**WORLD METEOROLOGICAL ORGANIZATION**

**Regional Association II WIGOS Workshop**

Beijing, China, 6-8 November 2018

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**FINAL REPORT**



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| **WMO RA II WIGOS Workshop**  FINAL PROGRAMME | | | |
| **Tuesday, 6 November 2018** | | | |
| 08:00-09:00 | | *Registration* | | |
| 09:00-09:10 | | Opening *Chair:* Lars Peter Riishojgaard（WMO） | | |
|  | Representative of Government of China | | Chong Pei |
| ***Session 1: WIGOS introduction Chair:* Lars Peter Riishojgaard（WMO）** | | | |
| 09:10-9:40 | WIGOS Framework | | L.P. Riishojgaard |
| 9:40-10:10 | WMO technical regulations and guidance material | | L.F. Nunes (WMO) |
| 10:10-10:30 | ***COFFEE & TEA BREAK*** | | |
| 10:30-11:00 | WIGOS implementation in RA II, Plan & status | | Y. Chen |
| 11:00-11:30 | China's observatory network rolling demand assessment practice | | Jianxia Guo |
| 11:30-12:00 | The Global Basic Observing Network; a new driver for WIGOS implementation | | L.P. Riishojgaard |
| 12:00-13:00 | ***LUNCH BREAK*** | | |
| ***Session 2: National Presentations Chair: L.P. Riishojgaard*** | | | |
| 13:00-15:30 | National presentations on WIGOS implementation: requirements, capabilities, gaps, plans and challenges;  (Tentatively 10 min. presentations followed by 5 min. discussion) | | RA-II Member representatives |
| 15:30-16:00 | ***COFFEE & TEA BREAK*** | | |
| 16:00-17:45 | National presentations (continued) | | RA-II Member representatives |
| 17:45-18:15 | Summary of national presentations; common themes, issues requiring regional collaboration | | WMO Secretariat, RA-II Member representatives |
| 18:30 | ***Dinner*** | | |

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| **Wednesday, 7 November 2018** | | |
| ***Session 3: Regional WIGOS Center Chair: Chong Pei*** | | |
| 9:00-9:10 | Speech by the Leader of CMA | Xinwen Yu |
| 9:10-9:20 | Statement by the Representative of WMO Secretary-General | Wenjian Zhang |
| 9:20-9:35 | Regional WIGOS Centres; guidance from the WMO Executive Council and ICG-WIGOS | L.P. Riishojgaard |
| 9:35-10:05 | Regional WIGOS Center in RA-II; CMA Proposal and capabilities | Lei Wu (CMA) |
| 10:05-10:20 | Regional WIGOS Center in RA-II; JMA Proposal and capabilities | Yoshihiko Tahara (JMA) |
| 10:20-10:35 | Regional WIGOS Center in RA-VI; EUMETNET; Proposal and capabilities | S. Klink (Germany) |
| 10:35-10:50 | Regional WIGOS Center in RA-II (West Asia); plans of Saudi Arabia | Representative from Saudi Arabia |
| 10:50-11:05 | Regional WIGOS Center in RA-II (South Asia); plans of India | Representative from India (TBC) |
| 11:05-11:25 | ***GROUP PHOTO/COFFEE & TEA BREAK*** | |
| 11:25-12:00 | Coordination of RWC activities in RA II; ensuring linkage between RWCs and individual Members | WMO Secretariat;  RWC representatives |
| 12:00-12:30 | *Poster Session* | *All participants* |
| 12:30-13:30 | ***LUNCH BREAK*** | |
| 13:30-17:30 | *Visiting China Huayun Group* | |
| 18:00 | ***Welcome banquet*** | |

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| **Thursday, 8 November 2018** | | |
| ***Session 4: CMA presentations Host：Changxing Li（MOC of CMA）*** | | |
| 9:00-12:30 | *Visit Daxing Test Base (Southern Suburbs)* | |
| 12:30-13:30 | ***LUNCH BREAK*** | |
| 13:30-15:30 | Visit the various business units of the CMA  (Meteorological Center, Satellite Center, Observation Center) | |
| ***Session 5: Summary and Closing Host：L.P. Riishojgaard（WMO）*** | | |
| 15:30-16:00 | ***COFFEE & TEA BREAK*** | |
| 16:00-16:45 | Way forward for WIGOS implementation in RA II, Workshop recommendations | All participants |
| 16:45-17:15 | Closure of the workshop | Chong Pei,  L.P. Riishojgaard |
| 17:30 | ***Dinner*** | |

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**Executive Summary**

The WMO Regional Association II (RA II) WIGOS Workshop was held in Beijing, China, from 6 to 8 November 2018, at the kind invitation of the government of the People’s Republic of China and it was hosted by the China Meteorological Administration (CMA) and co-organized by WMO Secretariat. 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.

Representatives from seventeen Members of RA II and from one Member of RA V, as well as the EUMETNET (network of European National Meteorological Services) Observations Programme Manager (Germany), participated at the Workshop which was organized according to the following sessions: 1-WIGOS Introduction, 2-National presentations, 3-Regional WIGOS Center, 4-CMA presentations, 5–Summary and closing.

The outcomes from the Workshop are summarized in [Appendix II](#Appendix_II), which include general and specific conclusions and recommendations.

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**General summary**

**1.** **ORGANIZATION OF THE WORKSHOP**

**1.1 Opening of the Workshop**

The WMO Regional Association II (RA II) WIGOS Workshop was held in Beijing, China, from 6 to 8 November 2018, at the kind invitation of the government of the People’s Republic of China It was hosted by the China Meteorological Administration (CMA) and co-organized by WMO Secretariat. The goals of the workshop were: to raise awareness of WIGOS, including its main ingredients, 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.

The session was opened by Ms Chong Pei (CMA), at 9:00 on Tuesday 6 November 2018. On behalf of the Permanent Representative (PR) of China, who sent his warm regards to all participants. Ms Chong Pei welcomed all the national and international representatives, in Beijing, China and mentioned some of the most relevant activities of CMA, including the operational Chinese meteorological satellites with global coverage. She mentioned that WIGOS had been identified as a WMO priority and that CMA had developed sophisticated metadata specifications and had made preparations to host a RA II RWC in pilot project with assistance from WMO. She also mentioned that CMA had a large experience in operating various types of observing stations and had been using the WMO Rolling Review of Requirements (RRR) to streamline its observing systems and technologies. CMA would be prepared to provide support to other RA II Members, with the contributions from the Meteorological Observation centres and from the integrated test bed site. She concluded by thanking her CMA colleagues who contributed to the organization of this Workshop and wished all a pleasant stay in Beijing.

Dr Lars Peter Riishojgaard speaking on behalf of WMO Secretary-General, Prof Petteri Taalas, and of the Director of the Observing and Information Systems Department, Dr Fernando Belda, also welcomed the participants, and he especially thanked CMA for the excellent organization of the Workshop. He stressed that timing has come to advance the implementation of WIGOS in RA II, with this second WIGOS meeting in 2018, after the one organized by JMA, and that now was the time to continue making progress on implementing RWCs in the region. WIGOS had clearly moved on from the concept phase, and was now based on technical tools such as OSCAR/Surface and WIGOS Data Quality Monitoring System (WDQMS), and also technical guidance to assist Members on how to implement WIGOS.

Representatives from seventeen Members of RA II and from one Member of RA V, as well as the EUMETNET (network of European National Meteorological Services) Observations Programme Manager (Germany) participated at the Workshop. The list of participants is given in [Appendix I](#Appendix_I).

**1.2 Official Welcome Ceremony**

On Wednesday 7 November 2018, a welcome ceremony was held, which was opened by Dr Yu Xinwen, CMA’s Deputy director, in charge of observations, who warmly welcomed the Workshop participants to Beijing and to the CMA facilities. He mentioned that CMA has been working on the integration of various observing systems, a necessity due to the increasing number and diversity of observing system; WIGOS was seen as playing an important role in integrating observations from the increasingly dense stations networks. He also made reference to the long experience accumulated by CMA in designing, building, installing, operating and maintaining observing systems. Regarding CMA’s role in the Region, he pointed out that since 2011 CMA has donated surface meteorological observations to several countries of the region. CMA has also been delivering training courses related to observations, with support from the WMO’s Regional Instrument Centre (RIC), hosted by CMA. He pointed to WIGOS as an important element of these CMA cooperation activities, and expressed his commitment to continue to support the WIGOS activities, including the Regional WIGOS Center pilot effort that China had proposed to establish in RA II. He finally wished this Workshop to be a complete success and wished the participants a nice stay in Beijing.

Dr Wenjian Zhang, WMO Assistant Secretary-General, on behalf of WMO Secretary-General Prof Petteri Taalas, extended a warm welcome to the participants in this Workshop in Beijing. He thanked both the participants, especially the representatives from Members of RA II who came to communicate their WIGOS plans and to find ways to work together as a regional community, and the hosts at CMA for organizing this workshop, especially Dr Yu Xinwen and the Department for integrated observations. Dr. Zhang mentioned the fact that the Numerical Weather Prediction (NWP) models now had very high resolution, while the observing systems with data availability, which are needed to validate the models, having generally much lower resolution, so the challenge was to establish observing systems to allow the provision of good services, for example for the mega-cities, Another challenge was the long-term observations which are needed to monitor and validate the climate change - WMO has developed the initiative of “Centennial stations” to protect those stations; Finally he mentioned WIGOS as an integrator in various ways: 1-WIGOS must be an integrator of all systems, by establishing partnerships with other entities who make observations; 2-WIGOS is an integrator of all the countries; 3-WIGOS is an integrator of people, as it is happening in the case of this Workshop. Next year the World Meteorological Congress would be expected to announce WIGOS as an operational system from 2020, but that would not mark the end of the WIGOS development, but rather the beginning. Dr Zhang finally, whished everyone an enjoyable stay Beijing.

1. **WORKSHOP SESSIONS AND DISCUSSION**

As shown in the Workshop Programme a series of presentations were delivered by the WMO Secretariat and by the participants. The content of the main sessions was as follows:

- Under session 1 “WIGOS Introduction”: “The WIGOS Framework”, by L.P. Riishojgaard; “WMO Technical Regulations and Guidance Material”, by L.F. Nunes (WMO); “WIGOS implementation in RA II, Plan & status”, by Y. Chen (China); “China's observatory network rolling demand assessment practice”, by Jianxia Guo (China); “The Global Basic Observing Network; a new driver for WIGOS implementation”, by L.P. Riishojgaard.

- Under session 2 “National presentations” – The following RA II Members’ representatives delivered presentations on the implementation of WIGOS at national level (requirements, capabilities, gaps, plans and challenges) in their countries: Bangladesh; Bhutan; China; Hong Kong, China; India; Japan; Kyrgyz Republic; Lao P.D.R.; Maldives; Mongolia; Myanmar; Nepal; Russia; Saudi Arabia; Sri Lanka; Thailand; and finally Singapore (RA V).

- Under session 3 “Regional WIGOS Center” – The following presentations were delivered: “Regional WIGOS Centres; Guidance from the WMO Executive Council and ICG-WIGOS”, by L.P. Riishojgaard; “Regional WIGOS Center in RA II; CMA Proposal and capabilities”, by Lei Wu (China); “Regional WIGOS Center in RA II; JMA Proposal and capabilities”, by Yoshihiko Tahara (Japan); “Regional WIGOS Center in RA VI; EUMETNET Proposal and capabilities”, by Stefan Klink (Germany); “Regional WIGOS Center in RA II (West Asia); plans of Saudi Arabia”, by Mohammed Babidhan; “Regional WIGOS Center in RA II (South Asia); plans of India”, Shri Sankar Nath.

1. **FINAL DISCUSSIONS AND OUTCOMES**

Input from the various contributions, including presentations from national representatives as well as from Members willing to establish RWCs in RA II, fed into discussion sessions focused, on the way forward for WIGOS implementation in RA II and on the coordination of RWC activities in the Region, to ensure the linkage between the RWCs and individual Members.

A set of draft conclusions and recommendations was presented and discussed at the last day of the Workshop; They were then edited and a final version was agreed by the participants during Session 5 “Summary and closing”; Those conclusions and recommendations are organized in six sections as described below and the corresponding summary slides are provided in [Appendix II](#Appendix_II):

General impressions of WIGOS in RA-II:

* All Members present at the Workshop are interested in collaborating on WIGOS;
* Most Members present at the Workshop have done at least some work in OSCAR/Surface;
* Most Members present at the Workshop are aware of and have done some level of implementation of WSI in OSCAR/Surface;
* Many Members have valuable observations than they currently do not exchange; additional stations; hourly observations; pilot-balloon data etc.;
* Recommendation (to both Members and RTHs): Use draft GBON material as a guide for observational data exchange and strive for compliance;

On national WIGOS implementation activities:

* Most Members present at the Workshop have nominated WIGOS and OSCAR/Surface National Focal Points;
* Some (but a minority) of Members present at the Workshop have approved National WIGOS Implementation Plans;
* Recommendation: Every country should develop such a plan; it can be an important document even where national resources are insufficient; can be used to drive development projects;
* Partnership engagement at the national level is beginning within a few Members; this is often found to be difficult;
* Recommendation: Members who have developed national schema for WIGOS Station Identifiers to participate in the experiment with ECMWF on exchange of BUFR reports containing WSI.

On OSCAR/Surface:

* Russia has developed a “OSCAR-like” system; intent to be compatible with OSCAR, but metadata elements are different;
* Recommendation: Coordination between OSCAR and Russian system urgently needed in order to prevent diverging metadata standards;
* Many Members present at the Workshop are requesting help to use OSCAR/Surface:
  + Training in OSCAR/Surface and other WIGOS elements requested by most participants;
  + Recommendation: All Members to use the OSCAR/Surface Resources Portal and join monthly Webinars.

On WIGOS Data Quality Monitoring System:

* China is willing to make available the monitoring outputs from their NWP model to the WDQMS Webtool to be hosted by ECMWF;
* Recommendation: all Members to be aware of the plans of RWCs in the Region and to be prepared to engage and to actively work with one of the RWC once established, starting from the pilot phase mode;
* Recommendation: Members interested in operating a RWC: to become familiarized with the new chapter 9 of the Guide to WIGOS: ”Technical Guidelines for Regional WIGOS Centres (RWCs) …”.

On Regional WIGOS Center coordination in RA-II:

* Two formal proposals for RWCs in pilot mode in RA-II (from China and from Japan);
* Two indications of interest (Saudi Arabia and India) recorded by RA II Management Group;
* Possibility of Russian language RA II/RA VI RWC located in Belarus and/or in Russia discussed at consecutive RA II/VI Workshops;
* Coordination between various RA II RWC efforts needed; decision on how to share work load to be taken after pilot phase;
* Recommendation: Establish RA II coordination body with representation from each of the Members listed above and WMO Secretariat; aim for short informal face to face meeting during RA II WIGOS Workshop in Tokyo in March 2019;
* Recommendation: To include regional coordination of the protection of Radiofrequencies as optional function of RWCs.

For the WMO Secretariat:

* Recommendation: Remind PRs who have not nominated WIGOS and OSCAR/Surface National Focal Points to do so, with copy to Workshop participants; make Circular Letter requesting nomination available online;
* Recommendation: Work with development agencies to limit the number of uncoordinated development projects, which tend to lead to systems that are difficult to integrate;
* Recommendation: Urgently arrange training sessions in OSCAR/Surface and other WIGOS elements in RA-II;
* Recommendation: Make available online information regarding the WSI experiment led by ECMWF;
* Recommendation: Provide support to India and Saudi Arabia regarding proposals for RWC pilots;
* Recommendation: given the urgency of establishing RWCs in RA II, to work with China and Japan towards establishing a joint cooperation mechanism in order to have their two projects initiated;
* Recommendation: to work with the RAP Office towards having a formal response from the P/RA II regarding China and Japan’s proposals to establish RWCs in pilot mode;
* Recommendation: to consider developing guidance to Members on how to engage with RWCs, and on the process for Members to adhere to a RWC.

1. **CLOSURE OF THE SESSION**

In her closing remarks, Ms Chong Pei commented on the very fruitful discussions of the last three days, with representatives from RA II, RA V and RA VI Members discussing WIGOS systems and RWCs, that allowed to achieve good progress towards establishing RWCs in RA II. She thanked the WMO Secretariat for assisting in organizing this Workshop in China and thanked all participants coming from abroad. She thanked her CMA colleagues from the various Centres that were involved in the Workshop: the Meteorological Observations Centre (MOC), the National Meteorological Information Centre (NMIC) and the National Meteorological Satellites Centre NMSC. Finally, Mrs Chong Pei stressed that CMA is strongly committed to implement WIGOS and to work with the Secretariat in that respect; CMA will continue to share its experience in support of other Members.

Dr Riishojgaard thanked CMA for the excellent organization and support and addressed special thanks to the participants for their candid and honest assessments of their experience with WIGOS, including the challenges they were facing at the national level. He mentioned that the most important part of the Workshop had been the session with national presentations, since this allows us to better understand the plans and the issues of Members, He concluded that excellent progress had been made during these days.

Dr Zhang underlined the benefits for Members of participating at this Workshop and made the following requests:

* The Members’ representatives to brief their PRs about WIGOS and about the outcomes of this Workshop; In this way the importance of their work will be recognized;
* There are high-expectations from the RWC to be hosted by CMA who are encouraged to continue to be supportive to countries of the Region, recognizing the big responsibility of running a RWC;
* Suggested that the approach applied for the WIS/GISCs should be replicated in a similar way to the RWCs, i.e. the Members would select which RWC they would join;
* All representatives to keep the engagement with WIGOS; this momentum should be repeated every year (each time with a different host) with annual Workshops for surface-based sub-systems, similarly to what is being done by the space community;
* The WIGOS Project Office (Secretariat) to formulate the summary of the Workshop in one cover page to be used to brief the WMO Secretary-General and to circulate to the PRs of all RA II Members.

Dr Zhang thanked the participants and thanked CMA for being such good hosts, and also thanked the work of the WIGOS PO for paving the way to allow Members to implement WIGOS, recognizing the lean resources for such a big responsibility.

Before closing the Workshop Mr Xu Xianghua Director of Department of International Cooperation thanked for everyone’s contribution and participation and then declared the workshop closed at 17:30 hours, Thursday 8 November 2018.

**Appendix I**

**LIST OF PARTICIPANTS**

|  |  |  |  |  |
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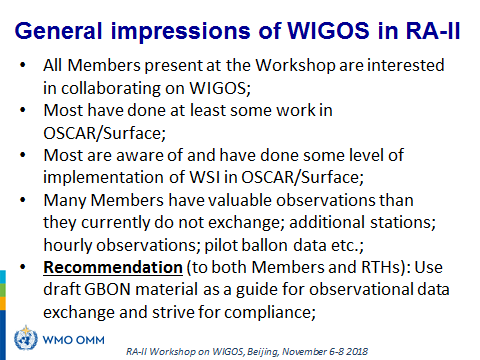
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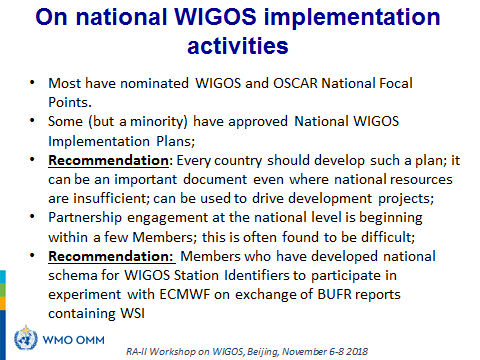
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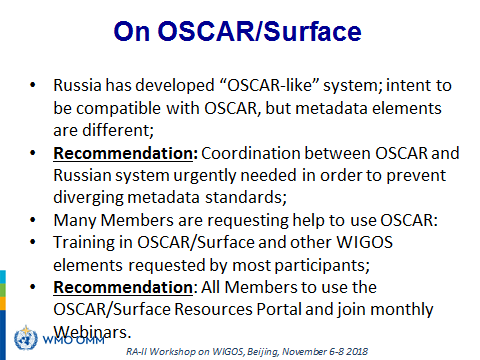
**Appendix II**

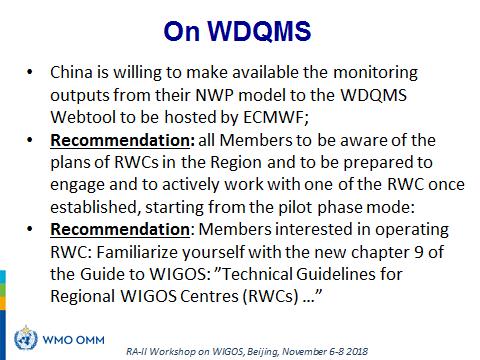
**Workshop summary and recommendations**

Final version based on a draft prepared by Lars Peter Riishojgaard and Luis Nunes (WMO Secretariat) - Includes feedback from the Summary & Closing Session”

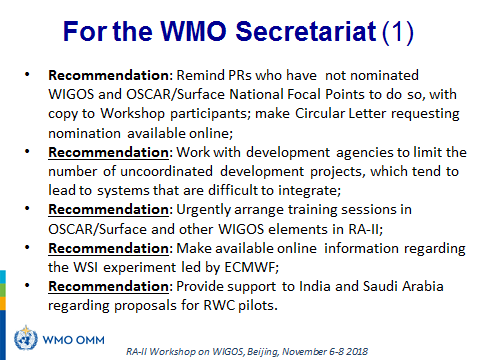


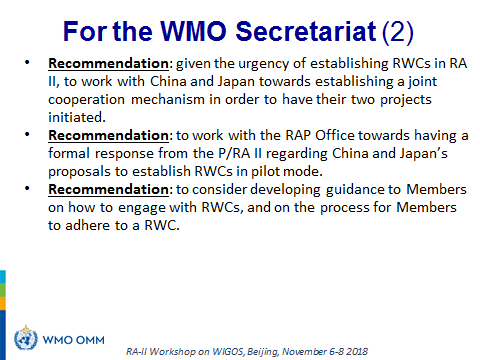
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