



Questionnaire to BSHC Member States on the implementation status of Baltic Sea Chart Datum 2000 (BSCD2000), S-104 Water Level and S-111 Surface Currents

Please return to Thomas Hammarklint by email (thomas.hammarklint@sjofartsverket.se) at the latest by **15 March 2024**.

| | |
|------------------|---|
| Member state | Germany |
| Date of reply | 2024-03-13 |
| Point of Contact | Dr. Patrick Westfeld, BSH, patrick.westfeld@bsh.de |

1. Are all the decisions done to implement the Baltic Sea Chart Datum 2000?

1.1. When the decisions have been done or planned to be done?

All decisions have been made.

1.2. What are the national decisive organizations?

German Federal Maritime and Hydrographic Agency (BSH).

2. What is the national status of implementation of chart datum?

2.1. What actions have already been done?

In August 2021, BSCD2000 (realised by ETRS89/DHHN2016) was officially introduced as the chart datum for German waters in the Baltic Sea. The announcement was made in the Notices to Mariners (NfS, 1/2022). The label BSCD2000^{DHHN2016} was first used for the chart '36 (INT 1352) – Travemünde to Gedser Odde', published in early 2022. All gauges in the German coastal areas have also been successively resurveyed with reference to DHHN2016, so that they are also consistent with BSCD2000.

2.2. What actions have been planned to be executed and what is the schedule?

None.

2.3 Which ENC Approach have been updated with the new reference datum? If possible, attach a chart datum overview covering Your countries nautical charts, designed graphically or as a table, updated around January, 2023. Also, if possible, include an attribute to each named chart describing the CD difference to BSCD2000 in cm (CD minus BSCD2000). Example attached at the end of the Questionnaire (Annex).

There is no need to update any ENC approach as the CD realisation has not changed.



2.4 If you implemented the attribute VERDAT in S-57 (ENC), are You using VERDAT=3 (Mean Sea Level)?

Yes.

3. Has Your country established the national realization of EVRS and are the water level stations connected to this new height system (BSCD2000)?

3.1 Which organization/-s is responsible for the water level stations/data in Your country?

Federal Waterways and Shipping Administration (WSV).

3.2 Which reference are used today to present water level information? Does Your country planning to present water level information referring to BSCD2000? Doing it already today? Date decided for change the reference to BSCD2000?

Water level information is provided with reference to DHHN2016 (gauge zero point), and therefore with reference to BSCD2000.

3.3 Are there any plans for digital service/-s intended for the users to have the option to choose MSL or BSCD2000 as the reference level for water level information?

No.

3.4 GNSS supported UKC control/confirmation is probably the reality in a few years. We also need reliable water level predictions for carrying out optimal loading and real time water level data to check the GNSS data. Do we need a shared service in the Baltic Sea for water level information (predictions/real-time), which fulfils nautical needs and demands?

Yes.

3.5 Do we need to work together with the development of the IHO S-104 standard?

Yes.

4. Are the relevant national contacts and interest groups defined for the change of chart datum and water level reference?

4.1. What are the essential national interest groups in your country?

On the user side, all operators using (hydrographic) survey data. On the administrative side, mainly the German Federal Maritime and Hydrographic Agency (BSH), partly the German Waterway and Shipping



Administration (GDWS) and the German Federal Institute of Hydrology (BfG).

4.2. Are the relevant point of contacts known and contacts been made to them?

Yes.

4.3 Are You planning any information campaign about the change of chart datum and water level reference? If, yes have you published information about this somewhere?

No, because the CD realization has not changed.

5. Have You identified any obstacles or major issues concerning transition to the harmonized vertical reference?

No.

6. Connections to neighbouring countries

6.1. Which are the relevant countries to cooperate?

Denmark, Sweden, Poland.

6.2. Are the needed points of contacts already known?

Yes.

6.3. What actions have been agreed with the relevant countries (e.g. synchronising plans and schedules)?

Synchronised measurement campaigns and R&D knowledge sharing.

7. Are there any needs for support from BSHC?

No.

8. Do you have any other proposals or guidance to the CDWCWG to help and foster the transition process?

Following the successful release of BSCD2000 at the end of 2023, CDWCWG-1 will need to discuss the current state of Continuity Management, which is currently being developed by Germany, and derive appropriate action items.



9. Are you using GNSS and GNSS augmentation services for referring to your (bathymetric) surveys to the chart datum?

9.1 What GNSS augmentation service is used for hydrographic surveys? (If there are several augmentation services, list all of them.)

SAPOS satellite positioning service of the German land survey authorities and commercial PPP services.

9.2 To which coordinate system, and vertical reference level/frame the GNSS augmentation service is referred to? (If there are several systems in use, list all of them.)

ETRS89/DREF91/2016 and DHHN2016.

9.3 Does your HO require, in-house or procured, that Hydrographic survey system shall be prepared to be able to measuring the GNSS-height and refer the depth to the geoid?

At BSH, measured depths are referenced to the geoid. Depending on the application/product, physical heights are transformed to water level dependent values later in the data processing chain (e.g. LAT transformation for North Sea chart production).

9.4 Do you discuss within your HO the need of an altimetric measured Mean Sea Surface (MSS)? (For example, in order to support hydrodynamic models, shipping and / or adjust existing depth data)?

Yes, partly.

9.5 Has your HO assessed the need for dynamic geodetic reference systems (time-dependent transformation relationship) between primarily national and global reference frames?

No.

10. What is the national status of the implementation of IHO S-104 Water Level and S-111 Surface Currents?

10.1 What actions have already been done?

Between 2017-2020, the R&D project "Integration von hochaufgelösten marinen Geodaten in elektronische Navigationssysteme (ImoNav)" focused on preliminary conceptual work and an accompanying pilot study in preparation for the introduction of S-104 and S-111 products.

Since 2023, preliminary conceptual work has been carried out to integrate the data sources and interfaces available at the BSH into the S-104 and S-111 standard.



Since March 2024, processing chains, interfaces, data management strategies, etc. have been developed with the aim of operationalising the production of S-104 and S-111 products and areal water levels. This will be the first step for the North Sea. Work on the Baltic Sea will start in the third quarter of 2024 at the earliest.

10.2 What actions have been planned to be executed and what is the schedule?

The following (preliminary) schedule applies to the development and introduction of the S-104 and S-111 products in the North Sea, which will also benefit the work for the Baltic Sea, which will start in the third quarter of 2024:

| Planned S-104/S-111 Products | | | | |
|------------------------------|----------|--|---------|--------------|
| Here: Only North Sea | | S-104 Edition 2.0.0 (January 31, 2024): Only DCF=2 | | |
| When? | Standard | Product | DCF | Updates |
| 2024 (test data) | S-104 | Tide predictions @ tide gauges | 8 -> 2? | 1x / year |
| 2024 (test data) | S-104 | Water level forecasts @ tide gauges -> Manual forecasts | 8 -> 2? | 4x / day |
| 2024 (test data) | S-111 | Surface currents (from circulation model) | 2 | 2x / day |
| ??? | S-104 | Water level forecasts @ tide gauges -> Semi-automated forecasts | 8 -> 2? | 4x / hour |
| ??? | S-104 | Tide predictions (area-wide on grid) | 2 | 1x / year |
| ??? | S-104 | Water level forecasts (area-wide on grid) | 2 | 4x / hour |
| ??? | (S-104) | (Water level observations) | 8 -> 2? | ~1x / minute |
| ??? | S-412 | Storm Surge Warnings | | as needed |

DCF: Data Coding Format

Preliminary schedule applies to the development and introduction of the S-104 and S-111 products in the North Sea. Source: https://www.bshc.pro/wp-content/uploads/TWG26_Presentations.zip → 2024-02-06_TWG26_Germany_S104-S111_status.pdf.

10.3 Are all the decisions done to implement S-104 and S-111?

From an organisational point of view, all decisions necessary for the implementation of S-104 and S-111 have been taken. Decisions of a technical nature are dependent on the final introduction of the respective standards. Accordingly, there are certainly still a number of decisions to be made. The same applies to decisions in connection with practical realisation.

10.4 When the decisions have been done or planned to be done?

From Germany's perspective, it is currently not possible to make a reliable statement here, as this depends on too many factors, some of which are external.



10.5 Which organization/-s is responsible for observed and modelled/ forecasted water level (Refer to 3.1) and currents in your country?

In Germany, the Federal Waterways and Shipping Administration (WSV) and state agencies are responsible for providing daily updated water levels and currents for inland and coastal gauges.

In Germany, the Federal Maritime and Hydrographic Agency (BSH) operates a numerical model system for the calculation of ocean, dispersion and water quality forecasts as well as climate projections in the North Sea and Baltic Sea. With this model system, forecasts of water level and currents for the next few days are computed several times a day.

10.6 How is Your country represented in the IHO Tides, Water Level and Currents Working Group (TWCWG)?

Germany is represented by Dr Andreas Boesch and Ms Maybritt Meyer.