W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

REGIONAL ASSOCIATION VI

WIGOS WORKSHOP

Belgrade, Serbia, 24 - 27 November 2015

MEETING REPORT

Link to meeting documentation:

http://www.wmo.int/pages/prog/dra/eur/meetings/2015-11-24_RAVI-WIGOS-WS-1-XVI_Belgrade/

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Opening

The WMO RA VI WIGOS Workshop was held at Hotel Moskva in Belgrade, Serbia, at the kind invitation of Prof Jugoslav Nikolić, Permanent Representative (PR) of Serbia with WMO.

In his opening speech Prof Nikolić pointed out the importance of WIGOS for the cost efficient evolution of observing systems and for its contributions to continuous improvement of data availability and data quality. Major future challenges are enhancement of collaboration with national partners and the integration of various national observing networks under a common umbrella, for which the population of the OSCAR databases will be crucial. Prof Nikolić expressed his wish for good collaboration at the workshop and for the WIGOS project in general.

Mr Ivan Čačić, President of WMO Regional Association VI (RA VI, Europe), introduced the session chairs and welcomed the participants to the workshop. The Workshop was attended by 70 individuals representing 35 countries and two international organizations. In his speech Mr Čačić underlined that improving the availability of information is key to improved decision making in all key activity areas of WMO. This can be achieved through synergistic interaction between the National Meteorological and Hydrological Services (NMHS) in the context of both WIS and WIGOS. Mr Čačić concluded his speech expressing the expectation that future work on WIGOS will be guided by the Regional WIGOS Implementation Plan (R-WIP). He furthermore expressed his wish to PRs to recognize and support the importance of WIGOS and to promptly nominate WIGOS focal points if not already done.

Dr Wenjian Zhang, Director of the WMO OBS Department, also emphasized the importance of WIGOS, evidenced also by the fact that WIGOS is one of the seven WMO priority areas.

Prof Bertrand Calpini, President of CIMO, Co-chair, ICG-WIGOS, Vice-Director of MeteoSwiss, delivered his keynote speech “Next Phase of WIGOS Implementation; Guidance from ICG-WIGOS”. All activities should start from clearly articulated requirements gathered and vetted through the WMO Rolling Review of Requirements (RRR) process. He further emphasized that this process should involve not only NMHSs but also public and private partners. He emphasized the importance of OSCAR/Surface as a major tool in this process and extended his wish to actively support the population of OSCAR/Surface. Immediate benefits for NMHSs include a consolidated source of station metadata to replace Pub. 9 Vol A[1] and other sources, visible and open to everyone. He concluded that OSCAR/Surface is of major importance as a tool both to empower WMO Members in their national efforts and to enable WMO and the RAs to actively work on WIGOS implementation. Prof Calpini finished his keynote with an example of improved observations, in which MeteoSwiss integrates crowd-sourced hail observations transmitted voluntarily by users of MeteoSwiss’ smartphone app[2] and use these data to validate and improve the interpretation of precipitation radar data.

In his presentation “Role of RA in the WIGOS Pre-operational Phase”, Mr Čačić made the case for the WIGOS implementation as a priority for RA VI. Support and assistance from Members but also from WMO Secretariat is welcome to update the R-WIP as the main document guiding the implementation process. In this work, lessons learnt from the Working Group on Technology Development and Implementation (WG-TDI), CIMO[3] and CBS[4] should be taken into account. All five priority areas for the WIGOS Pre-operational Phase and the ten key activity areas of the R-WIP must be taken into account. Mr Čačić concluded sharing the positive experience with a now ten-year old ongoing ‘WIGOS-like’ collaboration in which the Meteorological and Hydrological

[1] http://www.wmo.int/pages/prog/www/ois/volume-a/vola-home.htm

[2] http://www.meteoschweiz.admin.ch/home/service-und-publikationen/beratung-und-service/meteoschweiz-app.html

[3] Commission for Instruments and Methods of Observation

[4] Commission for Basic Systems

Service of Croatia had partnered with other agencies to provide improved maritime services for the Adriatic Sea area.

Session 1: Role of Members and NMHSs at the national WIGOS implementation

Agenda Item 1.1 Dr Zhang underlined that the WMO Members lead the implementation of WIGOS, while it is the role of the WMO Secretariat to assist and facilitate collaboration and support the Members in their efforts. WIGOS itself is of great importance also in the field of climate.

Agenda Item 1.2 Dr Dibbern concentrated on examples of regional projects that follow WIGOS principles like partnering of NMHS with other national agencies. Lack of coordination in the past has led to the establishment of more than 200 data quality monitoring centres.

Prof Calpini commented that respecting the provenance of the data and taking the data policies of the providers into account is key to collaboration in this field. It has to be demonstrated in each case that partnership is a win-win situation and an opportunity for both partners. The NMHSs will have to deliver value to their partners in order for this to work.

Agenda Item 1.3 Ms Grüter presented a restructuring project undertaken by MeteoSwiss. She stressed the importance of consolidating metadata at each service. MeteoSwiss collected valuable experience and achieved extreme benefits. A good tool in the project was the WIGOS self-assessment checklist structured along the 10 key activity areas of the WIP. The project is documented as one of the pilot projects for WIGOS implementation as "Application of WIGOS principles at MeteoSwiss".[5]

Agenda Item 1.4 Dr Zahumensky gave an overview of the WIGOS technical regulations recently adopted by the 17th World Meteorological Congress (Cg-17). The slides of his talk contain direct links to the referred to documents. The next major update of the Manual on WIGOS is planned to be submitted to Cg-18 in 2019.

Agenda Item 1.5 Mr Pröscholdt gave an overview of the WIGOS Information Resource including OSCAR/Surface, OSCAR/Space, OSCAR/Requirements, and SORT databases.

Mr Brown commented that INSPIRE compliance would be a good selling point for OSCAR/Surface.

Agenda Item 1.6 Mr Goldstraw pointed out that data quality monitoring should not be confused with quality management in the sense of ISO 9001. He furthermore underlined that the WIGOS Data Quality Monitoring System (WDQMS) itself produces valuable metadata that should be taken into account.

Agenda Item 1.7 Key to improved data quality is that recurring observational data quality problems are identified and that mitigation steps be taken. Collecting and dispatching quality monitoring information as feedback from data users is an important task of Regional WIGOS Centres (RWC).

Mr Čačić raised the question if such centres could be understood also as technical helpdesks and if existing WIS structures (e.g. the GISCs) could be used in their implementation. Dr Zhang confirmed that RWCs could also include helpdesk function. It should also be assessed on a case by case basis if any of the existing GISCs could be enhanced to meet the additional requirements from WIGOS.

Agenda Item 1.8 Mr Foreman presented an overview of WIS and its centres and indicated that there are still many open questions concerning the cooperation and possible synergies between WIS and WIGOS that will need further discussion.

Mr Čačić supported the view that WIGOS should benefit more systematically from WIS experiences and best practices. Clarifying the role of RWCs would be beneficial. The experiences

[5] http://www.wmo.int/pages/prog/www/wigos/Communications-Outreach.html

and results gained from next year's DCPC[6] audits should be considered in the establishment of RWCs.

Agenda Item 1.9 Mr Rozema gave an overview of JCOMM projects. WIGOS could benefit from close cooperation with JCOMM in the development of guidance material, OSCAR/Surface development, and other topics.

Agenda Item 1.10 (via video conference) Dr Tarasova presented a broad overview over Global Atmosphere Watch (GAW) activities. She explained that GAW observations may suffer from systematic biases because measurements are very heterogeneously distributed over the world. Also differences in instrumentation contribute to systematic errors. In this sense, GAW may benefit from implementing WIGOS principles that lead to harmonized observing networks and data exchange formats. Traceability of observation to international standards is crucial for GAW. Dr Tarasova voiced the opinion that WMO does not reach all potential data providers because it only communicates with or through PRs and not directly with the science community and the private sector.

Mr Büyükbaş suggested that WIGOS could help to gain more systematic access to data providers that are not reached by PRs.

Agenda Item 1.11 Dr Bérod described common activities of the Working Group on Climate and Hydrology (WG-CH) in the WHOS and WHYCOS projects. He suggested to learn from WG-CH best practices, for example concerning the GEOSS Common Infrastructure (CI).

Agenda Item 1.12 Dr Zhang introduced the Global Cryosphere Watch (GCW) and pointed out that GCW would benefit from the WIGOS implementation in many respects.

Session 2: Regional WIGOS relevant projects and activities

Agenda Item 2.1 Mr Klink gave a short description of EUMETNET. EUMETNET is implementing WIGOS in the sense that it is adhering to WIGOS Observing Network Design (OND) principles in its network design. As an example, Mr Klink presented results showing how classical upper air observations may be partially substituted by aircraft-based measurements.

Dr Zhang and other participants commented that aircraft observations only cover altitudes up to about 11 km, while classical measurements reach up to 35 km which is still necessary for longer term forecasts. One result from the study is that radiosonde stations should in general be located away from major airports in order to improve the overall coverage. Also optimizing observation times taking aircraft operations into account would be worthwhile.

Agenda Item 2.2 In his second presentation, Mr Klink described the cooperation in the OPERA project concerning harmonization of international regulations and EUMETNET's activities to expand and enhance aircraft observations.

Agenda Item 2.3 (via video conference) Ms Koch gave an overview over Copernicus and described the current status. She went into more details describing the six services provided by Copernicus.[7]

On question from Mr Čačić about WMO's role in the implementation of these six services, Ms Koch answered that in future more in-depth coordination with WMO would be necessary and welcome.

Agenda Item 2.4 Mr Suttie presented ECMWF contributions to the Copernicus project. ECMWF is especially active in two of the six services, namely in the Copernicus Atmosphere Monitoring (CAMS) and the Copernicus Climate Change Service (C3S).

Ms Grüter asked whether the free/open data policy of Copernicus is an issue for collaboration in Copernicus in general. Mr Suttie confirmed that it is an issue since the Copernicus and ECMWF data policies are not fully aligned.

[6] Data Collection or Production Centres

[7] http://www.copernicus.eu/main/services

Agenda Item 2.5 Mr Rozema presented a brief comparison of INSPIRE and WIGOS data models. There are significant differences between the two models. Coordination is needed in the further development.

Mr Čačić stated that coordination is important in this issue. Fortunately important milestones of INSPIRE and WIGOS coincide which means that there is still an opportunity not to duplicate work.

Mr Pröscholdt reported that both topics are dealt with by the UK MetOffice and that these dependencies are taken into account.

Session 3: Capacity development, communications and outreach activities to assist Members in the implementation of WIGOS

Agenda Item 3.1 Ms Grüter described how MeteoSwiss uses WIGOS principles in its acquisition, storage, and access to observational data and data products. Her main focus was on the RRR process, requirements engineering, and overall coordination of resources for which MeteoSwiss had established a central board with members of all departments. The overall goal is to exploit existing observing networks as far as possible, e.g. through a combination of weather radar and rain gauge data.

She strongly recommended to consolidate all available metadata in one spot and use them to monitor and steer processes. In order to implement this high level of cooperation within a service, communication is key.

Agenda Item 3.2 Mr Klarić introduced the undertaking to establish the Croatian National Marine Met Centre (AMMC), stressing in particular the importance of the RRR process.

Dr Zhang concluded that this project could be an example for the improvement of marine services for the whole of RA VI. Already now JCOMM representatives are present in ICG-WIGOS and their cooperation is highly appreciated. JCOMMOPS in contrast is more visible on a global level than in sub-regional projects. That means that NMHS must take lead in data collection and exchange in this topic.

Agenda Item 3.3 Ms Grüter described how MeteoSwiss employs the RRR for the identification and systematic closing of gaps in the observing networks. One lesson learnt in this work is that closing the gaps typically requires a combination of different approaches: modernization, integration of third party data, and combination of different measurements. Vital input are user requirements that are stated in technology-free terms. Most people are not used to this more abstract kind of formulations. They are, nevertheless, necessary in order to systematically identify good solutions.

Agenda Item 3.4 Dr Dibbern showed how WIGOS principles are reflected in DWD's management process for the evolution of the observing network. The goal of the national observation strategy of Germany is to reach full automation of observation and data quality monitoring no later than 2020.

Mr Čačić extended his wish that the German approach could be taken as an example to be followed by other Members in RA VI when developing their national WIGOS Implementation Plans (N-WIP).

Agenda Item 3.5 see Agenda item 3.7

Agenda Item 3.6 Mr Petković described the evolution of the observing network in Serbia with special emphasis on the role of the national legislative framework. Serbia had used input from OPERA to advocate mandatory minimum distances between wind parks and weather radars. This was adopted as a national law in Serbia, helping to protect the interests of RHMSS.

Mr Čačić quoted good experiences from bilateral collaborations of Slovenia and Croatia to forecast and issue of warnings for river floods.

Agenda Item 3.7 In a combined presentation addressing Agenda Items 3.5 and 3.7, Mr Büyükbaş described the application of the WIGOS self-assessment checklist at TSMS. In his view,

although the fact that it is a very comprehensive and qualitative study with need to spend some effort and time to prepare and evaluate, this is a good tool to be used during the kick-off phase of the national WIGOS implementation. He also stressed that a quantitative survey on WIGOS should be conducted which should be easy to prepare and evaluate, and which could itself be assessed by handing it out to a selected number of Members, before it is being distributed to the whole of Region VI.

Mr Büyükbaş cited the existence of a national law in Turkey that ensures that all meteorological observations, public or private, have to be done with permission of the Turkish State Meteorological Service (TSMS), and all observational data have to be provided to TSMS. This gives the opportunity to TSMS for an efficient implementation of WIGOS at national level, and to make the harmonization of data policies in Turkey an especially straightforward task.

Agenda Item 3.8 (Further examples of national experience)

Dr F. Belda, AEMET Spain, introduced the national observing network in Spain, which currently consists of many national networks operated by different agencies. A project was carried out to integrate this heterogeneous landscape. The management software developed to this effect is available as open source software under the name of SIGROBS.

Ms M. Huuskonen, FMI Finland, reported on recent observing system activities in Finland. She touched on the main partnership issues, and stressed the importance of coherent up-to-date metadata as a crucial prerequisite for operations. She raised the question on how to integrate OSCAR/Surface into FMI's local metadata infrastructure.

The metadata consolidation project at FMI was mainly motivated by these new requirements:

- new types of observations
- compliance with INSPIRE
- the open data policy
- FMI's obligation to store and publish third party data from private and public collaborators

Session 4: Adoption of the Observing Systems Capability Analysis and Review Tool – OSCAR/Surface

Agenda Item 4.1 Dr Riishojgaard put OSCAR/Surface in context with the other components of the WIGOS Information Resource (WIR) and motivated their development. OSCAR/Surface serves as a resource for asset management. While OSCAR/Surface provides answers to the question "What is WIGOS?" the WIGOS Data Quality Monitoring System will answer the question "How does it perform?"

Agenda Item 4.2 Mr Foreman motivated the use of metadata in general as opposed to exchanging ready-made products. He shed light on the principles guiding the development of WIGOS metadata and presented a number of high level examples. He closed his presentation with a short introduction of WIGOS station identifiers.

Agenda Item 4.3 Mr Pröscholdt motivated the development of OSCAR/Surface as a centralized metadata repository for all observing platform and stations under WIGOS. He gave a review of the current status of the development, providing additional detail regarding the necessity of a machine-to-machine interface (M2M). The M2M interface will also support data export from OSCAR/Surface for import into national databases.

On questions from the audience he explained that it is already possible to register users for OSCAR/Surface but only to testing reasons. Data introduced will be deleted when OSCAR/Surface becomes operational in May 2016. "Operational" in this context means that OSCAR/Surface will be publicly available, and that edits / data input from the Members can commence at that time.

OSCAR/Surface is designed to support historical metadata as well as current metadata. Priority in populating OSCAR/Surface should be given to metadata for those stations for which observations are currently exchanged internationally.

All PRs will be asked to nominate OSCAR/Surface focal points. These focal points will then be informed in detail about access rights and the procedures for ingesting/editing of metadata. Mr Kern Hansen from Denmark stated that his country would be interested to use OSCAR/Surface as their primary national metadata database.

Mr Čačić asked if stand-alone installation of OSCAR/Surface in the countries would be possible. This is not possible since the system has been designed as a single centralized information resource with no provision to accommodate and reconcile asynchronous edits performed on separate instantiations. However, it is possible, to develop independent proprietary software that interacts with OSCAR/Surface through the M2M interface and thus reap the full benefits of the existence of a common metadata repository without being constrained by its user interface.

Dr Gusev stated that it might not be impossible to put all metadata into OSCAR/Surface that is needed at a national level. Some metadata may not be shared e.g. due to considerations regarding national security. He also asked whether it would be possible to install OSCAR/Surface at national level and if, maybe at a later stage, an open source version of the OSCAR/Surface software would be made available. Mr Pröscholdt answered that the software is heavy to operate and not easy to change which restricts possibilities in this matter. Dr Riishojgaard added that downloading the software for local installation would represent a new requirement for the OSCAR/Surface development.

Mr Čačić raised the question of who the actual owner of the OSCAR source code is. Dr Riishojgaard reported that this issue is currently unclear but it is being discussed. He added that it is clear that full rights to the data introduced remain with the data providers.

Dr Dibbern shared his view that a metadata database is an integral part of a NMHS's IT environment that should be fully integrated. The German metadata database solves many more requirements for DWD's operations than a centralized WMO solution ever will or should. Some of these requirements are very specific for DWD and cannot be generalized for international use. Nevertheless, he conveyed the experience from current development at DWD that this topic is much more difficult to deal with than it initially seems. OSCAR/Surface might still turn out to be a good start for less developed countries.

Session 5: Regional WIGOS Implementation Plan (R-WIP) – Taking NMHSs requirements into account

Agenda Item 5.1 Dr Schröder stated that a primary aim of WIGOS is to help Members better exploit existing observing system capabilities. He introduced the general structure of the R-WIP's and stressed that clearly articulated requirements from Members are still missing in this document. The gap can be filled through the top-down and bottom-up approaches to develop national WIPs. It is crucial in this work to enhance communication within RA VI and its relevant bodies, namely MG, WG-TDI, TT-WIGOS, being supported by the ROE and the WIGOS-PO of the Secretariat.[8]

Ms Grüter suggested to set up an Internet forum to this effect and supported the view that communication is key.

The audience agreed that works should not be restricted to metadata issue but should also take data and data quality monitoring into account at an early stage.

Mr Dacić confirmed that the ROE will support all these efforts from the WMO Secretariat within the available resources.

It was pointed out that the specification and design of the WIGOS Data Quality Management System (WDQMS) have not been finalized yet, however it was clear that many existing elements must be collected and integrated into one coherent system. It is expected from prior experience

[8] Management Group, Workgroup on Technical Infrastructure and Development, Task Team on WIGOS Implementation, Regional Office for Europe, WIGOS Project Office

that the WDQMS will have a virtual decentralized structure in which specific functions will be provided by a number of individual NMHSs and other partners. Not every NMHS / data provider will need to have an explicit role in this, except for the support of the incident management processes.

Dr Gusev asked whether OSCAR/Surface considers hydrological observations as well and how they are included. The current WIGOS metadata definitions include hydrology and OSCAR/Surface can accommodate these observing systems. Dr Riishojgaard nevertheless expected that additional application areas might be recognized in the future which might pose new requirements in this area.

Agenda Item 5.2 Mr Büyükbaş reported on the outcomes from the last meeting of the Task Team on WIGOS Implementation (TT-WIGOS). The Team still suffers from having only a small number of members, representing only some RA VI Members (about half the members of the group are from Turkey). He stated that a sub task team on radar data exchange was established by considering the priority and importance of the weather radar data, as well as considerations on efficient operation of weather radars. After introducing the ToRs of the group he extended his wish to PRs to nominate more members for TT-WIGOS and the sub-TT on radar data exchange (TT-RDE), a wish that Dr Schröder fully supported.

Mr Čačić and Mr Dacić announced two additional nominations to the group from the PRs of Croatia and Serbia, respectively.

Agenda Item 5.3 and 5.4 (Chairs) The session continued with a general discussion to the topic “Identifying the key issues for the update of R-WIP-VI”. The main points and outcomes from the discussion are as follows:

- Do you know what to do after the workshop?
- Having WIGOS: Where do I get the data?
    - Data is still distributed through WIS systems, in which data and products can be identified using WIS discovery metadata. WIGOS observational metadata can give additional information about the stations and observations used to create the products. Coordination is needed between WIS and WIGOS to exploit this functionality.
- Is a direct link between WIS and WIGOS metadata possible?
    - Yes, but it has to be defined and specified which is currently under development.
    - A one-page document explaining differences and similarities of WIS and WIGOS would be useful for clarification.
    - It would be useful to be able to extend metadata definitions for national requirements. Here are many open questions. Currently WIGOS metadata is not meant to cover all purposes and also national specifics are out of scope.
- The EUMETNET portal offers a M2M interface to work offline with the data which is similar to the OSCAR/Surface approach.
- Historical metadata is within OSCAR/Surface scope but it is not a mandatory requirement in the current regulations.
    - Historical data is a challenge but would be a big win for many users, e.g. for data from centennial stations.
- How will the Regional Basic Observing Network (RBON) project evolve?
    - It is a regional and global task for the next years to create guiding material in this matter.
    - ICG-WIGOS in January 2016 will go into this topic.
    - National “OSCAR-like” facilities would be helpful to support regional centres with metadata.
        - OSCAR/Surface is not a distributed database that can be used for this purpose.
        - So far no requirement has been articulated for this, but ICG-WIGOS should possibly discuss that point. RWCs could also use the global OSCAR/Surface to maintain this data.

- It is possible to upload draft data in OSCAR/Surface but there are some limitations.
- The GUI cannot easily be separated from the software to be integrated into other projects.
- The OSCAR/Surface M2M interface will support full automatization of the synchronization process. It is http based and a Java client will be provided.
- Most countries have a local metadata database. Must the local database be compliant with OSCAR/Surface?
    - All exchanged information should be mapped to the WIGOS metadata standard. In some cases modifications/enhancements of the local databases will be needed to achieve that goal.
    - The data model for exchange is currently under development in IPET-MDRD.
    - Clear guidance is required for the technical implementation of the synchronization procedure. Documentation and tools will be provided but work is still ongoing.
    - The pilot project with DWD is of common interest, results should be published well in advance of OSCAR/Surface becoming operational for the general public.
    - Integration of OSCAR/Surface into national processes will be an iterative effort.
    - MeteoSwiss provides backup, security, availability for the operational system on a "best effort" basis only (i.e. Mon-Fri 9-5, rather than 24/7).
    - Critical operational systems should therefore not directly depend on uninterrupted online availability of OSCAR/Surface.

Agenda Item 5.5 (Chairs) Dr Schröder gave a short briefing for the breakout groups that would meet separate for discussion on these four topics:

1. **Communication and Working Structure for the WIGOS Implementation in RA VI**
   Focus on how to get in touch with Focal points of Member states (selection of the most suitable tools and methods) Requirements from RA VI Members for their implementation support
2. **Role of Regional WIGOS Centres**
   Focus on discussion on determining tasks, defining responsibilities and organizational structure of the centre, as well as making decisions on who can be part of the centre
3. **Regional WIGOS Implementation Plan**
   Focus on a review and update with specific regards to implementation challenges and solutions for the RA VI Members
4. **Guidance for RA VI Members**
   Focus on how to write, prepare and implement their N-WIP

Agenda Item 5.9 (Chairs) After the work in the breakout groups Dr Schröder presented a wrap-up of the results. Mr Čačić agreed that the discussions had been very fruitful and that everyone should commit to get things going and not lose momentum now. He thanked all chairs for their valuable guidance of the breakout groups.

A comprehensive report of the results of the working groups can be found in the end of this report.

Agenda Item 5.10 (Dr Schröder) In a panel discussion on the way forward it was underlined that it is still important to inform and motivate PRs to contribute to WIGOS activities. Senior WMO Secretariat staff members could lobby to this effect at national level. Also, printed material like flyers and brochures are still important even though there is a lot of information available on the Internet.[9] The WIGOS-PO will produce such material if demanded from the Members. Also approaching third parties would be necessary; especially GEO should be taken into account. In general not only the highest hierarchical levels in partner organizations should be approached but information should be available for a wider audience in NMHS and third parties.

[9] http://www.wmo.int/pages/prog/www/wigos/index_en.html

Guidance on the consolidation of national metadata is needed in many countries. A checklist would probably be of good help here.

It was decided to establish an Internet discussion group[10] but for successful application additional moderators will be needed.

A RA VI WIGOS Newsletter was proposed.

A general WIGOS helpdesk would be useful but it would also require significant human resources.

A lesson learnt from WIS could be to use the Jump Start process to build up RWCs.

Sub-regional grouping would be very advantageous considering the diversity (also in terms of languages) in RA VI. Video conferences in sub-regional groups could technically be supported by WMO's Bluejeans system. Mr Dacić will investigate on this matter.

The participants requested annual WIGOS workshops meetings similar to the current one as a way to keep the momentum in the regional implementation work. ROE will seek to exploit existing synergies with other regional efforts to partly accommodate this request and facilitate at least bi-annual meetings.

The NMHS should be encouraged to progress in their WIGOS efforts and not expect a general N-WIP template to be issued by the WMO Secretariat. The great heterogeneity of Members within RA VI could be accommodated by forming sub-regional groupings, but their structure will need to be discussed. Sub-regions should be aligned with existing linguistic and cultural boundaries within the regions.

The RWCs should be active entities in the (sub-)regions for which they serve. A strict accreditation and review process is therefore needed.

Agenda Item 5.12 Mr Čačić closed the meeting by stating that the people working on WIGOS issues and partaking in this meeting are already making a difference that will materialize in the future.

RA VI is very heterogeneous but is well placed to make progress on the implementation of WIGOS and to benefit from it. The existing EUMETNET collaboration involving many RA VI Members is a very useful catalyst for this work. He thanked the Serbian National Hydrometeorological Service RHMSS for their excellent performance and hospitality and extended his thanks to the organizers of the meeting.

Mr Petković, the representative of Serbia, expressed, on behalf of Prof Nikolić, his gratitude to WMO for choosing his country to host this meeting. He also expressed his gratitude for the productive collaboration with the WMO Secretariat in general and ROE and WIGOS-PO in particular.

Comprehensive Report of the Results of Working Groups

1. WIGOS – General Promotion

- Convincing Decision Makers:
  Members need the assistance and support of the WMO Secretariat to explain the benefits of WIGOS to national decision makers (high and medium levels)
- Information Material:
  Make the complete set of material supporting WIGOS available to Members (including all flyers)

[10] https://groups.google.com/a/wmo.int/forum/#!forum/wigos-ra-vi

Create a "Press Pack" for Members to use in their discussions with other organizations in their countries

- WIS ./. WIGOS
  Mitigate the still existing confusion with WIGOS and WIS
  Uncertainty about the overlap between Volume A and C and WIGOS and WIS.
  A one-page explanation of the differences and interactions between WIS and WIGOS would be very helpful.

2. WIGOS Technical Support

- **OSCAR**
  Detailed **OSCAR manual is required**
  A 1-page **step by step "how to" reaching minimum standard** when converting from Vol A to OSCAR.

- **Metadata**
  a selection of **sample metadata profiles** for a range of observation facilities (including hydrological).
  Clear definition for metadata (e.g. Different altitudes)

- **Consolidating National Observation Databases towards WIGOS**
  a central resource of metadata design principles and international samples would be valuable → provide basic principles, checklist

3. WIGOS (Technical) Support Platforms

Technical forum action plan (ToR needed)

- Designing the forum
- Secretariat: Steve Forman
- Members: Kemal Sehbajraktarevic
- Moderator(s): (ensure that questions are answered)
- Invitees: Focal Points and their nominees
- Set up forum before the end of 2015
- Add a Term of Reference for participation in the forum to the Focal Points' term of reference
- Assessing Performance of Forum
- Look for "happiness" score on forum
- Assess every six months
- e.g. email request to assess forum

Newsletter (provided ROE after input of TT-WIGOS)

- Must have meaningful content
- Content more important than appearance
- Inform on important issues that have been addressed (Forum, Teleconference)
- Keep up to date with plan
- TT-WIGOS responsible for issuing newsletter (Contributions on best practice, national successes would be requested)

Help Desk (resources needed but indispensable)

- Forum provides a written help desk, but running from TT-WIGOS is not sustainable.
- Providing help desk would be a key role of a Regional WIGOS Centre
  - Not just responding to operational problems
  - Advising on interpretation of WIGOS requirements

Other possibilities

- User groups; Exhibition at meetings plenaries

- An easily accessible and searchable WIGOS web page and printed documents are needed for Members.
- Learning from WIS: **WIGOS Jump Start Initiatives**

4. WIGOS Communication Platforms

Telephone conferences (problem with too many members → subgroups concept by TT-WIGOS)

- Conferences quarterly
- Agenda issued by TT-WIGOS
- Agenda available at least two weeks before the date of the telephone conference together with connection details
- Sub-groups
    - Task Team decide on sub-groups based on recommendations from Members – by 15 January
    - Task Team (with appropriate language skills) participate in each sub-group

Face to face meetings (→ once in a financial period due to lack of finances)

- Region VI meeting each year (if affordable) - WG-TDI needs to be involved in planning the meeting
- Training
  First day must be an introduction to WIGOS
- Exchange experience
  Report of progress published
  report prepared in advance of meeting
- Sub-regional meetings more frequent (if affordable)
  Focal points select attendees (including key non-NMHS partners)
  Demonstrating win-win

5. Regional WIGOS Implementation Plan

- Update considering the following aspects:
    - Consistency with WIGOS Framework Implementation Plan shall be ensured.
    - Decisions and outcomes from Cg-17, EC-67 and ICG-WIGOS shall be reflected in R-WIP-VI.
    - Five Priority Areas of WIGOS pre-operational phase shall be considered and reflected in the related part of R-WIP-VI, particularly in activities proposed.
    - Activities in the current plan (Table 2) should be reduced and redefined by considering the necessity for the realistic and achievable targets.
-

6. National WIGOS Implementation Plan

Support to NMHSs can be achieved by providing the following:

- A **concise guide on how to implement WIGOS at the national level** which summarises the basic steps to be taken and includes:
    - A **Template Implementation plan**
    - **Completed example** templates (both large and smaller NMSs)
    - **Strategy for ensuring WIGOS is a priority at NMS level** and receives the appropriate ongoing resource allocations to ensure sustainable WIGOS implementation.
    - **Guidelines for relationship development and management** with 3rd parties (e.g. sample contracts)

7. Assessment of Capabilities

- The self-assessment checklist is the first step in raising capability

- External assessment of the WIGOS capability in a country by an expert from another RA VI Member
    - the country being assessed benefits from an independent view
    - the assessor benefits by gaining detailed knowledge of how things are done differently in other countries

8. Regional WIGOS Centres (RWCs)

The group identified the following list of tasks which should be performed by RWCs for the benefit of whole RA VI and beyond.

Activity – area	**Activity – task description**	**Activity - ID**
Coordination	Overarching coordination and communication with all RA VI RWCs, RA VI office, RA VI WG TDI , RA VI TT WIGOS Implementation, WMO Secretariat, EUMETNET	COOR_1
Communication	Initial point of contact in response to FAQs concerning WIGOS implementation	COMM_1
	Collating benefits of WIGOS	COMM_2
	Education & Training for WIGOS implementation - Concerning establishing partnerships - Concerning metadata management (OSCAR)	COMM_3
Providing links to external entities/ establishing partnerships	Establishing and maintaining links with Regional Oceanographic Groups	LINK_1
	Establishing and maintaining links with Regional Climate centres	LINK_2
	Establishing and maintaining links with Regional Instrument centres	LINK_3
	Establishing and maintaining links with Regional Hydrological Groups	LINK_4
Providing technical support	Regional network management (network design and coordination)	TECH_1
	Regional data monitoring & data quality management	TECH_2
	Regional metadata management (OSCAR/Surface) - Day-to-day/On-demand tech. support to Members concerning usage of OSCAR/Surface - Regular check for completeness of OSCAR/Surface	TECH_3

	(Support concerning national data management)*	TECH_4

Table 1: Potential activities/tasks of RA VI RWCs.

*: For this task WMO guidance material is currently missing which covers the full chain of data processing from on-site sensor to storage in NMHS database and ingestion into GTS.

The group proposed to give the responsibility for conducting the aforementioned activities to one single entity (RA VI Member) for efficiency reasons. However, noting that it will be unlikely in the current economic situation to find a volunteering Member who is willing to perform all tasks, it was suggested to share the burden of managing the WIGOS implementation on regional level by assigning responsibilities for the different activities to different Members. This is shown in Table 2 and Figure 1.

Activity-IDs	**Range of RWC**	**Number of RWCs**	**RWC ID**	**RWC – proposed Member/ organisation**
COOR_1, COMM_1 and COMM_2 (these activities might be merged)	Regional	1	A	TBD
COMM_3 and TECH_3 (these activities might be merged, nevertheless two RWC are proposed to deliver the combination of COMM_3 and TECH_3 in two different sub-regions: e.g. English-speaking and Russian-speaking sub-regions)	Sub-regional	2	B, C	TBD
LINK_1	Regional	1	D	TBD + consortium?
LINK_2	Regional	1	E	TBD + consortium?
LINK_3	Regional	1	F	TBD + consortium?
LINK_4	Regional	1	G	TBD + consortium?
TECH_1	Regional	1	H	EUMETNET Obs Programme Management[1]
TECH_2 (this activity might be split-up into two tasks: 1-maintaining monitoring portal and	Regional	2	I, J	EUMETNET Obs Programme

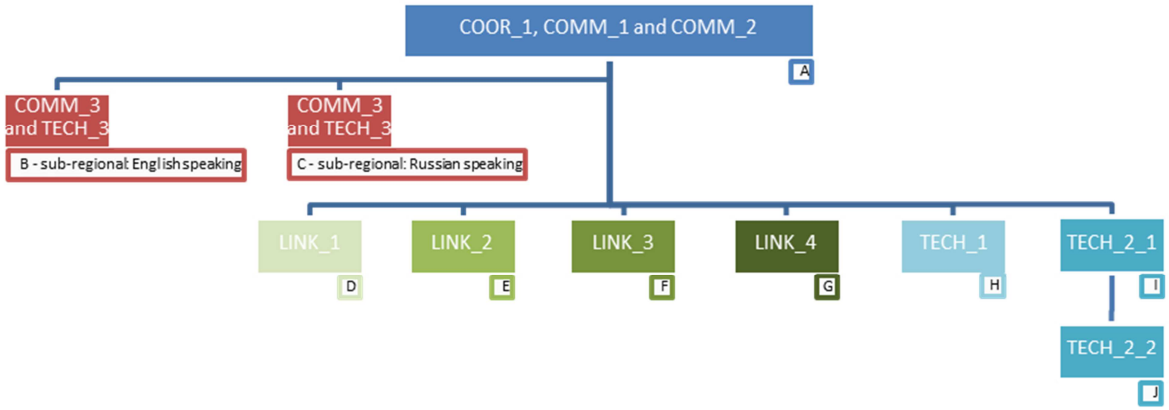
2-using portal and day-to-day monitoring)				Management[2], and TBD

Table 2: Potential structuring, distribution and assignment of RWCs.

[1] It could be considered to ask EUMETNET whether the EUMETNET Obs Programme Management can serve as a RWC and assume responsibility for performing this task.

[2] It could be considered to ask EUMETNET whether the EUMETNET Obs Programme Management can serve as RWC and provide, adapt and maintain the EUCOS Quality Monitoring Portal (QMP)/ RA VI QMP for RA VI WIGOS implementation monitoring. A separate RWC –ideally a non-EUMETNET member- is required to deliver the day-to-day QM service. This RWC would get access to the EUCOS/RA VI QMP, check the portal for suspicious Members' data and notify Members about identified irregularities.

It has to be further considered whether the different activities can be grouped together in different ways in order to reduce the overall number of RWCs.



Potential structure of RWCs in RA VI. Please compare with Table 2.

9. Overcoming barriers

Sub-regions overcome time zone and languages issues
Limited resources available to TT-WIGOS
Prioritize what we are asking of TT-WIGOS
Enhancing TT-WIGOS with a subgroup structure:

- Subgroup of RWC
- Subgroup of Support to N-WIP & OSCAR
- Subgroup on Guidance Material & Regulations
  (global task, no to be tackled by TT-WIGOS at regional level)

ANNEX I

	RA VI WIGOS WORKSHOP 24-27 November 2015, Belgrade, Serbia **LIST OF PARTICIPANTS**		
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ANNEX II

AGENDA

1. OPENING
2. KEYNOTE SPEECH: Next Phase of WIGOS Implementation; Guidance from ICG-WIGOS
3. Role of Members and NMHSs at the national WIGOS implementation
4. Regional WIGOS relevant projects and activities
5. Capacity development, communications and outreach activities to assist Members in the implementation of WIGOS
6. Adoption of the Observing Systems Capability Analysis and Review Tool – OSCAR/Surface
7. Regional WIGOS Implementation Plan (R-WIP) – Taking NMHSs requirements into account