proposed process (JCOMM Meeting Report, 83),

Further noting:

(i) the proposed Process for the formal adoption of the RMICs submitted by the JCOMM Co-President on behalf of JCOMM, as given in annex to this resolution titled “Procedure for Formal Adoption of the Regional Marine Instrument Centres”,

(ii) the approval of the process and designation of two RMICs by WMO, through WMO Resolution 9(Cg-XVI),

Recognizing:

(i) that JCOMM, serves as a technical advisory body for both organizations,

(ii) the need of Member States for high quality marine meteorology and oceanographic measurements of the world oceans to address the requirements by various oceanographic and climatological programmes/initiatives, and in particular those of the Global Framework for Climate Services,

(iii) that RMICs would facilitate fulfilling these requirements, and help to improve adherence and traceability of ocean observations and associated metadata to high level standards for instruments and methods of observation on a regional basis,

Acknowledging:

(i) the successful results of the JCOMM Pilot Project for WIGOS in demonstrating the value of RMICs for Member States, through pilot exercises by the USA National Data Buoy Center (for Americas),

(ii) a statement of compliance received from the National Centre of Ocean Standards and Metrology (NCOSM), State Oceanic Administration of China to host a RMIC for Asia-Pacific region in Tianjin, China, with corresponding capabilities and functions described contained therein in accordance with the approved RMIC Terms of Reference, and one regional training workshop on marine instrumentation to be organized in the Centre, 11–13 July 2011, to demonstrate its capability,

Approves:

(i) the Procedure for formal adoption of the IOC-WMO RMICs, as given in the annex to this resolution;

(ii) the designation of NCOSM, Tianjin, China, as an RMIC for the Asia-Pacific Region, and of National Data Buoy Center (NDBC), Mississippi, USA, as an RMIC for North and Central America;

Requests the Co-Presidents of JCOMM to:

(i) work on behalf of JCOMM to review applications by Member States for hosting RMICs based on the Procedure approved by the IOC Assembly and the WMO Congress, during the intersessional period, and to make recommendation to IOC and WMO governing bodies for including the candidate into the list of RMICs;

(ii) ensure that the Procedure for the adoption of RMICs be regularly reviewed and updated, in terms of ocean instrument calibration, evaluation and testing, based on feedback from Member States with a view to advancing in technology and evolving priorities for IOC and WMO;

(iii) coordinate regular consultation with Member States, IOC Regional Subsidiary Bodies and relevant programmes on all matters related to RMIC implementation;

Urges IOC Member States to:

(i) consider participating in RMIC activities, and if interested, to express intent to host a RMIC through the established procedure;

(ii) utilize available facilities and services provided by the RMICs, and to provide feedback to JCOMM on their effectiveness, and way for improvement;

Requests the IOC Executive Secretary to:

(i) work with the Secretary-General of WMO and with IOC Member States toward a global coverage of a RMIC network, with particular emphasis to meet the needs of developing and least developed countries, through encouraging Member States to consider hosting and contributing to RMICs;

(ii) work with the JCOMM Co-Presidents to ensure regular updates and publications on the procedure, technical criteria, and requirements.

Annex 1 to Resolution XXVI-9

Procedure for Formal Adoption of the Regional Marine Instrument Centres

According to the Terms of Reference of an IOC-WMO Regional Marine Instrument Centre (RMIC), the mechanism for formal WMO and IOC/UNESCO designation of RMICs implies the following:

(a) Governance for defining the functions and adoption of an RMIC is proposed by the Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (JCOMM) and endorsed by the IOC and WMO governing bodies;

(b) A candidate RMIC is required through its Member State to produce a statement of compliance, list capabilities of the proposed centre, state the suite of instrument expertise offered, state the formal commitment to voluntarily host the centre, and demonstrate capability to JCOMM.

The process for adoption, to be conducted by JCOMM, is the following:

- The RMIC evaluates the extent to which it will be addressing the RMIC requirement in terms of capabilities and functions as described in the RMIC Terms of Reference.

- Once the candidate RMIC believes that it meets the requirements to a sufficient extent, its Director writes to the JCOMM Co-President to formally state the host commitment to voluntarily run and operate the RMIC on behalf of the IOC and WMO, and to request that the RMIC be listed in the list of RMICs through appropriate channels. In doing so, the candidate RMIC also provides for a statement of compliance in terms of RMIC capabilities and corresponding functions as described in the Annex of the RMIC Terms of Reference. The list of variables measured by specific instruments for which expertise will be offered as part of the RMIC activities is also provided. According to the Terms of Reference, a RMIC must apply international standards applicable for calibration laboratories, such as ISO/IEC 17025, to the extent possible. The Candidate RMIC will indicate to what extent it will meet these requirements. The letter should be copied to the Permanent Representative of the host country with the WMO, the IOC Action Addressee for the host country, the Secretary General of WMO, the Executive Secretary of IOC, the President of the WMO Regional Association and the chair of the relevant IOC Regional Subsidiary Body where the RMIC is located.

- Capability is also demonstrated by means of a training workshop on Marine instrumentation to be organized within 12 months of the request; resources should be committed by the host country for providing financial assistance to participants of developing countries in the region.

- As the JCOMM Observations Coordination Group (OCG) will be the primary advisory body for JCOMM regarding the RMICs, the JCOMM Co-President requests the OCG to evaluate and verify the capabilities of the proposed Centre.

- The OCG evaluates the request and advises whether the candidate RMIC should be endorsed. The OCG may wish to delegate this work to individuals and/or groups acting on its behalf (e.g. one of the component teams, depending on the nature of the proposed centre), but any advice and proposal to JCOMM should still be assessed by and come through the OCG. OCG will also conduct reviews of performance and capabilities at the required intervals.

- If endorsed by the OCG, and depending on timing, the latter makes an informed recommendation to the JCOMM Management Committee (MAN) or the JCOMM Co-Presidents (acting on behalf of the Commission) and invites them to provide further advice to the next JCOMM Session.

- If endorsed by MAN or the JCOMM Co-Presidents as appropriate, a recommendation is passed to the next JCOMM Session, or depending on timing directly to the IOC and WMO governing bodies.

- If endorsed by the JCOMM Session or the JCOMM Co-Presidents as appropriate, a recommendation is passed to the IOC and WMO governing bodies for including the candidate in the list of RMICs.

- If the JCOMM recommendation is approved by both IOC and WMO governing bodies, the candidate becomes a joint IOC-WMO RMIC, and is listed in WMO Publication No. 8 (CIMO Guide) and IOC Relevant Publications.

It is expected that this process, from submission of the RMIC proposal to the JCOMM Co-Presidents, to formal approval by either of both the IOC/WMO governing bodies, may take from 6 to 12 months.

Annex 2 to Resolution XXVI-9

Terms of Reference for an IOC-WMO Regional Marine Instrument Centre

(as approved at the 3rd session of the Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology, November 2009)

IOC-WMO Regional Marine Instrument Centres (RMIC) should have the following capabilities to carry out their corresponding functions:

Capabilities:

(a) A RMIC must have, or have access to, the necessary facilities and laboratory equipment to perform the functions necessary for the calibration of meteorological and related oceanographic instruments deployed to address the common requirements of IOC and WMO marine-related programmes and co-sponsored programmes[3];

(b) A RMIC must maintain a set of meteorological and oceanographic standard instruments or references and establish the traceability of its own measurement standards and measuring instruments to the International System of Units (SI);

(c) A RMIC must have qualified managerial and technical staff with the necessary experience to fulfil its functions;

(d) A RMIC must develop its individual technical procedures for the calibration of meteorological and related oceanographic instruments using calibration equipment employed by the RMIC;

(e) A RMIC must develop its individual quality assurance procedures;

(f) A RMIC must participate in, or organize, inter-laboratory comparisons of standard calibration instruments and methods;

(g) A RMIC must utilize the resources and capabilities of its region of interest according to the region's best interests, when appropriate;

(h) A RMIC must apply international standards applicable for calibration laboratories, such as ISO/IEC 17025, to the extent possible.

Corresponding functions:

(a) A RMIC must assist Members/Member States of its region in calibrating their national meteorological standards and related oceanographic monitoring instruments according to the RMIC capabilities;

(b) A RMIC must participate in, or organize, JCOMM and/or regional instrument inter-comparisons, following relevant JCOMM recommendations;

3 Basically *in situ* geo-physical instruments deployed in the surface marine environment or sub-surface.

(c) A RMIC must make a positive contribution to Members/Member States regarding the quality of measurements;

(d) A RMIC must advise Members/Member States on enquiries regarding instrument performance, maintenance and the availability of relevant guidance materials;

(e) A RMIC must actively participate, or assist, in the organization of regional workshops on meteorological and related oceanographic instruments and measurements;

(f) The RMIC must cooperate with other RMICs in the standardization of meteorological and related oceanographic measurements and sensors;

(g) A RMIC must regularly inform IOC Member States and WMO Members and report, on an annual basis, to the JCOMM Management Committee on the services offered to Members/Member States and the activities carried out. JCOMM in turn should keep the IOC and WMO governing bodies informed of the status and activities of the RMICs, and propose changes, as required.

A recognized authority[4] must assess a RMIC, at least every five years, to verify its capabilities and performance.

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4 JCOMM will be the body that formally proposes new RMICs and proposes any authority to do evaluations.