**WORLD METEOROLOGICAL ORGANIZATION**

**INTER-COMMISSION COORDINATION GROUP**

**ON THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM**

**Eighth Session**

***Geneva, Switzerland, 24-26 January 2019***

**FINAL REPORT**



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**Executive Summary**

The Eighth Session of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS-8) was held at the WMO Secretariat in Geneva, Switzerland, from 24 to 26 January 2019. The session was co-chaired by Dr Sue Barrell (Australia) and Prof Bertrand Calpini (Switzerland), Co-Chairs of ICG-WIGOS.

ICG-WIGOS reviewed the progress towards the implementation of WIGOS in the five key priority areas of the WIGOS pre-operational phase (2016-2019), and achievements of the ICG-WIGOS Task Teams. In this regard, ICG-WIGOS expressed its appreciation of the progress achieved and thanked all involved experts and contributors ([see Item 4](#Item_4)).

ICG-WIGOS was briefed about the GBON as a WIGOS approach to securing observational data for critical global weather and climate applications, and progress made in drafting the GBON provisions in the Manual on WIGOS (WMO-No. 1160) to clarify the obligations of the WMO Members in this regard. ICG-WIGOS expressed its strong support for the GBON development overall (see [Item 5.2](#Item_5_2) and [Item 7](#Item_7)).

ICG-WIGOS was briefed on the progress achieved in the development of an integrated Vision for WIGOS in 2040 to be submitted to Cg-18. ICG-WIGOS endorsed the current version and requested the WMO Secretariat to finalize it and submit to Cg-18 ([see Item 6](#Item_6)).

It also considered the collaboration and engagement with cross-cutting WMO priorities areas, and achievements in the WIGOS main observing components ([see Item 10](#Item_10)).

ICG-WIGOS agreed on the six main priority areas, for the initial part of the WIGOS Operational Phase, beginning with the eighteenth WMO financial period (2020-2023): (1) National WIGOS implementation; (2) Implementation of the Global Basic Observing Network and the Regional Basic Observing Networks; (3) Operational deployment of the WIGOS Data Quality Monitoring System; (4) Operational deployment of Regional WIGOS Centres; (5) Further development of the Observing Systems Capability Analysis and Review (OSCAR) databases and integration with other system elements; (6) Fostering a culture of compliance with the WIGOS technical regulations ([see Item 9](#Item_9)).

ICG-WIGOS agreed on the deliverables to Cg-18 (see [Item 11](#Item_11)).

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**General summary**

**1.** **ORGANIZATION OF THE SESSION**

**1.1 Opening of the meeting**

1.1.1 The Eighth Session of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS-8) was held at the WMO Secretariat in Geneva, Switzerland, from 24 to 26 January 2019. The session was co-chaired by Dr Sue Barrell (Australia) and Prof Bertrand Calpini (Switzerland). The Co-Chairs welcomed the participants to the meeting, and expressed their wishes for a successful session.

1.1.2 Dr W. Zhang, Assistant Secretary General, welcomed the participants to Geneva. He highlighted the importance of the meeting as it was the last opportunity to review a status of the implementation of WIGOS before Cg-18; he indicated main outcomes and the critical tasks to be accomplished by Cg-18 for WIGOS to be operational from 2020.

1.1.3 He stressed the importance of WIGOS for Members and mentioned that WIGOS had been a very successful WMO project; ICG-WIGOS can be used as an example of a very effective and powerful coordination mechanism.

1.1.4 The list of participants is given in [Appendix I](#Appendix_I).

**1.2 Adoption of the agenda**

ICG-WIGOS adopted the [Agenda](#AGENDA) for the meeting, which is reproduced at the beginning of this report.

**1.3 Working arrangements**

1.3.1 ICG-WIGOS agreed on its working hours and adopted a tentative work plan for consideration of the individual Agenda Items.

1. **REPORT FROM THE CO-CHAIRS**
   1. Dr Barrell briefed the meeting on the achievements since ICG-WIGOS-7, progress made in five main priority areas for the WIGOS Pre-operational Phase, and the work accomplished by the various Task Teams.
   2. Dr Barrell further identified the following key objectives for ICG-WIGOS-8: to review the progress made, to identify gaps and outstanding challenges; what are the priority activities to be “WIGOS Ready”; deliverables to Cg-18; and preparation for WIGOS post 2020, such as WIGOS Operational plan 2020-2023, WIGOS governance and management. She stressed the critical importance of RWCs to the national WIGOS implementation as they link together all pillars of WIGOS.
   3. Other issues were highlighted, such as the recently developed regulatory material for the Global Basic Observing Network (GBON), Vision for WIGOS in 2040, and the potential impact of the anticipated WMO Constituent Body Reform on WIGOS.
   4. Prof Calpini made comments on importance of measurement, traceability and integration; he noted that OSCAR/Surface and WDQMS are real WIGOS tools already available and functional, however there remains the need to secure resources needed for their operations. A letter by Secretary General to PR of Switzerland to support an operational phase of OSCAR/Surface was recommended.
2. **RELEVANT DECISIONS AND GUIDANCE FROM EC-70**
   1. Dr I. Zahumensky, WIGOS-PO, briefed the session on the guidance and recommendations received from EC-70 regarding the implementation of WIGOS.
   2. Developing guidance on the WIGOS Station Identifiers (WSI) and GBON were seen as particularly important for the further development and implementation of WIGOS due to potential impact on Members. The importance of Resolution 17 (EC-70), Implementation Plan of WMO Hydrological Observing System phase II, was also stressed.
3. **STATUS OF THE KEY ACTIVITY AREAS IMPLEMENTATION OF THE PLAN FOR THE WIGOS PRE-OPERATIONAL PHASE**
   1. **National WIGOS implementation**
      1. ICG-WIGOS was briefed on the progress and achievements in this area, namely:

* Guidance on National WIGOS Implementation and Guidance on WIGOS Data Partnerships - Part 1 was finalized for the Guide to WIGOS (the update in English will be available in February 2019);
* The OSCAR/Surface Learning Resources Portal was updated with new training material (http://etrp.wmo.int/moodle/course/view.php?id=129);
* The OSCAR/Surface webinars have been organized monthly (WIGOS-PO) since September 2018 (http://etrp.wmo.int/moodle/mod/oublog/view.php?id=10232)
* The WIGOS Information Resource (WIGOS portal) was updated with new material (e.g. presentations, case studies on Partnerships, WIGOS Station Identifiers, technical reports on AMDAR benefits, etc.), and there were four issues of the WIGOS Newsletters;
* The national WIGOS capabilities of Japan and China were introduced during the separate RA-II WIGOS Workshops in Tokyo, March 2018, and in Beijing, November 2018.
  + 1. The importance of having functioning Regional WIGOS Centres (RWCs) to support national implementations of WIGOS was reaffirmed during the discussion of this item.
    2. ICG-WIGOS agreed that there is a clear need to provide support to Members in developing their national WIGOS implementation plans and that this area needs to be kept as a priority area during the initial part of the WIGOS Operational Phase 2020-2023. It was further agreed that assessment and compliance monitoring processes for the national implementation should be developed during this phase, and that this should include the necessary quantitative monitoring tools.
  1. **WIGOS Regulatory Material complemented with necessary guidance material to assist Members with the implementation of the WIGOS technical regulations**
     1. ICG-WIGOS was briefed on the development of WIGOS regulatory and guidance material during the Pre-operational Phase, namely:

1) New editions of the Technical Regulations (WMO-No. 49), Volume I, Part I WIGOS, and Manual on WIGOS (WMO-No. 1160), including the full integration of all relevant material from the current Manual on GOS (WMO-No. 544), the addition of new provisions relevant to GBON and RBON, remote sensing, data quality monitoring, etc.; to be submitted to Cg-18.

2) Updated version of the Guide to WIGOS with new chapters on: a) Guidance on the national WIGOS implementation; b) Guidance on WIGOS Data Partnerships; c) Establishing a Regional WIGOS Centre in pilot mode”; and d) Technical Guidelines for Regional WIGOS Centres (RWCs) on the WIGOS Data Quality Monitoring System (WDQMS) for surface-based stations of the Global Observing System (GOS) (WMO-No. 1224).

* + 1. ICG-WIGOS recognized the tremendous work made by WEdB with a very valuable contribution by S. Goldstraw (UKMO) and expressed its appreciation of this achievement.
  1. **Further development of the WIGOS Information Resource (WIR), with special emphasis on the operational deployment of the OSCAR databases**

***4.3.1.*** ***OSCAR/Surface***

4.3.1.1 The Secretariat informed the meeting that the OSCAR/Surface API is now available in OSCAR/Surface allowing Members to batch-update information. With respect to Member uptake of the system, the number of helpdesk tickets has remained stable at around 120 per year since 2016, with a slight increase in the number of stations with, however, marked differences across the WMO Regions. Capacity development activities in the form of training courses were conducted in Regions I, IV and V according to the capacity building plan, and the Secretariat pioneered the use of webinars to provide a regular online forum for the WIGOS community. Building on Member and user feedback, the development plan for 2019 will focus on facilitating metadata input through the use of templates, gather more statistics on metadata quality and user engagement and link OSCAR/Surface to the WIGOS Data Quality Monitoring System. With respect to the integration of the WIGOS component observing systems into OSCAR/Surface, the focus will be on fully integrating the already connected GOS, GAW and WMO Weather Radar systems, on developing the Aircraft Based Observing System (ABOS) module and on making the first steps toward integrating the Global Cryosphere Watch (GCW) network.

4.3.1.2 ICG-WIGOS endorsed both the OSCAR/Surface project implementation plan and the capacity development plan for 2019, and encouraged Members to continue updating their station information in OSCAR/Surface. The meeting also supported the notion of extending the production period of the Volume A legacy file until Members have had sufficient time and information to acquaint themselves with the API.

4.3.1.3 S. Gilbert, co-chair, Task Team on OSCAR Development, presented the Report of this Team. The team reviewed its TORs and categorized terms by urgency and established working procedures for working with the WIGOS Metadata and OSCAR Project teams. It also established a work plan for 2019 for the team, which would see the team developing concepts for a templating based input mechanism for OSCAR, provide input to the establishment of metrics and metadata quality indicators and establishing an interface between OSCAR/Surface and WDQMS. The team will also oversee the documentation of OSCAR/Surface. The team emphasized the importance of linking OSCAR/Surface functionality to Use-Cases and proposed to identify suitable users in the community who can serve as representatives for such Use-Cases.

4.3.1.4 ICG-WIGOS requested that the operational running costs of OSCAR/Surface be estimated and reflected in the WIGOS Operational Plan for the next financial period.

***4.3.2.*** ***OSCAR/Space***

4.3.2.1 The Secretariat provided information on progress regarding the operation, maintenance and further development of the WMO database of the space-based observing systems capabilities (OSCAR/Space).

4.3.2.3 ICG-WIGOS acknowledged the progress made and highlighted that OSCAR/Space is an excellent tool that is widely used by a broader community.

4.3.2.4 ICG-WIGOS agreed that there is an urgent issue to keep sustainability of the OSCAR/Space databases; CGMS members should be encouraged to provide resources needed. Requirement analysis should be made for this purpose.

***4.3.3.*** ***OSCAR/Requirements***

4.3.3.1 The Secretariat presented progress made regarding the operations, maintenance and further development of the WMO Database of User Requirements, included as OSCAR/Requirements into the Observing Systems Capability Analysis and Review Tool (OSCAR), and in harmonizing the variables listed in OSCAR/Requirements and OSCAR/Space with those in OSCAR/Surface and in the WIGOS Metadata Standard.

4.3.3.2 ICG-WIGOS acknowledged the progress and clearly recognized its importance for planning; however there is a big challenge to keep it updated due to lack of human resources and funds. All related experts and teams involved were encouraged to continue in their work.

***4.3******.4. WIGOS Station Identifiers***

4.3.4.1 S. Gilbert, representing the Task Team on WIGOS Station Identifiers (TT-WSI) presented the outcomes from the first meeting of the Team which had taken place partly along with the EUMETNET Task Team on WSI. TT-WSI agreed on a set of conclusions, recommendations and actions that are mostly related to: (a) a more constrained WSI structure; (b) a process for “trusted” third party organizations, such as EUMETNET, the Copernicus Climate Change Service (C3S) to be authorized to assign WSI, with ultimate authority (“veto power”) still residing with the PR of the country or territory in which the station is or was operated; (c) procedures for operational transmission of WSI in BUFR messages; (d) a minimal set of WIGOS Metadata fields required for registering a new station/WSI in OSCAR/Surface; (e) the need to preserve the documentation describing the national schemas for WSI; and (f) a test environment and experiment to be led by the European Centre for Medium-Range Weather Forecasts (ECMWF) in the short term.

4.3.4.2 ICG-WIGOS recognized that there are some challenges for Members to issue WSIs. It agreed that users’ requirements expressed under (a) above, should be carefully considered, however the impact on the WSI national schemas should be minimized.

4.3.4.3 The current process for allocation of WSIs (necessary first step in OSCAR/Surface registration) goes via the PR of the Country. ICG-WIGOS recognized that in many cases this amounts to an unnecessary and unacceptable bottleneck, and agreed that the WSI related procedures in the Manual on WIGOS (WMO-NO. 1160) must be updated such that trusted authorities other than the PR can assign WSIs. WIGOS Project Office was requested to propose a course of action on this matter.

4.3.4.4 ICG-WIGOS agreed in principle with the proposal to minimize a set of WIGOS metadata required for registering a new station in OSCAR/Surface, however there must be a clarification regarding the circumstances under which this would be acceptable.

***4.3.5.*** ***WIGOS Metadata implementation***

4.3.5.1 J. Klausen, co-chair, TT-WMD, presented the progress made in this area and indicated issues and challenges; he also presented the conclusions, actions and recommendations from TT-WMD-7.

4.3.5.2 ICG-WIGOS acknowledged the work done by TT-WMD. It agreed with recommendations from TT-WMD-7, as listed in [Doc.4.3(5)\_WMD](http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings/ICG-WIGOS-8/Doc.4.3(5)_WMD.docx) submitted to ICG-WIGOS-8, with an exception of two recommendations listed under 4.2.4.

4.3.5.3 ICG-WIGOS agreed with the proposals for changes in the Manual on WIGOS, WIGOS Metadata Standard and Guide to WIGOS, as presented to ICG-WIGOS.

* 1. **Development and implementation of the WIGOS Data Quality Monitoring System (WDQMS)**
     1. The progress achieved in the development and implementation of the WIGOS Data Quality Monitoring System (WDQMS) was presented, including contributions to WIGOS regulatory and guidance material. Next steps with timeline were presented as well.
     2. It was noted that the WDQMS development has had a substantial impact on a GBON concept, with the output generated by the GNWPC pilot being presented to EC-70 as a core piece of evidence for the need for a GBON.
     3. ICG-WIGOS acknowledged tremendous progress made; it underlined again critical importance of RWCs for operational activities related to the Evaluation and Incident Management Functions of the WDQMS.
     4. ICG-WIGOS agreed that the work of the Task Team must continue. It agreed with the recommendations, conclusion and actions from TT-WDQMS-3 presented in [Doc.4.4\_WDQMS](http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings/ICG-WIGOS-8/Doc.4.4_WDQMS.docx).
     5. It was agreed that the activity plan with timeline needs to be developed for the transition phase in respect to WMO Constituent Body Reform (CBR).
  2. **Concept development and initial establishment of Regional WIGOS Centres**
     1. The representatives of Presidents of the Regional Associations briefed ICG-WIGOS on the progress achieved in their respective Region.
     2. RA I: Several Members have indicated their interest in hosting or co-hosting RWC pilots, e.g. Morocco, Kenya, Tanzania; a main challenge are the resources. It has been agreed to establish an RWC in pilot mode in East Africa under HIGHWAY project funding provided by DFID (UK), operated jointly by Kenya and Tanzania. However, progress so far has been slow. The potential role for AGRHYMET in the implementation of a RWC (potentially jointly with Dakar RSMC) for the West Africa is under discussion. The ultimate intention is to identify potential candidates in each sub-region of RA I and have them submit proposals for RWC pilots.
     3. RA II: RWCs are being developed on a sub-regional basis: China and Japan have both formally addressed P/RA-II to request recognition of RWCs in pilot mode in Beijing and in Tokyo, respectively. The issue of RWC(s) for RA II was discussed at the RA-II Workshop on WIGOS held in Beijing, November 2018. At the RA-II WIGOS Workshop to be held in March 2019 in Tokyo, further discussions regarding RWC coordination will take place. There are indications of interest also from India, Saudi Arabia and Belarus (for Russian speaking countries of RA II and RA VI). A WIGOS Workshop is tentatively planned for the MENA countries (Middle East and North Africa) for Saudi Arabia in Q2-2019. There are tentative plans to establish a RA-II RWCs Coordination Group.
     4. RA III: A Virtual RWC was approved by RA III-17 (November 2018, Chile), with distributed functions undertaken by two Members, Brazil and Argentina; a coordination committee was established and the governance principles were agreed. A more detailed plan for the operational implementation is under development.
     5. RA IV: No clear path yet. USA may be willing to help. The CMO Headquarters and the Trinidad and Tobago Meteorological Service (TTMS) agreed to explore co-hosting a Regional WIGOS Centre for the English-speaking Caribbean, if the required technical resources can be made available.
     6. RA V: RA-V-17 endorsed the intention of Australia and Singapore to establish a virtual Regional WIGOS Centre (RWC) in pilot mode through a collaborative effort, with potential contributions offered also by Fiji and Indonesia and requested its Management Group to support the establishment of this RWC; Indonesia and Fiji should articulate their specific intended contributions to the RWC and to joining the RWC pilot as and when appropriate.
     7. RA VI: There is a successful RWC operating in pilot mode for the monitoring function of the WIGOS Data Quality Monitoring System (WDQMS) thanks to EUMETNET engagement, initially at DWD (2018) and now at UK MetOffice from 1 January 2019 with support from DWD (to run Quality Monitoring portal). The consideration is to expand activities to cover the function of WIGOS metadata management in OSCAR/Surface, depending on a decision by EUMETNET STAC/PFAC; there is a need to find one or more Members to operate the Evaluation and the Incident Management functions of the WDQMS as part of the RWC, and to find Members to host RWC(s) for those WMO Members who are not EUMETNET members, primarily in sub-regions of SE and E Europe. Potential candidate Members include Belarus (for the Russian-speaking Members in RA-VI and RA-III), Croatia, Greece and Turkey.
     8. The discussion can be summarized as follows:

1. ICG-WIGOS reaffirmed that Regional WIGOS Centres are a key element in supporting Members in the implementation of WIGOS, and in improving the overall performance of WIGOS.
2. The RWC concept has been developed and refined during three subsequent sessions of ICG-WIGOS, under strong guidance from the P-RAs in particular; however, the current level of implementation of the RWC concept remains quite low by any measure.
3. There is the need to enhance communications and outreach to the PRs and decision makers regarding the importance of RWCs.
4. There is a need to: (a) ensure global coverage of RWC efforts, given the limited effectiveness of seeking volunteers, (b) ensure unique affiliation between individual Members and one (and only one) RWC for the purpose of quality monitoring and incident management, (c) to establish process for accreditation of RWCs, and (d) to establish a strong global coordination and support mechanism for RWC.
5. **PROGRESS TOWARD IMPLEMENTATION OF WIGOS**

**(Review of key outcomes from regional WIGOS workshops and meetings)**

* 1. **JMA/WMO Workshop on Quality Management of Surface Observations**
     1. The joint JMA/WMO Workshop on Quality Management of Surface Observations and RA--II WIGOS Project was held at the Japan Meteorological Agency (JMA) headquarters in Tokyo, Japan, from 19 to 23 March 2018.
     2. The workshop was a major activity of the Regional WIGOS Project titled *Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations* as approved at the 16th session of RA II (Abu Dhabi, UAE, February 2017), and was planned in response to the Questionnaire on Quality Management for Surface Meteorological Observations in RA II conducted in April 2016 under the previous Regional WIGOS Project.
     3. The following matters were discussed in four groups: a) Future visions for surface observation networks; b) Short- and long-term goals in observation data quality; c) Improvement of on-site quality management, control and checking activities, including instrument calibration and maintenance; d) Approaches to staff training. The Tokyo Action Plan 2018 (TAP2018) was developed as an outcome of the consideration of these topics (see [Annex III of the Final Report from the Workshop](http://www.wmo.int/pages/prog/www/WIGOS-WIS/reports/JMA-WMO-Workshop-QM-RWC.pdf)).
  2. **GBON Global Basic Observing Network (GBON) Workshop**
     1. ICG-WIGOS was briefed about the rationale for, and outcomes from the GBON workshop, Geneva, July 2018. In June EC-70 gave CBS the authority to proceed with the design of a Global Basic Observing Network (GBON), the primary aim of which would be to clarify the obligations of the WMO Members to provide critically needed observational data for near-real time international exchange at the global level. Based on the outcomes from the breakout groups, the GBON Concept was drafted; it was further developed after the workshop and its latest version is available at: <http://www.wmo.int/pages/prog/www/wigos/GBON.html>.
     2. Regarding the GBON itself, see also Section 7 below.
  3. **RA VI Workshop on AMDAR and WIGOS**
     1. RA VI Workshop on AMDAR and WIGOS was held in Minsk, Belarus, 2-3 October 2018. The members of the RA VI Task Teams on WIGOS and on Aircraft based observations were invited to the Workshop. The first meetings of both RA VI Task Teams were conducted back to back on 4 October 2018. The outcomes were presented.
     2. In the follow-up discussion focus was given to communications and outreach activities, how to engage National WIGOS Focal Points to provide regular feedback via a web based portal to the Task Team on WIGOS and WIGOS Project Office.
  4. **GCOS-WIGOS-UNFCCC-Copernicus-GFCS Workshop on Improving observations to support climate policy, adaptation and mitigation in East Africa**
     1. The key messages from the Joint GCOS-WIGOS-UNFCCC-Copernicus-GFCS Workshop on Improving observations to support climate policy, adaptation and mitigation in East Africa (31 Oct-2 Nov 2018, Entebbe, Uganda) were presented.
     2. The workshop developed an outline for a regional plan to improve the value chain from observations to climate services in East Africa covering: a) Planning to ensure the sustainability of systems and staff: recognising the value of life cycle management of equipment and in-house staff training and mentoring; b) Calibration and maintenance policies; c) Meeting the observational needs of international numerical weather prediction and reanalysis centres; d) Building on the benefits of the HIGHWAY project around Lake Victoria to enable fully functioning regional network of stations; e) Support regional collaboration to build technical and operational capabilities.
  5. **RA II Workshop on WIGOS**
     1. The WMO Regional Association II (RA II) WIGOS Workshop was held in Beijing, China, from 6 to 8 November 2018. The meeting was hosted by the China Meteorological Administration (CMA) and co-organized by WMO Secretariat.
     2. The goals of the workshop were: to raise awareness of WIGOS, to showcase the latest WIGOS developments, such as those going on at CMA and at the Japan Meteorological Agency (JMA), and to further progress on establishing the Regional WIGOS Centres (RWC) in RA II.At the workshop, recommendations to RA II Members and WIGOS-PO were formulated (see the Final Report from the workshop, <http://www.wmo.int/pages/prog/www/WIGOS-WIS/meetings.html>).
  6. **Workshop for Regional WIGOS Centres in RA III**
     1. The Workshop on Regional WIGOS Centres (RWC) in Regional Association III (RA III) was held in Santiago, Chile, 16 - 17 November 2018. The goals of the workshop were: a) discussion on details of the RA III RWC project and proposal; b) consideration of relevant technical aspects; and c) preparation for the Regional Conference of Regional Association III (RA III RECO-17). The participants to this Workshop were the members of the Task Team on RWC in RA III established by the RA III Working Group on Infrastructure and Technological Development (WG-ITD/RA III).
     2. The participants identified the main WIGOS challenges in RA III and agreed on the recommendations to be addressed at the RECO-17, including establishment and operations of RWC pilot in RA III.
     3. ICG-WIGOS acknowledged the outcomes from the workshop as a very important step towards establishment of RWC pilot in RA III and expressed it appreciation to the WG-ITD/RA III, for the progress made.
  7. **RA I WIGOS Workshop on AWS Networks**
     1. The WMO RA I WIGOS Workshop on Automatic Weather Station (AWS) networks, Strengthening and modernizing observing systems in Africa, was organized in Windhoek, Namibia, 19 - 21 November 2018. The Workshop was dedicated to NMHS surface observing system managers and National WIGOS Focal Points of RA I.
     2. A set of recommendations, addressed partly to WMO, partly to the international development community and partly to the RA I Members, was developed (see the [Final Report from the Workshop](http://www.wmo.int/pages/prog/www/WIGOS-WIS/reports/RA-I-WIGOS-Workshop-AWS-Networks_Namibia-2018.docx)). One of the most important recommendations was to consider issuing strict directives (e.g. using ICAO as example), requiring countries to comply with obligations specified in the WMO Technical Regulations (WMO-No. 49), Volume I, and in the Manual on WIGOS (WMO-No. 1160), to actively monitor the compliance of Members regarding observing standards, station density. It was viewed that compliance monitoring from WMO’s side would help ensure adequate national investments in NMHSs.
     3. ICG-WIGOS agreed that fostering compliance with the WIGOS technical regulations should be one of the main priority areas for the initial part of the WIGOS Operational Phase, beginning with the eighteenth WMO financial period (2020-2023).

1. **VISION FOR WIGOS IN 2040**
   1. ICG-WIGOS was briefed on the progress achieved in the development of an integrated Vision for WIGOS to be submitted to Cg-18.
   2. ICG-WIGOS endorsed the current version and requested the WMO Secretariat to finalize it and submit to Cg-18.
   3. ICG-WIGOS recommended that the Secretariat undertake the necessary editorial work toward making the “Vision” easier to read and be graphically more appealing, noting that it is intended to serve as a guidance document, not as a regulatory text.
2. **GLOBAL BASIC OBSERVING NETWORK IMPLEMENTATION STRATEGY AND PLAN**
   1. The presentation on GBON as a WIGOS approach to securing observational data for critical global weather and climate applications was made, providing answers to the following questions: 1) Why is it important to have weather and climate observations everywhere on the globe? 2) What do we need to measure from the surface? 3) Why and where are we currently missing observations? 4) What is WMO doing about this problem? 5) What is the expected impact of GBON on WMO Members?
   2. Ensuring a continuous real-time supply of observational data from all areas of the globe to critical global NWP and climate analysis systems is vital to product generation and service delivery capabilities of all WMO Members. The current availability of observational data falls well short of agreed requirements, this limits the ability of all WMO Members to predict and understand the atmosphere at all time-scales. The GBON provisions in the Manual on WIGOS will clarify the obligations of the WMO Members in this regard, and can help guide both national WIGOS implementation and internationally funded development projects.
   3. ICG-WIGOS expressed its strong support for the GBON development overall.
   4. The issue of whether or not to include also observing systems beyond those used for NWP in the GBON development was discussed. ICG-WIGOS expressed its agreement with the approach proposed by the GBON Design Workshop, namely to focus on surface observations and upper air soundings provided by the NMHSs in the first iteration of the GBON, and keeping the option open to expand it further in the future as agreements on requirements are substantiated and agreed upon.
   5. OSCAR/Surface and WDQMS will play an important role in a process of designation of GBON stations by Members. Designation procedures/practices and a “GBON action plan for phased implementation” should be developed for Cg-18.
   6. ICG-WIGOS recalled the process for selection and nomination of stations in RBSN and RBCN, and agreed that with the increased number of stations anticipated to be part of GBON and RBON, the current model could not realistically be reproduced for such networks, and that the process should be modernized. ICG-WIGOS recommended that the nomination of stations by Members into GBON and RBON should follow the approach outlined below:

1) Members designate stations into GBON and RBON by themselves using OSCAR/Surface.

2) OSCAR/Analysis and WDQMS is used to monitor compliance of Members with regard to GBON and RBON requirements.

3) When gaps are identified, they are communicated to Members requesting them to take action as needed.

1. **WIGOS RELATED PROJECTS**

**8.1** ICG-WIGOS was briefed on activities related to the CREWS West Africa and the potential for a Regional WIGOS Centre (RWC) pilot in AGRHYMET for West Africa. Discussion was initiated with AGRHYMET and the World Bank regarding the role of AGRHYMET in the implementation of RWC, potentially jointly with Dakar RSMC, for the West Africa. AGRHYMET expressed its willingness to run one of the mandatory functions, i.e. metadata management of the West Africa Members. There is an opportunity to use the SAWIDRA Steering Committee to discuss establishment of a RWC pilot.

**8.2** The president of CIMO briefed ICG-WIGOS about progress achieved in the AWS Tender Specifications Project, where a current priority is to work together with HMEI in identifying one or more developing countries to test its practicality. Additional information was provided on the International Cloud Atlas (web-based WMO Manual available at: [cloudatlas.wmo.int/home.html](https://cloudatlas.wmo.int/home.html)), soon available in all WMO languages; and a new edition of the CIMO Guide (WMO-No. 8) with the five Volumes and forty Chapters.

**8.3** The Multi-hazard Early Warning Advisory System in South-East Europe was presented briefly. It was noted that Ukraine has been providing more data to the project as compared to what they currently disseminate through GTS/WIS.

1. **WIGOS POST 2020 AND IMPACT OF WMO CONSTITUENT BODY REFORM**
   1. The presentation on Constituent Body Reform was delivered.
   2. ICG-WIGOS expressed its concern regarding the transition phase, and lack of a governance umbrella for the ICG-WIGOS Task Teams; the view was that the teams must continue with their technical activities without break. ICG-WIGOS recommended that it should be authorized to keep its mandate until the new WMO structure is in place.
   3. ICG-WIGOS was briefed on the development of a skeleton “WIGOS operational (plan) 2020-2023” that describes the objectives and main planned activities for the initial part of the WIGOS Operational Phase, beginning with the eighteenth WMO financial period (2020-2023), and will be submitted to Cg-18.
   4. The document outlines the initial operational capabilities of WIGOS to be in place by 2020, and it describes the main activities that are planned to take place from 2020 and beyond in order to further develop the system during this next period. These activities are structured in six main priority areas, namely: (1) National WIGOS implementation; (2) Implementation of the Global Basic Observing Network and the Regional Basic Observing Networks; (3) Operational deployment of the WIGOS Data Quality Monitoring System; (4) Operational deployment of Regional WIGOS Centres; (5) Further development of the Observing Systems Capability Analysis and Review (OSCAR) databases and integration with other system elements; (6) Fostering a culture of compliance with the WIGOS technical regulations.
2. **COLLABORATION AND ENGAGEMENT WITH CROSS-CUTTING WMO PRIORITIES**
   1. **Global Framework for Climate Services (GFCS)**
      1. Mr. F. Lucio, D/GFCS Office, informed ICG-WIGOS about a Task Force that was established to analyse a current governance structure of GFCS and the major outcomes; it was agreed that the GFCS pillars need to be adequately reflected in the governance structure. Based on this analysis the proposal for mid-term solution was developed. ICG-WIGOS agreed that there is a way forward for collaboration within the new GFCS governance.
   2. **Global Climate Observing System (GCOS)**
      1. The GCOS Secretariat provided an update on GCOS activities in 2018, such as Performance Report of the GCOS surface network, GUAN monitoring, GCOS cooperation mechanism, activities in South Pacific – Fiji and Africa – Uganda, and the activities of its AOPC Task Teams.
   3. **Global Earth Observation System of Systems (GEOSS)**
      1. Mr Douglas Cripe, the GEO Secretariat, made a generic presentation on GEO; collaboration with WMO relevant to WIGOS.
      2. ICG-WIGOS agreed that there is opportunity for collaboration with mutual benefits.
   4. **Global Atmosphere Watch**
      1. Mr. S. Fuzzi, the CAS representative delivered the presentation on GAW; it covered the GAW structure, challenges in a RRR process, enhanced data management, and potential impact of CBR on performance of GAW.
      2. ICG-WIGOS stressed the importance of GAW observations to be made available operationally (in real/near-real time) for GNWP centres to improve their products. Full integration of a GAW observing component in WIGOS is important.
   5. **WMO Hydrological Observing System**
      1. The presentation on the Implementation Plan of WHOS Phase II was delivered by Mr. S. Pecora, CHy vice–president.
      2. ICG-WIGOS underlined the importance of enhanced and open sharing of hydrological observations.
   6. **Global Cryosphere Watch**
      1. Dr A. Snorrason, representing GCW, briefed ICG-WIGOS about a GCW status, its preoperational phase and way forward. There is an increasing interest to join the GCW network; however, there are some issues and challenges to be dealt with, such as the procedures for issuing WSIs, and exchange of data in real time, using BUFR or other formats, when the data originates from networks which are not operated by NMHSs.
      2. Acceptance of new stations for the GCW network has been paused to address their registration in OSCAR/Surface, mainly due to a problem with allocation of WSIs, and availability of WIGOS metadata required as mandatory.
      3. ICG-WIGOS noted that the British Antarctic Survey (BAS) has the potential to be proposed as RWC for Antarctica.
3. **DELIVERABLES TO CG-18**
   1. ICG-WIGOS agreed on the following deliverables to Cg-18:
   2. GBON, including concept and development of a nomination process;
   3. WIGOS Technical Regulations (WMO-No. 49, Vol. I, Manual on WIGOS (WMO-No. 1160);
   4. Guide to WIGOS (WMO-No. 1165);
   5. WIGOS Operational plan 2020-2023;
   6. Vision for WIGOS in 2040
4. **FUTURE WORK PROGRAMME AND ACTION PLAN OF ICG-WIGOS; REVIEW OF TORs**
   1. ICG-WIGOS agreed that the ICG-WIGOS Task Teams, mainly TT-WSI, TT-OD, TT-WDQMS, TT-WMD must have their mandates extended to allow them to continue their work without any interruption.
5. **ANY OTHER BUSINESS**
   1. The GCOS Secretariat briefed ICG-WIGOS about progress made in TPOS 2020, where the Second Report will be available soon (<http://tpos2020.org/project-reports/>).
   2. ICG-WIGOS was also briefed about the OceanObs’19 Conference. The Conference goal is to communicate the decadal progress of ocean observing networks and to chart innovative solutions to growing societal needs for ocean information in the coming decade. OceanObs’19 represents the culmination of a major planning effort to set the agenda for the next decade of sustained ocean observing, with a focus on ‘connecting observations to users’. More information is available at [www.oceanobs19.net](http://www.oceanobs19.net).
   3. The concept paper on MetData 2020 - WMO Conference on Meteorological Data Sharing in the 21st Century was presented. There were several proposals to enlarge a focus of the Conference; however ICG-WIGOS agreed that meteorological data are under highest risk and strongly endorsed the concept, keeping the emphasis on the current risks to meteorological data exchange, with a view to expanding the remit at future conferences.
   4. ICG-WIGOS exchanged views on how to enhance communications on WIGOS to encourage greater engagement at national and regional levels in WIGOS implementation.
   5. Dr W. Zhang, Assistant Secretary General, acknowledged great contribution by Dr S. Barrell and Prof B. Calpini, co-chairs of ICG-WIGOS, to the implementation of WIGOS since Cg-XVI and EC-LXIII (May-June 2010) when ICG-WIGOS was established.
   6. The certificates were presented to the co-chairs in recognition of their outstanding services to the WMO community, leading WIGOS from its initial concept phase to becoming recognized as fundamental observational infrastructure that underpins all products and services delivered by the WMO Members to their constituencies.
6. **CLOSURE OF THE SESSION**
   1. The session closed on Saturday, 26 January 2019, at 15:30 hours.

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**Appendix I**

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**Appendix II**

**FUTURE WORK PROGRAMME AND ACTION PLAN OF ICG-WIGOS AND TASK TEAMS**

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| **Action[[1]](#footnote-1)** | **Action/Activity** | **Deadline** | **Responsible** | **Status[[2]](#footnote-2)** | **Comment** |
| 1. 4.3(1)4 | To estimate the operational running costs of OSCAR/Surface and reflect it in the WIGOS Operational Plan for the next financial period | Cg-18 |  |  |  |
| 1. 4.3(4)3 | To propose process/procedures to allow “trusted” authorities other than the PR to assign WSIs | Cg-18 |  |  |  |
| 1. 4.3(5)3 | To incorporate the proposals for changes in the Manual on WIGOS, WIGOS Metadata Standard and Guide to WIGOS, as presented to ICG-WIGOS | Cg-18 |  |  |  |
| 1. 4.4.4 | To incorporate the proposals for changes in the Manual on WIGOS and Guide to WIGOS, as presented to ICG-WIGOS | Cg-18 |  |  |  |
| 1. 4.5.8 | To develop process for accreditation of RWCs, and mechanism for global coordination of RWCs | Cg-18 |  |  |  |
| 1. 6.2, 6.3 | To finalize the Vision for WIGOS in 2040 and submit to Cg-18, including editorial work toward making the “Vision” easier to read and be graphically more appealing | Cg-18 |  |  |  |
| 1. 7.5, 7.6 | To develop designation procedures/practices and a “GBON action plan for phased implementation” | Cg-18 |  |  |  |
| 1. 11.1 | To ensure the following deliverables to Cg-18:  1) GBON, including concept and development of a nomination process;  2) WIGOS Technical Regulations (WMO-No. 49, Vol. I, Manual on WIGOS (WMO-No. 1160);  3) Guide to WIGOS (WMO-No. 1165);  4) WIGOS Operational plan 2020-2023;  5) Vision for WIGOS in 2040 | Cg-18 |  |  |  |

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1. With the reference to the paragraph of the General Summary, Final report from ICG-WIGOS-8 [↑](#footnote-ref-1)
2. Status column entries will be one of the following descriptors: **Completed; On-Track; Overdue** [↑](#footnote-ref-2)