



WMO Integrated Global Observing System WIGOS NEWSLETTER

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Contents

1. From the President of CHy
2. Outcomes of the Workshop on the Vision for WIGOS in 2040, Surface-based perspective
3. Relevant outcomes of the 16th Session of the Commission for Basic Systems
4. Outcomes of the RA I WIGOS Workshop - French speaking countries
5. Outcomes of RA II WIGOS Workshop for West Asia
6. Outcomes of the 5th Session of ICG-WIGOS Task Team on WIGOS Metadata
7. Outcomes of the 1st Session of ICG-WIGOS Task Team on WIGOS Data Quality Monitoring System
8. WIGOS Related Events/Meetings

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[WIGOS Webpage](#)

[WIGOS Newsletter email](#)

1. From the President of the Commission for Hydrology (CHy), Harry Lins

The Commission for Hydrology held its fifteenth session (CHy-15) in Rome, Italy, from December 7-13, 2016. A total of 140 participants attended the session, representing 57 Members of WMO and 11 international organizations. A significant aspect of the session discussions related to data operations, management and exchange, with a special focus on the WMO Hydrological Observing System (WHOS), WaterML 2.0, and WIGOS and WIS. With respect to WaterML 2.0, the Commission concurred and decided to join with Commission for Basic Systems (CBS) in a recommendation to Executive Council-69 on data representation for hydrological information. It also reiterated its strong support for a closer linkage of CHy observational activities with WIGOS implementation. Notably, the newly elected vice-president of CHy, Mr. Silvano Pecora (Italy), has been the primary person responsible for developing the WHOS and for ensuring that its framework is both WIGOS and WIS compliant.

A major outcome of CHy-15 was the adoption of Resolution 4.1(3) on data operations and management which approves the further implementation of WHOS Phase I, dealing with an interactive map interface for linking to the existing freely and openly available hydrological data holdings of National Hydrological Services (NHSs), as well as the initial concept of WHOS Phase II. During its second phase, WHOS aims to develop IT Infrastructure and Services to support the advancement of hydrologic science and information as a principal component of WIGOS/WIS, directed toward operational water issues (surface and ground water, water quantity and quality). In this context, WHOS will publish discovery metadata allowing WMO users to access a range of services. A future phase of WHOS, under consideration, will pilot potential extensions of WIGOS/WIS functions and services tailored to the needs of the hydrological community.

The Commission also requested its Advisory Working Group (AWG), with the support of the WMO Secretariat, to develop an initial WHOS implementation plan for presentation to and endorsement by EC-70 in 2018, covering issues such as governance, architecture, relationships with the WIGOS and WIS centres, provision of metadata into OSCAR and a clear definition of the roles of CHy, the Secretariat, the global data centres, and the NHSs. In this regard, the president of CHy was requested to form a small task team to prepare a report to the EC-69 with regard to the evolving role of the Global Runoff Data Centre (GRDC), the International Groundwater Resources Assessment Centre IGRAC), and the International Data Centre on Hydrology of Lakes and Reservoirs (HYDROLARE), and their relationship with WMO in general, and with WIGOS and WIS in particular. This review may include the Global Precipitation Climatology Centre (GPCC) as well.

Finally, CHy-15 made two additional requests to the AWG of relevance to WIGOS and WIS: (1) to prepare a new version of the observational requirements and the Statement of Guidance for the Application Area "Hydrology", taking into account the implementation plan of WHOS Phase II, for presentation to the Inter-Programme Expert Team on the Observing System Design and Evolution (IPET-OSDE) in second half of 2017; (2) to engage with CBS to ensure that WHOS Phase II is fully aligned with the WIS 2.0 Strategy.

Thus, the Commission for Hydrology expressed its strong support for WIGOS through a series of actions having broad and substantive implications for the observational and data management activities of NHSs through the period leading to WIGOS becoming operational.

2. Outcomes of the Workshop on the Vision for WIGOS in 2040, Surface-based perspective (Geneva, Switzerland, 18-20 October 2016)

As well as launching WIGOS into its pre-operational phase, Cg17 requested CBS, to develop a Vision for WIGOS in 2040, for submission to Cg18 in 2019. The Vision for WIGOS in 2040 is intended to provide a reference to WMO Members and other providers of relevant observations for planning their long term investment in developing and delivering observing system components to meet user requirements across a wide range of application areas.

The Vision 2040 builds on the existing Vision 2025, but given that most satellite missions are already committed to 2025 and beyond, extending the timeline to 2040 is necessary to allow the WMO community to influence space agency mission planning and priorities. Such an extended timeline is more challenging for the surface-based component, but taking the long view is essential to optimising the complementarity of surface and space, and the integrated cross-cutting approach of WIGOS.

The CBS OPAG-IOS Expert Team on Satellite Systems (ET-SAT), in collaboration with the Coordinating Group on Meteorological Satellites (CGMS), has developed an advanced draft of the satellite component of the Vision 2040. The CBS OPAG-IOS Inter Programme Expert Team on Observing System Design and Evolution (IPET-OSDE) has developed an early draft of the 2040 vision for the surface-based component of WIGOS.

A meeting was convened in Geneva from 18-20 October 2016 to focus on evolving the draft surface component of the Vision 2040. However, the meeting achieved much more than that. Carefully selected participants and a series of well-targeted discussions allowed the meeting to map out many of the challenges, drivers and dependencies that will influence observing system needs and choices over the next 25 years. These included projected societal, economic, environmental and technological megatrends and their potential implications for delivery of meteorological, climate and hydrological services; the future of environmental measurements; and potential step changes in technology evolution, diverse sources of observations and the growing importance of data partnerships. The meeting examined trends across all the component observing systems of WIGOS – Global Observing System including ocean and aircraft observations, Global Atmosphere Watch, WMO Hydrological Observing System, Global Cryosphere Watch, as well as WIS.

The meeting considered the evolving requirements of GCOS, GFCS, numerical weather prediction and reanalysis, as key drivers of the Vision 2040, and heard from the World Bank on trends, pressures and requirements in developing countries.

Several national perspectives were provided to illustrate how various NMHSs were already responding to changing demands, highlighting the importance of integration and partnerships. The WMO Secretary General joined the meeting to outline his approach to WMO Strategic Planning and to discuss perspectives on the future of WMO and WIGOS.

The meeting reached agreement on the broad outline for a 10-page WIGOS 2040 vision document that brings together both surface-based and space-based components, with more detailed information on each in annexes. Relevant Expert Teams will continue to finalise the annexes while a small drafting team (Barrell – CBS/BOM, Calpini – CIMO/MeteoSwiss, Pica – NOAA NWS) is developing the draft of the main vision document for further consideration by ICG-WIGOS.



3. Relevant outcomes of the 16th Session of the Commission for Basic Systems (Guangzhou, China, 23-29 Nov. 2016)

The 16th Session of the Commission for Basic Systems was held in Guangzhou, China from November 23 to 29 2017 at the kind invitation of the government of the People's Republic of China. The Session was attended by more than 200 delegates and observers from more than 70 countries, and it was preceded by a two-day Technical Conference highlighting Emerging Trends in Information and its Use.

As one of the key strategic priority areas of WMO, WIGOS was featured prominently on the agenda, and many delegates weighed in on WIGOS issues during the deliberations. All WIGOS-related documents were approved without controversy by the Session, including the endorsement of a revised version of the Manual on WIGOS and the endorsement of the initial version of the Guide to WIGOS.

An item of particular interest to many delegates was OSCAR/Surface. Several requests for additional regional training events on how to use the new system were made during interventions from the floor. In principle the Secretariat is ready to support this, but the time line will depend on the available resources.

Several interventions were made also concerning the availability for a machine to machine interface through which Members can upload the contents of existing metadata databases to OSCAR/Surface. It was pointed out that both the training and the machine to machine interface are critical to the operational uptake of OSCAR/Surface among the WMO Members. The current status of this uptake was briefed to the delegate outside the formal session, and it was considered satisfactory for now but was still considered a major potential risk factor for WIGOS.

The CBS delegates were also briefed on the outcome of the Sixth WMO Impact Workshop in Shanghai. The Commission was highly appreciative of this work and requested that a seventh WMO Impact Workshop be held in the 2020 timeframe. Early results from the WIGOS Data Quality Monitoring System pilot and demonstration projects were also briefed to the delegates, and the potential transformative nature of this system and the information it can provide was clearly recognized.

4. Outcomes of the RA I WIGOS Workshop - French speaking countries (Dakar, Senegal, 28-30 September 2016)

The WMO Regional Association I (RA I) Workshop on WIGOS, for French speaking countries, was held in Dakar, Senegal, from 28 to 30 September 2016. On behalf of the Permanent Representative of Senegal with WMO, Dr. Aïda Diongue Niang opened the Workshop.

There were three main purposes of the Workshop:

- (a) to brief participants about the activities planned for the WIGOS Pre-operational Phase;
- (b) to advise them on WIGOS implementation at the regional and national levels;
- (c) to consider a way forward in the regional planning efforts for WIGOS, specifically for establishing Regional WIGOS Centres in pilot mode in RA I.

The Workshop Programme covered the following topics: 1. WIGOS Pre-operational phase (2016-2019); 2. Regional WIGOS Centres; 3. AMDAR Programme in RA I; 4. National WIGOS Implementation; 5. Regional WIGOS Partnerships. The presentations are available at the WIGOS web site: <http://www.wmo.int/wigos>

Based on the presentations delivered by the invited speakers and follow-up discussions, the participants, in majority Permanent Representatives (PRs) of French-speaking Countries with WMO of the RA I, formulated the following 11 recommendations:

- 1- Members that have not yet designated their national focal points for WIGOS, WIS and OSCAR/Surface to do so by 15 November 2016 at the latest.
- 2- Members should initiate the implementation of WIGOS and WIS at the national level.

3- The meeting recommended to the RA I Management Group and President RA I, to proceed with the amendment of Resolution 8 in order to re-establish the Task Team on WIGOS in RA I.

4- Workshop on AWS (in English): The meeting recommended to the WMO Secretariat to make necessary arrangements for French interpretation for French speaking participants.

5- The meeting proposed Morocco to host the Regional WIGOS Centre in pilot mode and requested the WG-OTI to collaborate with Morocco to develop a plan for its implementation, the draft document to be ready, preferably, before April 2017.

6- Taking into account the large number of countries in the Region, the meeting recommended that the RA I Management Group should consider establishing a RWC in each economic sub-region of Africa.

7- Taking into account a specific situation of Members in the West Indian Ocean, the meeting also recommended the establishment of a RWC dedicated to this region in Madagascar.

8- The meeting requested the WG-OTI to include in its terms of reference the development of AMDAR programme in the Region in collaboration with the Task Team on Aeronautical Meteorology.

9- The meeting recommended that NMHSs should strengthen partnerships to enhance observing networks in their countries and using a Memorandum of Understanding (MoU) with relevant partners.

10- The meeting recommended that Members should ensure the capacity development and the development of the necessary infrastructure and telecommunications for the implementation of WIGOS and WIS at the regional level.

11- The meeting invited ASECNA to continue in its efforts to collaborate with the National Meteorological Services in the implementation of WIGOS and WIS.



Participants in the RA I WIGOS Workshop for French Speaking Countries, 26-30 September 2016, Dakar, Senegal

5. Outcomes of the RA II WIGOS Workshop for West Asia (Abu Dhabi, United Arab Emirates, 2-3 November 2016)

The Regional Association II (RA II) WIGOS Workshop on Strengthening the Observing Capabilities of West Asia for Better Climate & Weather Services, was held at Abu Dhabi, the United Arab Emirates, 2 - 3 November 2016. Dr Abdullah Ahmed Al Mandoos, Permanent Representative of the United Arab Emirates with WMO, opened the Workshop.

There were three main purposes of the Workshop:

- (a) to brief participants about the activities planned for the WIGOS Pre-operational Phase;
- (b) to advise them on WIGOS implementation at the regional and national levels; and
- (c) to consider a way forward in the regional planning efforts for WIGOS, specifically for establishing Regional WIGOS Centres in pilot mode in RA II.

The Workshop Programme covered the following topics: 1. WIGOS Pre-operational phase (2016-2019); 2. WIGOS in RA II; 3. Regional WIGOS Centres; 4. National WIGOS Implementation. The presentations are available at: <http://www.wmo.int/wigos>.

Based on the presentations delivered by the invited speakers and follow-up discussions, the participants formulated the following nine recommendations to the RA II Management Group:

1. To support the urgent delivery of training on OSCAR/Surface for NFPs of West Asia
2. To support the development of the WDQMS and related training in West Asia
3. To support the development of a Regional WIGOS Centre in pilot mode for West Asia
4. To consider the establishment of specific thematic RWCs for sub-regions of RA II, e.g. for Weather Radar data processing, AMDAR data processing
5. To take into account the existing infrastructures of GISCs as a basis for sub-regional RWC – putting WIS and WIGOS working close together
6. To support further promotion and communications on benefits of WIGOS to Members of West Asia;
7. To urge Members of West Asia to support the protection of Radio-Frequencies used for observing systems, by taking appropriate actions at national level
8. To urge Members of West Asia to nominate the WIGOS NFPs as well as the OSCAR/Surface NFPs, if not done yet
9. To support the sharing of national documentation on the WIGOS, such as National Implementation Plans from the Members of RA II



Participants in the RA II WIGOS Workshop for West Asia (United Arab Emirates, 2-3 November 2016)

6. Outcomes of the 5th Session of ICG-WIGOS Task Team on WIGOS Metadata (Geneva, Switzerland, 5-7 December 2016)

The Fifth Session of the ICG-WIGOS Task Team on WIGOS Metadata (TT-WMD-5) was held from 5 to 7 December 2016 at Geneva, Switzerland.



Participants in the ICG-WIGOS/TT-WMD-5 (Geneva, Switzerland, 5-7 December 2016)

The major objectives were to consider the specific metadata requirements for remote-sensing observations, to review the current status of OSCAR/Surface, including training to Members, to review and/or complete a number of code tables of the WIGOS Metadata Standard (WMDS), to review the progress made in preparing guidance material, to consider the current version of the WMDS data exchange model and its relation to the machine-to-machine transfer of metadata, as well as to consider the ToRs and actions for the new established task team on OSCAR development.

The activities of the Task Team in 2016 focused on the following four major topics: 1) the WIGOS Metadata Standard, 2) the WMDS Code tables, 3) the further development of the Guide to WIGOS and 4) the further development of the WIGOS Metadata Exchange Model.

A major outcome of the session was the need to continue and finalize the work of the TT-WMD during 2017. The session also agreed on a set of conclusions/recommendations and actions related to those four topics and also on (5) the status and operation of OSCAR/Surface and further development, as well as on (6) the training for WMDS and OSCAR/Surface. They have also elaborated on the benefits of WMDS and on the user cases of OSCAR/Surface.

Some of the most relevant conclusions and recommendations are listed below:

- i) The WMDS is now at a mature state, but needs further development, such as to consider further feedback from the space community, e.g. via the Coordination Group for Meteorological Satellites Task Force on Metadata Implementation (CGMS-TFMDI);
- ii) The implementation of WMDS is not complete; As per the Manual on WIGOS Appendix 2.4 the implementation phases II (2017-18) and III (2019-20) are still to come;
- iii) As approved by CBS-16, the WMDS code tables have been moved from the Manual on WIGOS to the Manual on Codes;
- iv) There are still changes to introduce to the code tables, so there is work in progress to be continued;
- v) The updates to the code tables should be circulated for feedback/review by various communities before being submitted through the CBS Fast Track Procedure;
- vi) Further development is needed for the Guide to WIGOS related to the WMDS, including guidance for the implementation phases II and III; There is a need to identify individual experts to contribute to the guide.

- vii) There is the need to update the WIGOS Metadata Exchange Model according to the outcomes of discussion, particularly, the drop of the concept of data segments, in favor of concept of “deployment”;
- viii) The catalogue of radiosondes is recommended to be migrated into OSCAR/Surface; There is a need to investigate how to do this;
- ix) Regarding the “Machine-to-Machine” (M2M) interface to OSCAR/Surface it was agreed that the basic API should support the upload of metadata records in full (all elements), as well as in part (only some user selected elements); Further functionality changes to OSCAR/Surface need to be investigated;
- x) It was noted that fifty percent of WMO Members have nominated their National Focal Points for OSCAR/Surface;
- xi) Information on WMDS compliance by Members using a “traffic lights” approach in OSCAR/Surface was supported;
- xii) The training plan for OSCAR/Surface for 2017 was supported (as endorsed by CBS-16), and the need for proper resources, particularly to develop e-learning training material was recognized.

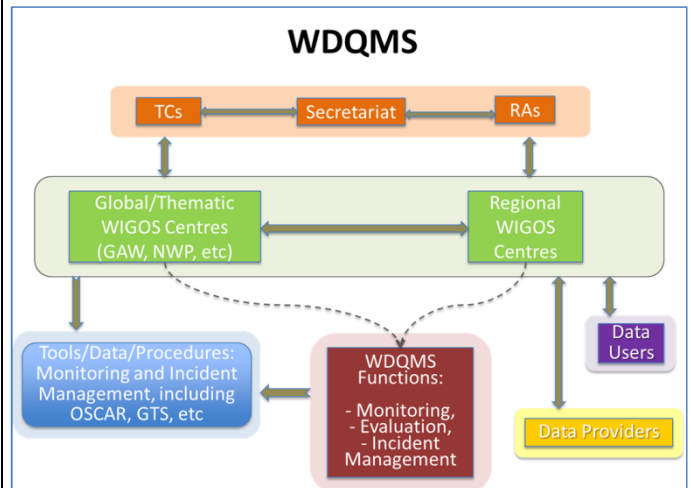
7. Outcomes of the 1st Session of ICG-WIGOS Task Team on WIGOS Data Quality Monitoring System (Geneva, Switzerland, 13-15 December 2016)

The First Session of the ICG-WIGOS Task Team on WIGOS Data Quality Monitoring System (TT-WDQMS-1) was held from 13 to 15 December 2016 at Geneva, Switzerland. This Task Team is a formalization of the ad-hoc group of experts, who worked on the outcomes of two WIGOS Workshops on Quality Monitoring and Incident Management held in December 2014 and December 2015. The major objectives of TT-WDQMS-1 were to review of their ToRs, to review the WDQMS concept and its main functions, to review the pilot project with NWP centres, to assess the results of the demonstration project in RA I, to update/further elaborate the WDQMS concept and its relation to the Regional WIGOS Centres, to discuss approaches to extend the WDQMS to all components of the GOS, and to integrate all WIGOS observing components in the system, and to draft their work programme/action plan.

The major outcomes from TT-WDQMS-1 were:

- i) The WDQMS should be interoperable with OSCAR/Surface, but it was agreed that they are two different systems;
- ii) The integration of other non-GOS observing systems into WDQMS does not mean replacing the existing monitoring systems;
- iii) The notion of Global WIGOS Centres should be considered in the structure of the system, as additional level to the concept of Regional WIGOS Centres;
- iv) Good progress was achieved by the Monitoring pilot project developed in cooperation with Global NWP Centres - monitoring files are being produced and made operationally available by ECMWF, JMA, NCEP and DWD (later also MSC)
- v) The “business rules” on how to aggregate the monitoring results (Evaluation Function), to be made available to Members, needs further development;
- vi) A WDQMS global web-tool using the files from NWP centres to show the 6 hourly results on maps, is available.
- vii) The Incident Management (IM) function will not replace any existing national IMS, but the results produced by RWCs should be provided to the NMHSs for their further action;

- viii) A set of graphical representations of the WDQMS were developed, starting with simple schemes that can be more and more detailed (Figure below is an example);



- ix) The results from the demonstration project in RA I, were assessed (based on national reports from the participating Members, Kenya and Tanzania) - it was considered to have been beneficial both for the consolidation of the WDQMS concept and for the participating Members, but there is the need for more training;
- x) There is the need for National Focal Points on WDQMS to be nominated by PRs (ToRs are not developed yet);
- xi) A guidance document on WDQMS for RWCs, drafted by EUMETNET is applicable to the stations of the GOS;
- xii) The following order of the systems to be included in the next development steps of WDQMS is proposed: Finish the work on Land Surface Pressure observations (GOS) and include timeliness of observations; Extend the demonstration project to include radiosonde observations; Include GOS Ocean observations of surface pressure and sea surface temperature; Include GOS aircraft observations of temperature, wind and humidity; Include CLIMAT messages;
- xiii) Clarification is needed regarding the content and frequency of the Mechanisms for routine reporting of monitoring results to EC, regional associations and Members by end of 2017, that are mentioned in item (f) of the road-map for WDQMS in the Plan of WIGOS Pre-operational Phase.

The session has drafted its Work-Programme/Action Plan for 2017-18, which includes the extension of the demonstration project in RA I to cover all the expected types of quality issues for both surface and upper-air observations.



Participants in the ICG-WIGOS/TT-WDQMS-1 (Geneva, Switzerland, 13-15 December 2016)

8. WIGOS Related Events/Meetings

8.1 Recent Events/Meetings

- ☞ Regional Association II Expert Group on WIGOS meeting, WIGOS Workshop for West Asia and AMDAR Workshop for West Asia, 31 October – 4 November 2016, Abu Dhabi, United Arab Emirates
- ☞ Commission for Basic Systems Technical Conference (CBS-TECO-2016), 21-23 November 2016, Guangzhou, China
- ☞ Sixteenth Session of the Commission for Basic Systems, 23-29 November 2016, Guangzhou, China
- ☞ Fifth Session of the ICG-WIGOS Task Team on WIGOS Metadata (TT-WMD-5), 5-7 December 2016, Geneva, Switzerland
- ☞ First Session of the ICG-WIGOS Task Team on WIGOS Data Quality Monitoring System (TT-WDQMS-1), 13-15 December 2016, Geneva, Switzerland
- ☞ Sixth Session of the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS), 12-14 January 2017, Geneva, Switzerland
- ☞ Global Cryosphere Watch (GCW) Steering Group meeting, 16-20 January 2017, Cambridge, United Kingdom of Great Britain and Northern Ireland
- ☞ 97th American Meteorological Society (AMS) Annual Meeting, 22-26 January 2017, Seattle, USA
- ☞ Steering Group on Radio Frequency Coordination (SG-RFC) meeting, 24-27 January 2017, Geneva, Switzerland

8.2 Coming Events/Meetings

- ☞ Sixteenth session of Regional Association II (RA II-16), 12-16 February 2017, Abu Dhabi, United Arab Emirates
- ☞ Regional Association I (RA I) Regional WIGOS Centre (RWC) Implementation Meeting, 21-23 Feb 2017, Arusha, Tanzania (tentative)
- ☞ Seventeenth meeting of the CBS Management Group, 27 February - 1 March 2017, Geneva, Switzerland
- ☞ GCOS OOPC meeting, 14-17 March, 2017, Cape Cod, USA
- ☞ GCOS AOPC meeting, 27-30 March, 2017, Exeter, United Kingdom of Great Britain and Northern Ireland
- ☞ Ninth meeting of the Ship Observations Team (SOT-9), 27-31 March 2017, London, United Kingdom of Great Britain and Northern Ireland
- ☞ Eleventh session of the CBS Expert Team on Satellite Systems (ET-SAT-11), 4-6 April, Geneva, Switzerland
- ☞ GCOS TOPC meeting, 6-7 April, 2017, Vienna, Austria
- ☞ Regional Association I (RA-I) Workshop on AWS Networks, 25-27 April 2017 Windhoek, Namibia

Thanks to:

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