**WORLD METEOROLOGICAL ORGANIZATION**

**INTER-COMMISSION COORDINATION GROUP**

**ON THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM**

***TASK TEAM ON WIGOS METADATA***

***Second Session***

Geneva, Switzerland, 12-15 May 2014

**FINAL REPORT**



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**Executive Summary**

 The second session of the Task Team on WIGOS Metadata (TT-WMD-2) of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS) was held at WMO headquarters in Geneva, Switzerland, from 12 to 15 May 2014. The session was chaired by Mr B. Howe (Canada), Chair, TT-WMD.

 Based on the decisions by Cg-XVI and in accordance with guidance from ICG-WIGOS and the Terms of Reference, TT-WMD-2 carefully reviewed and completed the first draft (version 0.1) of the WIGOS Metadata Standard (see [Appendix II](http://192.168.202.66/pages/prog/www/WIGOS-WIS/reports/TT-WMD-2_Final-Report_Appendix-II.docx)). As a major contribution to the WIGOS Regulatory Material, the session reviewed and updated the Appendix 2.3 of the draft Manual on WIGOS (see [Appendix III](#Appendix_III)) related to observational metadata. An important outcome included in those revisions is the adoption of a phased approach for the implementation of WIGOS Metadata by Members, instead of the previous concept of core metadata standard. Other conclusions are as follows: 1) the TT-WMD and Commission for Climatology Expert Team on Climate Data Management Systems (ET-CDMS) should work together with the Inter-Programme Expert Team on Metadata and Data Representation Development (IPET-MDRD) to develop a data model for WIGOS metadata and 2) IPET-MDRD should develop the technical standard for WIGOS metadata exchange, also with the effective participation of members from TT-WMD and ET-CDMS.

 TT-WMD-2 reviewed and updated its Future Work Programme/Action Plan (see [Appendix I](#Appendix_IV)V).

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**General summary**

1. **ORGANIZATION OF THE SESSION**
	1. **Opening of the session**
		1. The second session of the Task Team on WIGOS MetaData (TT-WMD-2) of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (ICG-WIGOS) was opened by its Chair, Mr B. Howe (Canada) at 09:00 hours on Monday, 12 May 2014, at the WMO Headquarters in Geneva, Switzerland.
		2. Dr W. Zhang, Director of the Observing and Information Systems Department, welcomed participants to the WMO Headquarters. He noted the importance of WIGOS as one of the five priorities of WMO and mentioned, as an example, the survey made during 16th session of the RA V-16, Jakarta, Indonesia, 2–8 May 2014, about Members priorities, which resulted in WIGOS being the very first of all priorities for Members of RA-V. He also noted that all WMO Regions are represented in ICG-WIGOS, which is really relevant, because the effective implementation of WIGOS depends on the Regional Associations and the Members. From the three task teams established by ICG-WIGOS, the TT-WMD is a crucial one for the others, especially for the work of the Task Team on WIGOS Regulatory Material (TT-WRM), and also in relation with the developments of OSCAR (Observing System Capability, Analysis and Review) tool of the WIR (WIGOS Information Resource). This second session of TT-WMD is a critical one, regarding its major goal of contributing to the current drafts of WIGOS regulatory material, as well as a clear contribution to the plans of the regional associations for the next four years. Finally, he noted that the TT-WMD needs to work closely with other related WMO bodies and that its work is fully supported by the Secretariat, particularly through the WIGOS Project Office.
		3. The list of participants is given in [Appendix I](#Appendix_I).
	2. **Adoption of the agenda**
		1. TT-WMD adopted the [Agenda](#AGENDA) for the meeting, which is reproduced at the beginning of this report.
	3. **Working arrangements**
		1. TT-WMD agreed on its working hours and adopted a tentative work plan for consideration of the individual Agenda Items.
2. **CHAIR’S REPORT**
	1. Mr B. Howe, Chair of TT-WMD, noted the work of the Task Team since its first session in March 2013, including a series of teleconference meetings via WebEx, approximately monthly, or bi-monthly. He thanked TT-WMD members for the work done as well as the Secretariat for the support. The Chair noted that the session should take into account the recommendations from ICG-WIGOS and he outlined the tasks of the team during this second session keeping in mind that the major deliverable is the revision and update of Appendix 2.3 of the draft Manual on WIGOS.
	2. Specifically, the following tasks were highlighted: 1) completing the first draft of WIGOS Metadata Standard; 2) Analysis of those comments about the WIGOS Metadata Standard, received but not yet considered; 3) Discussion of major issues such as harmonization of technical language, e.g. names and definitions, amongst different communities; 4) Formalization of the WIGOS Metadata Standard; 5) Revision and update of the work plan of TT-WMD.
3. **RELEVANT RECOMMENDATIONS OF ICG-WIGOS**
	1. TT-WMDwas informed on the guidance and relevant recommendations from the third session of ICG-WIGOS, including the relevant items from the “Future Work Programme and Action Plan of ICG-WIGOS and Task Teams” and the activities contained in the updated WIGOS framework Implementation Plan (WIP) relevant to TT-WMD.
	2. The session considered the need to have representatives of all WMO Application Areas effectively involved in the work of TT-WMD. I was suggested that each WMO Application Area could be represented in TT-WMD by its Focal Points.
4. **WORK OF OTHER BODIES RELEVANT TO THE WORK OF TT-WMD**
	1. **WIGOS Regulatory Material (WRM)**
		1. Mr R.Stringer, Chair of the Task Team on WIGOS Regulatory Material (TT-WRM) introduced the latest outcomes of this Task Team. He described the current structure and development status of the Technical Regulations, Volume I, Part I, and its relevant Annex (Manual on WIGOS). He noted the timeline of TT-WRM and the coming steps to be completed, namely the review process, including the deadline for feedback from the Presidents of Technical Commissions. He also mentioned the various sections in both, WMO Technical Regulations, Volume I, Part I, and Manual on WIGOS, regarding metadata provisions and notes. The text of Note 2 under paragraph 2.5.1.1 was edited in session to expand the valid values to be recorded/made available in mandatory elements, particularly during a transition period towards full capability of Members to enter actual values in those elements.
		2. The Chair of TT-WRM drew the attention of TT-WMD to the need to clarify which metadata elements are mandatory for the OSCAR database, also the need to update the current table of WIGOS metadata elements in Appendix 2.3 of the draft Manual on WIGOS, and finally to the definitions used in WIGOS regulatory material.
		3. The amount and list of mandatory metadata elements, for the first stage/first level, as recommended by ICG-WIGOS, were discussed and as a conclusion a phased approach was considered by TT-WMD. TT-WMD identified the metadata elements for each phase and prepared a summary table for that. In this context, it was recognized that the WIGOS Metadata Standard can be updated, for instance, bi-annually.
		4. TT-WMD noted that for Congress in 2015, benefits of WIGOS metadata should be presented to Members.
	2. **WIGOS Information Resource/OSCAR Database**
		1. The session was informed by the Secretariat and MeteoSwiss (Mr J. Klausen) on the status of development of the OSCAR[[1]](#footnote-1) tool of the WIR, relevant to the tasks of the TT-WMD. It was pointed out that observational platform and instrument metadata are relevant parts of OSCAR. Under the MoU established between WMO and MeteoSwiss, this National Meteorological Service, as an operational organization will, in a first phase, (a) move and integrate the observational user requirements part of OSCAR (OSCAR/Requirements) into MeteoSwiss IT infrastructure, (b) develop and host the observing systems capability part of OSCAR (OSCAR/Surface), (c) develop, host and make the GAWSIS (Global Atmosphere Watch – Station Information System) interoperable with OSCAR, and later, in a second phase MeteoSwiss will (d) move and integrate the current space-based observing systems capability part of OSCAR (OSCAR/Space) into the MeteoSwiss IT infrastruture; OSCAR will, in particular, but not only, be able to archive a subset of WIGOS metadata, including the “operational metadata”, that is the evolution of the current metadata contained in "Weather Reporting (WMO-No. 9), Volume A", as well as all the metadata required for the critical review (i.e. comparing the observing systems capabilities with the observational user requirements in order to identify the gaps) of the Rolling Review of Requirements (RRR).
		2. The existence of eventual multiple source(s) of metadata information for OSCAR, for various observing systems, which might create ambiguities, was raised as an issue to be addressed in a near future.
		3. It was recognized that the current WIGOS metadata elements cover all the OSCAR required metadata fields, although two fields (Vertical layer and Coverage) would have to be derived from the element “Spatial extent of observation”.
	3. **Inter-Programme Expert Team on WIGOS Framework Implementation Matters (IPET-WIFI)**
		1. Mr K. Monnik, Chair of the IPET-WIFI/Sub-Group on Metadata briefed the session on the work that has been performed, related to the WIGOS Metadata. He informed that the IPET-WIFI established three sub-groups, one on WIGOS regulatory material (RM), one on WIGOS metadata (MD) and another one on WIGOS quality management (QM).
		2. One of the issues under the responsibility of sub-group on RM is the possible “certification process” of the “third-party” (non-NMHS) observations. It was discussed how to ensure that the quality of such data can be guaranteed and known.
		3. Under the responsibility of sub-group on QM, work is needed to improve the current quality control and monitoring practices and procedures, including availability of monitoring results in real-time and feed-back to the data providers.
		4. Under the responsibility of sub-group on MD, the following needs (issues) were identified: a) wide consultation to develop a common understanding of mandatory, optional and conditional fields for the purpose of reporting metadata; b) clear documentation and communication of metadata fields which are generically applicable across WIGOS; c) ability to report "unknown" for many fields, in order to ease the transition to new standard; d) the responsibility for the technical implementation of WIGOS metadata.
		5. Considering the requirement for member states to have access to a mechanism to submit and maintain WIGOS metadata, IPET-WIFI-2 recommends that the Commission for Basic Systems (CBS) Open Programme Area Group on Information Systems and Services (OPAG ISS) takes responsibility for the technical implementation of the WIGOS Metadata Semantic standard in consultation with IPET-WIFI and TT-WMD. This was endorsed by the session.
	4. **Inter-Programme Expert Team on Metadata and Data Representation Development (IPET-MDRD)**
		1. The Secretariat briefed the session on the recent development of the IPET-MDRD, related to the WIGOS Metadata Standard, whose goals include the development of new data representations, which are interoperable, and consistent with existing standards, particularly with ISO 19156 (O&M) and OGC.
		2. TT-WMD-2 noted that IPET-MDRD had discussed the representation of WIGOS metadata in March 2014 and recognized that WIGOS Metadata Standard is strongly aligned with ISO 19156 (O&M).
		3. The session noted and accepted the proposal to nominate TT-WMD members to work with IPET-MDRD, as a way forward, in order to: Map WIGOS Metadata into “Requirements classes”; Create WIGOS Application Schema, building on work for aviation and Develop codings (such as XML, netDCF, TDCF).
	5. **Commission for Instruments and Methods of Observation (CIMO) Expert Team on Standardization (ET-Stand)**
		1. Mr B. Howe, Chair of the CIMO ET-Stand briefed the session on the development of the Metadata Catalogue of Observing Stations, Instruments and Observing Technologies prepared by this Expert Team. He noted the need to include a few more elements from the CIMO Metadata Catalogue in the WIGOS Metadata Standard.
		2. He also noted the need for a repository of related documents, and/or links, such as to the CIMO Metadata Catalogue.
	6. **Commission for Climatology Expert Team on Climate Data Management Systems (ET-CDMS)**
		1. Mr B. Bannerman, representative of the CCl ET-CDMS briefed the session on the development related to observational Metadata. He congratulated the TT-WMD for its work so far, and noted that the ET-CDMS “Climate Data Management System Specification” has explored the requirements for Observational Metadata. This work is complementary to that being undertaken by TT-WMD in defining WIGOS Metadata. He also noted the importance of metadata for climate data analysis, particularly for homogenization of time series.
		2. The session noted that WIGOS Metadata Standard is to be used also for data sets, not only for individual observations, since all WIGOS metadata records will have a time stamp, which allows to create metadata time series.
		3. It was noted that the reconciliation between different bodies working on metadata would have to be done through the development of a data model, such as the “METCE” that stands for “Modèle pour l'Échange de Temps, Climat et Eau” (Model for the Exchange of Weather, Climate and Water), or alternatively, the METeorological Community Exchange model (the Aviation XML), and it is being developed to be an umbrella data model for application to aviation.
		4. The session noted that IT solutions for implementation of WIGOS Metadata Standard are the responsibility of IT experts, the TT-WMD being in charge of defining what the needs are.
		5. The session noted the recommendation from ET-CDMS that CDMS Specification work on Observational Metadata should be merged into the WIGOS Metadata Standard. Then, the session concluded the need to map all observational metadata fields identified by ET-CDMS against WIGOS Metadata Standard elements.
		6. The session was questioned on how to use WIGOS Metadata to select stations that have been operating with the same type of instrument during a certain period of time. The answer was that it is possible, by specifying the measurand, because the WIGOS Metadata Standard is built on a measurand (observed quantity) approach, rather than a station approach.
		7. It was further recommended and accepted that TT-WMD and ET-CDMS should work closely together with IPET-MDRD to ensure consistency between development of a data model for WIGOS Metadata Standard and METCE and the WMO Registry.
	7. **Commission for Hydrology (CHy) and Global Runoff Data Centre (GRDC)**
		1. Mr T. Boston, representative of CHy, briefed the session on the perspectives of this Commission and the work of Global Runoff Data Centre related to hydrological metadata. He introduced the “WaterML2” model, which is an OGC standard for hydrological time series. He recommended that WIGOS Metadata Standard should take into account the ISO O&M definition and observation model and also recommended IPET-MDRD to develop the standard for the exchange of WIGOS metadata. Both recommendations were approved by the session.
	8. **Metadata for RADAR and other surface-based systems**
		1. The Secretariat briefed the session on the work and perspectives of the Expert Team on Surface-based Observing Systems (ET-SBO), such as those past activities regarding the creation of the WMO RADAR database (WRD), the survey to Members on wind profilers and the maintenance of RADAR metadata. The following issues were mentioned: a) the need to establish the links between WRD and the OSCAR database (WRD will not be discontinued, it will be a metadata source for OSCAR, and made interoperable with it); and b) the need for a task team to develop mechanisms for RADAR data exchange.
		2. The session was also requested to check on the previous comments on the WIGOS Metadata Standard, provided by ET-SBO.
		3. Mr D. Michelson, representative of EUMETNET’s (group of European National Meteorological Services) OPERA (Operational Programme for the Exchange of Weather Radar Information) briefed the session on the OPERA Data Information Model (ODIM). He mentioned that OPERA and WRD are complementary to each other, since OPERA is providing information to the WRD. He also mentioned the existence in ODIM of three different metadata groups: “what” (mandatory), “where” (mandatory) and “how” (optional). He noted the potential for similar information to be represented in mutually incompatible ways in the two models. He suggested that a mapping exercise between the two models could be useful to clarify the amount of common ground and areas that require attention
		4. The session noted the need for OSCAR database to be consistent and comprehensive, for instance, including wind profilers, to allow for effective gap analysis.
		5. The session noted that the WIGOS Metadata Standard is to be used by all WMO Application Areas, including those who need real time, or near real time, data, and those who are more concerned with past data sets.
5. **WIGOS OBSERVATIONAL METADATA SPECIFICATION**

Note 1: The numbering of paragraphs in this section is not in line with the numbering of sub-items under agenda item 5.

* 1. The Chair of TT-WMD introduced the latest version of the WIGOS Metadata Standard (v.0.0.23) and mentioned two documents with comments from different bodies, CIMO and CHy, which have to be considered.
	2. The session developed and adopted a phased approach consisting of three phases, for implementation of WIGOS Metadata Standard by Members. The selection of elements to be used in each phase was based on two criteria: a) to comply with the requirements of "Weather Reporting (WMO-No. 9), Volume A"; and b) to comply with the requirements for the OSCAR database to make the RRR critical review possible.
	3. The session decided to work in two breakout groups, the first one was in charge of the task described in 5.1, and the second one was in charge of the task described in 5.2.

Note 2: The outcomes of each breakout groups are not shown separately, since the final outcomes were the result of intensive discussions in plenary.

* 1. The session discussed the extension of the WIGOS Metadata Standard, to accommodate specific elements which are only applicable to some observing systems, e.g. “Beam width” which is only required for Weather RADARS.
	2. Regarding the profiling of the WIGOS Metadata Standard it was recognized that all elements that will emerge as being important for specific Application Areas will have to be added to become part of the WIGOS Metadata Standard, in order to comply with the ISO standards.
	3. The session introduced a new element “Source of Observation”, in category 8 (“Method of Observation”, previously named “Instrument”), with an associated code table, which will include human, manual and automatic observations.
	4. The session recognized that a recommendation should be made to Members for them to start collecting WIGOS metadata, during the implementation period, even before obligation comes into force.
	5. The session reviewed some relevant parts of the “Guide to the Expression of Uncertainty in Measurement” (GUM) and largely discussed the uncertainty issue. Then, the session decided that all elements under category 3 “Data quality” have to be mandatory for phase II. Recognizing that the estimation of effective “uncertainty of measurement” will require some effort, time and resources by Members, the instrument uncertainty provided by manufacturer will be a valid entry for that element. For the element “Quality Flag”, the use of the BUFR quality flags as code table was decided, but an additional valid entry should be “unknown”, recognizing that it is valuable information for users. Other quality flagging systems will also be valid, as long as they will be described by Members, under the element “Quality flagging system”.
	6. For the element “Traceability chain” the session discussed possible entries for a code table, such as “Not traceable” and “Traceable to a national standard”.
	7. The session noted that good guidance material will be needed, to enable Members to understand the WIGOS Metadata Standard and to comply with the Technical Regulations that refer to it.
	8. The session recognized that Presidents of Technical Commissions (PTCs) should have access to the latest version of the WIGOS Metadata Standard during the review process, in order to allow for a better understanding of the structure, definition and examples of all metadata categories and elements. It was decided to provide to PTCs a reference link to a webpage where the WIGOS Metadata Standard document could be published.
	9. The session reviewed the obligations for all WIGOS metadata elements and decided to make the following changes: element “Reporting interval (space)” from mandatory to conditional, because it only applies to remote sensing and mobile platform observations; element “Geospatial location” (of instrument), as well as all other elements under category 8 (“Method of Observation”) referring to “instrument”, changed from mandatory to conditional, because they do not apply to human observations.
	10. The session decided to abandon the notion of “core” for the WIGOS Metadata Standard.
	11. The session agreed on the definition and a new name for the former element “Latest maintenance of surface surrounding the station/platform”: “Intervention at station/platform”.
	12. For the element “Surface cover” three new code tables were added to include also the following classification schemes: “UMD”, “LAI/fPAR” and “NPP”.
	13. The session also reviewed and edited the names, the notes/examples, as well as code tables of some elements such as “Observable range”, “Configuration of instrument”, “Spatial extent of observed quantity”, “Instrument field verification”, “Reference datum” and “Geospatial location (instrument)”.
	14. The session also reviewed the conditions applicable to the conditional elements of the WIGOS Metadata Standard.
	15. The session reviewed the text of the WIGOS Metadata Standard document, and created a new section: “Adoption through a phased approach”.
	16. The session noted the need to develop specific recommendations to ICG-WIGOS regarding capacity development and training for effective implementation of WIGOS Metadata Standard by all Members.
	17. The session decided that the latest version of the WIGOS Metadata Standard, as the result of this TT-WMD-2 (see [Appendix II](http://192.168.202.66/pages/prog/www/WIGOS-WIS/reports/TT-WMD-2_Final-Report_Appendix-II.docx)), should be labelled version 0.1 and noted that the document needs further editorial work.
	18. Regarding the issue of archiving and accessing WIGOS metadata, the session recognized that the OSCAR database would only be able to archive a sub-set of WIGOS metadata, concluding that further discussions and the development of the WIGOS Metadata technical standard (for the exchange of WIGOS metadata) could bring more clarification.
1. **FUTURE WORK PROGRAMME AND ACTION PLAN OF TT-WMD**
	1. The session reviewed and updated its Future Work Programme and Action Plan, which is provided in [Appendix IV](#Appendix_IV), to ensure that the tasks assigned to the TT-WMD will be completed by Congress 17.
2. **ANY OTHER BUSINESS**
	1. The next teleconference meeting of the TT-WMD via WebEx is foreseen for early June 2014.
	2. The third session of TT-WMD is to be scheduled for later this year, possibly in late November or early December 2014, to allow completion of tasks assigned for 2014 and to prepare outcomes and recommendations to ICG-WIGOS (scheduled for January 2015).
3. **CLOSURE OF THE SESSION**
	1. As final remarks before closure, Dr. W. Zhang mentioned the benefits for Members of global standardization of observations.
	2. Mr B. Howe, thanked for the contributions from all participants, and closed the session at 17:20 hours, on Thursday, 15 May 2014.

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**Appendix I**

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## Appendix III

**APPENDIX 2.3**

**The WIGOS Core Metadata Standard**

***General***

This Appendix refers to the WIGOS Core Metadata Standard, which consists of the set of observational metadata elements to be made available internationally. They are required for the effective interpretation of observations from all WIGOS component observing systems by all observational data users, allowing them to access important information about why, where, and how an observation was made, and how the raw data were processed and what the quality of the data is. Note that WIGOS metadata which is required from specific components or sub-systems is detailed in other relevant parts of the WIGOS regulatory material.

The table below presents categories (or groups) of metadata, each containing one or more elements. Each element is classified (using the same terminology as is used by ISO) as either mandatory (M), conditional (C), or optional (O).

The definition of each metadata element, together with notes and examples, as well as the explanation of the condition to apply to the conditional elements, can be found in the latest version of the WIGOS Metadata Standard document which is available through the following (temporary) link: <http://www.wmo.int/pages/prog/www/wigos/TT-WRM.html>

***Members’ obligations***

Mandatory metadata elements shall always be made available. The content of the corresponding fields shall never be empty, either the metadata “value” or the reason for no-value, shall be made available.

Conditional metadata elements shall be made available when the specified condition or conditions are met, in which case the content of the corresponding fields shall never be empty, either the metadata “value” or the reason for no-value, shall be made available.

Optional metadata elements should be made available. They provide useful information that can help to better understand an observation. As is to be expected for a ‘core’ metadata standard, very few elements are considered optional. Optional elements are likely to be important for a particular community, but less so for others.

***Adoption through a Phased Approach***

Making available WIGOS metadata will generate substantial benefits for Members, but developing the capacity to make available these metadata also requires a substantial effort on the part of (meta)data providers. To help Members comply with reporting obligations, guidance material will be developed and provided.

Moreover, reporting obligations will be enforced in phases, in order to allow Members sufficient time to develop the capacity to comply. Balancing the effort required to generate and make available individual elements, and the need to have this information to make adequate use of observations, implementation will proceed through three phases as shown in the table below. Importantly, elements required by the end of **Phase I** are either the mandatory elements in WMO Publication No. 9, Vol. A or are of critical importance for the Observing Systems Capability Analysis and Review (OSCAR) tool of the WIR, and are considered of benefit for all application areas. **Phase II** adds elements recognized to be more challenging for Members, but the knowledge of which is still of rather immediate need for the adequate use of observations, in particular for assessing quality of observations. **Phase III** adds the remaining elements specified in this version of the standard.

Elements emerging as being important for specific application areas or observing programs will be added to the standard as it evolves.

**List of elements specified in the WIGOS metadata standard and the phases for Members implementation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Phase I** | **Phase II** | **Phase III** |
|  | **2016** | **2017-2018** | **2019-2020** |
| 1. Observed Quantity | **1-01 Name of observed quantity – measurand (M)** | 1-05 Representativeness of observation (O) |  |
|  | **1-02 Measurement unit (M)** |  |  |
|  | **1-03 Temporal extent of observed quantity (M)** |  |  |
|  | **1-04 Spatial extent of observed quantity (M)** |  |  |
|  | **1-06 Observed medium (M)** |  |  |
| 2. Purpose of Observation | 2-01 Application area(s) (O) |  |  |
|  | **2-02 Network affiliation (M)** |  |  |
| 3. Data Quality |  | **3-01 Uncertainty of measurement (M)** |  |
|  |  | **3-02 Procedure used to estimate uncertainty (M)** |  |
|  |  | **3-03 Quality flag (M)** |  |
|  |  | **3-04 Quality flagging system (M)** |  |
|  |  | **3-05 Traceability chain (M)** |  |
| 4. Environment |  | *4-04 Exposure of instrument (C)* | *4-01 Surface cover (C)*  |
|  |  | 4-05 Intervention at Station/platform (O) | *4-02 Surface Cover classification scheme (C)*  |
|  |  | 4-06 Site information (O) | *4-03 Topography or Bathymetry (C)*  |
| 5. Data Processing and Reporting | **5-03 Reporting interval (time) (M)** | 5-02 Processing/analysis centre (O) | 5-01 Data processing methods and algorithms (O) |
|  | *5-04 Reporting interval (space) (C)* | 5-06 Level of data (O) | 5-05 Software/processor and version (O) |
|  | *5-12 Reference datum (C)*  | **5-09 Aggregation interval (M)** | **5-07 Data format (M)** |
|  |  | **5-10 Meaning of time stamp (M)** | **5-08 Version of data format (M)** |
|  |  | **5-11 Reference time (M)** | 5-13 Numerical resolution (O) |
|  |  |  | **5-14 Latency (of reporting) (M)** |
| 6. Sampling and Analysis | 6-03 Sampling strategy (O) | **6-06 Spatial sampling resolution (M)** | 6-01 Sampling procedures (O) |
|  |  |  | 6-02 Sample treatment (O) |
|  |  |  | **6-04 Sampling time period (M)** |
|  |  |  | **6-05 Meaning of the time stamp (M)** |
|  |  |  | 6-07 Analytical procedures (O) |
| 7. Station/Platform | *7-01 Region of origin of data (C)*  | **7-04 Station/platform type (M)** | **7-05 Station/platform model (M)** |
|  | *7-02 Territory of origin of data (C)*  | 7-08 Data communication method (O) |  |
|  | **7-03 Station/platform name (M)** |  |  |
|  | **7-06 Station/platform unique identifier (M)** |  |  |
|  | **7-07 Geospatial location (M)** |  |  |
| 8. Method of Observation | **8-01 Source of observation (M)** | *8-12 Geospatial location (C)*  | *8-06 Configuration of instrumentation (C)* |
|  | **8-02 Measurement principle (M)** |  | *8-07 Lab calibration interval (C)*  |
|  | **8-03 Observable range (M)** |  | *8-08 Instrument lab calibration date and time (C)*  |
|  | *8-04 Instrument stability (C)*  |  | *8-09 Instrument model and serial number (C)*  |
|  | *8-05 Vertical distance (C)*  |  | *8-10 Instrument field maintenance (C)*  |
|  |  |  | *8-11 Instrument field verification (C)*  |
| 9. Ownership and Data Policy | **9-02 Data policy/use constraints (M)** | **9-01 Supervising organization (M)** |  |
| 10. Contact |  |  | **10-01 Contact (Nominated Focal Point) (M)** |

## Appendix IV

**TT-WMD ACTION PLAN FOR THE PERIOD XI.2012 TO VI.2015**

|  |  |  |
| --- | --- | --- |
| **Version** | **Date** | **Comments** |
| **1** | **23/11/2012** | **Action plan developed at TT-WMD-01** |
| **2** | **15/3/2013** | **TT-WMD-01** |
| **2a** | **31/01/2014** | **Intermediate update for ICG-WIGOS** |
| **3** | **15/05/2014** | **TT-WMD-02** |
|  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Task** | **Deliverable/Activity** | **Deadline (if not stated end of month)** | **Responsible** | **Status\*** | **Comment** |
| 0 | Produce proposed definition of contents of WIGOS metadata | Initial version of WIGOS metadata | 15 March 2013 | Howe | Complete15/3/2013 | TT-WMD-1 achieved this |
| 1 | Define Initial Observation Types to be described | All WIGOS observational data types have been listed (the purpose of the list is to design a robust model for observation metadata, so although it may not be possible to include every observation type, those in the list should ensure that the range of requirements for metadata is covered), and each assigned to a relevant TC for specification of metadata requirements (TT-WMD) | May 2013 | Klausen | Task completed with sufficient coverage in the presentations for TT-WMD-115/3/2013 | Adequate information was provided through the presentations for the meeting. No direct further list required; review of metadata will identify further issues. |
| 2 | Define essential requirements of application areas beyond the Standard | TCs review the needs of application programmes against the specification of metadata, and propose additional elements that they consider essential for that application area.In doing this, TCs may recommend modifications to the metadata. | November 2013 | TT member for Commissi*o*nsCAgM, EC-PORS contacts needed |  | completed. |
| 3 | Define essential metadata for observing systems beyond the Standard | TCs review the needs of observing programmes against the specification of Standard, and propose additional elements that they consider essential for that observing programme.In doing this, TCs may recommend modifications to the Standard. | November 2013 | TT member for CommissionsCAgM, EC-PORS contacts needed |  | completed. |
| 4 | Confirm Metadata Elements | WIGOS Metadata reviewed following feedback from Commissions and first formal definition agreed. Mandatory, Conditional and Optional elements defined. | March 2014 (EC deadline for documents) | TT-WMD by correspondence |  | Delayed to November 2014 |
| 5 | Formal definition of Metadata | Define, using a standard methodology, the detailed specification of WIGOS metadata, in a form that allows extension to other elements (eg using UML). Precursor to item 5 of WIP 8.1.1 (that may result in item 5 being redefined). | Sep 2014 (needs feedback from EC before completion) | Secretariat liaise with IPET-MDRD |  | Delayed to November 2015 |
| 6 | Recommend to ICG-WIGOS on how they should go about deciding on approaches for gathering, storing and exchanging WIGOS metadata | Within the principle that all data must be provided along with the relevant metadata, identify how WIGOS metadata may be gathered, stored and exchanged. (Precursor for item 5 in the WIP 8.1.1 work plan that may define that item)a catalogue to allow , in a form that allows extension to othe | March 2014 (EC document deadline) | ICG-WIGOS or TT-WMD? |  | This should be led by another group other than TT-WMD. |
| 7 | Decide on subsets of summary metadata and how they will be presented as catalogues | Identify a subset of the metadata that has to be recorded in globally available catalogues to meet requirements for an overview of the observations available through WIGOS and for exchanging critical metadata that changes infrequently. (Precursor to item 5 in the WIP 8.1.1 work plan that may define that item 5). This may include a complete station list similar to Volume A. | November 2014 | Representative of each CommissionIn liaison with IPET-WIFI subgroup on WIGOS Information Resource |  | Completed after identification of the phases approach. |
| 8 | Monitor progress of plan | Quarterly teleconferencing meetings. | 1st Week May 2013September, December, March | Chair |  | Now monthly or bi-monthly |
| 9 | Create contents of code tables etc | Defined contents of code tables, classifications etc that are needed to operate the standard | Dec 2014, but can begin during first half of 2013 | TT-WMD members to take responsibility for individual tablesChair to allocate responsibilities |  | Initial code tables developed. |
| 10 | Development of guidance material, with examples, to assist Members with the practical implementation of the Standard | Document with proposed guidance material | May-Sep. 2015 (based on feedback from Congress) | TT-WMD |  |  |
| 11 | Define the requirements and configuration of metadata exchange | Document with requirements and architecture of metadata exchange | May 2015 | Shared between the chair and Secretariat |  |  |
| 12 | Develop competencies | Identify competencies required for those responsible for providing WIGOS metadata | May 2015 | TT-WMD with Secretariat |  |  |

\* STATUS column entries will be one of the following descriptors, as determined by the Chair TT-WMD based on consultation with the responsible party (in each case, elaborative comments can be added after the standard descriptor or in the "Comment" column):

|  |  |  |
| --- | --- | --- |
| On-Track | Under-Stress | Overdue |

1. (http://www.wmo.int/oscar) [↑](#footnote-ref-1)