



# ICG-WIGOS TT-WMD-1

## Members

B. Howe (chair, CIMO), K. Monnik (CBS), J. Swaykos (JCOMM), U. Looser (CHy), E. Bañon García (CCI), S. Taylor (CAeM), J. Klausen (CAS)

## WMO

S. Foreman, R. Atkinson, T. Oakley, T. Proescholdt

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# Terms of Reference

In accordance with guidance and recommendations of Cg-XVI, EC and ICG-WIGOS-1:

- 1.To identify the information that is needed to allow the majority of users to use WIGOS observations in appropriate contexts and in a defensible way;
- 2.To create the WIGOS Core Metadata Standard that allows the essential information to be exchanged unambiguously, regardless of the format used for the transfer;
- 3.To define a mechanism for maintaining the WIGOS Core Metadata Standard, including how metadata might be provided that is additional to the Core and coordinate with the ICG-WIGOS Task Team on Regulatory Material (TT-WRM) on any appropriate documentation as needed for WIGOS related Manual(s) and Guide(s);
- 4.To implement within the WIGOS Core Metadata Standard, and the WMO Core Metadata Profile, a standard method of providing users with an indication of the quality of the data, and to do so in a way that distinguishes with the quality management of the data (“quality of the observation”) and ensuring that the user is able to identify which applications the data are suitable for (“classification” of the observation”);
- 5.To coordinate regularly with the ICG-WIGOS as needed and report at least annually to the ICG-WIGOS on the progress;
- 6.To complete its tasks and hand over additional requirements to its successor (if required) in time for approval by Cg-17.

# Representation



- All TCs (except CAgM) represented
- EC-PORS not represented

# Framework

- Definition of WIGOS metadata
  - information that enables users to make adequate use of observational data
- Challenges
  - Standard must be applicable to all disciplines
  - Standard should be forward-looking but also respect legacy (e.g., Vol. A)
  - Standard must be acceptable to all Members
  - Standard must be applicable for all Members

# Observational data types considered

- Atmosphere, ocean, land, water
- Ground-based, airborne, ship-based, satellite
- In-situ, remote
- Physical, chemical

# Recommended WIGOS Metadata Principles

- Every piece of metadata shall have date/time information associated with it (incl. date/time specification)
- All metadata associated with internationally exchanged data shall be made available
- Metadata shall be updated in time to ensure adequate use of data
- Standard should be applicable to all disciplines
- Standard should be forward-looking but also respect legacy (e.g., Vol. A)
- Standard should be acceptable to all Members
- Standard should be applicable for all Members

# WIGOS Core Metadata (Categories)

**information needed to make adequate use of data**

- (M) Observed quantity
- (M) Data quality
- (M) Sampling and analysis
- (M) Data processing
- (C) Instrument
- (M) Station/Platform
- (C) Environment
- (M) Purpose of observation
- (M) Provenance and ownership
- (M) Contact

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# (M) Observed Quantity

abstract class. The specification of a measurand requires knowledge of the kind of quantity, description of the state of the phenomenon, body, or substance carrying the quantity, including any relevant component, and the chemical entities involved. [VIM3, 2.3].

- (M) Name of quantity (e.g. air temperature)
- (M) Unit of measure (°C or °K)
- (M) Object under observation (e.g., air temperature or catchment water yield)
- (M) Geolocation (in situ or remote, point, area, volume)
- (M) Representativeness = volume that is represented by the observed value (e.g., catchment size, basin, local, regional, global, ...)
- (M) Temporal extent (start, end of data set, time zone)



# (M) Data quality

- **(M) Uncertainty of observation** (method describing how this can be derived is context-specific; a lot of training will be required to teach/convince Members to report something real)
- **(M) Traceability chain** (aim is to provide an unbroken chain from observation to SI)
- **(M) Quality flags** (context-specific codelist of data quality flags, possibly with certain unified elements; a lot of training will be required to teach/convince Members to report something real)

# (M) Sampling and analysis

- (M) Sampling strategy (codelist, e.g., continuous, discrete, cumulative, ...)
- (M) Sampling period (e.g. first 5 minutes every hour, every 1 second, event)
- (C) Sampling procedures (how specimen is captured)
- (C) Sample treatment (how specimen is treated before analysis, e.g. size cut-off for aerosols)
- (C) Analytical procedures (how specimen is analyzed)
- (M) Definition of time stamp (beginning | middle | end) of period

# (M) Data processing

- (C) Data processing methods and algorithms
- (C) Processing/analysis centre (e.g., chemical analysis, AMDAR processing centre)
- (M) Aggregation interval (a fraction of the reporting period, e.g. the last 5 minutes in a 15' window)
- (M) Reporting rate (= frequency at which data are reported, maybe non-applicable for event-based observations)
- (M) Definition of time stamp (beginning | middle | end) of period
- (M) Data format and format version (e.g., ASCII, BUFR 2)
- (M) Data version (e.g. level of data, processing/refinement stage)
- (C) Software/processor and version (e.g., avionics version, retrieval algorithm version)

# (C) Instrument

- (M) Geolocation (complex type) (relative to station/platform reference or absolute terms)
- (C) Distance relative to reference (e.g. height above ground, depth below water surface, height above/below lowest astronomic tide)
- (M) Instrument type (physical principle, e.g. gauge, TAT probe, uv absorption monitor)
- (M) Instrument model and S/N
- (M) Instrument performance characteristics (needs definition)
- (C) Environment of instrument (e.g., shelter, temperature-control, housing)
- (C) Exposure of instrument (e.g, site enclosure, siting classification index, photograph)
- (M) Instrument lab calibration date/time
- (M) Instrument field verification date/time (applies to satellites as well)
- (M) Instrument maintenance date/time (even if installation date)

# (M) Station/Platform

Where sensors are located, may be in situ or remote

- (C) Geolocation (complex type) (Mandatory for fixed land-based stations and for predetermined trajectory, optional for other mobile stations)
- (C) Region (WMO RA)
- (C) Country (Mandatory for fixed land-based stations, optional for mobile stations)
- (M) Type (e.g., fixed, aircraft, ship, satellite, gauging station)
- (M) Model (e.g., manual, aircraft type, river-gauging)
- (M) Unique identifier
- (O) environment of station (e.g., maps, plans, photographs)

# (C) Environment

- (M) Local topography (=geometry)
- (M) Land cover (=what's on it, on different spatial scales)

# (M) Purpose of observation

- (M) Application areas (e.g., aviation, marine, climate, etc.)
- (M) Network affiliations (GUAN, GCOS, GAW, etc.)

# (M) Provenance and Ownership

- (M) Supervising organization (= data owner)
- (M) Country responsible for observation (may need definition)
- (M) Data policy / use constraints



# Complex types

- Geolocation
  - Location (lat, long, elevation), can be a volume, area, trajectory or point
  - Coordinate reference system
  - To be modeled using existing standard
- Contact
  - Organization and/or individual
  - To be modeled using existing standard

# Work plan

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)	June 2013
TCs have identified the needs of application programmes for observation metadata to support the use of observations (TT-WMD)	January 2014
TCs have provided detailed metadata specifications to TT-WMD for each of their assigned data types (TCs)	January 2014
A minimum general standard has been defined for observational metadata for all observations types to meet the needs identified by TCs (TT-WMD).	April 2014 NB three months is too short for this – minimum of six months needed
Based on the detailed metadata specifications received from the respective TCs, the WIGOS observational metadatabase has been designed (Contractors/procurement working to WIS staff).	October 2014 Only minimal functionality would be available in this release.
Depends on decisions made in 5. Metadatabase built and integrated into the WIR (Consultant/Contract)	June 2015
TT-WRM advised of the requirements for related practices to be included in the WIGOS regulatory material.	June 2015
Members requested to populate the metadatabase with their observational metadata.	June 2015

# Recommendations to ICG-WIGOS-2

- TT-WMD-1 recommends that ICG-WIGOS-2
  - adopts the WIGOS metadata principles
  - adopts the WIGOS Metadata Core and
  - recommends both to EC-65
  - adopts the work plan of TT-WMD