

COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND
PRODUCTS

ITEM: 10.2

SECOND SESSION

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WIGOS Metadata Standard

(Submitted by Secretariat)

Summary and Purpose of Document

Status of the WIGOS Metadata Standard and results from the satellite-specific actions agreed with satellite experts. An ad-hoc workshop was held in 2015 with participation by IPET-SUP-delegated experts to discuss the applicability of the Standard for describing space-based observations.

ACTION PROPOSED

The second session is invited to

- (a) take note of the developments and support the continuation of collaborative actions from IPET-SUP to the work of the ICG-WIGOS TT-WMD;
- (b) advise on a way forward regarding the utilization of the WIGOS Metadata Standard in the satellite community.

Appendix A. Ad-hoc Workshop on WIGOS Metadata for Space-based Observations (29 Sep – 1 Oct 2015): Actions

Appendix B. Examples of the WIGOS Metadata Standard (WMDS) applied to space-based observations

DISCUSSION

Introduction

1. The WIGOS Metadata Standard was developed by the Inter-Commission Coordination Group on WIGOS Task Team on WIGOS Metadata (ICG-WIGOS TT-WMD), which first version is an attachment to the Manual on WIGOS that was approved by Cg-17 (Resolution 26; Attachment to Appendix 2.4 - http://library.wmo.int/pmb_ged/wmo_1157_en.pdf#382). The TT-WMD had received remote inputs from representatives of IPET-SUP as comments and suggestions during the development of the WMDS.
2. An ad hoc workshop dedicated to WIGOS Metadata for space-based observations was organized at WMO headquarters in Geneva, Switzerland, from 29 September to 1 October 2015 with WMO/CBS (IPET-SUP and ET-SAT) and EUMETSAT representatives. The session was chaired by Dr J. Klausen (Switzerland), co-Chair TT-WMD, and Secretariat support was provided by the WMO Space Programme and the WIGOS Project Office.
3. The 5th session of ICG-WIGOS (25-28 January 2016, Geneva), agreed with the updated action plan of TT-WMD for 2016. According to that, the team is working on improving the WMDS, including the priority tasks of producing guidance material for Members to implement the standard, as well as reviewing and completing the code tables and also finalizing the “logical data model” for the WMDS.

Outcome and actions

4. As a major outcome, the workshop concluded that the WMDS is applicable and should be used by the meteorological satellite community, after a few additions and small adjustments that were identified.
 5. Specific results of the workshop include the following: for space-based observations the WMDS should be applicable to both level one and level two data; a few additional metadata elements are needed in the WMDS to accommodate all the fields currently existing in OSCAR/Space database (e.g. orbits, frequencies); some use cases should be developed and included in the WMDS, to illustrate the usage of the WMDS to space-based observations.
 6. The workshop recognized the benefits of all observing systems, surface and space-based, adopting the WMDS to ensure interoperability. It was recognized that strengthened collaboration between WIGOS and WIS metadata development would allow for an optimized implementation of the WMDS. An improved WMDS, allowing an easier use and understanding will ensure that the space agencies and the whole satellite community embrace the WMDS.
 7. The workshop agreed on a list of actions to be developed, by the IPET-SUP representatives and by TT-WMD members, in order to ensure full applicability of the WMDS to all observations from space-based systems. The results of the workshop served as input for discussions during the 4th session of TT-WMD (20-23 October 2015, Alanya, Turkey).
 8. Most of the actions agreed were completed. The TT-WMD discussed the outcomes of the ad hoc workshop on WIGOS Metadata for space-based observations and agreed to incorporate the proposed changes and additions into the next version of the WMDS.
 9. To illustrate how the WMDS can be used for space-based observations, the example cases prepared by the satellite experts during the workshop are shown in appendix to this document.
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AD-HOC WORKSHOP ON WIGOS METADATA FOR SPACE-BASED OBSERVATIONS (29 SEP – 1 OCT 2015) - ACTIONSFull report: https://www.wmo.int/pages/prog/www/WIGOS-WIS/documents/Workshop_WMD_satellites_29Sep-1Oct2015_FR.pdf

No.	Action/Recommendation	Comments	Deadline	Assigned to
1	To add a list of Acronyms to the WMDS document	Proposed by Lihang Zhou	TT-WMD-4	Secretariat
2	Define M, C, O before or on top of table 2	Proposed by Lihang Zhou	TT-WMD-4	Secretariat
3	Define/clarify the meaning of Matrix	Proposed by Lihang Zhou	TT-WMD-4	Secretariat
4	Eliminate column "Mode of observation", when completing code table 1-01 (entries existing in OSCAR/Surface are to be used) Circulate the OSCAR/Surface tree of variables and method to TT-WMD-4	Proposed by Jörg Klausen	TT-WMD-4	TT-WMD-4
5	Complete the list of definitions in code tables 2-01, 4-01-01 and others	Proposed by Lihang Zhou	TT-WMD-4	TT-WMD-4
6	Circulate the NOAA draft document, which includes a section on Metadata "standard"		ASAP TT-WMD-4	Lihang Zhou

7	Mapping of the Eumetsat Medatata model against the WMDS (finish examples and mention corresponding O&M element against WMDS)	For this action, it would be helpful to have the use cases for satellite use of the WMDS developed beforehand	ASAP TT-WMD-4	Guillaume Aubert
8	Develop a use case for the application of WMDS to NOAA satellites		TT-WMD-4	Lihang Zhou; Luis to share latest version
9	Expand/complete the entries in code table 3-08	Some changes have been made on session	ASAP	Stephan Bojinski
10	Add notes / explanations in WMDS related to calibration / instrument section		TT-WMD-4	Leon to lead
11	Update code tables according to discussions of meeting		TT-WMD-4	Luis to highlight in WMDS
12	Adequate representation of TT-WMD in IPET-MDRD meeting 10-12 Nov 2015, Geneva			Guillaume to contact chair
13	Present updated WMDS / formal standard to CGMS in June 2016		CGMS	WMO Space Office

EXAMPLES OF WMDS APPLIED TO SPACE-BASED OBSERVATIONS

WMDS				Questions	Himawari-8 AHI brightness temperature at 10.3um	
Category	Id	Name	Definition			
Observed variable	1-01	Observed variable – measurand	Variable intended to be measured or observed or derived, including the biogeophysical context	units that we measure that are not present	Brightness Temperature	
	1-02	Measurement unit	Real scalar quantity, defined and adopted by convention, with which any other quantity of the same kind can be compared to express the ratio of the two quantities as a number [VIM3, 1.9]	unitless quantities? enumerated types (cloud type)	kelvin	1-02-5
	1-03	Temporal extent	Time period covered by a series of observations inclusive of the specified date-time indications (measurement history)	end date could be the end of a processing system	7/7/2015	
	1-04	Spatial extent	Typical georeferenced volume covered by the observations		GEOS @ 140.7 (80N-80S, 60E-220E)	
	1-05	Representativeness	Spatial extent of the region around the observation for which it is representative	I expect we could ignore - or specify the spatial resolution	NA	

Purpose of observ.	Id	Name	Definition	Questions	Himawari-8 AHI brightness temperature at 10.3um	
	2-01	Application area(s)	Context within, or intended application(s) for which the observation is primarily made or which has/have the most stringent requirements			Nowcasting, General forecasting; ocean applications
	3-01	Region of origin of data	WMO Region	NilReason		
Station/platform	3-02	Territory of origin of data	Country or territory name of the location of the observation	NilReason		
	3-03	Station/platform name	Official name of the station/platform	is this the full name?	Himawari-8	173
	3-04	Station/platform type	A categorization of the type of environmental monitoring facility at which an observed variable is measured			satellite
	3-05	Station/platform model	The model of the monitoring equipment used at the station/platform	perhaps cosmic is better ex. most hw platforms are different (except 8 9)	Himawari-8	
	3-06	Station/platform unique identifier	A unique and persistent identifier for an environmental monitoring facility (station/platform), which may be used as a external point of reference	WMO ID	173	
Station/platform	3-07	Geospatial location	Position in space defining the location of the environmental monitoring station/platform at the time of observation	space/orbit; what about drift in orbit NOAA-15 into terminator?	moving	space based
					Orbit type	GEO
					Central longitude	140.7
					Height	38500

				Questions	Himawari-8 AHI brightness temperature at 10.3um	
	Id	Name	Definition			
Station/platform	3-09	Station Status	Declared reporting status of the station	Do not include gaps of a day or two = covered by data set level metadata. Do we need a standby status	Operational	3-09-3
Environment	4-01	Surface cover	The observed (bio)physical cover on the earth's surface in the vicinity of the observation		NA	4-01-01-00
	4-02	Surface cover classification scheme	Name and reference or link to document describing the classification scheme			
	4-03	Topography or bathymetry	The shape or configuration of a geographical feature, represented on a map by contour lines			
	4-04	Events at station/platform	Description of human action or natural event at the station or at the vicinity that may influence the observation	space weather (specify start/stop)	can be realized as a specific URL pointing to this information	
	4-05	Site information	Non-formalized information about the location and its surroundings at which an observation is made and that may influence it			
Instruments and methods of observation	5-01	Source of observation	The source of the dataset described by the metadata		automatic	5-01-1
	5-02	Measurement/observing method	The method of measurement/observation used	add to table form - hierarchy of methods for review (surface bias). Verify that these match	Moderate-resolution optical imager	

Questions						
Himawari-8 AHI brightness temperature at 10.3um						
Id						
Name						
Definition						
Questions						
Himawari-8 AHI brightness temperature at 10.3um						
Instruments and methods of observation	5-04	Instrument operating status	The status of an instrument with respect to its operation	perhaps add satellite terminology such as "commissioning"	operational	5-04-1
	5-05	Vertical distance of sensor	Vertical distance of the sensor from a (specified) reference level such as local ground, or deck of a marine platform at the point where the sensor is located; or sea surface	NA for satellite.		
	5-06	Configuration of instrumentation	Description of any shielding or configuration/setup of the instrumentation or auxiliary equipment needed to make the observation or to reduce the impact of extraneous influences on the observation	NA	NA or a URL	
	5-07	Instrument control schedule	Description of schedule for calibrations or verification of instrument	In case of AVHRR this could be each scan (PRT-bb) - no, this is data. MODIS lunar calibration is more appropriate	generic short statements and/or URL	
	5-08	Instrument control result	The result of an instrument control check, including date, time, location, standard type and period of validity	Perhaps the table could be expanded -	URL to where this info can be found	
	5-09	Instrument model and serial number	Details of manufacturer, model number, serial number and firmware version if applicable		Advanced Himawari Imager - 01	

	5-10	Instrument routine maintenance	A description of maintenance that is routinely performed on an instrument		NilReason=not applicable	
				Questions	Himawari-8 AHI brightness temperature at 10.3um	
	Id	Name	Definition			
Instruments and methods of observation	5-12	Geospatial location	Geospatial location of instrument/sensor	NA	same as geolocation of platform	
	5-13	Maintenance Activity	Description of maintenance performed on instrument	Station keeping, calibration	NilReason=not applicable	
	5-14	Status of observation	Official status of observation		n/a	
	5-15	Exposure of instruments	The degree to which an instrument is affected by external influences and reflects the value of the observed variable		n/A	
Sampling	6-01	Sampling procedures	Procedures involved in obtaining a sample		optional, can be a URL	
	6-02	Sample treatment	Chemical or physical treatment of sample prior to analysis		n/a	
	6-03	Sampling strategy	The strategy used to generate the observed variable		optional, can be a URL	
	6-04	Sampling time period	The period of time over which a measurement is taken		instantaneous, repeat every 10	
	6-05	Spatial sampling resolution	Spatial resolution refers to the size of the smallest observable object. The intrinsic resolution of an imaging system is determined primarily by the instantaneous field of view of the sensor, which is a measure of the ground area viewed by a single detector element in a given instance in time		n/a	
	6-06	Temporal sampling interval	Time period between the beginning of consecutive sampling periods		N/a	

	6-07	Diurnal base time	Time to which diurnal statistics are referenced		n/a	
	6-08	Schedule of observation	Schedule of observation		n/a	

				Questions	Himawari-8 AHI brightness temperature at 10.3um	
Data processing and Reporting	Id	Name	Definition			
	7-02	Processing/analysis center	Center at which the observation is processed		ABOM	
	7-03	Temporal reporting period	Time period over which the observable variable is reported		10-minute	
	7-04	Spatial reporting interval	Spatial interval at which the observed variable is reported		2x2	
	7-05	Software/processor and version	Name and version of the software or processor utilized to derive the element value	Provider would know		AGLS r5700 (svn revision ID or git)
	7-06	Level of data	Level of data processing		L1	7-06-3
	7-07	Data format	Description of the format in which the observed variable is being provided		NetCDF	
	7-08	Version of data format	Version of the data format in which the observed variable is being provided	Provider would know	AGLS_data-product-specification_rev01.05	
	7-09	Aggregation period	Time period over which individual samples/observations are aggregated	?		
	7-10	Reference time	Time base to which date and time stamps refer		1/1/1970	
	7-11	Reference datum	Reference datum used to convert observed quantity to reported quantity	what about geoid?		
	7-12	Numerical resolution	Measure of the detail in which a numerical quantity is expressed			1dp

	7-13	Latency (of reporting)	The typical time between completion of the observation or collection of the datum and when the datum is reported			8 mins
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				Questions	HW-8 Brightness temperature at 10.3um	
Data quality	Id	Name	Definition			
	8-02	Procedure used to estimate uncertainty	A reference or link pointing to a document describing the procedures / algorithms used to derive the uncertainty statement			
	8-03	Quality flag	An ordered list of qualifiers indicating the result of a quality control process applied to the observation			
	8-04	Quality flagging system	Reference to the system used to flag the quality of the observation	?		
	8-05	Traceability	Statement defining traceability to a standard, including sequence of measurement standards and calibrations that is used to relate a measurement result to a reference [VIM 3 2.4.2]	difficult to specify	GSICS	
Ownership and data policy	9-01	Supervising organization	Name of organization who owns the observation	code table?	ABOM+JMA	
	9-02	Data policy/use constraints	Details relating to the use and limitations surrounding data imposed by the supervising organization		None	9-02-4

Contact	10-01	Contact (Nominated Focal Point)	Principal contact (Nominated Focal Point, FP) for resource		ABOM	
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WMDS		SARAL SLA		MTSAT-2 CSR		
Category	Id					
Observed variable	1-01	Sea Level Anomaly		Clear sky radiance (Brightness Temperatures at multiple wave-lengths), % of area that is clear, Standard Deviation of bright-ness temperatures within box		
	1-02	m	1-02-1	kelvin, %, kelvin	1-02-5	
	1-03	2012-		2009-		
	1-04	Global		GEOS@ 145 (80N-80S, 65E-225E)		
	1-05	NA		NA		
Purpose of observ.	2-01	Ocean	2-01-7	GNWP	2-01-1	
	2-02	?		?		
Station/platform	3-01					
	3-02					
	3-03	Satellite with ARGOS and AltiKa	441	Himawari-7	172	
	3-04		satellite		satellite	
	3-05	Satellite with ARGOS and AltiKa		Himawari-7		
	3-06	441		172		
	3-07					
		moving	space based	moving	space based	
		Orbit type	LEO	Orbit type	GEO	
		Sun synchronous	yes	Central longitude	145	
		Equator crossing time (ascending)	6:00	height	35800	
		height	800			
	3-08	Global downlink	3-08-XX	rebroadcast via MTSAT-1R	3-08-XX	

	3-09	Operational	3-09-3	Operational	3-09-3	
WMDS		SARAL SLA		MTSAT-2 CSR		
Category	Id					
Environment	4-01	NA	4-01-01-00	NA	4-01-01-00	
	4-02					
	4-03					
	4-04					
	4-05					
Instruments and methods of observation	5-01	automatic	5-01-1	automatic	5-01-1	
	5-02	Radar Altimeter		Moderate-resolut. optical imager		
	5-03					
	5-04	operational	5-04-1	operational	5-04-1	
	5-05					
	5-06			?		
	5-07			?		
	5-08					
	5-09	ALTIKA (but also MWR)		IMAGER		
	5-10					
	5-11					
	5-12					
	5-13					
	5-14					
	5-15					
Sampling	6-01					
	6-02					
	6-03	Pulse		Continuous		
	6-04	20 Hz		instantaneous, repeat every 60		
	6-05	point, 7km apart		60x60		

	6-06					
WMDS		SARAL SLA		MTSAT-2 CSR		
Category	Id					
Sampling	6-07					
	6-08	every second		hourly full disk		
Data processing and Reporting	7-01					
	7-02	AVISO/RADS		JMA		
	7-03	1-second		Hourly		
	7-04	7km along track		60x60		
	7-05		RADS v4			
	7-06	L2	7-06-4	L2	7-06-4	
	7-07	NetCDF		BUFR		
	7-08	RADS v4				
	7-09	1s				
	7-10	1/1/1980		1/1/1970		
	7-11					
	7-12		0.001m		1dp	
	7-13		2 days		30 mins	
Data quality	8-01	?mm		?		
	8-02					
	8-03					
	8-04					
	8-05	multi-sensor and GPS buoys		depends on cloud mask product, GSICS		
Ownership data policy	9-01	ISRO		JMA		
	9-02	Restricted	9-02-4	WMO	9-02-1	
Contact	10-01	RADS		JMA		

