



15th Meeting of the Hydrographic Services and Standards Committee

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

Agenda Item HSSC15-05.7A

HSSC-15, Helsinki, Finland, 5 – 9 June 2023



IHO

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

International
Hydrographic
Organization

Intersessional work between TWCWG6 (April 2022) and TWCWG7 (February 2023)

1. Extensive development (by correspondence of the TWCWG Project Teams) of S-104 & S-111 Product Specifications. **S-104 Ed. 1.1.0** and **S-111 Ed 1.2.0** were finalised at TWCWG7 and subsequently passed to the GI Registry.
2. Initial meeting (January 2023) of the **International Association for the Physical Sciences of the Oceans (IAPSO)** Best Practice Study group on Tidal Analysis. **ACTION HSSC14/70**
3. Correspondence with Vice Chair of **Maritime Autonomous Surface Ships (MASS) WG**, on a ‘**Gap Analysis**’ between S-104 & S-111 and the requirements of MASS.
4. A **Survey /Questionnaire**, kindly prepared by **KHOA**, for circulation to TWCWG Member States, on **Water Level (S-104) and Surface Currents (S-111) Data Production Methods and Data Formats**.
5. Correspondence with Chair of **Hydrographic Surveys WG (HSWG)**, to collaborate on **improved tidal observation uncertainty standards within S-44**.
6. Correspondence with Chair of **Data Quality Working Group (DQWG)** on an **opportunity to present** on S-104 & S-111 at **DQWG18**. Also on **cross checks of DQ chapters** between S-104 & S-111, as well as **testing of S-104 & S-111 datasets**.
7. **Capacity Building**; Chinese and Spanish versions of the Tides course now completed.
8. Responded to, and resolved, Member State comments on **HSSC Circular Letter (CL) 03/2022**, regarding IHO Resolutions M-3 (i.e. those under control of TWCWG).



IHO

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

International
Hydrographic
Organization

TWCWG7 held via VTC, 28 February - 2 March 2023.

~60 Attendees; 22 Member States; IOC (GLOSS) & 6 from Industry.

- Initial (and highly appreciated) investigation by SANHO to host TWCWG7 in South Africa. Final decision taken in late 2022 to conduct the TWCWG7 meeting as a full VTC.
- Comprehensive agenda – good participation & engagement.
- Several new participants attended online.
- Note on TWCWG8; this will occur in **February 2024**.
- Note on TWCWG9; we plan to **move this back to November 2024**, to better complement the HSSC meeting schedule. *ACTION HSSC14/71*.



IHO

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

Outcomes from TWCWG7

Finalised Editions of S-104 & S-111

- S-104 Edition 1.1.0
- S-111 Edition 1.2.0
- Both have been submitted to the GI Registry for copy-editing and subsequent formal release.
- **For S-104 Ed 1.1.0**
 - Fill value for waterLevelHeight now has 2 zeroes after decimal point.
 - Clause on determination of water level trend.
- **For S-111 Ed 1.2.0**
 - Overview (clause 1) and Dataset identification (clause 3) harmonized with S-104 regarding both structure and content.
 - New attribute, surfaceCurrentTime, for use with non-uniform intervals in DCF 8.
 - Various alignments with S-104; Various updates to the values group.
- **Common to both**
 - Full alignment with S-100 Ed 5.0.0.
 - Specified data type size for HDF5 attributes.
 - Harmonized enumeration for types of data.
 - Additional guidance for production.
 - Requirements for compliance with S-98 (Interoperability).
 - Guidance for “cell scheming”.
 - Rules for dataset and support file names (allowed characters, length).
 - Annex F describing product specific validation checks (“informative” in this edition).
 - Temporary removal of screen captures in Annex E.
 - Updated references.
 - Minor editorial corrections throughout.



IHO

PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

Outcomes from TWCWG7

S-104 & S-111

- Working towards Editions 2.0.0 of both Product Specifications (operational editions); agreement on the key components to achieve this.
- Additional Member States volunteered to join the PT groups to assist the development.
- Require fully operational test data sets (proper and rigorous); automated testing.
- Real-time data; work closely with S-100WG / Test Strategy Meeting (TSM) (e.g. pick report portrayal of graphic time series plots and the support for this in S-100).
- Data Quality checks (Section 6) – look to extend these also taking into account at the DQWG work on S-100 Part 4c.
- Added surfaceCurrentTime attribute in S-111 (to cater for non-uniform time interval data).
- Agreed definition of surfaceCurrentSpeed.
- Proposed Timeline for publication of Editions 2.0.0 is likely Q3/Q4 of 2024.

Survey / Questionnaire on Water Level (S-104) and Surface Currents (S-111) Data Production Methods and Data Types.

- KHOA-produced survey to assess current state of ‘readiness levels’ of Member States in terms of their production plans for S-104 & S-111 outputs.
- Useful information gained on setting a ‘priority order’ of data type (i.e. real-time, forecast, predicted.....).
- Responses from 16 Member States; results show a variety of vertical datums, numerical models and grid sizes.
- Those Member States who *are* currently outputting data provide Forecast, Predicted and Real-time data types.
- Those Member States who *are not* currently outputting data do have plans to do so in future.
- PRIMAR training modules are available as a development aid.

HSWG / TWCWG collaboration to improve tidal observation uncertainty standards within the relevant sections of S-44

- S-44 currently holds very limited information about “tidal observation uncertainties”.
- Edition 6.1.0, only refers to observation/measurement uncertainties for ‘Water Flow Direction’ and ‘Water Flow Speed’.
- Potential to re-define the existing criteria, and add new criteria for Water Levels.
- Established a TWCWG task team to look at this in accordance with HSWG timeline for next Edition of S-44.



IHO

PROBLEMS OR OUTSTANDING ISSUES

International
Hydrographic
Organization

1. No significant problems identified.
2. Outstanding issues :
 - Difficult to encourage volunteer venues for in-person meetings; TWCWG8 planned for IHO Monaco in February 2024 (in-person only).



IHO

FUTURE WORK PROGRAMME

International
Hydrographic
Organization

TWCWG Work Plan 2023-2024

1. Maintain the list of standard tidal constituents.
2. Compare the tidal and tidal current predictions generated as a result of analysis of a common data set using different analysis software.
3. Support and Contribute to the International Association for the Physical Sciences of the Oceans (IAPSO) Best Practice Study group on Tidal Analysis.
4. Draft S-104 & S-111 Eds 2.0.0 and aim to publish by Q3/Q4 of 2024.
5. Liaise with S-100WG on water level and current matters relevant to ECDIS applications.
6. Liaise with industry experts on the development of product specifications for water levels and currents.
7. Maintain an inventory of water level gauges and current meters used by Member States.
8. Review and maintain the Actual Tides and Currents On-Line links (ATOL).
9. Maintain and extend the relevant IHO standards, specifications and publications. (S-44 and C-13)
10. Maintain IHO Resolutions & Charting Specifications.
11. Develop and maintain material for CB course on Tides and Tide gauges.
12. Review and maintain the List of Chart Datums (CD) in use by Member States.



IHO

ACTIONS REQUESTED FROM HSSC

International
Hydrographic
Organization

1. Note the TWCWG7 report.
2. Note proposed plan to draft Eds 2.0.0 of S-104 & S-111 with a plan to publish in Q3/Q4 of 2024.
3. Agree and support work plan.