IHO International Hydrographic Organization

18th Meeting of the Hydrographic Services and Standards Committee

Report of the Tides Water Levels and Surface Currents Working Group (TWCWG)

Agenda Item HSSC18-05.4A

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

International Hydrographic Organization

TWCWG10 held as a VTC
04-06 November 2025

54 Registered Delegates
43 from Member States
11 combined from Expert Contributors
(JHA, IOC (GLOSS) & Industry)

- Comprehensive agenda – good participation & engagement.
- Several new participants attended online.
- Note on TWCWG11 2026; two offers for a host were identified during the 2025 meeting, but unfortunately by the end of TWCWG10 these did not come to fruition (it remains difficult to find volunteers).

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

International Hydrographic Organization

TWCWG10 – Main Highlights:

1. **Validation Checks Product Specifications, S-158:104 & S-158:111,** completed; discussed at TWCWG10; circulated thereafter by **HSSC Circular Letter 02/2025.**

2. **S-104 & S-111 Product Specifications;** Ongoing development items discussed at TWCWG10 and subsequent correspondences of the TWCWG Project Teams**.**

3. **Discussions on use-cases for S-104 & S-111**; valuable feedback identified for ongoing development of the Product Specifications (to be considered for either a Revision (Ed 2.1.0) or a Clarification (Ed 2.0.1)). IHO TWCWG GitHub site.

4. **Survey on tides, water level and currents**; data production method and data format (S-104 & S-111 products); ROK (KHOA) presented on the latest results from Member States.

5. **TWCWG collaboration with HSWG** to improve water level and surface current observation uncertainty standards in S-44. Progress Report provided by the Task Group; first draft completed and submitted to HSWG; VTC intersessional discussions.

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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Discussed at TWCWG10 – S-104 & S-111

- **S-104 and S-111 Coordinate Reference System (CRS);** ensuring the same CRS is used in S-104 & S-102; resolve inconsistencies across different Product Specifications

- Proposal to change the **Exchange Catalogue productSpecification** attribute from a single value [“1”] to allowing one or more [“ 1..* ”] product specifications in a single Exchange File, simplifying packaging and reducing producer effort.

- Proposal to develop **Exchange Catalogue–specific XML Schema Definitions (XSDs)** to enable consistent, automated validation of incoming and outgoing S-100 products, reducing ambiguity, supporting multiple PS versions, and improving production and quality assurance across producers and RENCs.

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

Post TWCWG10 discussions on S-104; key changes:-

- Clarify waterLevelTime usage (Feature Catalogue only; not populated in datasets).
- Align display scale and overlap rules with S-98 (allow multiple scales; no same-scale overlap).
- Update UKHO / PRIMAR file naming and editionNumber conventions
- Confirm dataset size limits and add aligned validation guidance (consistent with S-102).
- Clarify and align bounding box / bounding polygon rules and producer best practice.
- Update CRS, UoM, vertical CRS and attribute-precedence rules for consistency with S-100/S-102.
- Apply targeted editorial and remark corrections (figures, annexes, wording, sequencing).

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

Post TWCWG10 discussions on S-111; key changes:-

- Clarify and update Lua portrayal and Portrayal Catalogue (PC) requirements.
- Align display scale and no-overlap rules with S-98 and restate producer constraints.
- Confirm dataset size limits and associated validation guidance.
- Update arrow symbols and SVGs for S-100 Ed 5.2.0 conformance.
- Correct and clarify fillValues, uncertainty handling, UoM, and vertical axis wording.
- Apply targeted editorial corrections and clarifications (remarks, figures, terminology).

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

Post TWCWG10

- **TWCWG collaboration with HSWG** to improve chapter on Tides, Water Levels and Currents in Publication C-13, the Manual on Hydrography.
- Task Group established; VTC discussions; first draft in progress; aiming to be submitted to HSWG September 2026.

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

International Hydrographic Organization

'Standing' Agenda items discussed at TWCW10:

- Standard Constituent List.
- *The study of long-term data sets for the determination of global sea level rise and changes in tidal range.**
- *List of vertical datums in use to describe Chart Datum.**

  *Combined into **The study of changes in tidal range reflected in epoch information related to Chart Datum (List of Vertical Datums).**
- Compare Tidal Predictions generated as a result of analysis of a common data set by different analysis software (including the **International Association for the Physical Sciences of the Oceans (IAPSO)** Best Practice Study group on Tidal Analysis).
- Historical data recovery/data archaeology.
- Establishment and Maintenance of Vertical Reference Frames (VRF) for High Resolution Bathymetric Surfaces.
- Determining ellipsoidal height of MSL at the coast.
- Inventory of Tide gauges used by IHO Member States.
- Actual Tides On-line Link [ATOLL] status.
- Review of relevant IHO Resolutions and Charting Specifications. (**Ref Action HSSC17/069**)
- Capacity Building: Tides training course.

PROBLEMS OR OUTSTANDING ISSUES

1. No significant or major problems identified.

2. Outstanding issues :
   - Resources; maintenance of PS [Application for IC-ENC Activity Fund in progress].
   - Challenging to encourage volunteer venues for in-person meetings, for TWCWG11+

3. S-104 & S-111 – Clarification (2.0.1) or Revision (2.1.0) Editions?
   by end 2026/early 2027 for HSSC19

FUTURE WORK PROGRAMME

International Hydrographic Organization

TWCWG Work Plan 2025-2026

A	Maintain the list of standard tidal constituents (IHO Task 2.8.4)
B	~~Compare the tidal predictions generated as a result of analysis of a common data set using different analysis software~~
	The study of changes in tidal range reflected in epoch information related to the selection / calculation of Chart Datum (in order to review and maintain the List of Chart Datums (CD) / Vertical Reference Levels in use by Member States) (IHO Task 2.8.8)
D	Develop, maintain and extend a Product Specification for Surface Currents in ECDIS (S-111) (IHO Task 2.3.4)
E	Develop, maintain and extend a Product specification for Water Level Information in ECDIS (S-104) (IHO Task 2.3.4)
F	Liaise with S-100WG on water levels and currents themes relevant to ECDIS applications (IHO Task 2.3.5)
G	Liaise with industry experts on the development of Product Specifications for water levels and currents (IHO Task 2.5.1)
H	Prepare and maintain an inventory of water level gauges and current meters used by Member States and publish it on the IHO/TWCWG web site (IHO Task 2.8.5)
I	Review and maintain the Actual Tides and Currents On-Line links as published on the IHO TWCWG website (IHO Task 2.8.5)
J	Maintain and extend the relevant IHO standards, specifications and publications as required (IHO Tasks 2.8.4 and 2.1.8)
K	Conduct at least annual meetings of TWCWG and its sub-group(s) and project team(s) (IHO Tasks 2.1.2.7)
L	Develop and maintain material for course on Tides, Water Levels and Currents (IHO Task 3.3.9)
~~**M**~~	~~Review and maintain the List of Chart Datums (CD) / Vertical Reference Levels in use by Member States (IHO Task 2.8.8)~~

ACTIONS REQUESTED FROM HSSC

1. To note the TWCWG10 report.
2. To note the publication of Editions 1.0.0 of S-158:104 & S-158:111 on the IHO GI Registry.
3. To note the intention to publish either Clarification or Revision Editions of S-104 & S-111 by end 2026 / early 2027
4. To approve closing Action HSSC17/69.
5. To approve amendments to TWCWG Work Plan 2025-2026
6. To agree and support TWCWG work plan.