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| **World Meteorological Organization****COMMISSION FOR BASIC SYSTEMS****Inter-Programme Expert Team on Metadata and Data Representation Development****Fourth meeting**Geneva, 9 to 12 May 2016 | **IPET-MDRD-4****Final Report** |
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# FOurth Meeting of the Inter-Programme Expert Team on Metadata and Data Representation Development

# FINAL REPORT

**DRAFT**

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# Final report of the fourth meeting of the Inter-Programme Expert Team on Metadata and Data Representation Develoment (IPET-MDRD-4)

## 1. Opening of the Meeting

### 1.1 Formal opening

1. Mr Tandy (Chair IPET-MDRD) opened the meeting at 0900 on Monday 9 May 2016. He noted that the meeting would be asked to agree the input needed from the team for CBS‑16, and to take account of the needs to make WIS easier for users, to avoid a proliferation of model driven code forms, and to prepare a work plan for the period 2016-2020. He also commented that the president of the Open Geospatial Consortium (OGC) had recommended proposing to the OGC that WMO schema should be adopted as recognized standards.
2. Mr Shi (Director of the WIS Branch) welcomed participants to the meeting and stressed the importance of the decisions to be made at the meeting. He recognized that the team had a huge work load, and asked the team to consider new ways of working that would allow the team to manage the introduction of new standards and best practices without the team becoming a bottleneck. He reminded the team that WIS had been asked to extend its practices to include management of information throughout its life cycle.
3. The agenda of the meeting is in Annex 1 and the list of participants is in Annex 2.

### 1.2 Review of work plan

Information provided to the meeting:

i01.01(02) - ISS work plan

i01.01(01) - Report of ICT-ISS from IPET-MDRD

1. Mr Tandy provided an overview of what the team had delivered since CBS-15, and congratulated the members on their achievements.

## 2. WMO Core Metadata Profile

Information provided to the meeting:

d02(01) – ET-WISC feedback

I02(01) - Draft minutes of IPET-MDRD-3

I02(02) - Detailed feedback from ET-WISC

1. The meeting of ET-WISC in Melbourne 18-22 April 2016 had responded to issues identified by IPET-MDRD at the meeting of the metadata sub-team in November 2015. The responses of ET‑WISC are recorded in Annex 1.
2. IPET-MDRD noted that ET-CTS had decided to include a table mapping from GTS centres to their RTH, and that table could be used to generate Volume C1 without the need for recording the RTH in the metadata record.
3. IPET-MDRD recommended that a WIS metadata record for a GTS bulletin should describe the WMO region(s) to which the information applied, using place keywords at identificationInfo/\*/descriptiveKeywords/\*[keywordtype=”place”]/keyword. The Region should be represented using the same keyword list as used for WIGOS metadata.
4. IPET-MDRD reaffirmed decision D10 of its third meeting: IPET-MDRD recommended that the submission of WIS Metadata should be the procedure to “make known to all Members through WMO Secretariat” the designation of “additional” data regarding Resolution 40 (Cg-XII).
5. The procedure to use the WIS metadata records to provide the formal notification for additional data should be documented in the Guide to the WIS, and the text should make it clear that nominating an individual to edit metadata includes the delegation of authority to record the data policy and that appropriate internal processes should be in place to authorize the change in record.

### 2.1 Consideration of ISO 19115-1

Information provided to the meeting:

D02.01(1) - ISO 19115-1

1. Mr Toyoda reported the activities of IPET-MDRD regarding new ISO standards of geographical metadata, on which the WMO Core Metadata Profile is based, including the result of the team’s first and third meetings.
2. IPET-MDRD reaffirmed the decisions of its third meeting that
(i) it will continue study of the new ISO standards, and
(ii) while the study was being performed, IPET-MDRD would concentrate its development activities on improving guidance and search
3. IPET-MDRD also reaffirmed the decision of it third meeting that the extended code lists in ISO 19115-1 could be used with future versions 1.*n* of WMO Core Metadata Profile.
4. The secretariat would inform JCOMM that the move to ISO 19115-1 would be delayed, and as a consequence harmonization with JCOMM would be delayed.

### 2.2 Publication of guidance on WIS metadata

Information provided to the meeting:

D02.02(1) / WCMP metadata guidance

D02.02(2) / Guidance on keywords

D02.02(3) / Guidance on dataset granularity

1. The second meeting of the Task Team on Application of Metadata (TT-ApMD) (Tokyo, 2013) agreed to produce of guidance on creation of WIS Metadata. WIS Wiki was used for development work, and the result was published at [http://wis.wmo.int/page=WmoCoreMetadata](http://wis.wmo.int/page%3DWmoCoreMetadata).
2. There was strong demand among the users of WIS to have single printable version of the guidance. The Annex to input document 2.2(1) was an incomplete compilation from the wiki guidance. Examples of WIS Metadata records were excluded in the compilation because of the size. Typical users were expected to reference only few of the examples.
3. Mr Aubert described the metadata guidance being prepared by CGMS for providers of satellite information. This would provide the detailed guidance for the satellite sections of the guide, but it was likely that the descriptions of key fields could be extracted to form generic guidance.
4. IPET-MDRD agreed that the guidance should be split into two: the first section aimed at authors of metadata; the second section would be aimed at those who needed more information on the mapping onto XML records, such as software developers. The first section should form part of the Guide to WIS and be translated into all languages. The more detailed technical document should remain on the web in English only and linked from the Guide.
5. In addition to the guidance on the contents of the metadata records, guidance would be needed on how to decide which metadata records to produce and similar issues.
6. Mr Toyoda would complete the wiki documentation for section 2 of the guidance by 17 October 2016. IPET-MDRD would need to review this before the start of the CBS session on 23 November 2016.
7. IPET-MDRD noted the proposal in the draft guidance (Doc 2.2(2)) that the use of GMET keywords should not be permitted in metadata records that described information that were not covered by the European INSPIRE directive.
8. IPET-MDRD decided strongly recommendation that WIS metadata records use the extended version of the table of “quantity-kind” that had been introduced to support the model driven code forms. GEMET terms might be included in addition.
9. Records that were intended to be compliant with the requirements of INSPIRE should include an explicit assertion in the data quality section that was specified in the EU INSPIRE technical guidance. Inclusion of a GMET term in a metadata record should not be used to determine whether the record was intended to be compliant with the requirements of INSPIRE.
10. WMO-No. 49 Volume A was being replaced by OSCAR/surface as the official repository of station information. In addition, WMO was introducing a new system of station identifiers that could be resolved by OSCAR/surface.
11. References in WIS metadata records and guidance to Volume A should be replaced by one to WIGOS station identifiers available through OSCAR/surface and use the URI provided by OSCAR to refer to the station details.
12. IPET-MDRD noted the draft guidance in on granularity provided by Mr Guillaud in input document 2.2(3).
13. Mr Hermann Asensio presented the feasibility of using facetted filters to refine search results in the WIS DAR Metadata catalogue (Doc 2.3(4)). A large number of hits could be reduced in few steps; this approach allowed the user to navigate through fine granular metadata descriptions with the help of an automated index.
14. IPET-MDRD agreed an outline of the aspects of WIS metadata that would be described in the Guide to the WIS. Team members were assigned to draft the required text that was not already available from the INSPIRE or CGMS guidance.
15. There would be a teleconference to discuss the draft text and coordinate the finalization of the WIS Metadata guide at 0900 on 15 June to deliver the guide by the end of June. This work would be led by Mr Aubert.

### 2.3 Approach to improving metadata quality

Information provided to the meeting:

D02.03(1) - Improving metadata quality

D02.03(2) - Generating metadata from spreadsheets (plus 2 attachments)

D02.03(3) - Standardizing use of keywords

D02.03(4) - Faceted search

D02.03(5) - Vol C1 metadata generator

D02(02) - In-meeting response to ET-WISC comments

1. IPET-MDRD noted that information on how users searched for information was necessary in order to improve the effectiveness of WIS metadata. It suggested that GISCs might be able to provide analytics on the use of the WIS catalogue to support the production of additional guidance.
2. Mr Toyoda explained his analysis of the situation regarding maintenance of WIS Metadata (input doc 2.3(1)):
	1. Existing inconsistency among metadata records from different originating centres could be addressed by the guidance for metadata creators (i.e. data providers): single printable compilation of the guidance (see agenda item 2.2) was expected to reach more WIS users than current WIS Wiki did. Although there were many missing parts in the guidance, “the more eyes, the faster improvement” strategy would work.
	2. Undescribed metadata elements could be addressed by monitoring of metadata.
	3. Missing or obsolete metadata elements could be addressed by monitoring of metadata and comparison with other sources.
3. IPET-MDRD recommended that CBS add ongoing monitoring and improvement of the quality of WIS metadata records to the Terms of Reference of one of its expert teams.
4. The monitoring could be run on a periodical basis (say monthly).
5. The expert team should select which parts of metadata are to be monitored. The content of the test would change over time, taking into account the maturity WIS metadata.
6. The expert team would be responsible for initiating and following through actions to improve the quality of metadata in response to the monitoring.
7. The expert team would need to define the feedback procedures and the quality criteria to be used for monitoring and taking action.
8. Mr de la Beaujardiere would investigate the possiblilty of NOAA performing the routine monitoring of WIS metadata.
9. IPET-MDRD recommended to ET-CTS and ET-WISC that future developments of systems for data exchange in WIS (either PUSH or PULL), should (1) trigger an error report to both the centre receiving the data and the centre providing the data if there was no corresponding WIS Discovery Metadata record, and (2) ensure that the system used the data policy specified in WIS metadata to control access and delivery of the information described by the record.
10. IPET-MDRD noted that TT-WMD had prepared a comprehensive list of keywords to describe physical parameters for use in WIGOS metadata records. It agreed to merge the WIGOS list with <http://codes.wmo.int/common/quantity-kind> to provide the preferred list for use in WIS Discovery Metadata.
11. Using the same set of keywords to describe the contents of standard reports (identified in the World Weather Watch context from the associated traditional alphanumeric code form) would help users find information and reduce the decisions needed of those writing metadata.
12. IPET-MDRD agreed with the principle of providing mappings from standard World Weather Watch reports to keywords that should be included in the WIS metadata records, but decided that the keywords should be drawn from (the extended version of) <http://codes.wmo.int/common/quantity-kind>.
13. IPET-MDRD added the use of faceted search to the tasks of the joint task team with TT-GISC.
14. Mr Guillard described the spreadsheet used by Meteo France to gather the information required to complete a metadata record.
15. Mr Hermann Asensio presented a Metadata Generator from Deutscher Wetterdienst which allowed users to create XML WMO Core Profile Metadata in an automated process from VOLC1 or Advances Notification files (AN-files) in CSV format.
16. A permanent resolvable URI was needed to allow WIS metadata records to be referenced. Mr Tandy would research a solution, assisted by Mr de la Beaujardiere.
17. Mr Hermann Asensio presented the possibility to use faceted filters to refine search results in the WIS DAR Metadata catalogue. A large number of hits can be reduced in few steps; this approach allows the user to navigate through fine granular metadata descriptions with the help of an automated index.
18. Mr Hermann Asensio presented a Metadata Generator from Deutscher Wetterdienst which allows users to create XML WMO Core Profile Metadata in an automated process from VOLC1 or Advances Notification files (AN-files) in CSV format.
19. IPET-MDRD noted the tool to generate WIS metadata from Vol C1.
20. Noting the difficulty arising from the unspecified length of fileIdentifier, IPET-MDRD agreed that version 2.0 of the WMO Core Profile would specify a maximum length for that and other fields used for processing the records.

## 3. Development of Model Driven Code Forms (Tandy)

### 3.1 IWXXM

Information provided to the meeting:

D03.01(01) - Updates to IWXXM

1. IPET-MDRD considered the changes implemented in IWXXM 2.0RC1 required by Amendment 77, those requested by the user community and minor changes implemented in METCE 1.2RC1 to better support IWXXM.
2. IPET-MDRD agreed that IWXXM 2.0RC1 should be issued for consultation and testing for a period of two months, to allow the team to incorporate any needed modifications before CBS-16.
3. In order to meet the CBS-16 deadline for documents, if IWXXM 2.0RC2 was not complete by the deadline for submitting the Draft 1 of documents for CBS-16, IWXXM 2.0RC1 would be used to create the Draft 1 document and the document would note the ongoing consultation. Modifications needed for IWXXM 2.0RC2 would be included in Draft 2
4. IWXXM 2.0 RC1 used AIXM schemas. The AIXM schemas did not refer to the official GML namespace, and caused IWXXM to fail validation. *Note: immediately following the meeting, the managers of AIXM announced that the required change had been implemented in AIXM 5.1.1.*
5. IPET-MDRD noted that changes to METCE that referred to OM\_Observation instead of OM\_ComplexObservation and introduced constrainigs on featureOfInterest would change the formal definition of IWXXM 2.0, but would not impact on the XML representation. These changes could be introduced following the consultation period.
6. Mr Lowe would review the IWXXM schema to confirm whether the reference to xlink was correct.
7. IWXXM 2.0 RC2 (to be produced following the consultation and submitted to CBS‑16) would be issued as “pre-operational” mimicking the practices of IPET-DRMM.

### 3.2 WIGOS and climate station metadata

Information provided to the meeting:

D03.02(01) - Specification of WIGOS and climate station metadata

I03.02(1) - OCSCAR presentation at EGU 2016

1. IPET-MDRD noted the progress in creating a data representation for WIGOS (observation) and climate station metadata. This work had been carried out by a team with members drawn from CBS CCl CHy, T-WMD and IPET-MDRD. The version considered by IPET-MDRD was that at <http://wis.wmo.int/WIGOSmd/d2>, and the associated schemas were at <http://schemas.wmo.int/wmmd/d2>.
2. Mr Lowe would change the association from Observation\_Collection to OM\_Observation from “observationMember” to “observationSegment” in WMDR.
3. Mr Lowe would change the “deployment” association to permit many deployments in an observation segment in WMDR.
4. Mr Lowe would add a “dateEstablished” attribute to ObservingFacility in WMDR.
5. Mr Lowe would add a WIGOSidentifier to the deployment feature in WMDR.
6. Mr Lowe would amend the model to change sampling, processing and reporting (for Process) from associations to attributes in WMDR.
7. Mr Lowe would change LogEntry types to “data-types” in WMDR.
8. Incremental updating of metadata records in a metadata repository would need a mechanism to associate the new information with the related entries in the existing records. In some cases it would be necessary to hold information about these relationships as items within the data model. Simple data-types (such as LogEntry) whose relationships were uniquely defined should be updated using an API that resolved the relationship rather than recording the relationship within the data.
9. Mr Lowe would correct the description and stereotype for EventReport in WMDR.
10. All feature types of WMDR should use <gml:identifier> expressed as are resolvable URL to implement the requirement for a WIGOS identifier.
11. TT-WMD would need decide on the code space to be used for the WIGOS identifiers.
12. Noting the complexity of the proposed data representation and the limited testing that had taken place to date, IPET-MDRD decided that the representation should undergo a two-month consultation review phase based on the UML diagrams and the supporting schemas before a final version was prepared for approval by CBS. The consultation should ask reviewers to study the model and schemas and report potential issues, and also report major issues when implementing it to represent WIGOS metadata. The review should concentrate on those elements that are needed for Phase 1 of the implementation of WIGOS metadata.
13. Mr Klaussen would provide examples in WMDR based on synoptic stations with information extracted from OSCAR/surface.
14. The WMDR model to be presented to CBS-16 would only address the elements required for WIGOS phases 1 and 2.
15. IPET-MDRD noted that although the “observing capability” component of INSPIRE was not exactly the same as its equivalent in WIGOS metadata, it was possible to construct WIGOS metadata records to be compliant with INSPIRE. With that exception it was possible to map directly between WIGOS and INSPIRE classes. IPET-MDRD concluded that the INSPIRE model did not provide a better representation of the WIGOS metadata standard.
16. Mr Lowe would document the mapping between WIGOS and INSPIRE metadata schemas to assist Members export their metadata to either or both formats.
17. There would be a link in the WIGOS metadata record to point to a WIS metadata record that provided information about data policy and other dataset related issues.
18. IPET-MDRD noted that the draft model had been divided into four application schemas for the convenience of editing, and decided to merge them into a single model.
19. The consultation would be supported by a teleconference to which reviewers would be invited; the aim of the teleconference would be explain the model to reviewers.
20. The name of the data representation proposed to CBS would be FM 241 WMDR-XML - WIGOS Metadata Record
21. WMDR would be offered for pre-operational consultation until 31 July. Based on the outcome of the consultation a revised version would be prepared by 31 August for presentation to CBS-16.
22. Mr Lowe would prepare formal documentation, in the form of that for IWXXM, based on the current version of WMDR by 31 July to permit initial translation, in the expectation that only minor modifications would be needed for the final version.
23. Mr Lowe would review the alignment between WMDR and SensorML.
24. Reference to WIS metadata records from within WIGOS metadata records should refer to those describing archived data sets rather than to the transient GTS bulletins; more than one WIS metadata record could be referenced.
25. Mr Lowe would remove the AncillaryMetadata class from WMDR and move its attribute “officialStatus” to the Reporting class.
26. Authors of WIGOS metadata wishing to describe constraints on the use of the data from a observing facility would need to refer to an appropriate WIS metadata record.
27. Mr Specora would provide example metadata for a hydrological station using the XML rendering of WMDR.

### 3.3 TimeSeriesML

Information provided to the meeting:

D03.03(01) - Specification of TimeSeriesML

1. IPET-MDRD considered the draft text defining the XML representation of information using TimeSeriesML (input document 3.3(1)). It agreed with the recommendation to use FM221 as the formal code identification.
2. IPET-MDRD advised that the requirements classes were to be treated as identifiers that must remain the same in each language.
3. In specifying the unit of measure in TimeseriesML, those wishing to use a short name should use the table specified in GML, but those willing to use a full URI should use common code table 6 (<http://codes.wmo.int/common/unit>).
4. Check that the DRMM codes database has correctly recorded the IA2 and IA5 abbreviations for use in Common Code Table 6 and correct the error in WMO Codes Registry.
5. Add a reference in the WMO Codes Registry entries for Common Code Table 6 to the UCUM.
6. Noting that the data quality codes were a subset of those proposed for WIGOS metadata, IPET-MDRD recommended that WMO would ask OGC to extend the TimeseriesML code list to include the additional terms needed for WIGOS metadata and defined by the CIMO Guide.
7. Accepting that TimeSeriesML had undergone considerable peer review during the Open Geospatial Consortium’s (OGC) review procedures, IPET-MDRD recommended that ICT‑ISS include the proposed amendment in the documentation for CBS-16.
8. Any suggestions for modifications to the text of the proposal should be sent to wis-help@wmo.int before 31 July.

### 3.4 WaterML2

Information provided to the meeting:

D03.04(01) - Specification of WaterML2

1. IPET-MDRD considered the draft text defining the XML representation of hydrological time series information (WaterML 2.0 Part 1) and Ratings, Gauging and staging (WaterML 2.0 Part 2) using WaterML2 (input document 3.3(1)). It noted that the standards had been prepared jointly by OGC and CHy. IPET-MDRD agreed with the recommendation to use FM 331 Ext. WMLTS XML and FM 332 Ext. WMLRGS XML as the formal code identifications.
2. Accepting that WaterML 2.0 Parts 1 and 2 had undergone considerable peer review during the Open Geospatial Consortium’s (OGC) review procedures, IPET-MDRD recommended that ICT‑ISS include the proposed amendment in the documentation for CBS-16 and for CHy-15 with the expectation that there would be a recommendation that Part 1 was adopted and notification that CBS and CHy that OGC had endorsed Part 2.
3. Mr Pecora would seek advice from the President of CHy on whether WaterML 2.0 Part 2 should be submitted for approval by CHy-15.
4. (Secretariat) Check that OGC intends that the URL for WaterML 2.0 release 2 is intended to be permanent.
5. Any suggestions for modifications to the text of the proposal should be sent to wis-help@wmo.int before 31 July.

### 3.5 Modifications required to METCE

Information provided to the meeting:

I03.05(01) - Update to METCE

I03.05(1) - Overview of METCE 1.1

1. Like METCE, TimeseriesML was a profile of ISO 19156 Observations and Measurements. However, the rigid constraints applied within METCE for ‘process’ and ‘featureOfInterest’ were in conflict with the more general approach of TimeseriesML.
2. When considering meteorological observations in their broadest scope it was not uncommon to use specimens; for example, using ice cores to measure historic atmospheric contaminants. ISO 19156 provided a data model for describing specimens: SF\_Specimen, a sub-class of SF\_SamplingFeature. METCE 1.1 prohibited use of specimens through rigid constraints on ‘featureOfInterest’.
3. The constraints within METCE were considered overly restrictive. Amendments to METCE were proposed in order to integrate TimeseriesML and make METCE applicable to a broader range of meteorological observations by allowing specimens and domain features to be used as subjects for those observations.
4. The amendments to METCE required changes both to the IWXXM Application Schema and WMO No. 306 Vol I.3. However, they had no impact on the XML representation of IWXXM.
5. The namespace for METCE would remain /metce/2013, because the changes were “non‑breaking.”
6. The version metce 1.2 produced by Mr Choy would be retained as the draft for consultation.
7. Mr Choy was asked to amend the release notes for RC1 to say that the “O&M types package containing specializations of OM\_Observation has been removed in favour of allowing classes from O&M to be used directly”. He was also asked to modify the text in the documentation section of the XML schema to remove reference to O&M specialization.
8. The secretariat would correct the configuration of schemas.wmo.int to allow the display of images.

### 3.6 Requirements for additional representations

Information provided to the meeting:

D03.06(01) - Requirements for representing additional types of information in model driven code forms

1. The work on data representation in support of WIGOS metadata would need to be extended to cover all the information required by the climate data management system specification.
2. WMO might need to endorse the use of the OGC HY\_Features standard.
3. IPET-MDRD needed to create a mechanism for engaging with WMO Programmes on their needs for developing and standardizing data representations. This might include adoption of external (open) formats such as HDF5.
4. IPET-MDRD recognized that the focus of IPET-MDRD and IPET-DRMM had been on exchange of information between NMHS, but that there were many other WMO applications that would benefit from adoption of recommended practices. It also recognized that the volume of work needed to prepare the development and documentation of those practices would exceed the capacity of IPET-MDRD. Recommended practices would be most likely to be adopted if tools (such as APIs) were available to assist with their implementation.
5. IPET-MDRD recognized that the best practices on publication of data on the web that were under development by W3C would be of benefit to WMO members. Other examples were guidance produced by the United States and Australian governments.
6. IPET-MDRD recommended that an OPAG ISS expert team should seek out and make available to WMO Members externally produced guidance from which WMO Members could benefit. These would be offered as possibilities for consideration rather than as recommended practices.
7. IPET-MDRD would investigate publication of conceptual models (such as METCE) as ontology resources through the MWO Codes Registry.
8. Definitions, translations and cross-references needed to be added to codes.wmo.int.

## 4. Management of code lists

### 4.1 Consistent management of code lists

Information provided to the meeting:

D04.01(01) - Uses of code lists

I04.01(01) - Draft update to WIGOS metadata standard

I04.01(02) - Comments on D4.1(1)

1. WIGOS Observation Metadata, WIS Discovery Metadata, model driven code forms, table driven code forms and traditional alphanumeric code forms used code lists to allow concise and unambiguous identification of items, and that this also enabled language independence of information that was exchanged. This proliferation of code lists was potentially confusing for users and could make it difficult to determine whether two concepts were intended to be the same.
2. In order to encourage standardization of code lists, IPET-MDRD decided on the set of principles for managing code lists in [Annex 3](file:///S%3A/DRMM/2016/IPET-MDRD-4/Technical/IPET-MDRD-4-d04-01%2801%29-CONSISTENT-CODE-LISTS-draft1_en.docx#_Annex_1:_Principles).
3. Mr Pecora described the WMO Hydrological Ontology. While preparing the ontology, CHy had been unable to identify a WMO source of names of physical variables in all official languages. (See [http://hiscentral.ddns.net:8088/ontology/#)](http://hiscentral.ddns.net:8088/ontology/%23%29).
4. Mr Tandy would work with Mr Pecora to publish hydrological code lists from WMO‑No. 49 Volume  3 into the WMO Codes Registry.
5. WIGOS metadata code list 1-01 tried to list all known quantities that would be observed by observing facilities. The terms in the list might go into quantity-kind and the hierarchy be described somehow in codes.wmo.int.
6. IPET-MDRD recommended that future versions of TDCF (GRIB, BUFR, CREX) should refer to the WMO Codes Registry and include the URLs for the code lists and terms in the documentation.

### 4.2 Developments to the WMO Codes Registry

1. The formal definitions of the code lists were in the WMO Manuals. The wmo.codes.int registry provided a machine-readable repository for the code lists.
2. Many of the BUFR tables had been uploaded to wmo.codes.int, as had some GRIB tables (including the physical parameters).
3. Mr Tandy would ask the team developing the WMO Codes Registry to improve the labelling and to investigate the use of SKOS as a means of improving navigation.
4. To enhance readability, new categories in the WMO Codes Registry would not use the Manual numbers as the root for terms. (Eg WIS metadata tables would be under /wis rather than /1060).
5. IPET-MDRD would define thematic themes for use in the WMO Codes Registry.
6. Mr Tandy would arrange for correction of the error in Common Code Table 6 in which the roles of IA2 and IA5 had been reversed.

### 4.3 Governance model and maintenance procedures for the WMO Codes Registry

1. The formal definition of the codes was in the WMO Manuals, that was supported by the wmo.codes.int registry (that support was essential for the model driven codes, and desirable for others).
2. Governance of code lists used the WMO procedures for managing change to Manuals and Guides. In this expert teams had to be identified as responsible for managing each code list.
3. The deployment of the codes registry was managed using GitHub (<https://github.com/wmo-registers/codes-wmo-deploy>). Users could request changes to the code lists using the GitHub interface that would notify the team responsible for the code list. The draft changes would be reflected on test.wmocodes.int.
4. Work with DRMM to agree a governance processes for code lists and their introduction to the codes registry.
5. Mr Tandy demonstrated the process for notifying errors to the managers of the codes registry using a GitHub repository.
6. New terms and code lists should be passed to the codes registry at the same time that they were released for publication through other channels.
7. IPET-MDRD recommended to ICT-ISS that all code lists, including those related to WIGOS metadata, should be managed using the same update procedures.

## 5. Management of the development of future data representations

1. The UML models were managed in an SVN repository. The team was using the free assembla service for developing WMDR, and a service from UCAR that was soon to be withdrawn for development of IWXXM. The repository should be moved to a formal hosted service.
2. Mr Lowe would investigate hosted SVN services and recommend one to the secretariat for hosting WMO configuration items.

### 5.1 Use of community developments

Information provided to the meeting:

D05.01(01) - Use of community developments

1. IPET-MDRD noted the success of working with OGC to develop WaterML2 and TimeseriesML, and also on the development of the graphical weather symbols. The model of using self-selecting communities to develop potential recommended practices and standards worked in these cases.
2. Where requirements were identified centrally, such as through elicitation of requirements from WMO Programmes or Technical Commissions, it was essential that the appropriate body was identified to deliver against those requirements. In the case of TimeseriesML, the choice had been simple because the goal was to generalise a previously published standard (WaterML2 Part 1 - Timeseries).
	1. Candidate bodies for leading the development might include: Standards Development Organisations (SDO), Industry bodies, Consortia or federations, Regional Associations or Individual or collaborating NMHS.
3. The main criteria for choosing developing technical regulations, recommended practices or general guidance should be:
	1. Thematic responsibility- does the work item reflect their scope?
	2. Participation- are the most appropriate experts (e.g. those with the knowledge, skills and motivation; both from interested WMO Members and from elsewhere) able to participate in this activity?
4. Where standards, recommended practices or guidance relevant to WMO were developed by a community, WMO might act as an endorsement and “publication agent” to make them more widely accessible.
5. IPET-MDRD asked Mr Tandy, with the assistance of Mr de la Beaujardiere, to develop the proposed working mechanism in document 5.1(1), send it to IPET-MDRD for review, and present it to the meeting of ICT‑ISS.

## 6. Future WIS strategy

Information provided to the meeting:

i06.01(01) - Presentation by Chair OPAG ISS at ET WISC

I06.01(02) - Tandy input to ICT-ISS WIS strategy meeting May 2016

1. Mr Tandy briefed IPET-MDRD on the draft WIS strategy.

## 7. Structure of OPAG ISS

### 7.1 OPAG ISS expert teams and their Terms of Reference for the period 2017-2020

Information provided to the meeting:

D07.01(1) - CBS Management Group proposals for OPAG ISS expert teams 2017-2020

1. IPET-MDRD considered the structure for the Open Programme Area Group on Information Systems and Services that had been proposed by CBS-MG-16.
2. IPET-MDRD discussed whether IPET-CM should be given responsibility for maintain the WMO Core Profile, but concluded that only the code table maintenance was a candidate for being transferred.
3. IPET-MDRD was concerned about the duplication of expertise in aviation issues between IPET-CM and IPET-DRD.
4. IPET-MDRD recommended the terms of reference for IPET-CM and IPET-DRD (the successors for IPET-DRMM and IPET-MDRD) shown in Annex 4.
5. IPET-MDRD reviewed the terms of reference for national codes focal points and national metadata focal points and proposed the revised versions in Annex 5.
6. Members of IPET-MDRD would send to Mr Tandy their comments on the proposed terms of reference for IPET-DRD.
7. IPET-MDRD noted the terms of reference for other teams in OPAG-ISS.

## 8. Work Plan 2017-2020 (Tandy)

### 8.1 Draft work plan for 2017-2020

1. My Toyoda would review the change requests for the team and propose how they would be addressed.
2. IPET-MDRD decided to responded to the change request MM?? from GEOSS, on the description of licence terms within the metadata, by informing GEOSS that the WIS standard allowed a high level description of the licence terms but that it was intentionally left to the user how to provide additional information.
3. Mr Tandy and Mr Foreman would construct the work plan from the items raised during the meeting and circulate to the members of IPET-MDRD to produce a work plan for presentation to ICT-ISS.
4. IPET-MDRD considered items for its work plan for the next intersessional period of CBS. See Annex 6.

## 9 Any Other Business

1. IPET-MDRD considered how to respond to the request form GEOSS for inclusion of “attribution” requirements in WIS Discovery Metadata records, including details of charging. IPET-MDRD concluded that WMO already provided standard classifications for recording usage limitations, and that users were allowed to provide additional licensing information if they wished. IPET-MDRD did not consider additional regulation to be appropriate.

## 10 Closure of the meeting

Mr Tandy closed the meeting at 16:27 on Thursday 12 May 2016

## Action and Decision Summary

## Actions

[**A2** The procedure to use the WIS metadata records to provide the formal notification for additional data should be documented in the Guide to the WIS, and the text should make it clear that nominating an individual to edit metadata includes the delegation of authority to record the data policy and that appropriate internal processes should be in place to authorize the change in record.](#_Toc450830009)

[**A3** Mr Toyoda would complete the wiki documentation by 17 October 2016. IPET-MDRD would need to review this before the start of the CBS session.](#_Toc450830012)

[**A4** There would be a teleconference to discuss the draft text and coordinate the finalization of the WIS Metadata guide at 0900 on 15 June to deliver the guide by the end of June. This work would be led by Mr Aubert.](#_Toc450830013)

[**A5** Mr de la Beaujardiere would investigate the possiblilty of NOAA performing the routine monitoring of WIS metadata.](#_Toc450830014)

[**A6** A permanent resolvable URI was needed to allow WIS metadata records to be referenced. Mr Tandy would research a solution, assisted by Mr de la Beaujardiere.](#_Toc450830015)

[**A7** Mr Hermann Asensio presented the possibility to use facetted filters to refine search results in the WIS DAR Metadata catalogue. A large number of hits can be reduced in few steps; this approach allows the user to navigate through fine granular metadata descriptions with the help of an automated index.](#_Toc450830016)

[**A8** Mr Hermann Asensio presented a Metadata Generator from Deutscher Wetterdienst which allows users to create XML WMO Core Profile Metadata in an automated process from VOLC1 or Advances Notification files (AN-files) in CSV format.](#_Toc450830017)

[**A9** IPET-MDRD noted the tool to generate WIS metadata from Vol C1 [and agreed that it should be shared with other centres | and pointed out that the objective was to generate Vol C1 from the WIS metadata and not the other way round].](#_Toc450830018)

[**A10**](#_Toc450830019)

[**A11** The secretariat would inform JCOMM that the move to ISO 19115-1 would be delayed, and as a consequence harmonization with JCOMM would be delayed.](#_Toc450830020)

[**A12** Mr Lowe would change the name “observationMember” to “observationSegment”.](#_Toc450830022)

[**A13** Mr Lowe will change the schema to permit many deployments in an observation segment.](#_Toc450830023)

[**A14** Mr Lowe will add a WIGOSidentifier to the deployment feature.](#_Toc450830024)

[**A15** Mr Klaussen would provide examples based on synoptic stations with information extracted from OSCAR/surface.](#_Toc450830025)

[**A16** Mr Lowe would document the mapping between WIGOS and INSPIRE metadata schemas to assist Members export their metadata to either or both formats.](#_Toc450830026)

[**A17** The consultation would be supported by a teleconference to which reviewers would be invited; the aim of the teleconference would be explain the model to reviewers.](#_Toc450830027)

[**A18** Mr Lowe would prepare formal documentation, in the form of that for IWXXM, based on the current version of WMDR by 31 July to permit initial translation, in the expectation that only minor modifications would be needed for the final version.](#_Toc450830028)

[**A19** Check that the DRMM codes database has correctly recorded the IA2 and IA5 abbreviations for use in Common Code Table 6.](#_Toc450830029)

[**A20** Noting that the data quality codes were a subset of those proposed for WIGOS metadata, IPET-MDRD recommended that WMO would ask OGC to extend the TimeseriesML code list to include the additional terms needed for WIGOS metadata and defined by the CIMO Guide.](#_Toc450830031)

[**A21** Any suggestions for modifications to the text of the proposal should be sent to wis-help@wmo.int before 31 July.](#_Toc450830032)

[**A22** Mr Pecora would seek advice from the President of CHy on whether WaterML 2.0 Part 2 should be submitted for approval by CHy-15.](#_Toc450830033)

[**A23** (Secretariat) Check that OGC intends that the URL for WaterML 2.0 release 2 is intended to be permanent.](#_Toc450830034)

[**A24** Any suggestions for modifications to the text of the proposal should be sent to wis-help@wmo.int before 31 July.](#_Toc450830037)

[**A25** Mr Choy was asked to amend the release notes for RC1 to say that the “O&M types package containing specializations of OM\_Observation has been removed in favour of allowing classes from O&M to be used directly”. He was also asked to modify the text in the documentation section of the XML schema to remove reference to O&M specialization.](#_Toc450830038)

[**A26** The secretariat would correct the configuration of schemas.wmo.int to allow the display of images.](#_Toc450830039)

[**A27** The work on data representation in support of WIGOS metadata would need to be extended to cover all the information required by the climate data management system specification.](#_Toc450830040)

[**A28** Work with DRMM to agree a governance processes for code lists and their introduction to the codes registry.](#_Toc450830041)

[**A29** Mr Lowe would investigate hosted SVN services and recommend one to the secretariat for hosting WMO configuration items.](#_Toc450830042)

[**A30** IPET-MDRD asked Mr Tandy, with the assistance of Mr de la Beaujardiere, to develop the proposed working mechanism in document 5.1(1), send it to IPET-MDRD for review, and present it to the meeting of ICT‑ISS.](#_Toc450830043)

[**A31** Members of IPET-MDRD would send to Mr Tandy their comments on the proposed terms of reference for IPET-DRD.](#_Toc450830044)

## Decisions

[**D1** IPET-MDRD noted that ET-CTS had decided to include a table mapping from GTS centres to their RTH, and that table could be used to generate Volume C1 without the need for recording the RTH in the metadata record.](#_Toc450830047)

[**D2** IPET-MDRD recommended that a WIS metadata record for a GTS bulletin for observation reports from the RBSN/RBCN/ANTON stations should describe the WMO region of the observing site, using place keywords at identificationInfo/\*/descriptiveKeywords/\*[keywordtype=”place”]/keyword. The Region should be represented using the same keyword list as used for WIGOS metadata.](#_Toc450830048)

[**D3** IPET-MDRD agreed that the guidance should be split into two: the first section aimed at authors of metadata; the second section would be aimed at those who needed more information on the mapping onto XML records, such as software developers. The first section should form part of the Guide to WIS and be translated into all languages. The more detailed technical document should remain on the web in English only and linked from the Guide.](#_Toc450830049)

[**D4** IPET-MDRD noted the assertion in the draft guidance (Doc 2.2(2)) that the use of GMET keywords was not permitted in metadata records that described information that were not covered by the European INSPIRE directive. It decided to make the strong recommendation that WIS metadata records use the extended version of quantity-kind. The GEMET terms might be included in addition, and INSPIRE compliant records should include the assertion in the data quality section that was specified in the EU INSPIRE technical guidance.](#_Toc450830050)

[**D5** WMO-No. 49 Volume A was being replaced by OSCAR/surface as the official repository of station information. In addition, WMO was introducing a new system of station identifiers that could be resolved by OSCAR/surface. The reference to Volume A should be replaced by one to WIGOS station identifiers available through OSCAR/surface and use the URI provided by OSCAR to refer to the station details.](#_Toc450830051)

[**D6** IPET-MDRD recommended that CBS add ongoing monitoring and improvement of the quality of WIS metadata records to the Terms of Reference of one of its expert teams.](#_Toc450830056)

[**D7** IPET-MDRD recommended to ET-CTS and ET-WISC that future developments of systems for data exchange in WIS (either PUSH or PULL), should (1) trigger an error report to both the centre receiving the data and the centre providing the data if there was no corresponding WIS Discovery Metadata record, and (2) ensure that the system used the data policy specified in WIS metadata to control access and delivery of the information described by the record.](#_Toc450830057)

[**D8** IPET-MDRD noted that TT-WMD had prepared a comprehensive list of keywords to describe physical parameters for use in WIGOS metadata records. It agreed that the WIGOS list would be merged with http://codes.wmo.int/common/quantity-kind to provide the preferred list for use in WIS Discovery Metadata.](#_Toc450830058)

[**D9** IPET-MDRD agreed with the principle of providing mappings from standard World Weather Watch reports to keywords, but decided that the keywords should be drawn from (the extended version of) http://codes.wmo.int/common/quantity-kind.](#_Toc450830060)

[**D10** IPET-MDRD added the use of faceted search to the tasks of the joint task team with TT-GISC.](#_Toc450830064)

[**D11** IPET-MDRD agreed that IWXXM 2.0RC1 should be issued for consultation and testing for a period of two months, to allow the team to incorporate any needed modifications before CBS-16.](#_Toc450830065)

[**D12** In order to meet the CBS-16 deadline for documents, if IWXXM 2.0RC2 was not complete by the deadline for submitting the Draft 1 of documents for CBS-16, IWXXM 2.0RC1 would be used to create the Draft 1 document and the document would note the ongoing consultation. Modifications needed for IWXXM 2.0RC2 would be included in Draft 2](#_Toc450830066)

[**D13** Noting the complexity of the proposed data representation and the limited testing that had taken place to date, PET-MDRD decided that the representation should undergo a two-week consultation review phase based on the UML diagrams and the supporting schemas before a final version was prepared for approval by CBS. The consultation should ask reviewers to study the model and schemas and report potential issues, and also report major issues when implementing it to represent WIGOS metadata. The review should concentrate on those elements that are needed for Phase 1 of the implementation of WIGOS metadata.](#_Toc450830067)

[**D14** The model to be presented to CBS-16 would only address the elements required for WIGOS phases 1 and 2.](#_Toc450830068)

[**D15** There would be a link in the WIGOS metadata record to point to a WIS metadata record that provided information about data policy and other dataset related issues.](#_Toc450830069)

[**D16** IPET-MDRD noted that the draft model had been divided into four application schemas for the convenience of editing, and decided to merge them into a single model.](#_Toc450830070)

[**D17** The name of the data representation proposed to CBS would be FM 241 WMDR-XML - WIGOS Metadata Record](#_Toc450830071)

[**D18** WMDR would be offered for pre-operational consultation until 31 July. Based on the outcome of the consultation a revised version would be prepared by 31 August for presentation to CBS-16.](#_Toc450830073)

[**D19** In specifying the unit of measure in TimeseriesML, those wishing to use a short name should use the table specified in GML, but those willing to use a full URI should use common code table 6 (http://codes.wmo.int/common/unit).](#_Toc450830074)

[**D20** Accepting that TimeSeriesML had undergone considerable peer review during the Open Geospatial Consortium’s (OGC) review procedures, IPET-MDRD recommended that ICT‑ISS include the proposed amendment in the documentation for CBS-16.](#_Toc450830075)

[**D21** Accepting that WaterML 2.0 Parts 1 and 2 had undergone considerable peer review during the Open Geospatial Consortium’s (OGC) review procedures, IPET-MDRD recommended that ICT‑ISS include the proposed amendment in the documentation for CBS-16 and for CHy-15 with the expectation that there would be a recommendation that Part 1 was adopted and notification that CBS and CHy that OGC had endorsed Part 2.](#_Toc450830076)

[**D22** The namespace for METCE would remain /metce/2013), because the changes were “non-breaking.”](#_Toc450830077)

[**D23** The version metce 1.2 produced by Mr Choy would be retained as the draft for consultation.](#_Toc450830078)

[**D24** IPET-MDRD needed to create a mechanism for engaging with WMO Programmes on their needs for developing and standardizing data representations. This might include adoption of external (open) formats such as HDF5.](#_Toc450830079)

[**D25** IPET-MDRD recommended that an OPAG ISS expert team should seek out and make available to WMO Members externally produced guidance from which WMO Members could benefit. These would be offered as possibilities for consideration rather than as recommended practices.](#_Toc450830080)

[**D26** In order to encourage standardization of code lists, IPET-MDRD decided on the set of principles for managing code lists in Annex 3.](#_Toc450830081)

[**D27** New terms and code lists should be passed to the codes registry at the same time that they were released for publication through other channels.](#_Toc450830082)

## Personal

P1 \_Personal

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## Annex 1: Agenda

1. Opening of the Meeting

1.1 Formal opening

1.2 Review of work plan

2. WMO Core Metadata Profile

2.1 Consideration of ISO 19115-1

2.2 Publication of the guidance on WIS metadata

2.3 Approach to improving metadata quality

3. Development of Model Driven Code Forms

3.1 IWXXM

3.2 WIGOS and climate station metadata

3.3 TimeSeriesML

3.4 WaterML2

3.5 Modifications required to METCE

3.6 Requirements for additional representations

4. Management of code lists

4.1 Consistent management of code lists

4.2 Developments to the WMO Codes Registry

4.3 Governance model and maintenance procedures for the WMO Codes Registry

5. Management of the development of future data representations

5.1 Use of community developments

6. Future WIS strategy

7. Structure of OPAG ISS

7.1 OPAG ISS expert teams and their Terms of Reference for the period 2017-2020

8. Work Plan 2017-2020

8.1 Draft work plan for 2017-2020

9 Any Other Business

10 Closure of the meeting

## Annex 2: List of Participants

## Annex 3: Principles for governing code lists

These principles are intended to encourage consistency between code lists (also known as controlled vocabularies) used in WMO data representations. The should be applied to all new code lists.

1. Do not create a new term if there is an existing term with the same definition. Terms in a code list should be drawn from existing code lists, provided the term being defined is the same in both lists. The URI of the term in the new list must be the same as in the original list (or if the data representation does not permit URIs, the definition must refer to the URI). The definition must be the same as in the original list. *This allows applications to extend or restrict the values permitted for a particular application while retaining a clear link between the meaning of terms in different code lists.*
2. Do not create a new code list if there is an existing code list that meets the requirement. *Though it may be necessary to create a synonym for the list to conform with the naming conventions used in that context.*
3. Each term in a code list must have a URI that permanently identifies it..
4. Each code list must have a URI that permanently identifies it.
5. When introducing a new term that is related to an existing term, use SKOS to link the two terms to indicate whether the new term is broader or narrower than the existing one. SKOS should also be used to note that two terms are synonyms when updating existing code lists.
6. Once approved for inclusion in a code list, a term must never be removed from that list, though it may be marked as not permitted for use in that list. *This is to ensure that information records created before the term was taken out of use remain meaningful, and that the term definition remains available for any code lists that re-use it.*
7. The meaning of terms must not be changed to be more restrictive. If a term has to be made more restrictive (for example because a single category had to be divided into several sub-categories), then new terms should be defined that have new URIs. *Making a term more restrictive could lead to inappropriate interpretation of pre-existing information records. Broadening the definition of a term may in some cases be permissible, but could cause difficulties in code lists other than the one that proposed the change.*
8. WMO terms may use URIs provided by other organizations (such as ISO) provided that organization uses the principles 1, 6 and 7.

## Annex 4: Proposed Terms of Reference for the successors to IPET‑MDRD and IPET-DRMM

**Inter-Programme Expert Team on Codes Maintenance (ET-CM) (Was IPET-DRMM)**

Note: IPET-CM is expected to deliver its responsibilities through task teams that work by correspondence.

Note: items marked with green dashed underline are items added since the CBS-MG-16 meeting.

(a) Review and maintain the Table Driven Code Forms by defining descriptors, common sequences, data templates and the regulations supporting these, including data representation of regional practices, so they meet the requirements of all Members, WMO Programmes and other concerned international organizations, such as ICAO;

(b) Review and update guidance to Members and technical commissions on data representation, including national practices, and invite, coordinate and assist Members to validate modified or new data representations;

(c) Review, develop and update the Manual on Codes (WMO-No 306) and associated reference and guidance material as required, and publish these in suitable electronic formats for human and automated use including codes.wmo.int;

(d) Review and develop procedures and guidance to enable the interoperability of metadata and data between WMO standards and formats used within other communities, such as NetCDF, using the WMO Logical Data Model as a tool to achieve this;

(e) Monitor conformance of data exchanged within the WIS and metadata records published to the WIS DAR catalogue with WMO data representation standards for utility and conformance with the guidance and WMO Core Metadata Profile, and develop action plans, including capacity-building, to address issues identified by monitoring;

(f) Review and update the procedures used to maintain WMO data representations, taking into account opportunities presented by the WMO Logical Data Model;

(g) Monitor progress towards and coordinate actions to implement migration to Table Driven Codes Forms;

(h) Identify implementation issues requiring the urgent consideration of the OPAG on ISS;

(i) Review and maintain the data designators in abbreviated headings in Manual on the GTS (WMO-No. 386);

(j) Review and maintain the Graphical Representation of Data, Analyses and Forecasts in the attachment to Manual on Codes in cooperation with OPAG-DPFS;

(k) Contribute to the maintenance of WIS competencies related to use of codes and associated training and learning guides and facilitate training.

**Inter-Programme Expert team on Data Representation Development (IPET-DD) (Was IPET‑MDRD)**

Note: IPET-DD is expected to deliver responsibilities through task teams that address specific issues.

(a) Review and further develop the WMO Core Metadata Profile, WMO Logical Data Model and WMO standards for metadata and data exchange based on the ISO 19100 series of international standards (including XML) to meet the needs of Members, WIS, WMO Programmes and cooperating organizations such as ICAO;

(b) Contribute to the review of and recommend updates to the Manual on Codes (WMO No. 306) and the Manual on the WMO Information System (WMO-No 1060) and associated reference and guidance material as required, publishing these in suitable electronic forms for human and automated use;

(c) Review and update the procedures for maintaining and developing the WMO Core Metadata Profile, WMO Logical Data Model and WMO standards for metadata and data exchange based on the ISO 19100 series of international standards;

(d) Propose to ISO and OGC changes to their respective standards that are required to meet the needs of WMO Members;

(e) Advise Members, technical commissions and ICG-WIGOS on WMO Discovery Metadata, the WMO Logical Data Model and associated application schema and data interoperability issues;

(f) Identify implementation issues requiring the urgent consideration of the OPAG on ISS;

(g) Contribute to the maintenance of WIS competencies related to use of metadata and new model based data representation and associated training and learning guides and facilitate training.

## Annex 5: Proposed Terms of Reference for Focal Points related to IPET-MDRD

### National Focal Point for Codes and Data Representation Matters

National Focal Points for Codes and Data Representation matters are nominated by the Permanent Representatives of Member countries of WMO. These Focal Points provide the operational channel of communication between the WMO Secretariat and Members on Codes and Data Representation Issues.

The responsibilities of the Focal Points are:

(a) To receive notifications of amendments to the Manual on Codes (WMO-No. 306), and propagate the information within their state or territory;

(b) To comment on amendments to the Manual on Codes (WMO-No. 306) by the fast-track procedure, on behalf of the Permanent Representative;

(c) To request amendments to the Manual on Codes (WMO-No. 306) on behalf of the Permanent Representative,

(d) To support verification of data resulting from migration process;

(e) To communicate with the WMO Secretariat on behalf of the Permanent Representative on issues relating to codes and data representation matters.

Focal Points for WIS Discovery Metadata matters are nominated by the Permanent Representatives of Member countries of WMO. These Focal Points provide the operational channel of communication between the WMO Secretariat and Members on WIS Discovery Metadata issues.

##

## Annex 6: Work items for the intersessional period following CBS-16.

| ***Id*** | ***Priority*** | ***Objective*** | ***Outcome*** | ***Deliverable*** | ***Activity*** | ***Leader*** | ***Due*** | ***OtherETs*** | ***Effort*** | ***StatusReport*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | Improve relevance of WIS Discovery metadata | 1.1 Users more able to find information when searching | 1.1.1 Analysis of use of GISC catalogue interface |  |  |  | TT-GISC |  |  |
|  |  |  |  | 1.1.2 Updated guidance for authors based on user behaviour on GISC catalogues |  |  |  |  |  |  |
|  |  |  |  | 1.1.3 Guidance for GISC/DCPC providers on improving search | Assisting general search engines to index WIS metadata |  |  |  |  |  |
|  |  |  |  | 1.1.4 Tools and regular monitoring of WIS metadata | Rubric updatedRoutine monitoring of catalogue contents |  |  |  |  |  |
|  |  |  | 1.2 WMO Core Profile compatible with community best practice | 1.2 WMO Core Profile updated to use ISO 19115-1 | 1.2.1 WCMP 2.0 |  |  |  |  |  |
| 2 |  | Extend Data Model to address all WMO information without proliferating code forms | 2.1 Data Model based representations available to Programmes that require them | 2.1.1 Application schema for climate stations | Release 2018 |  |  |  |  |  |
|  |  |  |  | 2.1.2 WMO Endorsement of existing OGC data models required by Programmes | Candidates: HY\_Features |  |  |  |  |  |
|  |  |  |  | 2.1.3 Extensions to METCE | Release 2018Release 2020 |  |  |  |  |  |
|  |  |  |  | 2.1.4 Modification of IWXXM to meet needs of ICAO’s SWIM | Release 2018 (Amd 78)Release 2020 (Amd 79) |  |  |  |  |  |
|  |  |  | 2.2 Guidance available for Members to make use of model driven code forms | 2.2.1 Online documentation available | Release 2018Release 2020Representations (concept schemas) included in WMO Codes Registry |  |  |  |  |  |
|  |  |  |  | 2.2.2 Tool sets available | Release 2018Release 2020 |  |  |  |  |  |
| 3 |  | Standard vocabularies for describing information | 3.1 Consistent naming within WMO | 3.1.1 Enable links between terms used in different context to be expressed | Technical solution to link terms in WMO Codes Registry (eg SKOS concept schemas)Import translations, definition into WMO Codes RegistryImprove the user interface for the WMO Codes Registry to better show relationships |  |  |  |  |  |
|  |  |  |  | 3.1.2 Working practice that does not duplicate existing terms |  |  |  |  |  |  |
|  |  |  |  | 3.1.3 Consolidated CBS lists | Consolidate WIS and WIGOS metadataWIGOS, GDPFS lists to WMO Codes Registry |  |  |  |  |  |
|  |  |  |  | 3.1.4 Extend use of WMO Codes Registry beyond TDCF and Model Driven Codes | Incorporate hydrological terms Incorporate WIGOS metadata terms  |  |  |  |  |  |
| 4 |  | New working practices for managing data representations | 4.1 Faster, consistent response to new requirements | 4.1.1 Process to guide and use development by other organizations  |  |  |  |  |  |  |
|  |  |  |  | 4.1.2 Process to gather and assess requirement from Programmes |  |  |  |  |  |  |
|  |  |  |  | 4.1.3 Standardized procedures | Adopt common management procedures across ISS, CBS and WMO for managing code lists |  |  |  |  |  |
|  |  |  | 4.2 Better management of data publication | 4.2.1 Identify and adopt best practice from WMO and other communities |  |  |  |  |  |  |