8th MEETING OF THE S-100 WORKING GROUP

Proposal on revising S-100 Part 4c

Agenda Item 10.4c

S-100WG-8, Singapore, 13 - 17 November 2023

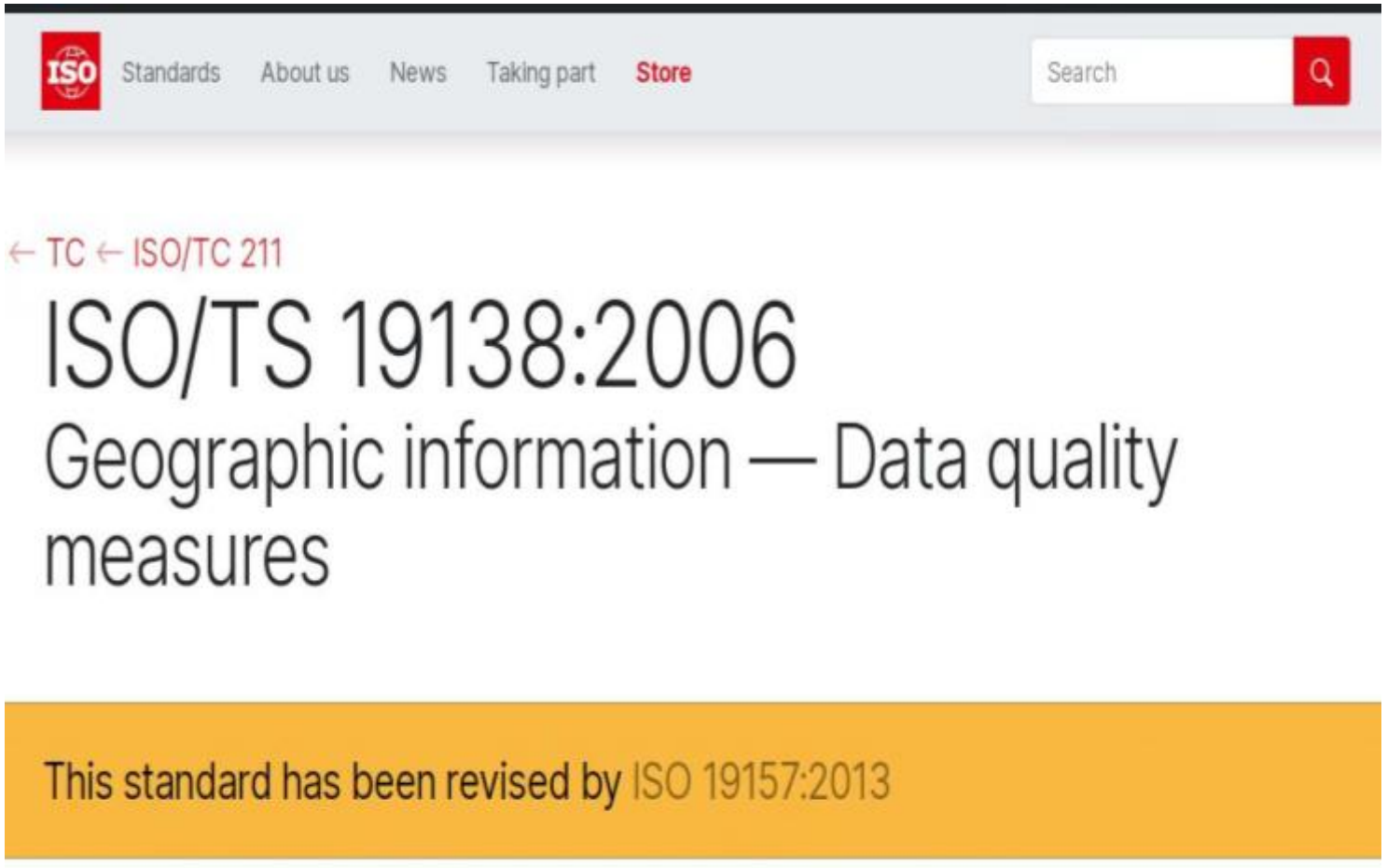
DISCUSSION/RECOMMENDATIONS

International Hydrographic Organization

It is recommended to:

a)Replace the wording “ISO 19138 ” with “ISO 19157”.

Some texts in S-100 Part 4c refers to ISO 19138 Geographic Information - Data Quality Measurement, which has been withdrawn and revised by ISO 19157:2013 Geographic Information - Data Quality Standard. S-100 Part 4c needs to be revised to maintain consistency with ISO 19157 and IHO S-97.



DISCUSSION/RECOMMENDATIONS

b) Add the Public Attribute **BiasOfPositions** to **DQ_AbsoluteExternalPositionalAccuracy.**

In ISO 19157,the data quality measures for positional uncertainty in general of the data quality element **absolute or external accuracy** contains the **Bias of Positions**.

Table D.30 — Bias of positions

Line	Component	Description
1	Name	bias of positions (1D, 2D and 3D)
2	Alias	-
3	Element name	absolute or external accuracy
4	Basic measure	not applicable
5	Definition	bias of the positions for a set of positions where the positional uncertainties are defined as the deviation between a measured position and what is considered as the corresponding true position
6	Description	For a number of points (N), the measured positions are given as x_{mi}, y_{mi} and z_{mi} coordinates depending on the dimension in which the position of the point is measured. A corresponding set of coordinates, x_{ti}, y_{ti} and z_{ti}, are considered to represent the true positions. The deviation and biases are calculated as Single deviations: $e_{xi} = x_{mi} - x_{ti}$ $e_{yi} = y_{mi} - y_{ti}$ $e_{zi} = z_{mi} - z_{ti}$ Bias: $a_x = \frac{\sum e_{xi}}{N_x}$ $a_y = \frac{\sum e_{yi}}{N_y}$ $a_z = \frac{\sum e_{zi}}{N_z}$ $a_p = \sqrt{a_x^2 + a_y^2}$ $a_{3D} = \sqrt{a_x^2 + a_y^2 + a_z^2}$ A criterion for the establishing of correspondence should also be stated (e.g. allowing for correspondence to the closest position, correspondence on vertices or along lines). The criterion/criteria for finding the corresponding points shall be reported with the data quality evaluation result.
7	Parameter	-
8	Value type	Measure
9	Value structure	-
10	Source reference	-
11	Example	-
12	Identifier	128

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The recommended amendments are as follows:

DQ_AbsoluteExternalPositionalAccuracy
Closeness of reported coordinative values to values accepted as or being true. [Per ISO 19115]
Public Attributes:
meanValuePositionalUncertainties[0..1] : Real
Mean value of the positional uncertainties for a set of positions where the positional uncertainties are defined as the distance between a measured position and what is considered as the corresponding true position.~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].
BiasOfPositions[0..1] : Real
Bias of positions for a set of positions where the positional uncertainties are defined as the deviation between a measured position and what is considered as the corresponding true position. [Adapted from ISO 19157].

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c) Add texts to indicate which Public Attributes of **DQ_AbsoluteExternalPositionalAccuracy** are only used for horizontal positional uncertainties and which Public Attributes are only used for vertical positional uncertainties in **DQ_AbsoluteExternalPositionalAccuracy**.

The recommended amendments are as follows:

linearErrorProbable[0..1] : Real
Half length of the interval defined by an upper and lower limit in which the true value lies with probability 50%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].
The Public Attribute is only used for vertical positional uncertainties.

standardLinearError[0..1] : Real
Half length of the interval defined by an upper and lower limit in which the true value lies with probability 68.3%. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].
The Public Attribute is only used for vertical positional uncertainties.

DISCUSSION/RECOMMENDATIONS

d) Rename the Public Attribute **physicalStructureConflicts** of **DQ_FormatConsistency** as **physicalStructureConflictsNumber**, and add a new Public Attribute **physicalStructureConflicts** to DQ_FormatConsistency so as to maintain consistency with ISO 19157.

D.3.3 Format consistency

The data quality measures for the data quality element format consistency are provided in Tables D.19 to D.21.

Table D.19 — Physical structure conflicts

Line	Component	Description
1	Name	physical structure conflicts
2	Alias	-
3	Element name	format consistency
4	Basic measure	error indicator
5	Definition	indication that items are stored in conflict with the physical structure of the data set
6	Description	-
7	Parameter	-
8	Value type	Boolean (true indicates physical structure conflict)
9	Value structure	-
10	Source reference	-
11	Example	True (data set is stored in wrong fileformat, shapefile instead of gml)
12	Identifier	119

Table D.20 — Physical structure conflicts number

Line	Component	Description
1	Name	number of physical structure conflicts
2	Alias	-
3	Element name	format consistency
4	Basic measure	error count
5	Definition	count of all items in the data set that are stored in conflict with the physical structure of the data set
6	Description	-
7	Parameter	-
8	Value type	Integer
9	Value structure	-
10	Source reference	-

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The recommended amendments are as follows:

DQ_FormatConsistancy
Degree to which data is stored in accordance with the physical structure of the data set. [Per ISO 19115]
Public Attributes:
physicalStructureConflicts [0..1] : Integer
This data quality measure is an indication that items are stored in conflict with the physical structure of the dataset. [Adapted from ISO 19157].
physicalStructureConflictsNumber [0..1] : Integer
This data quality measure is a count of all items in the dataset that are stored in conflict with the physical structure of the dataset. ~~[Adapted from ISO 19138]~~ [Adapted from ISO 19157].
This is an integer count.

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e) Change the Public Attribute **temporalConsistencyStatement** of **DQ_TemporalConsistency** to **chronologicalOrder** so as to maintain consistency with ISO 19157.

The recommended amendments are as follows:

DQ_TemporalConsistancy

Correctness of ordered events or sequences, if reported. [Per ISO 19115]

Public Attributes:

chronologicalOrder[0..1] : Boolean

This data quality measure indicates that an event is incorrectly ordered against the other events.

This is a Boolean where TRUE indicates that the event is incorrectly ordered. [Adapted from ISO 19157].

~~**temporalConsistencyStatement[0..1] : CharacterString**~~

~~This is a qualitative statement of the consistency of the time measurement.~~

~~There is no qualitative measure provided for this data quality sub-element.~~ ~~[Adapted from ISO 19138]~~

D.5.2 Temporal consistency

One data quality measure for the data quality element temporal consistency is provided in Table D.62.

Table D.62 — Chronological order

Line	Component	Description
1	Name	chronological order
2	Alias	-
3	Element name	temporal consistency
4	Basic measure	error indicator
5	Definition	indication that an event is incorrectly ordered against the other events
6	Description	-
7	Parameter	-
8	Value type	Boolean (true indicates that the event is incorrectly ordered)
9	Value structure	-
10	Source reference	-
11	Example	True (5 historical events are present in the data set but are not ordered correctly).
12	Identifier	159

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f) Add **DQ_ Aggregation** so as to maintain consistency with ISO 19157 and IHO S-97.

S-97

The components of Data Quality Measure can be divided into the following elements[7]:

1. Completeness
2. Logical Consistency
3. Positional Accuracy
4. Thematic Accuracy
5. Temporal Quality
6. Aggregation
7. Usability

ISO 19157

D.7 Aggregation Measures

In a data product specification, several requirements are set up for a product to conform to the specification. The data quality measures for this element are provided in Tables D.77 to D.81.

Table D.77 — Data product specification passed

Line	Component	Description
1	Name	data product specification passed
2	Alias	-
3	Element name	usability element
4	Basic measure	correctness indicator
5	Definition	indication that all requirements in the referred data product specification are fulfilled
6	Description	

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The recommended amendments are as follows:

DQ_Aggregation
Several requirements are set up for a product to conform to the specification. [Adapted from ISO 19157]
Public Attributes:
dataProductSpecificationPassed[O..1]: Boolean
This data quality measure indicates that all requirements in the referred data product specification are fulfilled. [Adapted from ISO 19157].
dataProductSpecificationFailCount[O..1]: Integer
This data quality measure indicates that the number of data product specification requirements that are not fulfilled by the current product/dataset. [Adapted from ISO 19157].
dataProductSpeclficationPassCount[O..1]: Integer
This data quality measure indicates that the number of data product specification requirements that are fulfilled by the current product/dataset. [Adapted from ISO 19157].
dataProductSpecificationFailRate[O..1]: Real
This data quality measure indicates that the number of data product specification requirements that are not fulfilled by the current product/dataset in relation to the total number of data product specification requirements. [Adapted from ISO 19157].
dataProductSpecificationPassRate[O..1]: Real
This data quality measure indicates that the number of data product specification requirements that are fulfilled by the current product/dataset in relation to the total number of data product specification requirements. [Adapted from ISO 19157].

ACTION REQUIRED OF DQWG

The S-100WG is invited to:

a. **Note** the information provided.