

17th Meeting of the Hydrographic Services and Standards Committee

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

Agenda Item HSSC17-05.4A



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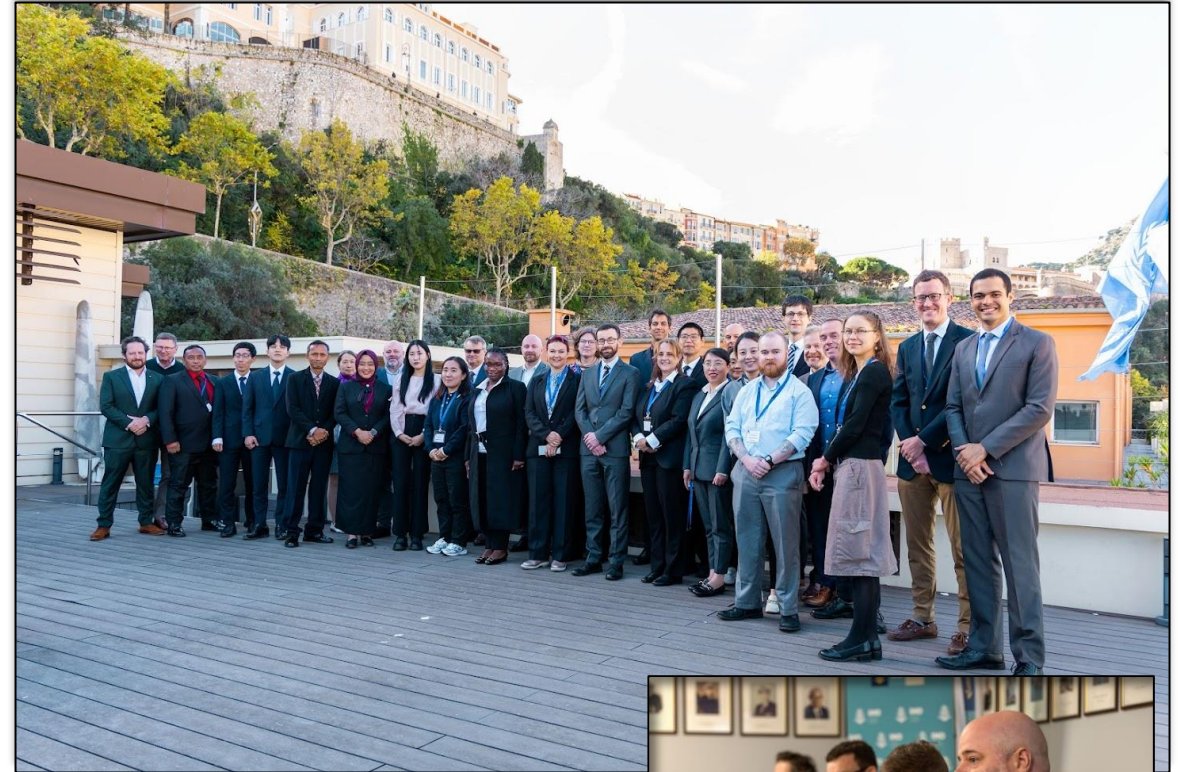
PRINCIPAL ACTIVITIES AND ACHIEVEMENTS

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TWCWG9 held via Hybrid Meeting IHO Monaco, 19-22 November 2024

65 Registered Delegates

- 29 in-person
 - 57 from Member States
 - 8 combined from Expert Contributors (JHA, IOC (GLOSS) & Industry)
-
- Hybrid meeting worked extremely well.
 - Comprehensive agenda – good participation & engagement.
 - Several new participants attended online.
 - TWCWG meeting schedule now ‘re-set’ to **November ACTION HSSC14/71.**
 - Note on TWCWG10; no location identified by the end of TWCWG9 (it is difficult to find volunteers).





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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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TWCWG9 - Main Highlights

1. Extensive development (by correspondence of the TWCWG Project Teams) of **S-104 & S-111 Product Specifications**. **S-104 and S-111 Editions 2.0.0 completed and endorsed** via IHO CL39/2024.
2. TWCWG **collaboration with HSWG** to improve water level and surface current observation uncertainty standards in S-44. Task group established to take this forward; VTC intersessional discussions.
3. The **International Association for the Physical Sciences of the Oceans (IAPSO) Best Practice Study group on Tidal Analysis**; First draft created; volunteers to work on its further development. Goal is to publish on **IOC Ocean Best Practices** website (www.oceanbestpractices.org), July 2025.



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Discussed at TWCWG9 – S-104 & S-111

S-104 Finalised Edition 2.0.0

- **Decision**: to delay any requirement for an additional “S-10x” (e.g. “S-105”) (maintain full focus on the Phase 1 S-104 / S-111). **ACTION HSSC16/84 – can be closed**
- **Reminder**: S-104 Ed 2.0.0 ‘pared back’ [reduced scope] to permit **only regularly-gridded data** at one or more times [DCF=2].
- **Reminder**: S-104 designed **solely for gridded coverages** [observed / predicted / forecast] useful for **water level adjustment (WLA)** as described in **S-98 Annex C (C-4-2)**. Focus on Phase 1 implementation.
Decision 8/27 of S-100WG8

In response to IHO CL39/2024 comments:

- **Bilinear interpolationType** removed as an option – only **Nearest Neighbour** now permitted (because S-98 Annex C WLA does not use bilinear interpolation).

S-111 Finalised Edition 2.0.0

- No specific issues from CL39/2024, only comments common to both (see next slide).



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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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Discussed at TWCWG9 – S-104 & S-111

Common to both S-104 & S-111 for Finalised Edition 2.0.0

- Annex F, “Validation”, removed (this will now be in S-158:104 & S-158:111 – see next slide)

In response to IHO CL39/2024 comments:

- Optional attribute **otherLocale** removed from table 12.2.4 (only uses defaultLocal).
- **Date multiplicity**; S-104 & S-111 comply with S-100 Ed 5.2.0 (use 0..1).
- **producerCode** shown as an optional attribute in S-104 & S-111; given that S-104 uses the same multiplicity as S-100 Ed 5.2.0, a remark was added recommending its use for datasets intended for ECDIS.
- **classification** shown as an optional attribute in S-104 & S-111; given that S-104 & S-111 uses the same multiplicity as S-100 Ed 5.2.0, a remark was added recommending its use for datasets intended for ECDIS.
- **complianceCategory**: S-104 & S-111 has this as Mandatory (Exactly one); this complies with S-100 Ed 5.2.0; a remark was added about what to do before a PS is formally published



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Discussed at TWCWG9 – S-104 & S-111

S-104 & S-111 Validation Checks

- Detailed in **S-158:104** & **S-158:111** (No longer part of the Product Specification ‘package’)
- Checks removed from Annex F of both Product Specifications
- Many of the checks are structured similarly to the ‘original’ S-58 checks
- S-158:104 currently relates to Ed 1.1.0 of S-104
- S-158:111 currently relates to Ed. 1.2.0 of S-111
- The S-104 PT and the S-111 PT to move forward with updating both “S-158’s” to make them conform to Editions 2.0.0 of S-104 & S-111
- To be endorsed by HSSC intersessionally (between HSSC17 & HSSC18).



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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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Discussed at TWCWG9 – Standing Agenda Items

- [Standard Constituent List](#).
- The study of long-term data sets for the determination of global sea level rise and changes in tidal range.
- [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 / Systems [VRF / VRS] for High Resolution Bathymetric Surfaces.

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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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Discussed at TWCWG9 – Standing Agenda Items

- Determining ellipsoidal height of MSL at the coast.
- [Inventory of Tide gauges](#) used by IHO Member States.
- [Actual Tides On-line Link](#) [ATOLL] status.
- [List of vertical datums](#) in use to describe Chart Datum.
- Review of relevant IHO [Resolutions](#) and [Charting Specifications](#).
- Capacity Building: Tides Training Course.
- Minimum metadata requirements for water level gauges and current monitors.
- Working with the Hydrographic Surveys Working Group (HSWG) [Chair David Parker] on defining uncertainty standards for water level and currents in S-44 (Standards for Hydrographic Surveys)



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PRINCIPAL ACTIVITIES AND ACHIEVEMENTS *CONTINUED*

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Action HSSC16/86 (*formerly HSSC15/67 & HSSC13/60*)

(Call for Endorsement of New and Revised IHO Resolutions, M-3 ([CL 03/2022](#)))

- **MS voting resulted in acceptance**; two comments from NL & EE were addressed via personal correspondence
- This resulted in only **minor editorial amendments**, which were agreed and accepted by NL & EE
- IHO Assistant Director (Sam Harper) advised these very minor amendments do not manifestly change the meaning of the Resolutions affected – further TWCWG / MS voting is not required.
- The agreed ‘redline’ version, along with the minor editorials, are now with the IHO Secretariat, to be **committed to create the new edition of M-3**.



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Action HSSC16/76

(HSSC ISO 9001 Cell: Extension of the ISO approach to other PS than S-101, S-98 and S-164)

- TWCWG now represented in this group
- Participation in online meetings of the ISO 9001 Cell since HSSC16



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PROBLEMS OR OUTSTANDING ISSUES

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1. No significant or major problems identified.
2. Outstanding issues :
 - Resources; maintenance of PS
 - Challenging to encourage volunteer venues for in-person meetings, for TWCWG10+



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FUTURE WORK PROGRAMME

TWCWG Work Plan 2024-2025

1. Maintain the list of standard tidal constituents.
2. Compare the tidal 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. **Maintain ~~Draft~~ S-104 & S-111 Eds 2.0.0 ~~and aim to publish by Q3/Q4 of 2024.~~**
5. **Update S-158:104 & S-158:111 to conform to Editions 2.0.0 of S-104 & S-111.**
6. **Plan a draft ~~Draft~~ of S-10x Ed 1.0.0, Water Level Information (non-Water Level Adjustment, WLA) ~~when deemed appropriate.~~**
7. Liaise with S-100WG on water level and current matters relevant to ECDIS applications.
8. Liaise with industry experts on the development of product specifications for water levels and currents.
9. Maintain an inventory of water level gauges and current meters used by Member States.
10. Review and maintain the Actual Tides and Currents On-Line links (ATOL).
11. Maintain and extend the relevant IHO standards, specifications and publications. (S-44 and C-13)
12. Maintain IHO Resolutions & Charting Specifications.
13. Develop and maintain material for CB course on Tides and Tide gauges.
14. Review and maintain the List of Chart Datums (CD) in use by Member States.



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ACTIONS REQUESTED FROM HSSC

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1. To note the TWCWG9 report.
2. To note the publication of operational Editions 2.0.0 of S-104 & S-111 on the IHO GI Registry.
3. To approve the TWCWG recommendation to delay the creation of an additional S-10x [e.g. “S-105”] Water Levels Product Specification, for “non-Water Level Adjustment, WLA” purposes (to ‘re-include’ the removed content from S-104 Ed. 2.0.0).
4. To approve closing Action HSSC16/84.
5. To approve closing Action HSSC16/86.
6. To approve closing Action HSSC16/76.
7. To agree and support TWCWG work plan.