Coast Survey Development Laboratory
Office of Coast Survey
National Ocean Service
National Oceanic and Atmospheric Administration

New *dataCodingFormat* for time series in S-100 Part 10c

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S-100WG5 4.18: S-100 Change Proposal

Summary

- 4.18A: S-100 Proposal - Extension to Part 10c

  New *dataCodingFormat* to support time series

- 4.18B: S-100 Proposal - Clarifications to Part 10c

  General editorial corrections

- 4.18C: Part 10c redline for both

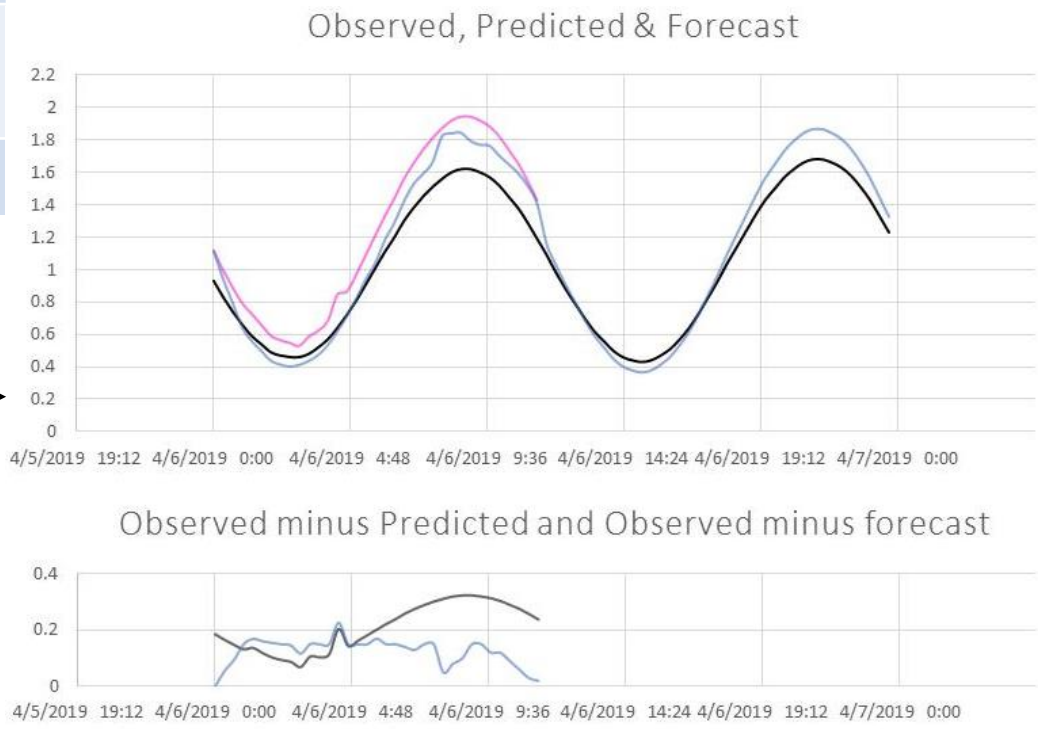
Remaining slides cover 4.18A…

New *dataCodingFormat*

- A new *dataCodingFormat* for fixed station time series is proposed, organized by station rather than time:

***dataCodingFormat*=1** Fixed station time series	**New *dataCodingFormat*=8** Fixed station (stationwise) time series
Group_001=Data at Time No. 1 values across all stations	**Group_001**=Data at Station No. 1 values across all times
Group_002=Data at Time No. 2 values across all stations	**Group_002**=Data at Station No. 2 values across all times
etc.	etc.

- Motivated by S-104 use case of graphic plot of multiple time series →
  - all times at one station



dataCodingFormat comparison

- ***dataCodingFormat* = 1:**
  - supports animation of real-time data (display all station values at one time, then animate through time)
  - but…can't easily handle different start/end times, different time intervals
  - can't easily handle non-uniform time intervals (and S-100 doesn't say how to handle these)
  - is inefficient in storing one values group per time, especially for longer time series
    - e.g. 1 yr of 6-min predicted water level data = 87,600 values groups
- ***dataCodingFormat* = 8:**
  - handles well different start/end times, intervals, non-uniform intervals
  - better supports longer time series
  - better supports graphical products (e.g. graphic plot)

S-100 Change Proposal

- Change proposal form mainly includes adding wording for new *dataCodingFormat*=8
- A few changes involve introducing a new table for values group attributes, including support for non-uniform time intervals:

Table 10c-19 – Attributes of values groups

No	Name	Camel Case	
***dataCodingFormat* = 1, 2, 3, 5, 6 or 7**			
1	Time stamp	*timePoint*	
***dataCodingFormat* = 8**			
1	Name of the station	*stationName*	
2	Station identification number	*stationNumber*	
3	Number of time records	*numberOfTimes*	
4	Index for time interval	*timeIntervalIndex*	**for non-uniform intervals**
5	Time interval	*timeRecordInterval*	
6	Valid time of earliest value	*startDateTime*	
7	Valid time of latest value	*endDateTime*	
	(additional attributes)	(as specified in Product Specification)	

S-100 Change Proposal

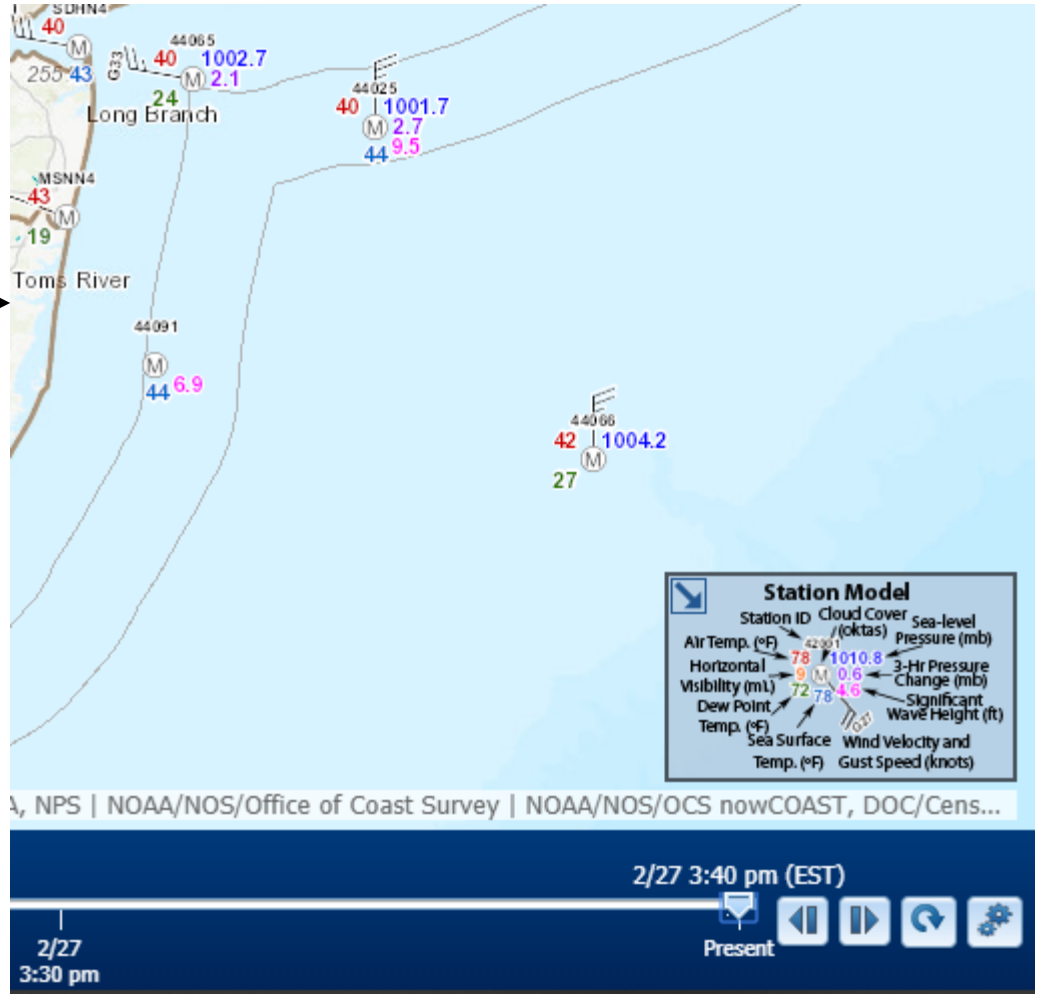
- The S-100 WG is invited to:
  - Discuss the changes
  - If agreed upon, endorse the extension (4.18A) and clarifications (4.18B) to Part 10c
  - Take other actions as appropriate

Supplementary Slides

dataCodingFormat=1 use case

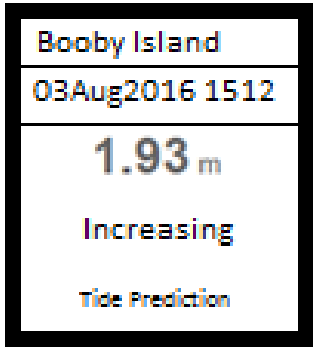
- *dataCodingFormat* = 1 structured to support animation of real-time data (display all point values at one time and then animate through time)
  - all stations at one or a few times:

***dataCodingFormat*=1** Fixed station time series
Group_001=Data at Time No. 1 values across all stations
Group_002=Data at Time No. 2 values across all stations
etc.



S-104 Use Cases for Time Series

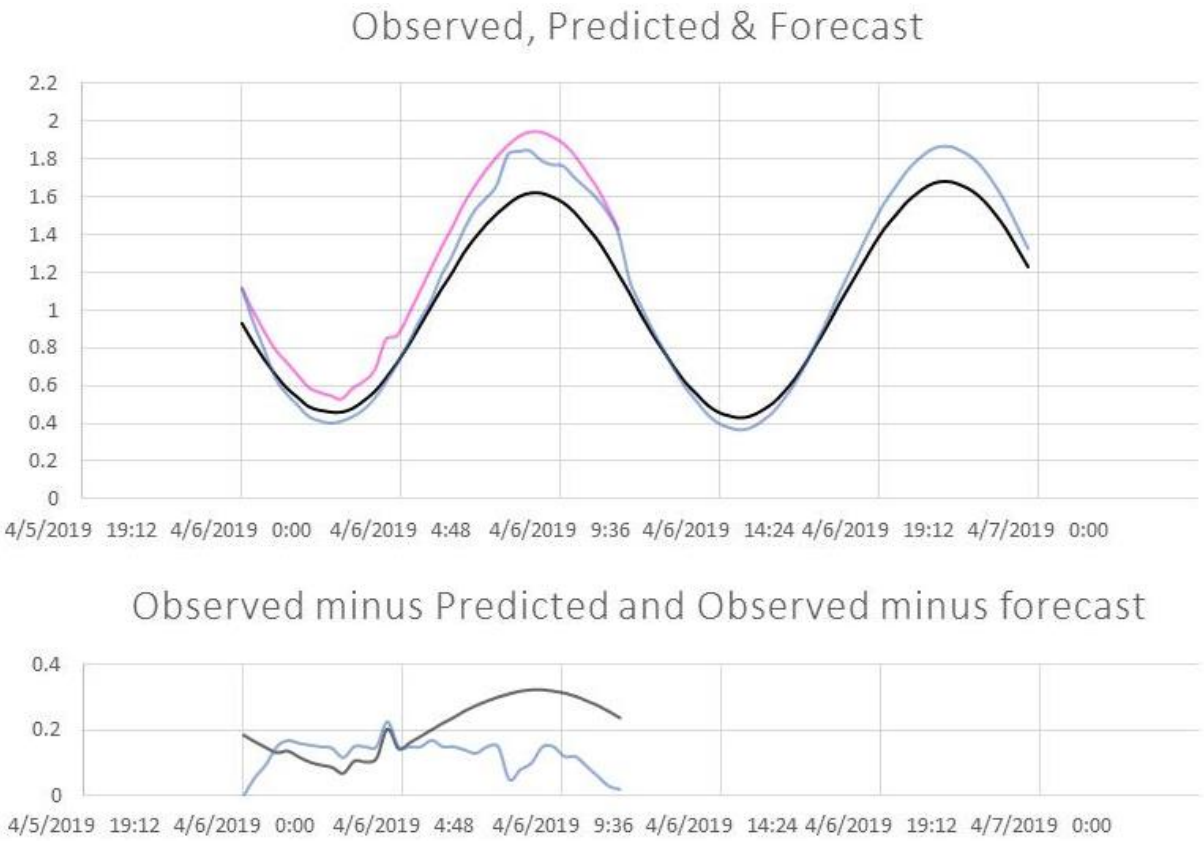
- After selection of station:
  - Use Case 1: Pick report
  - Use Case 2: Graphic plot of multiple time series



Pick report

- Time series may have different start/end times, # records
- Series have different types: prediction, etc.

- Series may have variable time intervals
  - 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**."
  - S-100 does not say how to support this type of data



Graphic plot

Sample S-104 File: *dataCodingFormat*=8

S-104 HDF5 File
Feature Container: WaterLevel
Feature Instance: WaterLevel.01 (predictions only)
Values: Group_001=Data for Station No. 1
Values: Group_002=Data for Station No. 2
Feature Instance: WaterLevel.02 (observations only)
Values: Group_001=Data for Station No. 2
Feature Instance: WaterLevel.03 (forecasts only)
Values: Group_001=Data for Station No. 2