



National Oceanic and
Atmospheric Administration
U.S. Department of Commerce

S-104 and S-111 updates

S-104 Ed. 1.1 and S-111 Ed. 1.2

NOAA S-104/S-111 team

7th Tides, Water Level and Currents Working Group (TWCWG7)

VTC

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Overview



- Revisions for S-104 Ed. 1.0.0 → Edition 1.1.0 transition



- Revisions for S-111 Ed. 1.1.1 → Edition 1.2.0 transition



- Requirements for Editions 2.0.0





Revisions common to S-104 and S-111



- Document structure is now the same for both Product Specifications except for the Annexes describing use cases, data sources, and portrayal.
- Full alignment with S-100 Edition 5.0.0
 - Exchange catalogues (clause 12) fully aligned with S-100 Part 17.
 - Product-specific restrictions on discovery metadata in exchange catalogues are specified (clause 12). The restrictions are the same for S-104 and S-111, allowing for product identification.
 - Exchange set structure rules (clause 11) aligned with S-100 Part 17 exchange set structure.
 - Provision for optional “language packs” and “ISO metadata files” in exchange sets.
- Data type size for HDF5 attributes has been specified.



3	Horizontal Coord. Ref. Sys.	horizontalCRS	1	Integer 32-bit	EPSG code or -1 if user defined. EXAMPLE 1: 4326 (for WGS84) See https://spatialreference.org/ref/epsg/?page=1 EXAMPLE 2: EPSG:9057 is WGS 84 (G1762) realization with valid epoch 2005.0
4	Bounding box	westBoundLongitude	1	Float 32-bit	Area encompassing all feature instances Units are Decimal Degrees in the EPSG 4326 CS. In accordance with ISO 19115-1 these coordinates need be accurate only to two decimal places.
5		eastBoundLongitude	1	Float 32-bit	
6		southBoundLatitude	1	Float 32-bit	
7		northBoundLatitude	1	Float 32-bit	



Common Revisions - 2



- Harmonized enumeration for types of data (S-111 uses only codes 1-5)



Item	Name	Description	Code	Remarks
Enumeration	S104_DataDynamicity	Classification of data according to the relationship between the time of its collection, generation, or calculation of generation parameters, in relation to the time of publication of the dataset.	--	
Value	observation	Values from in-situ sensor(s); may be quality controlled and stored after collection	1	Includes both historical and real-time observations. See also Notes 1 and 2.
Value	astronomicalPrediction	Values computed using harmonic analysis or other proven method of tidal analysis	2	IHO Res. 3/1919, as amended
Value	analysisOrHybrid	Values calculated by statistical or other indirect methods, or a combination of methods	3	A hybrid method combines two or more approaches.
Value	hydrodynamicHindcast	Values calculated from a two- or three-dimensional dynamic simulation of past conditions using only observed data for boundary forcing, via statistical method or combination	4	A hindcast is a model simulation that attempts to recreate present conditions by using the most recent observational data.
Value	hydrodynamicForecast	Values calculated from a two- or three-dimensional dynamic simulation of future conditions using predicted data for boundary forcing, via statistical method or combination	5	A forecast is a simulation made for many hours into the future using predicted winds, water levels, etc.
Value	observedMinusPredicted	Values computed as observed minus predicted values	6	Observation minus astronomical prediction
Value	observedMinusAnalysis	Values computed as observed minus analysis values	7	Observation minus analysis or hybrid
Value	observedMinusHindcast	Values computed as observed minus hindcast values	8	Observation minus hydrodynamic hindcast
Value	observedMinusForecast	Values computed as observed minus forecast values	9	Observation minus hydrodynamic forecast
Value	forecastMinusPredicted	Values computed as forecast minus predicted values	10	Hydrodynamic forecast minus astronomical prediction



Common Revisions - 3



- Additional guidance for production (clauses 7 & 8):
 - Necessity for use of underlying chart datum.
 - Values of new S-100 Part 17 discovery metadata attributes:
 - Navigation purpose
 - Compliancy category
 - Encoding of exchange catalogue metadata related to maintenance
 - New dataset, new edition of dataset, and cancelled datasets.
 - When the next dataset will be issued (daily, 6-hourly, etc.).
- Requirements for compliance with S-98 (Interoperability) – clause(s) 7.7
 - Integration of S-101, S-102, S-104, S-111, S-129 to provide harmonized, up-to-date, better quality information to mariners on ECDIS.
 - Requirements pertaining to hamonized display of multiple products at the same time.



Common Revisions - 4



- Guidance for “cell scheming” - clause 11.
- Rules for dataset and support file names (allowed characters, length) – clause 11.
- Supporting artifacts:
 - Dictionary of enumerations – XML file that maps numeric codes to enumeration values for enumerations used in the HDF5 dataset.
 - Dictionary format is the same as the ISO 19115 dictionaries used by ISO metadata and the S-100 exchange catalogue.
 - Provides a machine-readable mapping of numeric codes to enumeration labels.
 - Schematron rules file that applies most of the product-specific restrictions to the respective exchange catalogue file.
 - Separate dictionary and rules files for S-104 and S-111, but with a lot in common.
 - Use of dictionary and Schematron files is not mandatory.
 - URL: <https://schemas.s100dev.net> – see the “S-104 files” or “S-111 files” sections on the landing page.



Common Revisions - 5



- Annex F describing product-specific validation checks (marked “informative” in this edition).
 - Detailed checks are specified in a separate spreadsheet.
 - Generic S-100 checks are being prepared by the S-100 WG.
- Screen captures (Annex E) temporarily removed, pending completion of sample datasets.
- Updated references.
- Minor editorial corrections throughout.



Additional specific revisions – S-104

- Fill value for waterLevelHeight now has 2 zeroes after decimal point.
- Clause on determination of water level trend – clause 7.1.1



Additional specific revisions – S-111



- Overview (clause 1) harmonized with S-104 regarding both structure and content.
- Dataset identification (clause 3) harmonized with S-104 structure and content.
- New attribute *surfaceCurrentTime* for use with non-uniform intervals in DCF 8.
 - Definition: The time of the surface current data, expressed in ISO 8601 Date-time format.
- Aligned with S-104
 - Spatial quality (clause 4.3.5)
 - Coordinate reference systems (clause 5)
 - New material on data quality (clause 6) – aligned with S-104 and according to S-97 Part C.
 - Types of (surface current) data – astronomical prediction, forecast, etc.
 - Metadata, both external and embedded.
 - Values group attributes.
 - UML diagrams content and style.



S-111 specific – 2 – values group



N	Name	Camel Case	Mult.	Data Type	Remarks and/or Units
dataCodingFormat = 1 (fixed stations), 2 (regular grid), 3 (ungeorectified grid), 4 (moving platform)					
1	Time stamp	timePoint	1	String	DateTime. All times are in UTC. See Clause 10.2.2.5.
dataCodingFormat = 8 (fixed stations, stationwise)					
2	Index for time interval	timeIntervalIndex	1	(Integer) 8-bit unsigned	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 S-100 Table 10c-1.
3	Time interval	timeRecordInterval	0..1	Integer 16-bit unsigned	Only if <i>timeIntervalIndex</i> = 1. The uniform interval between time records. Units: Seconds. Value here overrides corresponding value at Instance level.
4	Name of the station	stationName	0..1	String	Descriptive text, or 'Not Available'
5	Station identification number	stationIdentification	0..1	String	Letter-number combination, or 'Not Available'
6	Number of time records	numberOfTimes	1	Integer 32-bit unsigned	Use at Values Group level only for dataCodingFormat = 8. (Only mandatory if <i>timeIntervalIndex</i> =1.)
7	Valid time of earliest value	startDateTime	1	String	Mandatory for S-111. DateTime format
8	Valid time of latest value	endDateTime	1	String	Mandatory for S-111. DateTime format
9	Location Maritime Resource Name	locationMRN	0..1	String	The Maritime Resource Name assigned to the station, if any. Must be formatted as an MRN (cf. IALA G1143).
10	URL to station or data portal.	stationURL	0..1	String	URL to station or data portal. Must be an <i>http</i> or <i>https</i> URL (S-100 Clause 1-4.6; RFC 3986).



Summary



- Drafts were circulated by email to the respective Project Teams.
 - Feedback received from NOAA and BSH
- Next steps for release as S-104 Edition 1.1.0 and S-111 Edition 1.2.0?
 - Sample datasets and screen captures in Annex E.
 - NOAA suggests releasing these editions without sample datasets and Annex E screen captures.
 - Approval / review-by-correspondence by the whole of TWCWG?
- Steps for Edition 2.0 – Readiness Level 2:
 - S-97 1.1.0: “Depending on the end-user requirements of the Product Specification, Level 2 can be implemented in an operational context.”



Progressing to Readiness Level 2

Discussion to follow



Readiness Levels



***S-100 Readiness Levels,
for reference if needed***

Required Product Specification component	Level 1 v1.0.0	Level 2 v1-2.0.0	Level 3 >v2.0.0	Level 4 >v2.0.0	Level 5 >v2.0.0
Main Document (Defines the relevant parts of S-100 that are required for the Product Specification)	X	X	X	X	X
A Default Encoding	X	X	X	X	X
S-100 Compliant Feature Catalogue	X (draft)	X (updated)	X (final, from IHO GI Registry)	X	X
Data Classification and Encoding Guide	X (draft)	X	X (final)	X	X
S-100 Compliant Portrayal Catalogue NOTE: Not every Specification will need a Portrayal Catalogue – this should be determined as part of the development process and stakeholder feedback.		X	X	X	X
Data Quality Checks		X	X	X	X
Test Data Sets		X	X	X	X
Data Validation (and test datasets)		X	X	X	X
Exchange Catalogue		X	X	X	X
Encryption / Digital Signatures			X	X	X
Interoperability			x* (draft)	X* (tested)	X*
Alerts and Indications				X*	X*
Operational data					X

(X* = ECDIS only)