

Title: Part 10c – New dataCodingFormat
S-100 Maintenance - Change Proposal Form

Organisation	U.S. NOAA/Office of Coast Survey (GS, KH)	Date	19-Feb-2020
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Change Proposal Type (*Select only one option*)

1. Clarification	2. Correction	3. Extension
		X

Location (*Identify all change proposal locations*)

No.	S-100 Version No.	Part No.	Section No.	Proposal Summary
0	4.0.0	10c	--	Summary: Add new dataCodingFormat to support fixed station time series data use cases. Please see Change Proposal Justification below.
1			9.1	Add name of new dataCodingFormat to footnote of clause 10c-9.1 to read: "Except for moving station data and fixed station (stationwise) data." See attached redline for this and all following changes.
2			9.2	Add paragraph to end of clause 10c-9.2.2 describing values group attributes.
3			9.3	Add row in Table 10c-4 for dataCodingFormat=8, "Fixed Stations (Stationwise)"
4			9.3	Remove "Times" heading in Table 10c-4. Apply "Data Values" heading across columns 4-7 in table.
5			9.6	Add "8: Time series at fixed stations (stationwise)" to Table 10c-10 row 2
6			9.6	Add 2 rows to Table 10c-10 for new dataCodingFormat = 8
7			9.7	Add text to Table 10c-12 Remarks for <i>numberOfTimes</i> and <i>timeRecordInterval</i> to indicate these variables migrate to the values group attributes (Table 10c-19)
8			9.7	Add 2 rows to Table 10c-12 to indicate new dataCodingFormat = 8
9			9.10	Add text for new dataCodingFormat = 8 "fixed station (stationwise) data" to clause 10c-9.10 paragraphs 1 and 2, and "fixed station (stationwise) time series data" to clause 10c-9.10.1 paragraphs 2 and 3
10			9.10	Add row to Table 10c-15 for new dataCodingFormat = 8
11			9.11	Add text for new dataCodingFormat = 8 to clause 10c-9.11 paragraph 3. Also, add "numberOfTimes" to the same paragraph
12			9.11	Add row to Table 10c-17 for new dataCodingFormat=8
13			9.11	Revise Table 10c-18 row 2 to reference new Table 10c-19 for values group attributes

14			9.11	Add text for new dataCodingFormat = 8 to paragraphs 1 and 3 below Table 10c-18
15			9.11	Add “uniform” before “time interval” in paragraph 4 below Table 10c-18, to differentiate from non-uniform time intervals.
16			9.11	Add Table 10c-19 and preceding text describing the table for attributes of values groups for dataCodingFormat = 8. This table also introduces support for non-uniform time interval data by using <i>timeIntervallIndex</i> .
17			10	Renumber subsequent tables to new Table 10c-19 accordingly.
18			9.6	Because of the addition of new Table 10c-19, renumber references to old Tables 10c-19, 10c-20, 10c-21 in Table 10c-10.

Change Proposal

The existing format for fixed station time series data (dataCodingFormat = 1) does not support two use cases for fixed station time series data (pick report and graphic plot time series). A new dataCodingFormat =8 [fixed station (stationwise) time series data] is proposed. See justification below for more details.

Details for change items are under provided under the respective sub-heads below.

Text in italic font is explanatory and should not be added to S-100.

Item 1

See attached redline.

Item 2

Text describing the values group attributes should be added to the end of clause 10c-9.2.2, as follows (also see attached redline):

“Additional information describing the data is contained in the values group, as attributes that apply to the values dataset in each values group. The data may be a time point, or station information such as station name and the time series characteristics such as time interval, number of values, and start and end times.”

Items 3, 4

Add row to Table 10c-4, and remove “Times” heading, as it does not apply to numGRP for dataCodingFormat=8. Apply “Data Values” heading across numGRP. New Table 10c-4 here:

Table 10c-1 – Array dimensions for different types of coverages

Coding Format	Data Type	Positioning	Data Values			
		numPOS	numCOLS	numROWS	numZ (3-d only)	numGRP
1	Fixed Stations	numberOfStations	1	numberOfStations	1	numberOfTimes
2	Regular Grid	(not used)	numPointsLongitudinal	numPointsLatitudinal	numPointsVertical	numberOfTimes
3	Ungeorectified Grid	numberOfNodes	1	numberOfNodes	1	numberOfTimes
4	Moving Platform	numberOfTimes	1	numberOfTimes	1	1
5	Irregular Grid	numberOfNodes	1	numberOfNodes	1	numberOfTimes
6	Variable cell size	numberOfNodes	1	numberOfNodes	1	numberOfTimes

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7	TIN	numberOfNodes	1	numberOfNodes	1	numberOfTimes
8	Fixed Stations (Stationwise)	numberOfStations	1	numberOfTimes	1	numberOfStations

Item 5

See attached redline.

Item 6

Add 2 rows for new dataCodingFormat = 8 to Table 10c-10. Last 4 rows of Table 10c-10 are as follows:

Table 10c-2 – Attributes of feature container groups

dataCodingFormat = 8					
	(none)				
(any dataCodingFormat value)					
	(additional attributes)				(As specified in Product Specification)

Item 7

Add the following text to Table 10c-12 Remarks for numberOfTimes and timeRecordInterval, to indicate that for dataCodingFormat = 8, the variables migrate to the values group attributes as indicated in Table 10c-19:

“Time series data only. For dataCodingFormat = 8, this variable migrates to the values group attributes (Table 10c-19).”

Item 8

Add 2 rows for new dataCodingFormat = 8 to Table 10c-12. Last 4 rows of Table 10c-12 are as follows:

Table 10c-3 – Attributes of feature instance groups

dataCodingFormat = 8					
	Number of fixed stations	numberOfStations	1	Integer	The number of fixed stations
(any dataCodingFormat value)					
	(additional attributes)				(as specified in product specification)

Item 9

See attached redline.

Item 10

Add row to Table 10c-15 for new dataCodingFormat = 8. Table 10c-15 should be:

Table 10c-4 – Positioning dataset types and dimensions for different coverage types

Type of coverage	dataCoding Format	Structure of coordinates dataset
Fixed Stations	1	1-dimensional Array, length = numberOfStations
Regular Grid	2	not used
Ungeorectified Grid	3	1-dimensional Array, length = numberOfNodes
Moving Platform	4	1-dimensional Array, length = numberOfTimes
Irregular Grid	5	not used

Type of coverage	dataCoding Format	Structure of coordinates dataset
Variable cell size	6	not used
TIN	7	1-dimensional Array, length = numberOfNodes
Fixed Stations (Stationwise)	8	1-dimensional Array, length = numberOfStations

Item 11

See attached redline.

Item 12

Add row to Table 10c-17 for new dataCodingFormat = 8. Table 10c-17 last row should be:

Table 10c-5 – Values dataset type and size for different data encoding formats

Fixed Stations (Stationwise)	8	values: 1-dimensional Array, length = numberOfTimes	As for fixed stations
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Items 13, 14, 15

See attached redline.

Item 16

Add Table 10c-19 and preceding text describing the attributes of values group for the new dataCodingFormat = 8. Text and table as follows:

Attributes (Table 10c-19) may consist of a single value (timePoint) as for the gridded data, or an extended list of variables that describe several characteristics of fixed station (stationwise) time series data (dataCodingFormat=8).

Table 10c-19 – Attributes of values groups

No	Name	Camel Case	Mult.	Data Type	Remarks and/or Units
dataCodingFormat = 1, 2, 3, 5, 6 or 7					
1	Time stamp	timePoint	1	Character	DateTime
dataCodingFormat = 8					
1	Name of the station	stationName	0..1	Character	
2	Station identification number	stationNumber	0..1	Integer	
3	Number of time records	numberOfTimes	0..1	Integer	Only mandatory if <i>timeIntervalIndex</i> = 1. Use at Values Group level only for dataCodingFormat = 8.
4	Index for time interval	timeIntervalIndex	1	(Integer)	1 (TRUE) denotes uniform time interval; interval provided by <i>timeRecordInterval</i> . 0 (FALSE) denotes non-uniform time interval. This is a boolean implemented as described in Table 10c-1.
5	Time interval	timeRecordInterval	0..1	Integer	Only if <i>timeIntervalIndex</i> = 1 The uniform interval between time records. Units: Seconds. Use at Values Group level only for dataCodingFormat = 8.
6	Valid time of earliest value	startDateTime	0..1	Character	Only mandatory if <i>timeIntervalIndex</i> = 1. DateTime format
7	Valid time of latest value	endDateTime	0..1	Character	Only mandatory if <i>timeIntervalIndex</i> = 1. DateTime format
	(additional attributes)				(As specified in Product Specification)

Items 17, 18

See attached redline.

Change Proposal Justification

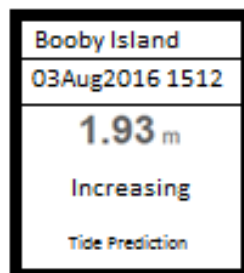
A new dataCodingFormat for HDF5 in S-100 Part 10c is needed to support the use cases for pick report (Figure 1 below) and graphic time series plot (Figure 2) of fixed station time series information. The existing dataCodingFormat = 1 for fixed station time series is structured to most efficiently support the use case of animation of point data (display all point values at one time and then animate through time). It is structured so that each values group represents a specific time.

The new dataCodingFormat = 8 is structured so that each values group represents a station, and most efficiently supports the graphic time series plot of multiple times at one station in one graph (Figure 2).

The new dataCodingFormat = 8, fixed station (stationwise) time series data, is structured so that there can be multiple values groups within a feature instance. This results in an expansion of the values group attributes in S-100 Ed 4.0.0 Table 10c-18 with the addition of Table 10c-19, since station and time series information may differ between each values group.

Each station is not proposed to be encoded as a separate feature instance, one instance for each station time series, which would add attributes of feature instances (Table 10c-12) instead of values datasets (new Table 10c-19). Reasons include file size overhead from creating an additional Feature Instance group for each station.

S-100 Ed. 4.0.0 Part 10c-6 mentions as a goal that the S-100 HDF5 profile must apply to “either static data or time series data (for any of the other kinds), with fixed or variable intervals”. So, this change proposal also adds support for non-uniform time interval time series (included in Table 10c-19 as *timeIntervallIndex*).



Booby Island
03Aug2016 1512
1.93 m
Increasing
Tide Prediction

Figure 1. A sample pick report for a water level station (see S-104, Ed. 0.0.7, Sec.9.2.2). The information displayed includes the station name, the valid date and time (local or UTC), the height, the trend, and the type of water level data.

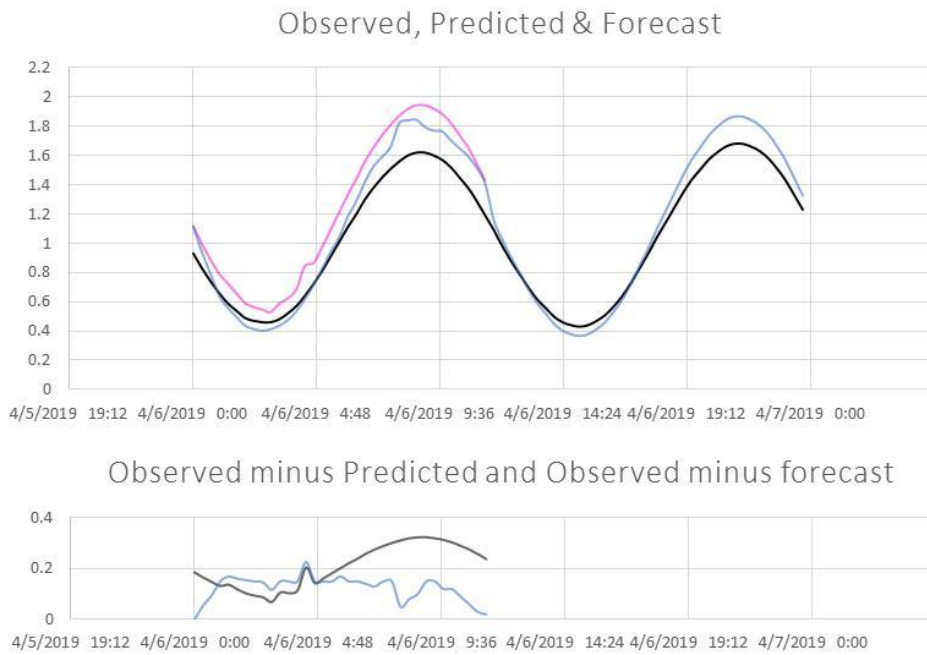


Figure 2. Sample graphic showing five separate time series of water level data. The type of data (observation, prediction, etc.) is represented by the line colour. (see S-104 presentation at TWCWG4, slide 8)

What parts of the S-100 Infrastructure will this proposal affect?

- S-100 Feature Concept Dictionary Interface or Database
- S-100 Portrayal Register
- S-100 Feature Catalogue Builder
- S-100 Portrayal Catalogue Builder
- S-100 UML Models

Please send completed forms and supporting documentation to the secretary S-100WG.