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Copernicus Climate Change Service

Common Data Model for in situ observations

C3S311a Lot 2: Global Land and Marine Observations Database

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Executive Summary

This document defines the initial version of the Common Data Model (CDM) developed within the Copernicus Climate Change Service (C3S) Access to Global Land and Marine Observations Database (C3S 311a Lot 2) service. This has been developed in consultation across the four C3S 311a (Collection and Processing of In Situ Observations) Lots and ECMWF.

Tab separated versions of the code tables defining the data model can be found at:

`https://github.com/glamod/common_data_model/tree/master/tables/tsv/`

Version	Release date	Release notes
1	31/08/2017	Initial version of the common data model

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1 Introduction

1.1 Purpose of this document

This document defines the initial version of the Common Data Model (CDM)[1] developed within the Copernicus Climate Change Service (C3S) Access to Global Land and Marine Observations Database (C3S 311a Lot 2) service. This has been developed in consultation across the four C3S 311a (Collection and Processing of In Situ Observations) Lots and with ECMWF.

1.2 Scope

The defined common data model is intended for use with in situ land and marine observations. Instantaneous (or point) observations and temporal statistics (e.g. daily and monthly min / max temperatures, accumulation of precipitation etc.) are supported through the use of a significance qualifier. Similarly, column average data are supported through the reporting of the observed variable alongside its value. Profile data is supported through reporting the z-coordinate for each observed value.

Whilst initially intended for use with observations of Essential Climate Variables (ECVs; e.g. GCOS, 2016) the data model is not restricted to the ECVs. As noted above, and following the ECMWF Observations DataBase (ODB) type data model, the observed variable is reported alongside the observed value.

Comprehensive metadata is supported through the use of configuration tables, recording information on:

- Source level metadata: e.g. original source of data, source data centre, citation information etc.
- Station level metadata: e.g. location, operating institute, parameters reported etc.
- Profile level metadata: Additional information for profile data, e.g. unwinder type, type of balloon or expendable bathythermograph (XBT) etc.
- Sensor level metadata: e.g. calibration history and status, sensor type / serial number etc.

Comprehensive quality control and uncertainty information can be recorded using linked Entity-Attribute-Value (EAV) tables.

1.3 Structure of this document

Section 2 of this document provides background information on the data model and existing relevant data models and standards. Section 3 proposes a governance mechanism for the CDM in recognition that the data model will change and evolve as the requirements of the users and the C3S Climate Data Store develop. Section 4 describes the core components and tables of the data model. The appendix

[1] As noted in the ITT: A common data model is different from a file format, which defines how information is encoded in a file. The purpose of a data model is to provide a well-defined data structure that can be used to represent data records from a variety of sources, in such a way that the information contained in those records can be unambiguously accessed using a common set of tools. Development of a common data model for observations involves specification of data attributes and their symbolic names, including, for example, identifiers for different instruments, observed parameters, geolocation and timing, etc. A governance structure is required to manage such specifications, ensure consistency with standards where they exist, and to ensure a controlled evolution of the data model.

includes the individual table definitions and preliminary versions of the code tables. The code tables listed are provisional and will be expanded as the service develops.

2 Background and existing standards

2.1 Observational sources and requirements of the data model

Across the C3S 311a service (Collection and Processing of In Situ Observations) access will be provided to observations from surface terrestrial and marine environments and upper air data in a common data model. The observations included range from point observations made from moving platforms to daily and monthly statistics at fixed locations. The parameters reported include, inter alia: air temperature; humidity; wind speed; pressure; cloud cover information; present weather. The statistics include, inter alia: daily min, max and mean air temperature; accumulated precipitation over 3 or 24 hours; mean wind speed over the preceding 10 minutes. The full range of parameters and statistics to be reported will evolve as the service is developed. As new parameters are recovered from newly digitised sources and the reprocessed climate archives the list of parameters will need to expand.

Both surface level (terrestrial and marine) and upper air data will be initially included in the service. The surface level data include observations made at standard and non-standard heights. The upper air data will include multiple observations, starting at the surface and at increasing heights through the atmosphere, often as a function of pressure or geopotential height. Columnar averages will be included. As a result the data model needs to include the flexibility to record the height and the units used for reporting the height of measurement with every observation. Similarly, some reporting stations, and hence observations, will move in the horizontal plane, and the horizontal coordinates need to be reported with each observation. To avoid ambiguity, the CRS should be provided with each location reported.

The period covered by Lot 2 of the service ranges from ∼1850 to present. Over this period there have been many changes to the instruments and practices used to record the various parameters. The choice of instruments and practices will influence the quality of the observations and a change in instrumentation, or location, may introduce inhomogeneities into the record. To mitigate this risk comprehensive observational metadata are required. Similarly, information on adjustments and conversions applied to the data need to be recorded. The full range of observational practices and instruments used is not currently known and developed data model will need to be extendable to accommodate new metadata as required.

The observations to be included will be sourced from a variety of existing datasets, such as the International Comprehensive Ocean and Atmosphere Data Set (ICOADS; e.g. Freeman et al., 2017), and newly digitised sources. In defining the data model the provenance and lineage of the data sources need to be preserved. Similarly, usage rights and citation information need to be preserved and provided to users alongside the observational data. This is a common requirement across all Lots within the service.

In order to meet the above requirements a data model based on the ECMWF Observations DataBase (ODB) model has been developed, with the use of linked tables providing information on the observational and provenance metadata. The ODB type model allows for extension to new parameters through the use of a parameterized observation list (see next section). The linked tables will define a core set of

parameters under 4 different categories (station, source, profile and sensor), flexibility will be provided through the specification of optional elements and associated decode tables.

2.2 ECMWF Observations DataBase (ODB)

The data model developed and used in the ECMWF Observations DataBase (ODB) software allows the representation of environmental data from many sources, including in situ observations and weather reports, satellite data and model output. As noted in Hersbach et al. (2015), in the ODB implementation a distinction is made between weather reports and observations and this same distinction is made within the CDM and this document. A weather report, such as a ship weather report or a radiosonde ascent, may contain multiple observations of one or more parameters. In the case of a ship weather report observations of the air temperature and humidity, sea level pressure, sea surface temperature, wind speed and direction are typically made and recorded in a single report. In the case of a radiosonde report observations of the temperature will be made at a range of levels from the surface to the burst point of the balloon. To enable flexibility and scalability with the ODB data model the different elements making up a weather report are split into header elements, recording information common across a weather report, and observational (or body) elements specific to a single observation.

In the original version of ODB, e.g. Saarinen (2004), these elements were split between a header table, containing the header elements, and a linked body table containing the observations or body elements. Within the body table the name of the parameter being observed, or its numerical code, is recorded in one column and the observed value within a second column. Other columns, recording information such as QC results, are permissible. This data model allows the efficient expansion of the data model to new variables, without the need to change the underlying structure, by the addition of the new variable to the enumerated list defining the reportable variables. Within the latest version of ODB (ODB-2; e.g. Hersbach et al., 2015) the header and body tables have been combined into a single flat table, with the header rows repeated, to enable efficient archival within the ECMWF MARS system. A simplified schematic of the ODB-2 structure is shown in Table 1.

Within the CDM defined in this document we have opted for the original ODB type data model, with the reports split into header and observational records stored within separate tables. These are described fully within Section 3 of this document. When these tables are stored in a relational database, or similar structure, performing a join on the tables should result in ODB-2 compatible records.

Table 1: Simplified example of records in ODB type data model, with observations from reports 1 and 2 spanning multiple records. For simplicity, the z coordinate has been omitted but profile data would be represented with each layer / height as a separate record

header information					observation information		
record id	**report id**	**obs id**	**date**	**location**	**parameter**	**value**	**units**
1	1	1	2012-01-01 12:00+0.0	POINT(-40 40)	air temperature	300.0	K

Continued on next page

Table 1 adjustment (cont.)

header information					observation information		
record id	report id	obs id	date	location	parameter	value	units
2	1	2	2012-01-01 12:00+0.0	POINT(-40 40)	sea level pressure	1013.0	hPa
3	2	3	2012-01-01 18:00+0.0	POINT(-40.1 40.2)	air temperature	300.3	K
4	2	4	2012-01-01 18:00+0.0	POINT(-40.1 40.2)	sea level pressure	1013.2	hPa

End of table

2.3 BUFR and WIGOS Metadata Standard

There has been a large body of work and significant effort invested in defining data models and parameterising the data and metadata for encoding the data into those data models. Within the scope of the CDM and the C3S 311a service, the WMO Binary Universal Form for the Representation of meteorological data (BUFR) (WMO, 2015a) and the WMO Integrated Observing System Metadata Standard (WMDS) (WMO, 2015b) are key background material.

The BUFR format (WMO 2015a) is a flexible and efficient table driven format for reporting weather observations on the WMO Global Telecommunications System (GTS) in binary. The tables defined as part of the BUFR format include many of the parameters that will be included in the CDM. For example, Common code table C6 (WMO 2015a) includes all the measurement units reportable in BUFR (and other WMO codes). Similarly, code tables are defined for reporting instrument types and methods, station types etc. Where possible, these code tables have been referenced and used in preference to defining new code tables. BUFR tables from Version 27 of Master Table 0 have been used in this version of this document.

In recognition of the increasing importance of observational metadata the WMDS is currently under development and phased implementation (WMO, 2015b). The WMDS extends the ISO19115 metadata standard, with additional mandatory elements describing both the station level and discovery metadata as well as specific information on the instrumentation used and processing steps. As part of the process simplified versions of BUFR and other tables have been included in the standard. As with BUFR these tables have been referenced, where appropriate, in preference to defining new code tables.

3 Governance of the Common Data Model

A working group will be set up to manage the governance of the common data model. This group will operate remotely via email and regular teleconferences. Proposals to add new entries to the code tables or make changes to the structure of the common data model shall be made via email to email address:

c3s_311a_CDM_governance@surfacetemperatures.org.

Emails to this address will be distributed to all members of the working group.

During the initial development stage of the service proposals sent to the above email address will be assessed monthly, with discussion via email and teleconference as required. Accepted changes will be implemented at the beginning of the following month or with at least 2 weeks notice. These changes will be published both via the service website and via a subscription email list:

c3s_311a_CDM_notifications@surfacetemperatures.org.

The working group will be self nominating and initially contain at least one member from each Lot to act as a primary point of contact for that Lot and to represent their requirements on the working group. The working group will also contain a representative from ECMWF, or a nominated representative from another organisation, to represent the needs of the wider C3S community. Additional members from the different Lots will be welcomed. In the case of disagreement over proposed changes each Lot will have one vote irrespective of the number of members in the working group. In the case of a hung vote ECMWF, or their representative, will have the deciding vote.

4 Common Data Model

As noted above, the CDM is based on the original ODB data model, with meteorological reports split into header and observational records stored in separate tables. In support of these two primary tables, four auxiliary tables have been defined to enable the comprehensive reporting of metadata at different levels:

- Source level metadata (*source_configuration* table). This level contains detailed information on the source dataset, including: information on the product; whether any processing has been applied; the original data centre the data were sourced from; citation information; the data licence for the product; how to cite the data source etc.
- Station level metadata (*station_configuration* table). This level contains detailed information on the station reporting the data including: station operator; the type of station; station / AWS model type; location; operating territory; reporting frequency etc.
- Profile level metadata (*profile_configuration* table). This level contains detailed metadata for atmospheric and oceanic profiles, including: profile type; type of launcher; direction of profile; balloon / XBT type etc.
- Instrument (or sensor) level metadata (*sensor_configuration* table). This level contains detailed information on the sensor used to make a particular observation, including: calibration status; sampling strategy; observing method; sensor housing and ventilation; instrument model and serial number etc.

These tables are defined in the following section and contain elements that are mandatory across all report types. Additional optional elements are provided through Entity-Attribute-Value based tables linked to the configuration tables. Two additional tables have been defined to include the reporting of

comprehensive uncertainty estimates and quality control flags. A simplified schematic of the 12 tables forming the core of the CDM is shown in Figure 1 - a more complete schematic can be found at `https://github.com/glamod/common_data_model/blob/master/cdm_short.pdf`.

Within the tables in the following sections the following syntax has been used:

- numeric: Any numeric value (integer or floating point).
- int: An integer value.
- varchar: A variable length character string.
- timestamp with time zone: A timestamp, e.g. ”2017-07-01 00:00:0.0+00”.
- []: An array of the indicated type.
- (fk) The indicated value is also a foreign key linking to another table (e.g. decode table for encoded data).
- (pk) The indicated elements marked as (pk) within a table form the unique ID for the record.

Mandatory elements are indicated by a 1 (or 1+) in the occurrence column. Mandatory elements that are not available must be included but may be encoded as missing (.e.g NA, NULL or format specific equivalent). Optional elements are indicated by 0+. Whilst arrays have been indicated for the elements containing multiple values this does not preclude other implementations.

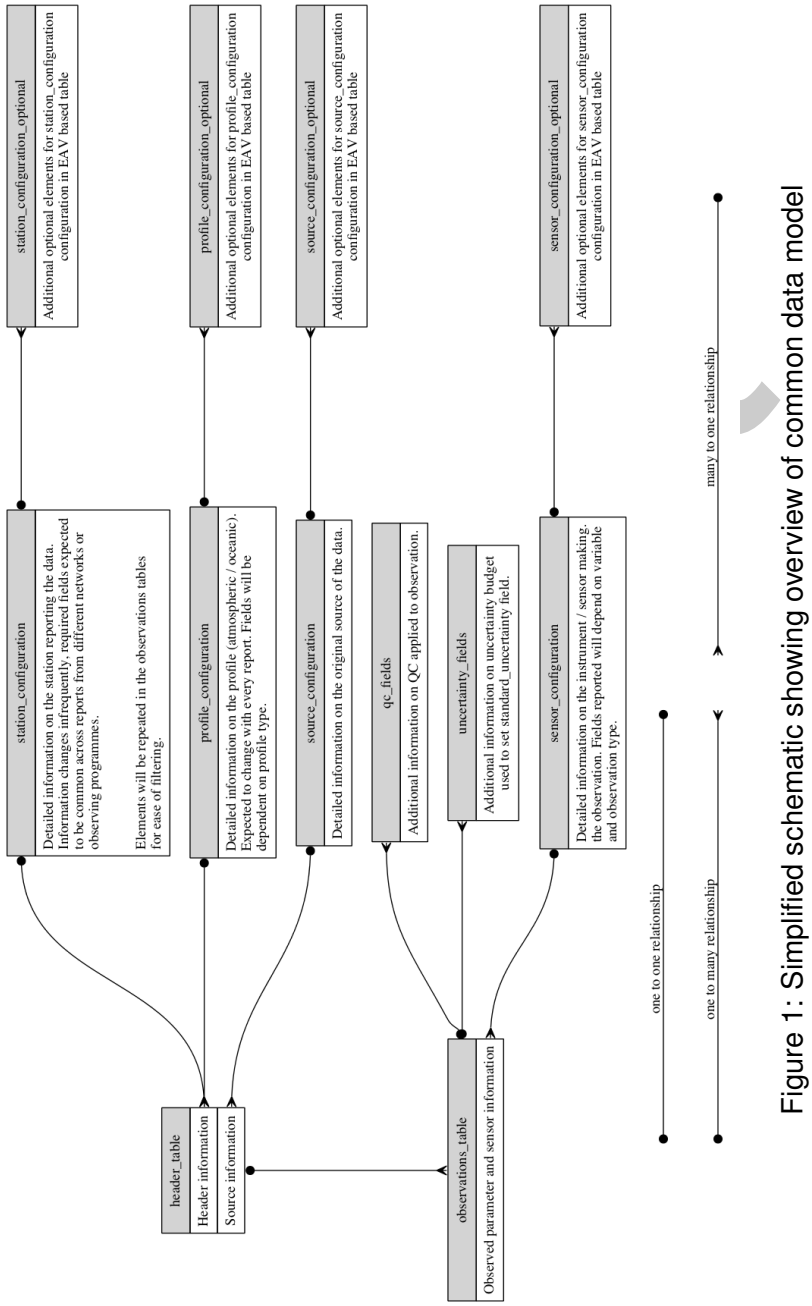

Figure 1: Simplified schematic showing overview of common data model

4.1 Header table

Table 2: header_table

element_ name	kind	external _table	description
report_id	varchar (pk)		Unique ID for report (unique ID given by combination of report_id and observation_id)
region	int	region:region	Region (WMO region / Ocean basin)
sub_region	int	sub_region: sub_region	Country / regional sea
applicatio n_area	int[]	application_ area:applic ation_area	WMO application area(s)
observing_p rogramme	int[]	observing_p rogramme:o bserving_pr ogramme	Observing programme, e.g. VOS
report_type	int	report_typ e:type	e.g. SYNOP, TEMP, CLIMAT, etc
station_name	varchar		e.g. GRUAN station name, ship name, site name etc
station_type	int	station_ty pe:type	Type of station, e.g. land station, sea station etc
platform_type	int	platform_ty pe:type	Structure upon which sensor is mounted, e.g. ship, drifting buoy, tower etc
platform_s ub_type	int	platform_su b_type:type	Sub-type for platform, e.g. 3m discuss buoy
primary_st ation_id	varchar	station_con figuration:p rimary_id	Primary station identifier, e.g. WIGOS ID
station_reco rd_number	int	station_confi guration:rec ord_number	Together with primary_station_id this forms a link to the station configuration table.

Continued on next page

Table 2 header_table (cont.)

element_ name	kind	external _table	description
primary_statio n_id_scheme	int	id_scheme:i d_scheme	Scheme used for station ID
longitude	numeric		Longitude of station, -180.0 to 180.0 (or other as defined by station_crs)
latitude	numeric		Latitude of station, -90 to 90 (or other as defined by station_crs)
location_a ccuracy	numeric		Accuracy to which station location recorded (radius in km)
location_m ethod	int	location_met hod:method	Method by which location determined
location_ quality	int	location_qua lity:quality	Quality flag for station location
crs	int	crs:crs	Coordinate reference scheme for station location
station_speed	numeric		Station speed over ground if mobile (m/s)
station_c ourse	numeric		Station course over ground if mobile (degree true)
station_h eading	numeric		Station heading if mobile
height_of_sta tion_above_l ocal_ground	numeric		Height of station above local ground (m)
height_of_st ation_above _sea_level	numeric		Height of station above mean sea level (m), negative values for below sea level.
height_of_s tation_abov e_sea_level _accuracy	numeric		Accuracy to which height of station known (m)
sea_level_ datum	int	sea_level_da tum:datum	Datum used for sea level

Continued on next page

Table 2 header_table (cont.)

element_ name	kind	external _table	description
report_mea ning_of_tim e_stamp	int	meaning_of _time_stamp :meaning	Report time - beginning, middle or end of reporting period
report_tim estamp	timestamp with timezone		e.g. 1991-01-01 12:00:0.0+0
report_du ration	int		Report duration (s), e.g. 86400 = daily obs, 3600 hourly etc
report_time _accuracy	numeric		Precision to which time was recorded (s)
report_time _quality	int	time_qualit y:quality	Quality flag for report_timestamp
report_time_ reference	int	time_referenc e:reference	Reference Time (e.g. referenced to time server, atomic clock, radio clock etc)
profile_id	varchar	profile_con figuration: profile_id	Information on profile (atmospheric / oceano- graphic) configuration. Set to Record ID for profile data or missing (NULL) otherwise.
events_at_ station	int[]*	events_at_st ation:event	e.g. ship hove to, crop burning etc.
report_quality	int	quality_fla g:flag	Overall quality of report
duplicate_ status	int	duplicate_st atus:status	E.g. no duplicates, best duplicate, duplicate, not checked.
duplicates	varchar[]*	header_tabl e:report_id	Array of report_id's for duplicates
record_tim estamp	timestamp with timezone		Timestamp of revision for this record
history	varchar		Sequence of processing steps. Free text with timestamp 1 : history 1; timestamp 2 : history 2 etc.
processin g_level	int	report_proc essing_lev el:level	Level of processing applied to this report

Continued on next page

Table 2 header_table (cont.)

element_name	kind	external_table	description
processing_codes	int[]*	report_processing_codes:code	Processing applied to this report
source_id	varchar	source_configuration:source_configuration	Original source of data, link to external table
source_record_id	varchar		Record ID in source data, e.g. ID of event from GRUAN meta database

End of table

4.2 Observations table

Table 3: observations_table

element_ name	kind	external _table	description
observat ion_id	varchar (pk)		unique ID for observation
report_id	varchar	header_tabl e:report_id	Link to header information
data_policy _licence	int	data_policy_li cence:policy	WMOessential, WMOadditional, WMOother
date_time	timestamp with timezone		timestamp for observation
date_time_ meaning	int	meaning_of _time_stamp :meaning	beginning, middle, end
observation _duration	int		Duration/period over which observation was made (s)
longitude	numeric		Longitude of the observed value, -180 to 180 (or other as defined by CRS). This may or may not be the same as the report location.
latitude	numeric		Latitude of the observed value, -90 to 90 (or other as defined by CRS)
crs	int	crs:crs	Coordinate reference scheme use to encode location
z_coordinate	numeric		z coordinate of observation
z_coordina te_type	int	z_coordinate _type:type	Type of z coordinate
observation_h eight_above_s tation_surface	numeric		Height of sensor above local ground or sea surface. Positive values for above surface (e.g. sondes), negative for below (e.g. xbt). For visual observations, height of the visual observing platform.
observed_ variable	int	observed_var iable:variable	The variable being observed / measured

Continued on next page

Table 3 observations_table (cont.)

element_ name	kind	external _table	description
secondary _variable	int	secondary _variable:v ariable	Secondary variable required to understand observation, e.g. chemical constituent. Set to NA / missing if not applicable.
observatio n_value	numeric		The observed value
value_sign ificance	int	observation _value_sign ificance:sig nificance	e.g. min, max, mean, sum
secondar y_value	int	secondary_va riable:value	value for the secondary variable. Set to NA or missing if not applicable.
units	int	units:units	Units for the observed variable
code_table	int	observation _code_table: code_table	Encode / decode table for variable (if encoded)
conversio n_flag	int	conversion _flag:flag	Flag indicating whether original, converted or both values are available.
location_m ethod	int	location_met hod:method	Method of determining location,
location_pr ecision	numeric		Precision to which location is reported (radius km)
z_coordinat e_method	int	z_coordina te_method :method	Method of determining z coordinate
bbox_min_l ongitude	numeric		Bounding box for observation, valid range given by CRS
bbox_max_ longitude	numeric		Bounding box for observation, valid range given by CRS
bbox_min_ latitude	numeric		Bounding box for observation, valid range given by CRS

Continued on next page

Table 3 observations_table (cont.)

element_ name	kind	external _table	description
bbox_max_ latitude	numeric		Bounding box for observation, valid range given by CRS
spatial_repres entativeness	int	spatial_repre sentativene ss:represen tativeness	Spatial representativeness of observation
quality_flag	int	quality_fla g:flag	Quality flag for observation
qc_passed	int		Number of quality control checks passed (see qc_table for more information)
qc_failed	int		Number of quality control checks failed (see qc_table for more information)
numerical_ precision	int		Reporting precision of observation in units given by 'units' variable. Equivalent to BUFR scale factor
standard_u ncertainty	numeric		Standard uncertainty in reported value
method_of_ estimating_ standard_u ncertainty	int	method_of_ estimating_ uncertainty :method	Method of estimating the standard uncertainty
sensor_id	varchar	sensor_con figuration:s ensor_id	NA
sensor_autom ation_status	int	automation _status:aut omation	Automated, manual, mixed or visual observation
exposure_o f_sensor	int	instrument_e xposure_qual ity:exposure	Whether the exposure of the instrument will impact on the quality of the measurement
original_pr ecision	int		Original reporting precision in units given by 'original_units'

Continued on next page

Table 3 observations_table (cont.)

element_ name	kind	external _table	description
original_units	int	units:units	Original units
original_value	numeric		Original value as reported or recorded in log book.
conversion _method	int	conversion_m ethod:method	Link to table describing conversion process
processin g_code	int[]*	processing_ code:code	e.g. TRC (temperature radiation correc- tions) etc. Encoded in table.
processin g_level	int	processing_ level:level	Level of processing applied to observation.
adjustment_id	int	adjustment:a djustment_id	Total adjustment applied to observation reported in obser- vation value (observation_value = original + adjustment)
traceability	int	traceability:t raceability	Whether observation can be traced to international standards.
advanced_qc	int	data_pres ent:flag	Flag indicating whether advanced qc data are available
advanced_u ncertainty	int	data_pres ent:flag	Flag indicating whether advanced uncer- tainty estimates are available
advanced_ho mogenisation	int	data_pres ent:flag	Flag indicating whether advanced homogeni- sation information is available

End of table

4.3 Station configuration

Table 4: station_configuration

element_ name	type	external _table	description
primary_id	varchar (pk)		Primary (e.g. WMO) ID for station
primary_id _scheme	int	id_scheme :scheme	Scheme used for primary ID
record_n umber	int (pk)		Record number for this station entry
secondary_id	varchar[]*		Secondary (e.g. local) ID for station
secondary_i d_scheme	int[]*	id_scheme :scheme	Scheme used for secondary ID
station_name	varchar		Name of station (e.g. Tateno)
station_abb reviation	varchar		Abbreviation of station name (e.g. TAT)
alternative _name	varchar[]*		NA
station_crs	int	crs:crs	coordinate reference system used to report stations location
longitude	numeric		Report position for station if stationary or NULL if mobile. If more than one estimate record best here and additional values using optional fields.
latitude	numeric	NA	Report position for station if stationary or NULL if mobile
local_gravity	numeric	NA	Local gravity at station location (units ms-2)
start_date	timestamp		Date that the station first started reporting in this configuration
end_date	timestamp		Last data the station reported in this configuration
station_type	int	station_ty pe:type	Type of reporting station
platform_type	int	platform_ty pe:type	Generic type of observing platform
platform_s ub_type	int	platform_su b_type:type	Specific type of observing platform

Continued on next page

Table 4 station_configuration (cont.)

element_ name	type	external _table	description
operating_ institute	int	organisation: organisation	Institute operating the station (e.g. National Oceanography Centre)
operating_ territory	int	sub_region: sub_region	Sub-region where station is located or country of registry for mobile station
city	varchar	NA	Nearest city / town to station location
contact	varchar[]	contact:contact_id	Contact for station
role	int[]	role:role	Role of contact
observing_frequency	int	observing_ frequency:frequency	Typical frequency of observations for this station (reports per day). If irregular use reporting_time.
reporting _time	int[]	NA	Reporting hour(s) if non-standard / irregular hours used
telecomm unication_ method	int[]	communication_method:method	Method used to report observations
station_automation	int	automation _status:automation	Whether station is automated, manual or mixed
measuring_system_model	varchar[]	measuring_system_model	Station / AWS model type
measuring_ system_id	varchar[]		ID or serial number of measuring system
observed_ variables	int[]	observed_variable:variable	array indicating which variables are observed by this station
comment	varchar		Any other comments / footnotes
optional_data	int	data_present:flag	Flag indicating availability of additional data

End of table

Table 5: station_configuration_optional

element_name	kind	external_table	description
station_primary_id	varchar	station_configuration:primary_id	Link to station for which this entry corresponds
record_number	int	station_configuration:record_number	Link to station for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	station_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

4.4 Profile configuration

Table 6: profile_configuration

element_ name	kind	external _table	description
profile_id	varchar (pk)	NA	Unique ID for this profile entry
profile_type	int	profile_type:type	Type of profile (e.g. atmospheric or oceanic)
standard_time	int	standard_time:time	e.g. Standard / scheduled time for launch or report, e.g. 00, 06, 12, 18 UTC
actual_time	timestamp		Actual report / launch time
profile_number	numeric		e.g. Balloon Number
comments	varchar		Any additional comments / footnotes
optional_data	int	data_present:flag	Flag indicating whether there is additional metadata available

End of table

Table 7: profile_configuration_optional

element_name	kind	external_table	description
profile_id	varchar	profile_configuration:profile_id	Link to profile for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	profile_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

4.5 Source configuration

Table 8: source_configuration

element_name	type	external_table	description
source_id	varchar (pk)		Unique record ID for dataset
product_id	varchar		ID for product
product_name	varchar		Name of source, e.g. International Comprehensive Ocean Atmosphere Data Set, RS92 GRUAN Data Product
product_code	varchar		Abbreviations / product code, e.g. ICOADS, RS92-GDP
product_version	varchar		Version number for dataset, e.g. Release 3.0.0
product_level	int	product_level:level	Level of product
product_uri	varchar		URI for product, either to original source or to CDS
description	varchar		Description of dataset / comments
product_references	varchar[]		References describing the dataset
product_citation	varchar[]		Citation to use when using this product
product_status	int	product_status:status	Status of product, draft, pre-release, release
source_format	int	source_format:format	Original format for data
source_format_version	varchar		Version of original data format
source_file	varchar		Filename for data from source
source_file_checksum	varchar		Checksum of source datafile
data_centre	int	organisation:organisation_id	Data centre from which data sourced

Continued on next page

Table 8 source_configuration (cont.)

element_ name	type	external _table	description
data_cen tre_url	varchar		URL for data centre
data_policy _licence	int	data_policy_li cence:policy	Data policy / licence
contact	varchar[]	contact:co ntact_id	contact for data source with role specified by role element
contact_role	int[]	role:role	role of contact
history	varchar		History of source
comments	varchar		Additional comments / footnotes
timestamp	timestamp with timezone		Date record created / created
maintenance _and_update _frequency	int	update_fre quency:fre quency	Frequency with which modifications and deletions are made to the data after it is first produced
optional_data	int	data_pres ent:flag	Flag indicating availability of additional data

End of table

Table 9: source_configuration_optional

element_name	kind	external_table	description
source_id	varchar (fk)	source_configuration:source_configuration_id	Link to source for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	source_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

4.6 Sensor configuration

Table 10: sensor_configuration

element_ name	type	external _table	description
sensor_id	varchar (pk)		Unique ID for this instrument
observing_ method	int	observing_me thod:method	Method (instrumental, estimated / visual, computed) by which observation made
sampling_s trategy	int	sampling_stra tegy:strategy	Sampling strategy used by instrument
calibration _status	int	calibration_s tatus:status	Whether the sensor is in / out of calibration
calibratio n_date	timestamp		Date of last calibration
comments	varchar		additional comments for sensor not reportable elsewhere
date_start	timestamp		start date for period of validity assoiciated with this entry
date_end	timestamp		end date for period of validity assoiciated with this entry
optional_data	int	data_pres ent:flag	Flag indicating if additional data available

End of table

Table 11: sensor_configuration_optional

element_name	kind	external_table	description
sensor_id	varchar (fk)	sensor_configuration:sensor_id	Link to sensor for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	sensor_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

4.7 Quality control flags

A single QC flag is provided in the observations table for the observed value. Additional flags can be provided using the qc_table and by setting the advanced_qc flag to true in the observations_table.

Table 12: qc_table

element_name	kind	external_table	description
report_id	varchar	header_table:report_id	Link to report this entry is for
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for. Set to NULL / NA if entry for report level QC
qc_method	int	qc_method:method	Link to table describing QC method used to set this flag
qc_flag	int	quality_flag:flag	E.g. 0 = good, 1 = inconsistent etc

End of table

4.8 Uncertainty budget

A single standard uncertainty value is provided for each observed value in the observations table. Additional values can be provided using the uncertainty_table and by setting the advanced_uncertainty to true in the observations_table.

Table 13: uncertainty_table

element_name	kind	external_table	description
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for
uncertainty_type	int	uncertainty_type:type	The type of uncertainty described by this entry
uncertainty_method	int	uncertainty_method:method	Method used to estimate this uncertainty
uncertainty_value	numeric	NA	Expected error standard deviation due to specified uncerainty source
uncertainty_units	int	units:units	The units used to report the uncertainty. This may be different to the reporting units (e.g. %)

End of table

4.9 Homogenisation data

Table 14: homogenisation_table

element_name	kind	external_table	description
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for
homogenisation_method	int	homogenisation_method:method	Method used to homogenise data
homogenisation_adjustment	numeric	NA	Value applied to homogenise data (homogenised_value = original (+-/*) homogenisation_adjustment)
homogenisation_operator	int	homogenisation_operator:operator	Operator (+-/*) used to apply adjustment
homogenisation_order	int	NA	Order in which the adjustments are applied. Set to NA or missing if not applicable

End of table

5 References

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6 Appendix

6.1 Table definitions

6.1.1 Data tables

Table 15: adjustment

element_name	kind	external_table	description
adjustment_id	varchar (pk)	NA	unique ID for adjustment record
observation_id	varchar	observations_table:observation_id	link to observation that this entry is for
value	numeric	NA	adjustment value
reference	varchar	NA	reference describing adjustment

End of table

Table 16: contact

element_name	kind	external_table	description
contact_id	varchar (pk)	NA	primary key
title	varchar	NA	Title of contact (e.g. Mr, Mrs, Dr. etc)
name	varchar	NA	Name of contact
organisation	varchar	organisation:organisation_id	Link to organisation that contact is associated with
telephone	varchar	NA	telephone number for contacr

Continued on next page

Table 16 contact (cont.)

element_name	kind	external_table	description
email	varchar	NA	email address for contact
url	varchar	NA	website for contact

End of table

Table 17: header_table

element_ name	kind	external _table	description
report_id	varchar (pk)		Unique ID for report (unique ID given by combination of report_id and observation_id)
region	int	region:region	Region (WMO region / Ocean basin)
sub_region	int	sub_region: sub_region	Country / regional sea
applicatio n_area	int[]	application_ area:applic ation_area	WMO application area(s)
observing_p rogramme	int[]	observing_p rogramme:o bserving_pr ogramme	Observing programme, e.g. VOS
report_type	int	report_typ e:type	e.g. SYNOP, TEMP, CLIMAT, etc
station_name	varchar		e.g. GRUAN station name, ship name, site name etc
station_type	int	station_ty pe:type	Type of station, e.g. land station, sea station etc
platform_type	int	platform_ty pe:type	Structure upon which sensor is mounted, e.g. ship, drifting buoy, tower etc
platform_s ub_type	int	platform_su b_type:type	Sub-type for platform, e.g. 3m discuss buoy
primary_st ation_id	varchar	station_con figuration:p rimary_id	Primary station identifier, e.g. WIGOS ID
station_reco rd_number	int	station_confi guration:rec ord_number	Together with primary_station_id this forms a link to the station configuration table.
primary_statio n_id_scheme	int	id_scheme:i d_scheme	Scheme used for station ID

Continued on next page

Table 17 header_table (cont.)

element_ name	kind	external _table	description
longitude	numeric		Longitude of station, -180.0 to 180.0 (or other as defined by station_crs)
latitude	numeric		Latitude of station, -90 to 90 (or other as defined by station_crs)
location_a ccuracy	numeric		Accuracy to which station location recorded (radius in km)
location_m ethod	int	location_met hod:method	Method by which location determined
location_ quality	int	location_qua lity:quality	Quality flag for station location
crs	int	crs:crs	Coordinate reference scheme for station location
station_speed	numeric		Station speed over ground if mobile (m/s)
station_c ourse	numeric		Station course over ground if mobile (degree true)
station_h eading	numeric		Station heading if mobile
height_of_sta tion_above_l ocal_ground	numeric		Height of station above local ground (m)
height_of_st ation_above _sea_level	numeric		Height of station above mean sea level (m), negative values for below sea level.
height_of_s tation_abov e_sea_level _accuracy	numeric		Accuracy to which height of station known (m)
sea_level_ datum	int	sea_level_da tum:datum	Datum used for sea level
report_mea ning_of_tim e_stamp	int	meaning_of _time_stamp :meaning	Report time - beginning, middle or end of reporting period

Continued on next page

Table 17 header_table (cont.)

element_ name	kind	external _table	description
report_tim estamp	timestamp with timezone		e.g. 1991-01-01 12:00:0.0+0
report_du ration	int		Report duration (s), e.g. 86400 = daily obs, 3600 hourly etc
report_time _accuracy	numeric		Precision to which time was recorded (s)
report_time _quality	int	time_qualit y:quality	Quality flag for report_timestamp
report_time_ reference	int	time_referenc e:reference	Reference Time (e.g. referenced to time server, atomic clock, radio clock etc)
profile_id	varchar	profile_con figuration: profile_id	Information on profile (atmospheric / oceano-graphic) configuration. Set to Record ID for profile data or missing (NULL) otherwise.
events_at_ station	int[]*	events_at_st ation:event	e.g. ship hove to, crop burning etc.
report_quality	int	quality_fla g:flag	Overall quality of report
duplicate_ status	int	duplicate_st atus:status	E.g. no duplicates, best duplicate, duplicate, not checked.
duplicates	varchar[]*	header_tabl e:report_id	Array of report_id's for duplicates
record_tim estamp	timestamp with timezone		Timestamp of revision for this record
history	varchar		Sequence of processing steps. Free text with timestamp 1 : history 1; timestamp 2 : history 2 etc.
processin g_level	int	report_proc essing_lev el:level	Level of processing applied to this report
processin g_codes	int[]*	report_proc essing_cod es:code	Processing applied to this report

Continued on next page

Table 17 header_table (cont.)

element_ name	kind	external _table	description
source_id	varchar	source_configuration:source_configuration	Original source of data, link to external table
source_record_id	varchar		Record ID in source data, e.g. ID of event from GRUAN meta database

End of table

Table 18: homogenisation_table

element_name	kind	external_table	description
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for
homogenisation_method	int	homogenisation_method:method	Method used to homogenise data
homogenisation_adjustment	numeric	NA	Value applied to homogenise data (homogenised_value = original (+-/*) homogenisation_adjustment)
homogenisation_operator	int	homogenisation_operator:operator	Operator (+-/*) used to apply adjustment
homogenisation_order	int	NA	Order in which the adjustments are applied. Set to NA or missing if not applicable

End of table

Table 19: profile_configuration

element_name	kind	external_table	description
profile_id	varchar (pk)	NA	Unique ID for this profile entry
profile_type	int	profile_type:type	Type of profile (e.g. atmospheric or oceanic)
standard_time	int	standard_time:time	e.g. Standard / scheduled time for launch or report, e.g. 00, 06, 12, 18 UTC
actual_time	timestamp		Actual report / launch time
profile_number	numeric		e.g. Balloon Number
comments	varchar		Any additional comments / footnotes
optional_data	int	data_present:flag	Flag indicating whether there is additional metadata available

End of table

Table 20: profile_configuration_optional

element_name	kind	external_table	description
profile_id	varchar	profile_configuration: profile_id	Link to profile for which this entry corresponds

Continued on next page

Table 20 profile_configuration_optional (cont.)

element_name	kind	external_table	description
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	profile_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

Table 21: qc_table

element_name	kind	external_table	description
report_id	varchar	header_table:report_id	Link to report this entry is for
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for. Set to NULL / NA if entry for report level QC
qc_method	int	qc_method:method	Link to table describing QC method used to set this flag
qc_flag	int	quality_flag:flag	E.g. 0 = good, 1 = inconsistent etc

End of table

Table 22: sensor_configuration

element_name	type	external_table	description
sensor_id	varchar (pk)		Unique ID for this instrument
observing_method	int	observing_method:method	Method (instrumental, estimated / visual, computed) by which observation made
sampling_strategy	int	sampling_strategy:strategy	Sampling strategy used by instrument
calibration_status	int	calibration_status:status	Whether the sensor is in / out of calibration
calibration_date	timestamp		Date of last calibration
comments	varchar		additional comments for sensor not reportable elsewhere
date_start	timestamp		start date for period of validity assoiciated with this entry
date_end	timestamp		end date for period of validity assoiciated with this entry
optional_data	int	data_present:flag	Flag indicating if additional data available

End of table

Table 23: sensor_configuration_optional

element_name	kind	external_table	description
sensor_id	varchar (fk)	sensor_configuration:sensor_id	Link to sensor for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	sensor_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

Table 24: source_configuration

element_name	type	external_table	description
source_id	varchar (pk)		Unique record ID for dataset
product_id	varchar		ID for product
product_name	varchar		Name of source, e.g. International Comprehensive Ocean Atmosphere Data Set, RS92 GRUAN Data Product
product_code	varchar		Abbreviations / product code, e.g. ICOADS, RS92-GDP
product_version	varchar		Version number for dataset, e.g. Release 3.0.0
product_level	int	product_level:level	Level of product
product_uri	varchar		URI for product, either to original source or to CDS
description	varchar		Description of dataset / comments
product_references	varchar[]		References describing the dataset
product_citation	varchar[]		Citation to use when using this product
product_status	int	product_status:status	Status of product, draft, pre-release, release
source_format	int	source_format:format	Original format for data
source_format_version	varchar		Version of original data format
source_file	varchar		Filename for data from source
source_file_checksum	varchar		Checksum of source datafile

Continued on next page

Table 24 source_configuration (cont.)

element_name	type	external_table	description
data_centre	int	organisation:organisation_id	Data centre from which data sourced
data_centre_url	varchar		URL for data centre
data_policy_licence	int	data_policy_licence:policy	Data policy / licence
contact	varchar[]	contact:contact_id	contact for data source with role specified by role element
contact_role	int[]	role:role	role of contact
history	varchar		History of source
comments	varchar		Additional comments / footnotes
timestamp	timestamp with timezone		Date record created / created
maintenance_and_update_frequency	int	update_frequency:frequency	Frequency with which modifications and deletions are made to the data after it is first produced
optional_data	int	data_present:flag	Flag indicating availability of additional data

End of table

Table 25: source_configuration_optional

element_name	kind	external_table	description
source_id	varchar (fk)	source_configuration:source_configuration_id	Link to source for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	source_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

Table 26: station_configuration

element_ name	type	external _table	description
primary_id	varchar (pk)		Primary (e.g. WMO) ID for station
primary_id _scheme	int	id_scheme :scheme	Scheme used for primary ID
record_n umber	int (pk)		Record number for this station entry
secondary_id	varchar[]*		Secondary (e.g. local) ID for station
secondary_i d_scheme	int[]*	id_scheme :scheme	Scheme used for secondary ID
station_name	varchar		Name of station (e.g. Tateno)
station_abb reviation	varchar		Abbreviation of station name (e.g. TAT)
alternative _name	varchar[]*		NA
station_crs	int	crs:crs	coordinate reference system used to report stations location
longitude	numeric		Report position for station if stationary or NULL if mobile. If more than one estimate record best here and additional values using optional fields.
latitude	numeric	NA	Report position for station if stationary or NULL if mobile
local_gravity	numeric	NA	Local gravity at station location (units ms-2)
start_date	timestamp		Date that the station first started reporting in this configuration
end_date	timestamp		Last data the station reported in this configuration
station_type	int	station_ty pe:type	Type of reporting station
platform_type	int	platform_ty pe:type	Generic type of observing platform
platform_s ub_type	int	platform_su b_type:type	Specific type of observing platform
operating_ institute	int	organisation: organisation	Institute operating the station (e.g. National Oceanography Centre)
operating_ territory	int	sub_region: sub_region	Sub-region where station is located or country of registry for mobile station
city	varchar	NA	Nearest city / town to station location
contact	varchar[]	contact:co ntact_id	Contact for station
role	int[]	role:role	Role of contact
observing_f requency	int	observing_ frequency:f requency	Typical frequency of observations for this station (reports per day). If irregular use reporting_time.
reporting _time	int[]	NA	Reporting hour(s) if non-standard / irregular hours used

Continued on next page

Table 26 station_configuration (cont.)

element_name	type	external_table	description
telecommunication_method	int[]	communication_method:method	Method used to report observations
station_automation	int	automation_status:automation	Whether station is automated, manual or mixed
measuring_system_model	varchar[]	measuring_system_model	Station / AWS model type
measuring_system_id	varchar[]		ID or serial number of measuring system
observed_variables	int[]	observed_variable:variable	array indicating which variables are observed by this station
comment	varchar		Any other comments / footnotes
optional_data	int	data_present:flag	Flag indicating availability of additional data

End of table

Table 27: station_configuration_optional

element_name	kind	external_table	description
station_primary_id	varchar	station_configuration:primary_id	Link to station for which this entry corresponds
record_number	int	station_configuration:record_number	Link to station for which this entry corresponds
kind	int	kind:kind	Enumerated data type (numeric, int, etc)
field	varchar	station_configuration_fields:field_id	Field that this entry corresponds to
value			Kind inherited from field
comments	varchar	NA	Any additional comments.

End of table

Table 28: uncertainty_table

element_name	kind	external_table	description
observation_id	varchar	observations_table:observation_id	Link to observation this entry is for
uncertainty_type	int	uncertainty_type:type	The type of uncertainty described by this entry
uncertainty_method	int	uncertainty_method:method	Method used to estimate this uncertainty
uncertainty_value	numeric	NA	Expected error standard deviation due to specified uncerainty source
uncertainty_units	int	units:units	The units used to report the uncertainty. This may be different to the reporting units (e.g. %)

End of table

6.1.2 Code tables

Table 29: application_area (WIGOS 2-01)

element_name	kind	external_table	description
application_area	int(pk)	NA	Unique ID for code entry
description	varchar	NA	Description of application area

End of table

Table 30: automation_status

element_name	kind	external_table	description
automation	int(pk)	NA	Unique ID for entry
description	varchar	NA	description of automation status (e.g. automatic observations, manual observation etc)

End of table

Table 31: calibration_status (WIGOS 5-08)

element_name	kind	external_table	description
status	int(pk)	NA	unique ID for entry

Continued on next page

Table 31 calibration_status (cont.)

element_name	kind	external_table	description
description	varchar	NA	Description of calibration status (e.g. No changes - in calibration etc)

End of table

Table 32: communication_method (Various sources (WMO47, WIGOS, BUFR))

elemet_name	kind	external_table	description
method	int(pk)	NA	Primary key / unique ID for entry
description	varchar	NA	Decoded value / text description of communication method

End of table

Table 33: conversion_flag

element_name	kind	external_table	description
flag	int(pk)	NA	primary key
description	varchar	NA	Description of whether the original value has been converted or decoded and is stored in the observed variable element

End of table

Table 34: conversion_method

element_name	kind	external_table	description
method	int(pk)	NA	unique ID for entry
description	varchar		text description of conversion method
implementation	varchar		details of implementation
reference	varchar		reference / doi of document giving more details on conversion method

End of table

Table 35: crs (BUFR 0 01 150)

element_name	kind	external_table	description
crs	int(pk)	NA	primary key

Continued on next page

Table 35 crs (cont.)

element_name	kind	external_table	description
description	varchar	NA	Decoded value / description of coordinate reference system

End of table

Table 36: data_present

element_name	kind	external_table	description
flag	int(pk)	NA	Primary key for table
description	varchar	NA	Decoded value indicating presence of additional data

End of table

Table 37: data_policy_licence (WIGOS 9-02)

element_name	kind	external_table	description
policy	int (pk)	NA	Primary key for table
name	varchar	NA	short name of data policy
description	varchar	NA	Description of data licence, usage rights and restrictions

End of table

Table 38: duplicate_status (Simplified version of duplicate status flags from IMMA (ICOADS))

element_name	kind	external_table	description
status	int(pk)	NA	Primary key for table
description	varchar	NA	Decoded value / description of duplicate status (e.g. unique, best duplicate etc)

End of table

Table 39: events_at_station (WIGOS 4-04)

element_name	kind	external_table	description
event	int(pk)	NA	primary key for table
description	varchar	NA	Decoded value / description of events at the time of report / observation

End of table

Table 40: id_scheme

element_name	kind	external_table	description
scheme	int(pk)	NA	Primary key for table
description	varchar	NA	Decoded value / description of ID scheme used to report the station ID

End of table

Table 41: instrument_exposure_quality (WIGOS 5-15)

element_name	kind	external_table	description
exposure	int(pk)	NA	primary key for table
description	varchar	NA	decoded value / description of instrument exposure quality

End of table

Table 42: kind

element_name	kind	external_table	description
kind	int(pk)	NA	primary key
description	varchar	NA	kind of data (int, numeric etc)

End of table

Table 43: location_method (based on WIGOS 11-01 and BUFR 0 02 148)

element_name	kind	external_table	description
method	int(pk)	NA	primary key for table
description	varchar	NA	decoded value / description of method by which the station location has been determined

End of table

Table 44: location_quality

element_name	kind	external_table	description
quality	int (pk)	NA	primary key for table
description	varchar	NA	decoded value / description of the quality of the location this indicator is for

End of table

Table 45: meaning_of_time_stamp (Based on simplified version of WIGOS 11-03)

element_name	kind	external_table	description
meaning	int(pk)	NA	primary key
name	varchar	NA	abbreviation / simple name for meaning of time stamp
description	varchar	NA	definition of meaning of time stamp

End of table

Table 46: method_of_estimating_uncertainty

element_name	kind	external_table	description
method	int(pk)	NA	primary key for table
description	varchar	NA	decoded value / description of how the uncertainty has been determined
reference	varchar	NA	Reference or DOI describing method

End of table

Table 47: observation_code_table

element_name	kind	external_table	description
code_table	int (pk)	NA	Primary key for table
code_table_scheme	varchar	NA	External scheme used for code table (e.g. BUFR)
code_table_id	varchar	NA	ID used to identify table within scheme (e.g. F XX YYY for BUFR tables)
code_table_name	varchar	NA	Name of code table
value	int	NA	coded value
description	varchar	NA	decoded value / meaning of decoded value

End of table

Table 48: observation_value_significance (based on BUFR 0 08 023)

element_name	kind	external_table	description
significance	int (pk)	NA	Primary key for table
description	varchar	NA	decoded value / description of indicated significance (e.g. min over specified period)

End of table

Table 49: observed_variable

element_name	kind	external_table	description
variable	int(pk)	NA	primary key for table
parameter_group	varchar	NA	parameter group (e.g. temperature, pressure) that this variable belongs to
domain	varchar	NA	Observation domain (atmospheric, oceanic etc) that this variable is typically reported for
sub_domain	varchar	NA	Sub-domain (e.g. upper air, surface etc)
name	varchar	NA	common name for variable
units	varchar	NA	ASCII abbreviation of units
description	varchar	NA	Description / definition of variable

End of table

Table 50: observing_frequency (WMO47 - 0602)

element_name	kind	external_table	description
frequency	int(pk)	NA	primary key for table
description	varchar	NA	decoded value / description of reporting frequency (e.g. once per day)

End of table

Table 51: observing_method

element_name	kind	external_table	description
method	int (pk)	NA	primary key for table
description	varchar	NA	decoded value indicating method of observing (e.g. measured, estimating or computed)

End of table

Table 52: observing_programme (WIGOS 2-02)

element_name	kind	external_table	description
observing_programme	int(pk)	NA	primary key for table
abbreviation	varchar	NA	Commonly used abbreviation for observing programme (e.g. VOS)
description	varchar	NA	Description or name of obsserving programme (e.g. Voluntary Observing Ships)

Continued on next page

Table 52 observing_programme (cont.)

element_name	kind	external_table	description
sponsor	varchar	NA	primary sponsor of observing programme (e.g. JCOMM)

End of table

Table 53: platform_sub_type (based on WMO47, ICOADS, BUFR 0 02 149)

element_name	kind	external_table	description
sub_type	int (pk)	NA	primary key for table
platform_type	int	platform_type:type	platform type to which this sub-type belongs
abbreviation	varchar	NA	abbreviation used to indicate this platform sub-type
description	varchar	NA	description of observing platform sub-type (e.g. Container ship)

End of table

Table 54: platform_type (IMMA (ICOADS) and BUFR 0 03 001 (0 - 31))

element_name	kind	external_table	description
type	int (pk)	NA	primary key for table
description	varchar	NA	Description of class of observing platform

End of table

Table 55: processing_code

element_name	kind	external_table	description
code	int (pk)	NA	primary key for table
abbreviation	varchar	NA	abbreviation for processing code
description	varchar	NA	description / meaning of processing code

End of table

Table 56: processing_level (WIGOS 7-06)

element_name	kind	external_table	description
level	int (pk)	NA	primary key for table

Continued on next page

Table 56 processing_level (cont.)

element_ name	kind	external _table	description
name	varchar	NA	Name commonly used to indicate level of processing
description	varchar	NA	Description of processing level

End of table

Table 57: product_level

description	varchar	NA	Meaningofproductlevel
level	int (pk)	NA	primary key for table
description	varchar	NA	Meaning of product level

End of table

Table 58: product_status

element_ name	kind	external _table	description
status	int(pk)	NA	primary key for table
abbreviation	varchar	NA	abbreviation used to indicate product status
description	varchar	NA	Meaning of product status

End of table

Table 59: profile_configuration_fields

element_ name	kind	external _table	description
field_id	varchar (pk)	NA	primary key
field_name	varchar	NA	Name of field described by this entry
type	int	kind:kind	The variable type used to store information on the indicated field
description	varchar	NA	Description of the indicated field

End of table

Table 60: profile_configuration_codes

element_name	kind	external_table	description
field_id	varchar (pk)	profile_configuration_fields:field_id	Link to field code is for
field_name	varchar	NA	Name of field
code_value	int (pk)	NA	Coded value. Together with field_id forms primary key
abbreviation	varchar	NA	Abbreviation used for coded value
description	varchar	NA	Decoded value / meaning of code
start_date	timestamp	NA	Start of validity period for indicated code
end_date	timestamp	NA	End of validity period for indicated code

End of table

Table 61: profile_type

element_name	kind	external_table	description
type	int (pk)	NA	primary key for table
description	varchar	NA	type of profile measurements (atmospheric, oceanographic etc)

End of table

Table 62: quality_flag (BUFR 0 33 020)

element_name	kind	external_table	description
flag	int (pk)	NA	primary key for table
description	varchar	NA	meaning of quality flag

End of table

Table 63: region (WIGOS 3-01)

element_name	kind	external_table	description
region	int(pk)	NA	primary key for table
WMO_region	int	NA	WMO region that this corresponds to
desription	varchar	NA	Definition of region

End of table

Table 64: report_processing_codes

element_name	kind	external_table	description
code	int (pk)	NA	primary key for table
abbreviation	varchar	NA	abbreviation used to indicate processing code
description	varchar	NA	definition of processing code

End of table

Table 65: report_processing_level

element_name	kind	external_table	description
level	int(pk)	NA	primary key for table
abbreviation	varchar	NA	abbreviation used to indicate processing level
description	varchar	NA	definition of processing level

End of table

Table 66: report_type

element_name	kind	external_table	description
type	int(pk)	NA	primary key for table
abbreviation	varchar	NA	abbreviation used to indicate report type (e.g. SHIP)
description	varchar	NA	description of report type, e.g. routine weather report made by ship

End of table

Table 67: role (ISOTC211/19115 CIRoleCode)

element_name	kind	external_table	description
role	int(pk)	NA	primary key for table
description	varchar	NA	definition of role

End of table

Table 68: sampling_strategy (WIGOS 6-03)

element_name	kind	external_table	description
strategy	int (pk)	NA	primary key for table
name	varchar	NA	name or abbreviation used to indicate sampling strategy

Continued on next page

Table 68 sampling_strategy (cont.)

element_ name	kind	external _table	description
description	varchar	NA	definition of sampling strategy

End of table

Table 69: sea_level_datum (BUFR 0 01 151)

element_ name	kind	external _table	description
datum	int(pk)	NA	primary key for table
description	varchar	NA	Long name of sea level dataum

End of table

Table 70: secondary_variable

element_ name	kind	external _table	description
variable	int(pk)	NA	part of primary key - indicator for secondary variable name
variable_ name	varchar	NA	name / description of secondary variable
code_value	int(pk)	NA	coded value for secondary variable
symbol	varchar	NA	abbreviation or symbol used to represent decoded value, e.g. chemical symbol for atmospheric constituent
description	varchar	NA	Name or description of decoded value

End of table

Table 71: sensor_configuration_fields

element_ name	kind	external _table	description
field_id	varchar (pk)	NA	primary key
field_name	varchar	NA	Name of field described by this entry
parameter	varchar	NA	Which parameter this entry if relevant for
type	int	kind:kind	The variable type used to store information on the indicated field
description	varchar	NA	Description of the indicated field

End of table

Table 72: sensor_configuration_codes

element_name	kind	external_table	description
field_id	varchar (pk)	source_configuration_fields:field_id	Link to field code is for
field_name	varchar	NA	Name of field
parameter	varchar	NA	Which parameter this entry is valid for
code_value	int (pk)	NA	Coded value. Together with field_id forms primary key
abbreviation	varchar	NA	Abbreviation used for coded value
description	varchar	NA	Decoded value / meaning of code

End of table

Table 73: source_configuration_fields

element_name	kind	external_table	description
field_id	varchar (pk)	NA	primary key
field_name	varchar	NA	Name of field described by this entry
type	int	kind:kind	The variable type used to store information on the indicated field
description	varchar	NA	Description of the indicated field

End of table

Table 74: source_configuration_codes

element_name	kind	external_table	description
field_id	varchar (pk)	source_configuration_fields:field_id	Link to field code is for
field_name	varchar	NA	Name of field
code_value	int (pk)	NA	Coded value. Together with field_id forms primary key
abbreviation	varchar	NA	Abbreviation used for coded value
description	varchar	NA	Decoded value / meaning of code

End of table

Table 75: source_format

element_name	kind	external_table	description
format	int(pk)	NA	primary key for table

Continued on next page

Table 75 source_format (cont.)

element_name	kind	external_table	description
description	varchar	NA	description of data format, e.g. NetCDF

End of table

Table 76: spatial_representativeness (WIGOS 1-05)

element_name	kind	external_table	description
representativenss	int (pk)	NA	primary key for table. coded value
description	varchar	NA	meaning / definition of decoded value

End of table

Table 77: standard_time

element_name	kind	external_table	description
time	int(pk)	NA	primary key for table, encoded value
description	varchar	NA	decoded observing time, e.g. 12 UTC

End of table

Table 78: station_configuration_codes

element_name	kind	external_table	description
field_id	varchar (pk)	station_configuration_fields:field_id	Link to field code is for
field_name	varchar	NA	Name of field
code_value	int (pk)	NA	Coded value. Together with field_id forms primary key
abbreviation	varchar	NA	Abbreviation used for coded value
description	varchar	NA	Decoded value / meaning of code

End of table

Table 79: station_configuration_fields

element_name	kind	external_table	description
field_id	varchar (pk)	NA	primary key
field_name	varchar	NA	Name of field described by this entry

Continued on next page

Table 79 station_configuration_fields (cont.)

element_name	kind	external_table	description
type	int	kind:kind	The variable type used to store information on the indicated field
description	varchar	NA	Description of the indicated field

End of table

Table 80: station_type (WIGOS 3-04)

element_name	kind	external_table	description
type	int (pk)	NA	primary key for table, coded value
description	varchar	NA	decoded station type

End of table

Table 81: sub_region

element_name	kind	external_table	description
sub_region	int(pk)	NA	primary key
type	varchar	NA	tpye of sub region, e.g. country, regional sea etc
code	varchar	NA	abbreviation or character code
name	varchar	NA	decoded value

End of table

Table 82: time_quality

element_name	kind	external_table	description
quality	int(pk)	NA	primary key, coded value
description	varchar	NA	decoded value expressing quality of time / date information

End of table

Table 83: time_reference (WIGOS: 7-10)

element_name	kind	external_table	description
reference	int(pk)	NA	primary key, coded value
description	varchar	NA	decoded base time to which times referenced

End of table

Table 84: traceability (WIGOS 8-05)

element_name	kind	external_table	description
traceability	int(pk)	NA	primary key, coded value
description	varchar	NA	definition of traceability of measurement

End of table

Table 85: units

element_name	kind	external_table	description
units	int(pk)	NA	primary key
name	varchar	NA	name of units
abbreviation	varchar	NA	conventional abbreviation in ASCII
base_units	varchar	NA	definition in base units

End of table

Table 86: update_frequency

element_name	kind	external_table	description
frequency	int (pk)	NA	primary key
description	varchar	NA	Description of update frequency

End of table

Table 87: z_coordinate_method

element_name	kind	external_table	description
method	int (pk)	NA	primary key, coded value
description	varchar	NA	description of method used to determine z location

End of table

Table 88: z_coordinate_type

element_name	kind	external_table	description
type	int(pk)	NA	primary key, coded value
description	varchar	NA	description of units / type of z coordinate

End of table

6.2 Code tables