BALTIC SEA HYDROGRAPHIC COMMISSION

IHO

Baltic Sea Chart Datum 2000

TWCWG4/GLOSS GE XVI-meeting

11 April 2019

Busan, Korea

Thomas Hammarklint

Baltic Sea Hydrographic Commission (BSHC)

BALTIC SEA HYDROGRAPHIC COMMISSION

IHO

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The Baltic Sea Hydrographic Commission,

which is an integrant part of the International Hydrographic Organisation (IHO), promotes the technical co-operation in the domain of hydrographic surveying, marine cartography and nautical information among the neighboring countries of the Baltic Sea region.

The main objectives of the Commission are the coordination of the production of the Baltic Sea INT Charts, the coordination of hydrographic re-surveys, harmonization of chart datums, harmonization of Baltic Sea ENCs, and the exchange of information and the harmonization of practices with regard to various issues related to hydrography.

The most recent development is the Baltic Sea Bathymetric Database – accessible via this portal.

International Hydrographic Organization
The International Hydrographic Organization is an intergovernmental consultative and technical organization that was established in 1921 to support safety of navigation and the protection of the marine environment. The object of the Organization is to bring about:
- The coordination of the activities of national hydrographic offices
- The greatest possible uniformity in nautical charts and documents
- The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys
- The development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography

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SWEDISH MARITIME ADMINISTRATION

Chart Datum Working Group (CDWG)

The CDWG will have its next meeting (CDWG12) 3-4 March 2020 in Gdansk, Poland

https://www.bshc.pro/working-groups/cdwg

Members of CDWG:
Denmark PhD Joanna Gerlings
Denmark Mr Philip Sigaard Christiansen
Estonia Mrs Gabriela Kotsulim
Finland Mr Jyrki Mononen
Germany Dr Patrick Westfeld
Latvia Mr Armands Murans
Lithuania Mr Mindaugas Zakarauskas
Poland Cdr Sławomir Lipiński
Poland Mr Witold Stasiak
Russia Capt S. Travin
Russia Mr Leonid Shalnov
Russia Dr Sergey V. Reshetniak
Sweden Mr Thomas Hammarklint (Chair)
Sweden Mr Lars Jakobsson
Sweden Mr Henrik Tengbert

Observers:
Finland Mrs Mirjam Bilker-Koivula
Finland Katri Leinonen
Germany Dr Gunter Liebsch
Norway Mr Aksel Voldsund
Sweden Dr Jonas Ågren
Sweden Dr Per-Anders Olsson
Sweden Mr Mikael Stenström

Representative of BOOS:
Sweden Mr Thomas Hammarklint

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Baltic Sea Chart Datum 2000 (BSCD2000)

- **Definition:**

The datum refers to each Baltic country´s realization of the European Vertical Reference System (EVRS) with land-uplift epoch 2000, which is connected to the Normaal Amsterdams Peil (NAP).

- **Justification:**

The Baltic Sea is an international shallow, non-tidal area in the northern part of Europe with dense traffic. IHO BSHC has approved the name and the adoption of the Baltic Sea Chart Datum 2000 (specification).

- **Height systems used as national realization of BSCD2000 (EVRS-based):**

Sweden RH2000	Denmark DVR90	Germany DHHN2016
Poland PL-EVRF2007-NH	Lithuania LAS07	Latvia LAS2000,5
Estonia EH2000	Finland N2000	Norway NN2000

- **Chart datum name to be shown in paper charts:**

Mean Sea Level (Baltic Sea Chart Datum 2000$^{\text{national realization name}}$)
or
Mean Sea Level (Baltic Sea Chart Datum 2000)

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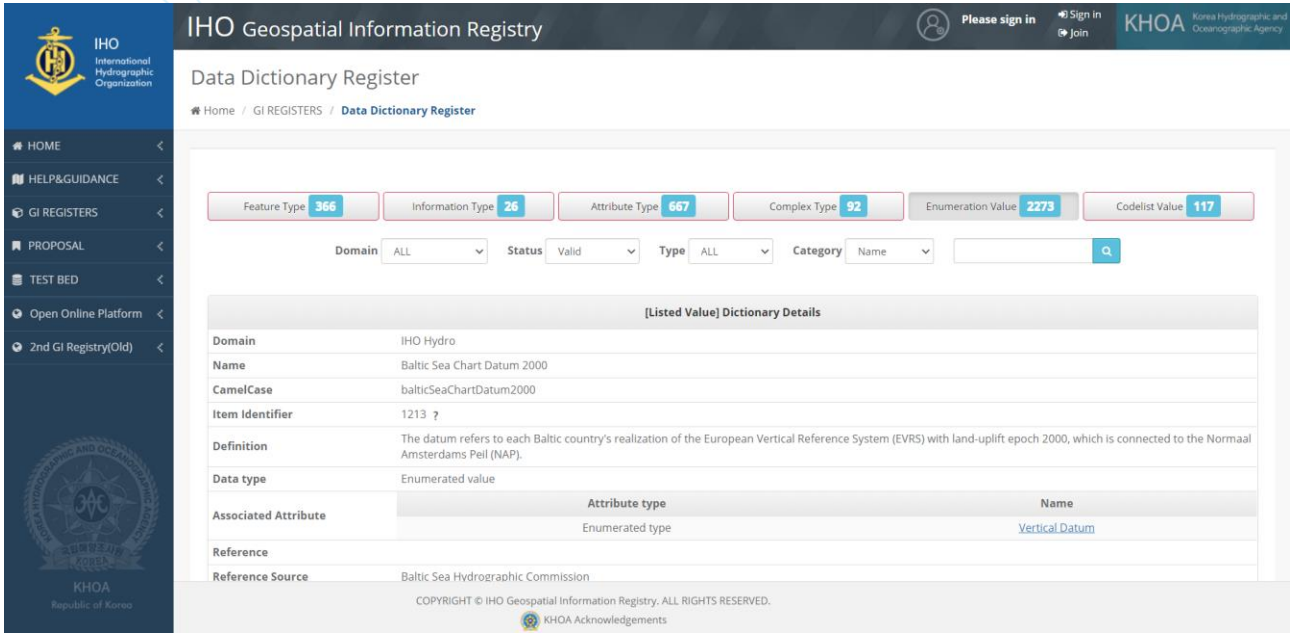
Baltic Sea Chart Datum 2000 in IHO Registry

BSCD2000 is now included in IHO Geospatial Information (GI) Registry, as chart datum number 44:



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BSCD2000 is included as a reference plane in BODC Vocabulary list / SeaDataNet

SeaDataNet

PAN-EUROPEAN INFRASTRUCTURE FOR OCEAN & MARINE DATA MANAGEMENT

BODC VOCAB LIBRARY

L11 (SEADATANET DEPTH MEASUREMENT REFERENCE PLANES)

Overview | Export subset of list | Export full list | New query | Found 1 | Current | Previous | Next

ConceptID	Preferred label	Alt label	Definition	Modified
D33	Baltic Sea Chart Datum 2000	BSCD2000	The elevation of the zero metres contour in the Baltic Sea as approved by the IHO Baltic Sea Hydrographic Commission as the common chart datum for the Baltic Sea. The datum refers to each Baltic country´s realization of the European Vertical Reference System (EVRS), which is connected to the Normaal Amsterdams Peil (NAP).	5/22/2017 16:41:48

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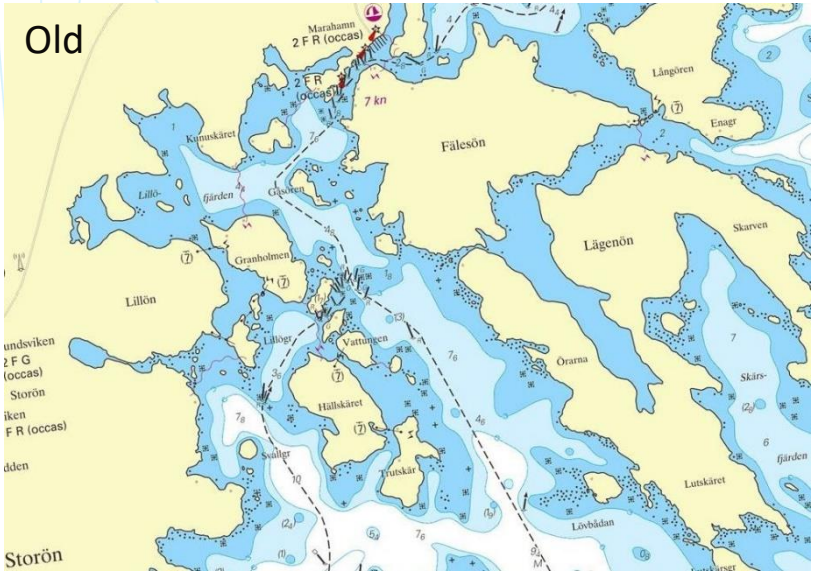
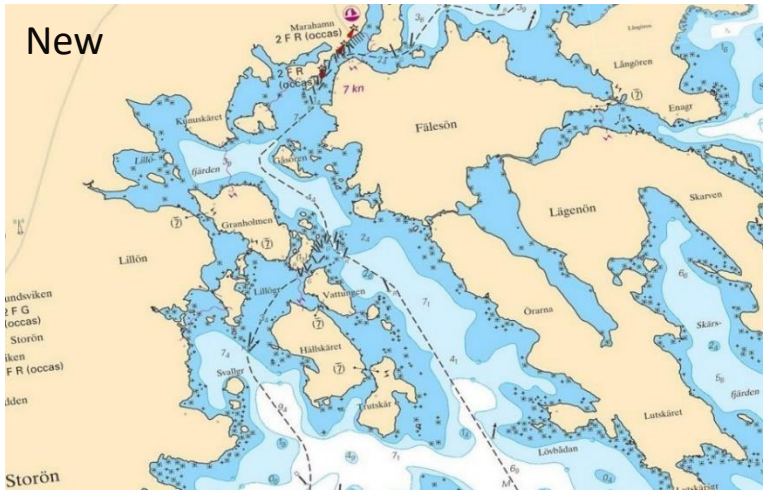
Swedish Chart Improvement project





Mean Sea Level (Baltic Sea Chart Datum 2000^{RH2000})

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Plan for transition to BSCD2000 in nautical charts

Updated 2019-04-08

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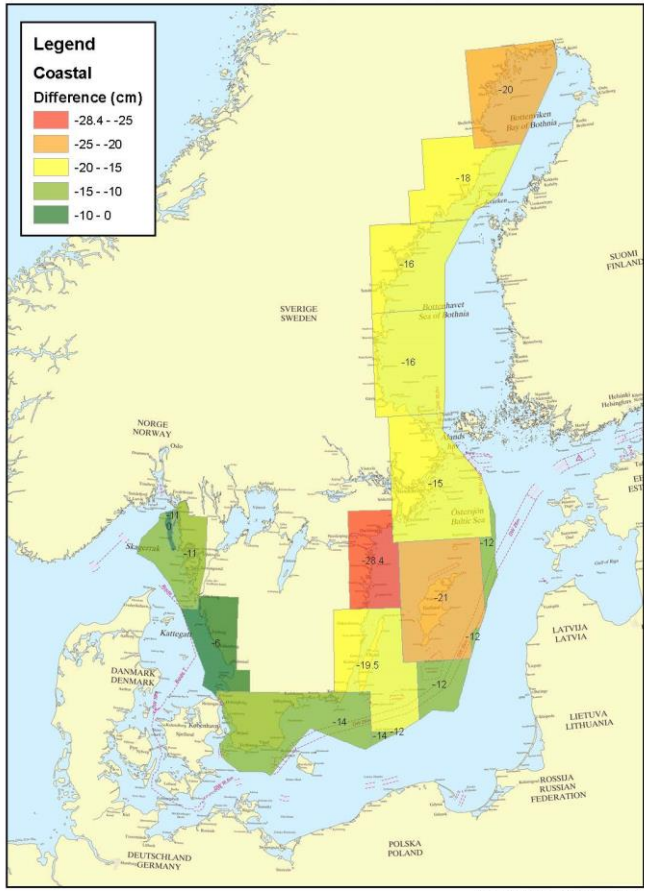
Difference between present chart datum and BSCD2000

Annex 1 To Questionare, BSHC CDWG Page 2 (4)

Difference between existing chart datum and RH 2000 - Coastal

Swedish Maritime Administration, Hydrographic Office, May 16, 2013

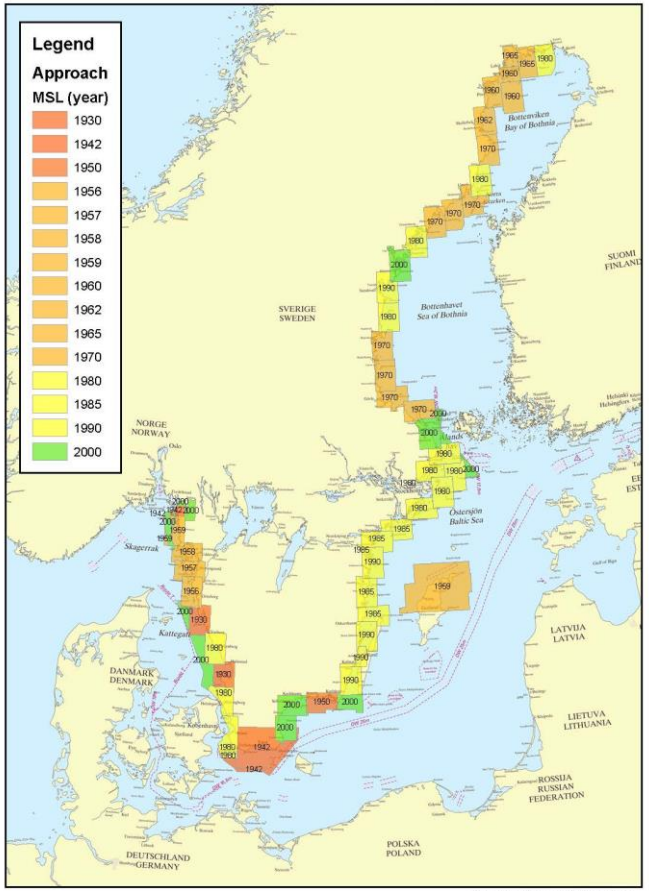


1 centimeters = 60 kilometers

Annex 1 To Questionare, BSHC CDWG Page 3 (4)

Year of MSL in Swedish chart database - Approach (Swedish water)

Swedish Maritime Administration, Hydrographic Office, May 16, 2013



1 centimeters = 60 kilometers

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Co-financed by the European Union
Connecting Europe Facility

Swedish Sea Level Network

- Real-time data relative BSCD2000 from 60 stations
- 1-minute values with 1 cm accuracy
- Real-time and delayed mode quality control

Class I	Upgrade with battery backup	27 stations (23 SMHI, 3 SMA, 1 CTH)
Class II	Upgrade without battery backup	25 stations (21 SMA, 3 GBG, 1 SKB)
Class III	Unchanged, temporary	7 stations (6 SMA, 1 SMHI)

Present water level information are shown in Wind- and Water Information (ViVa)

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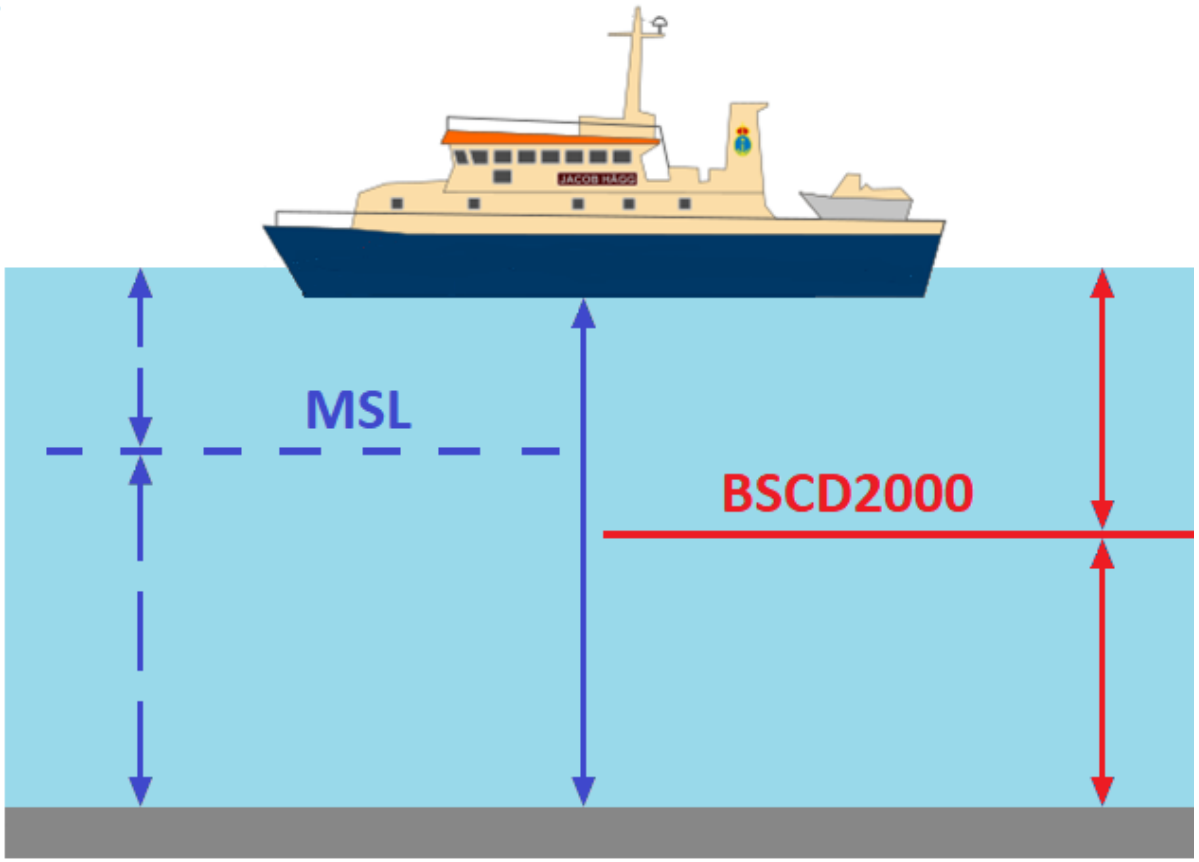
New reference datum for sea level



The water depth remains!

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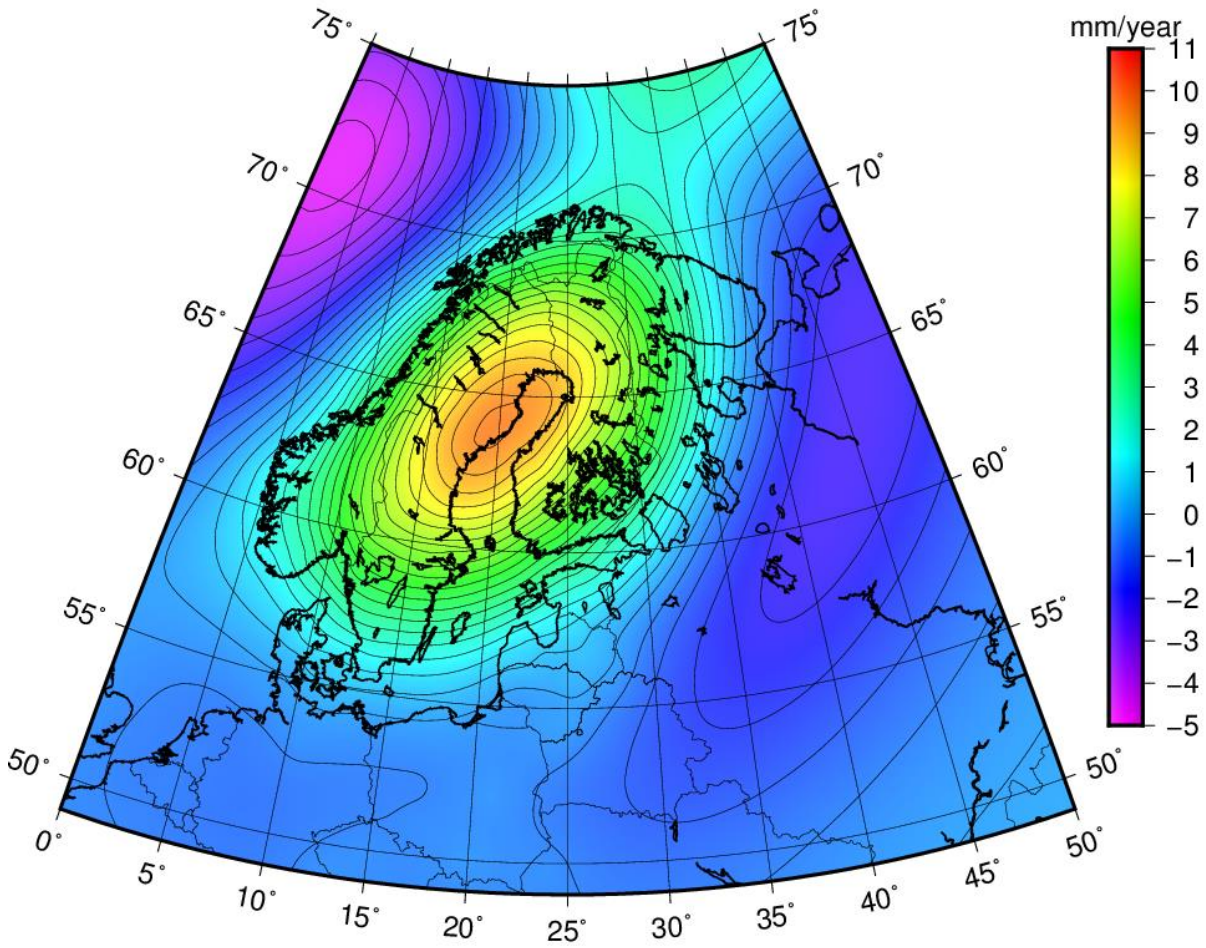
The land-uplift lowers the mean sea level



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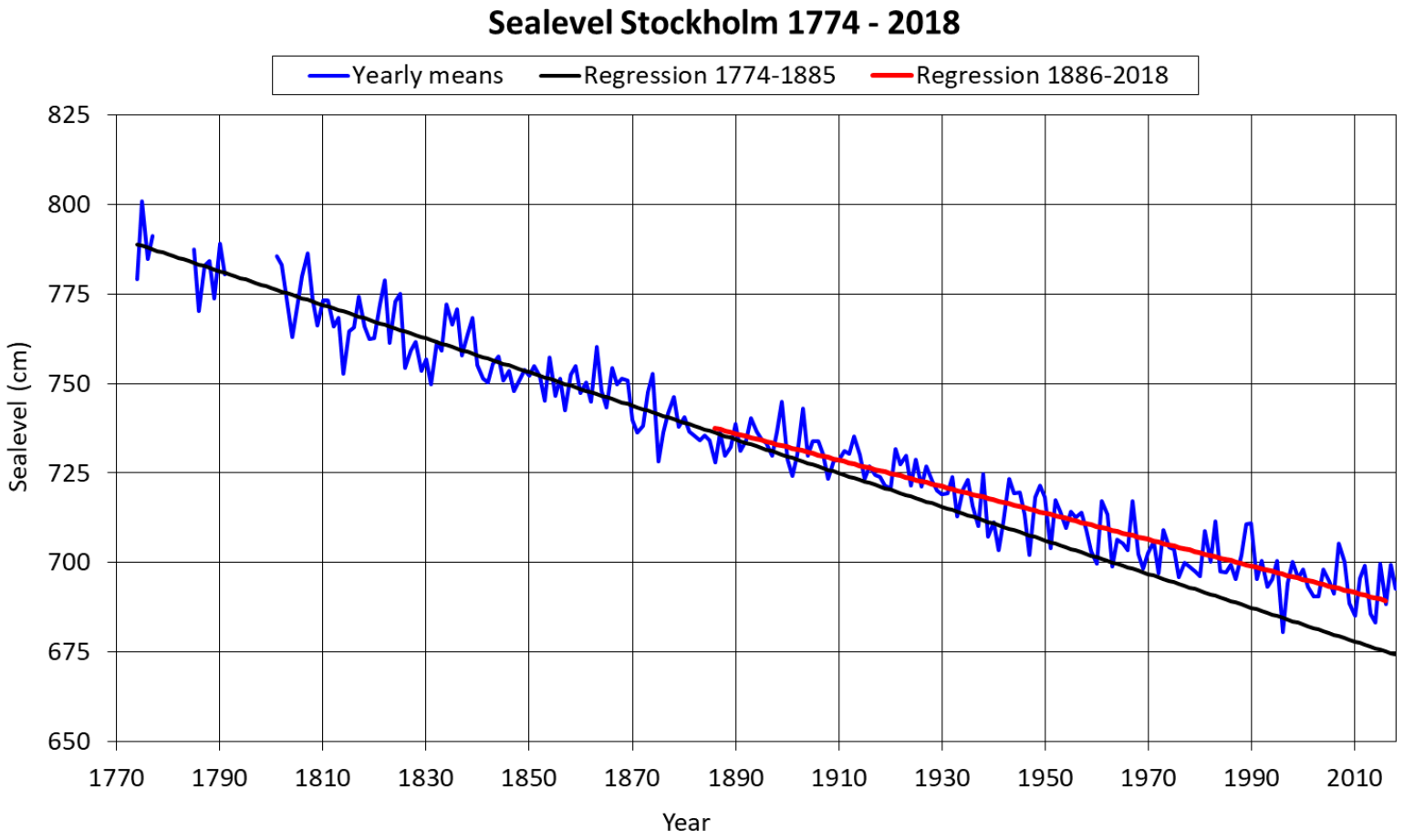
Stockholm
”World’s longest sealevel record”



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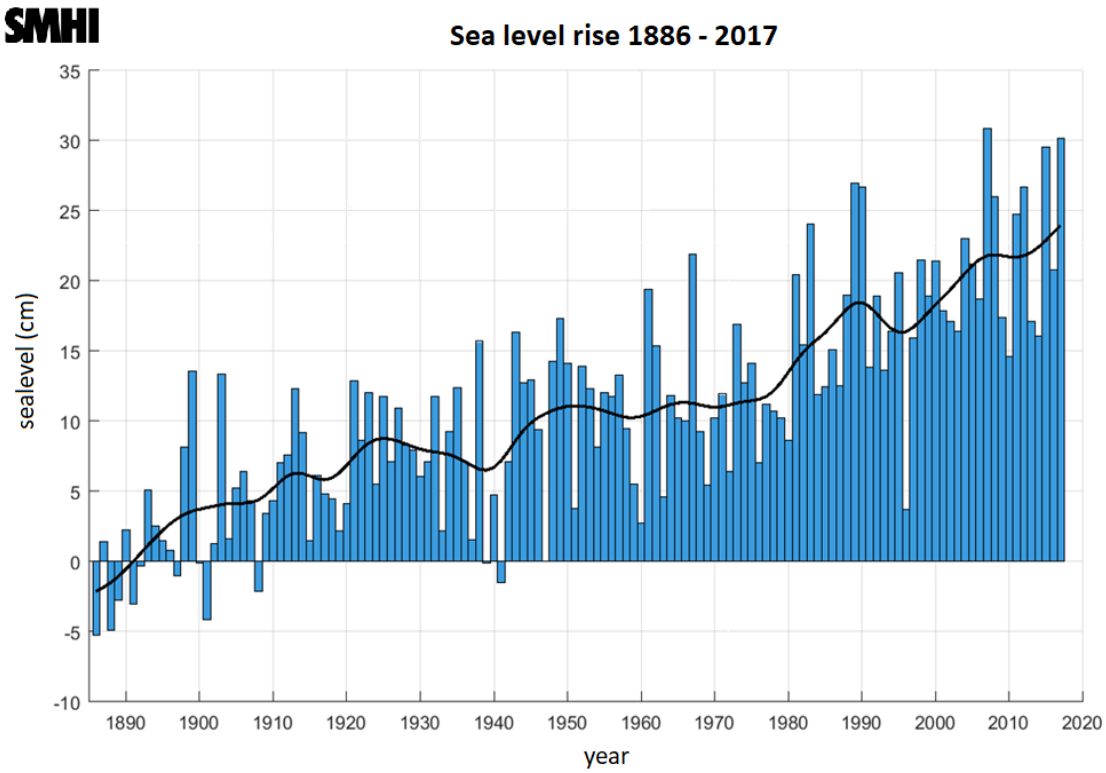
The sea level rise raises the mean sea level



Analysis of 14 Swedish sealevel records since 1886

Sealevel corrected for the levelled land-uplift (glacial isostatic adjustment)

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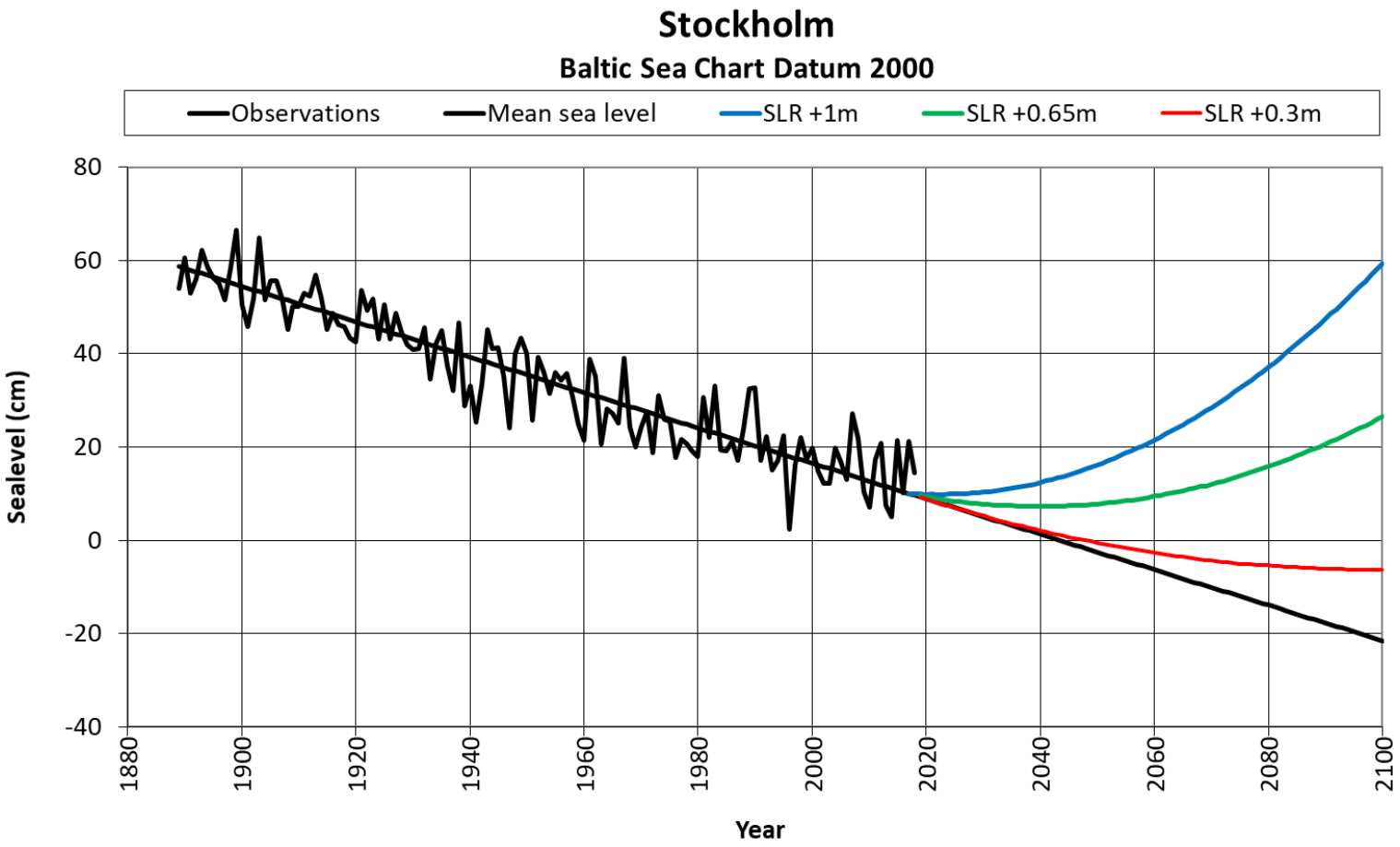
Future sea level rise (SLR)



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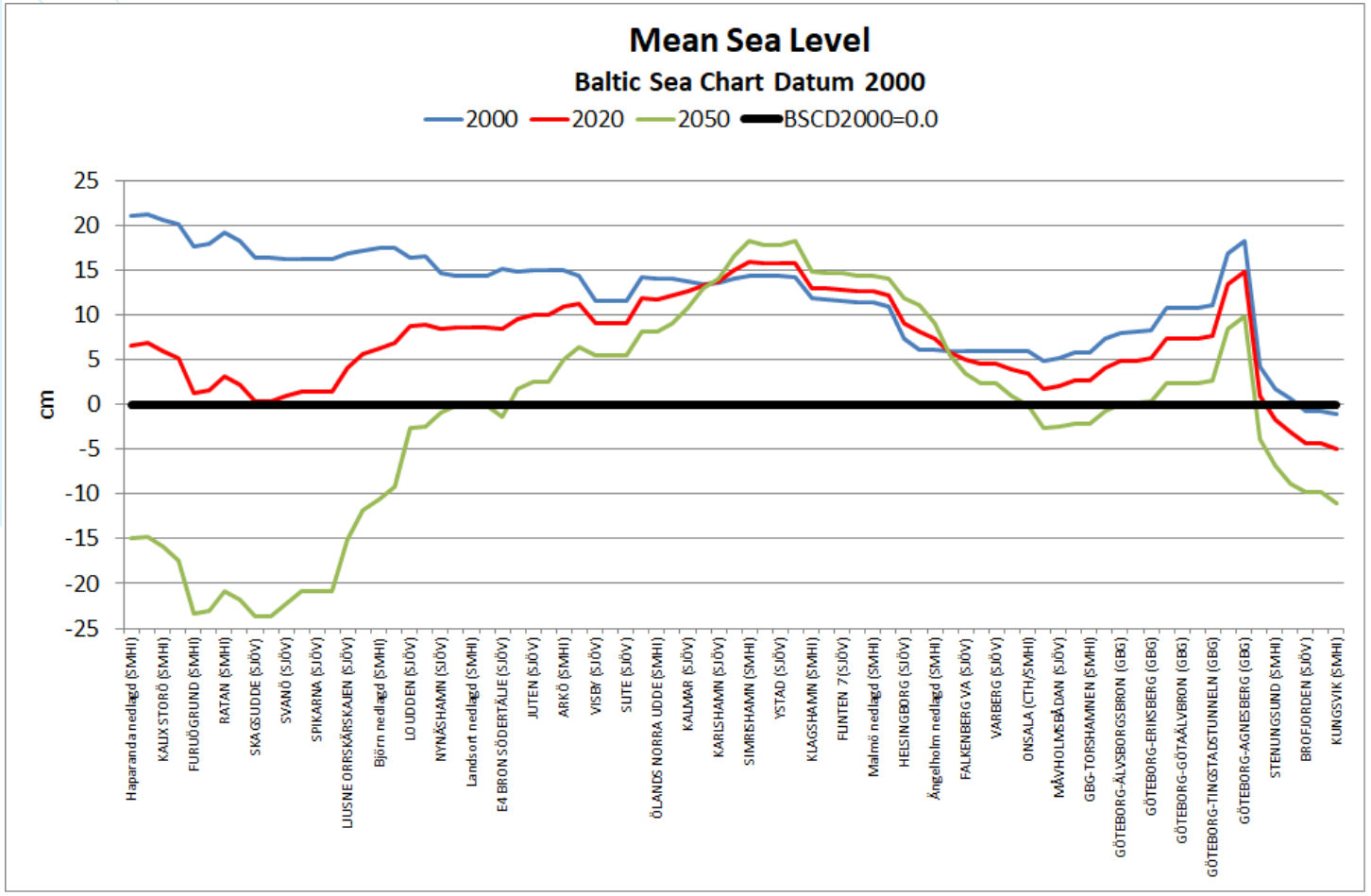
Changing mean sea level



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Difference between old reference system and BSCD2000

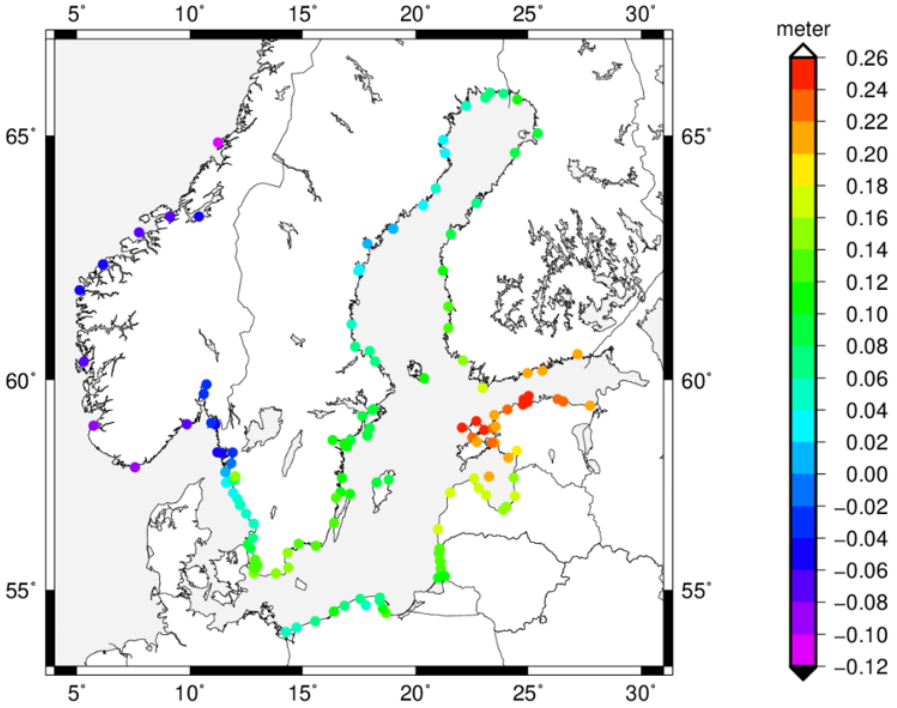

Fig. 4b: Differences between the reference levels of the old national chart datums with respect to Baltic Sea Chart Datum (BSCD2000). In Sweden and Finland, the old reference levels are equal to Mean Sea Level transferred to year 2019 (according to different national conventions). The values from Norway shows the Mean Sea Level over the period 1996-2014, relative NN2000/BSCD2000. In Estonia, Latvia, Lithuania and Poland, the Kronstadt reference level is used as old chart datum. Notice how postglacial rebound reduces the magnitude of the mean sea level in the Bay of Bothnia; it is now just a few cm near the land uplift maximum.

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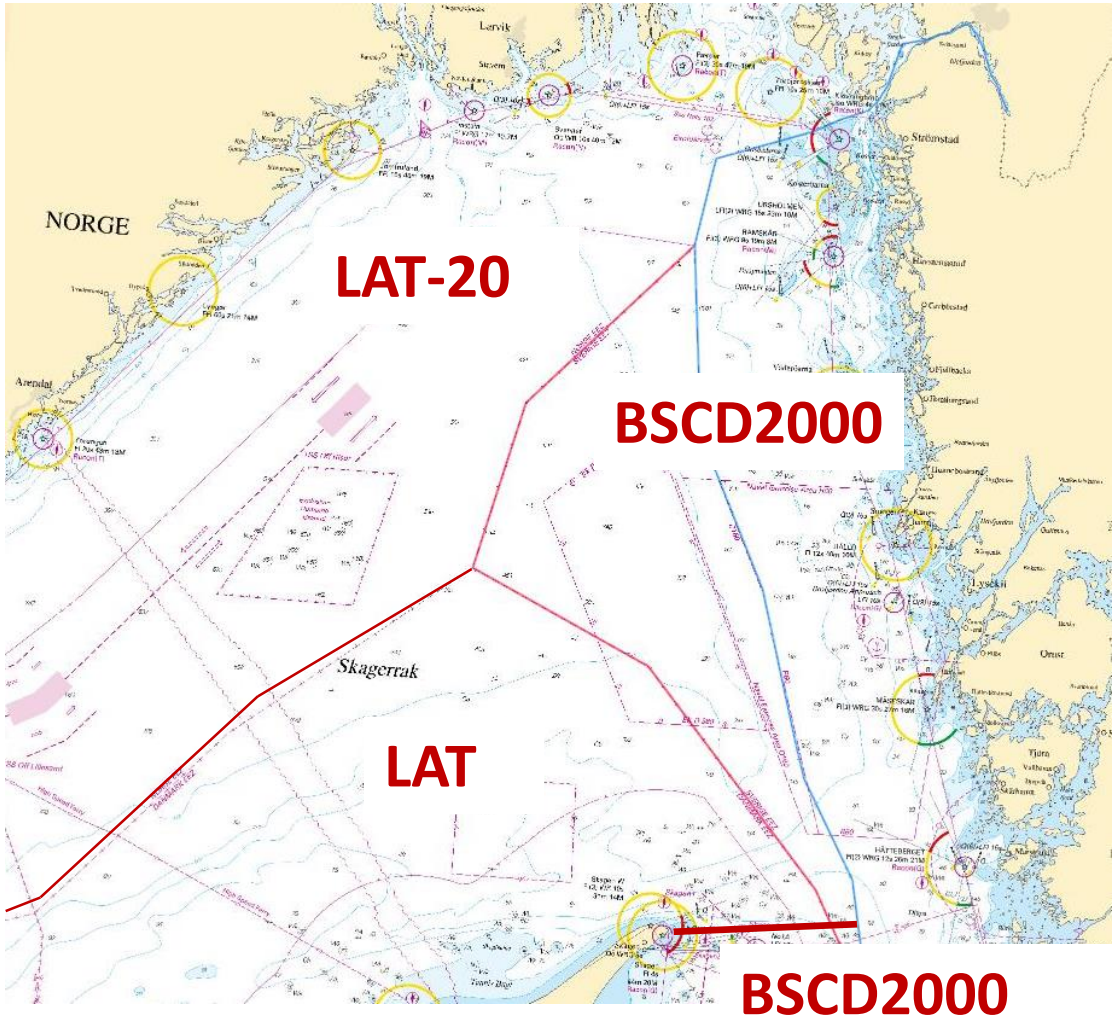
Reference datums in Skagerack

- Norwegian chart datum (LAT-20) ca 0,5-0,6 m below BSCD2000
- Danish LAT ca 0,2 m below BSCD2000



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Sweden will change reference datum

Swedish Maritime Administration (SMA) and Swedish Meteorological and Hydrological Institute (SMHI) will present sea level data relative BSCD2000 from 3rd June 2019

SWEDISH MARITIME ADMINISTRATION

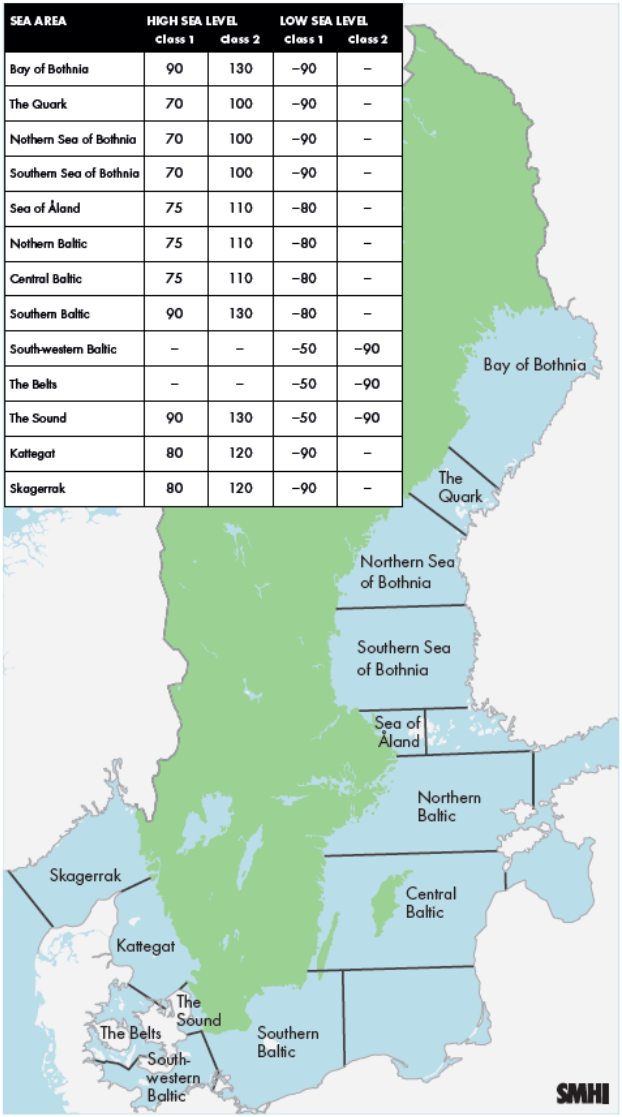
SMHI oceanographic warning and forecasting service

- An ongoing transition to BSCD2000 (RH 2000) at SMHI -> forecasts, warnings and information about current sea level will be issued in BSCD2000

- Warning levels have been adjusted from MSL to BSCD2000

- **2019-06-03**: Warnings for high and low sea level will be issued in BSCD2000

SEA AREA	HIGH SEA LEVEL		LOW SEA LEVEL	
	class 1	class 2	class 1	class 2
Bay of Bothnia	90	130	−90	–
The Quark	70	100	−90	–
Nothern Sea of Bothnia	70	100	−90	–
Southern Sea of Bothnia	70	100	−90	–
Sea of Åland	75	110	−80	–
Nothern Baltic	75	110	−80	–
Central Baltic	75	110	−80	–
Southern Baltic	90	130	−80	–
South-western Baltic	–	–	−50	−90
The Belts	–	–	−50	−90
The Sound	90	130	−50	−90
Kattegat	80	120	−90	–
Skagerrak	80	120	−90	–



New Sealevel service from SMHI

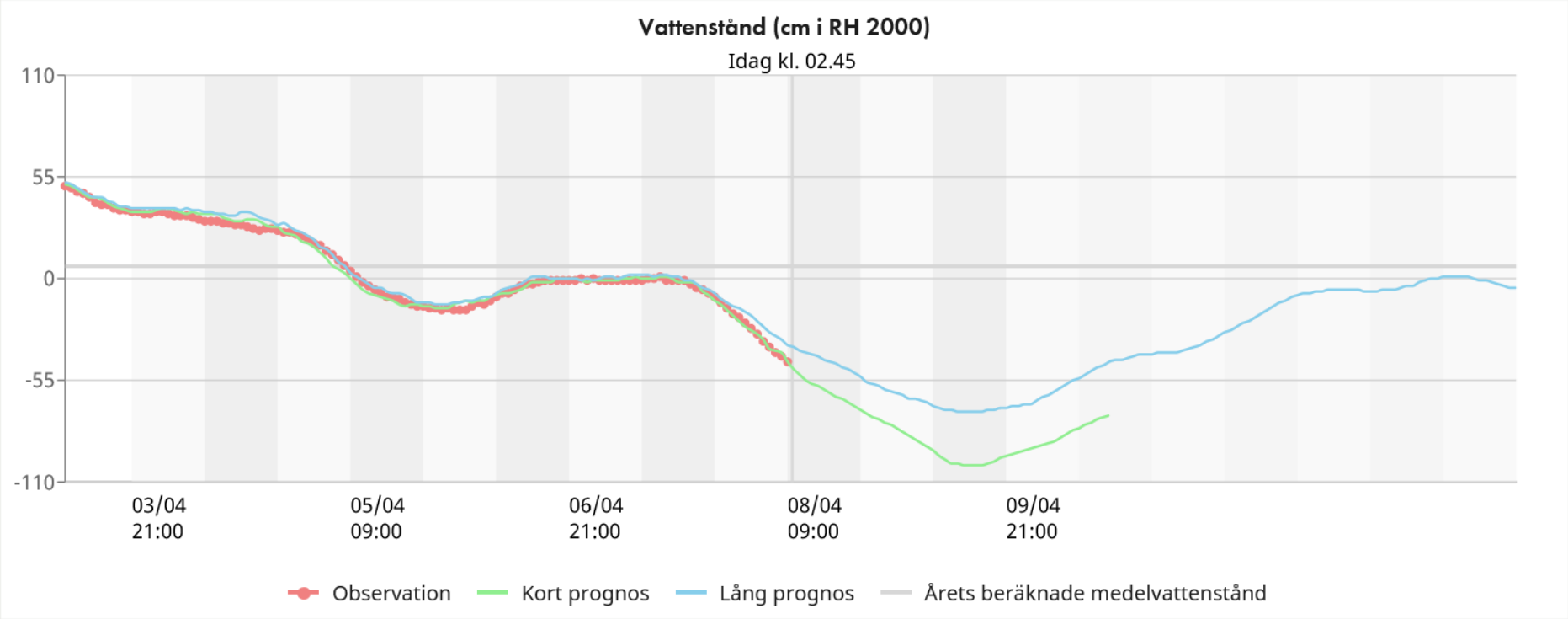
Kalix-Storön
SMHI:s mätstation

Stäng ✕

Välj tidsspann: Fler dygn Närtid

☆ Spara som favorit

Diagram **Tabell**



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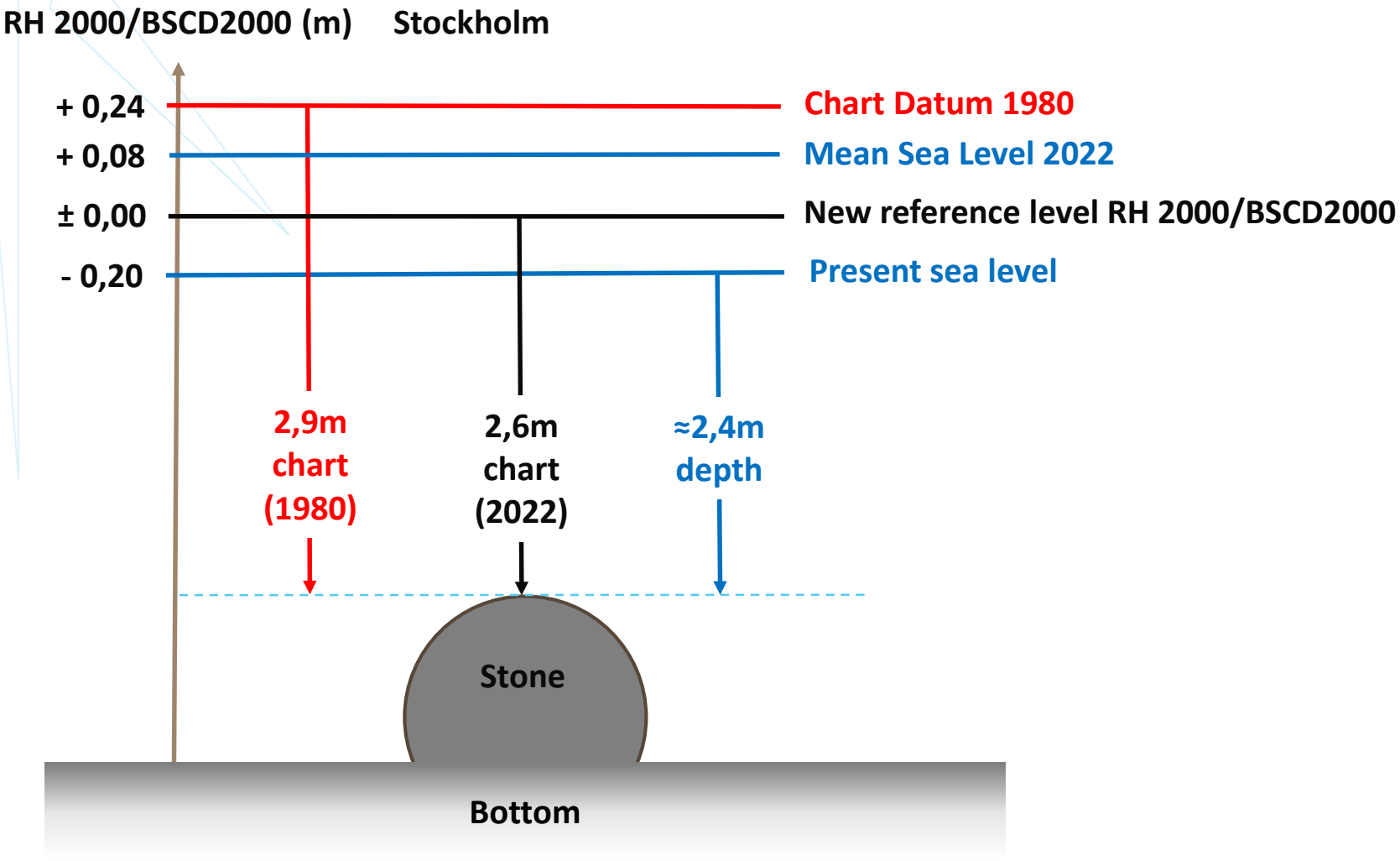
Transition to RH 2000/BSCD2000 in charts and sea level



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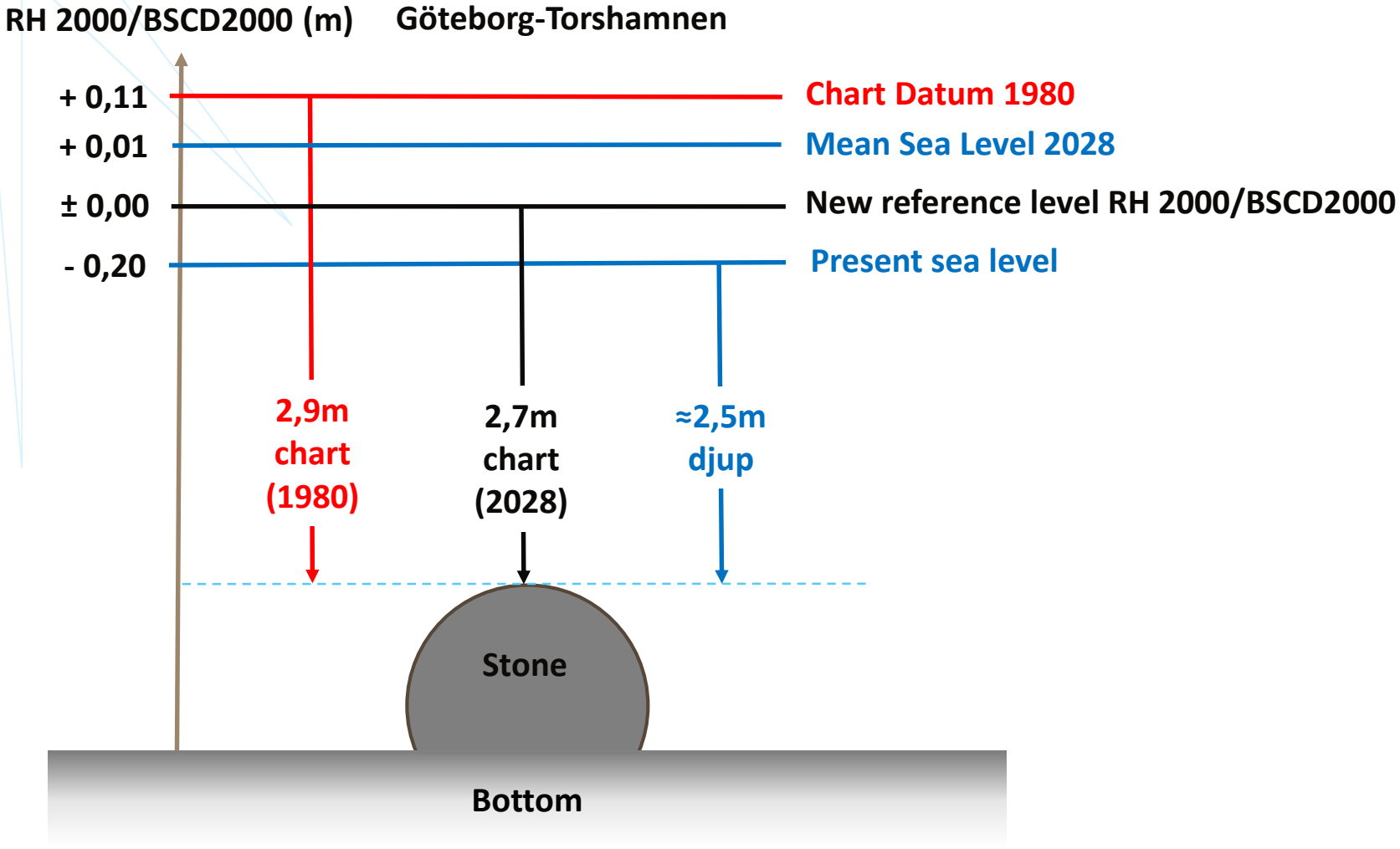
Transition to RH 2000/BSCD2000 in charts and sea level



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New info sheets about the transition to BSCD2000 as the new reference level for sea level, nautical charts and warnings

Svensk

English

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A uniform reference system from land to sea

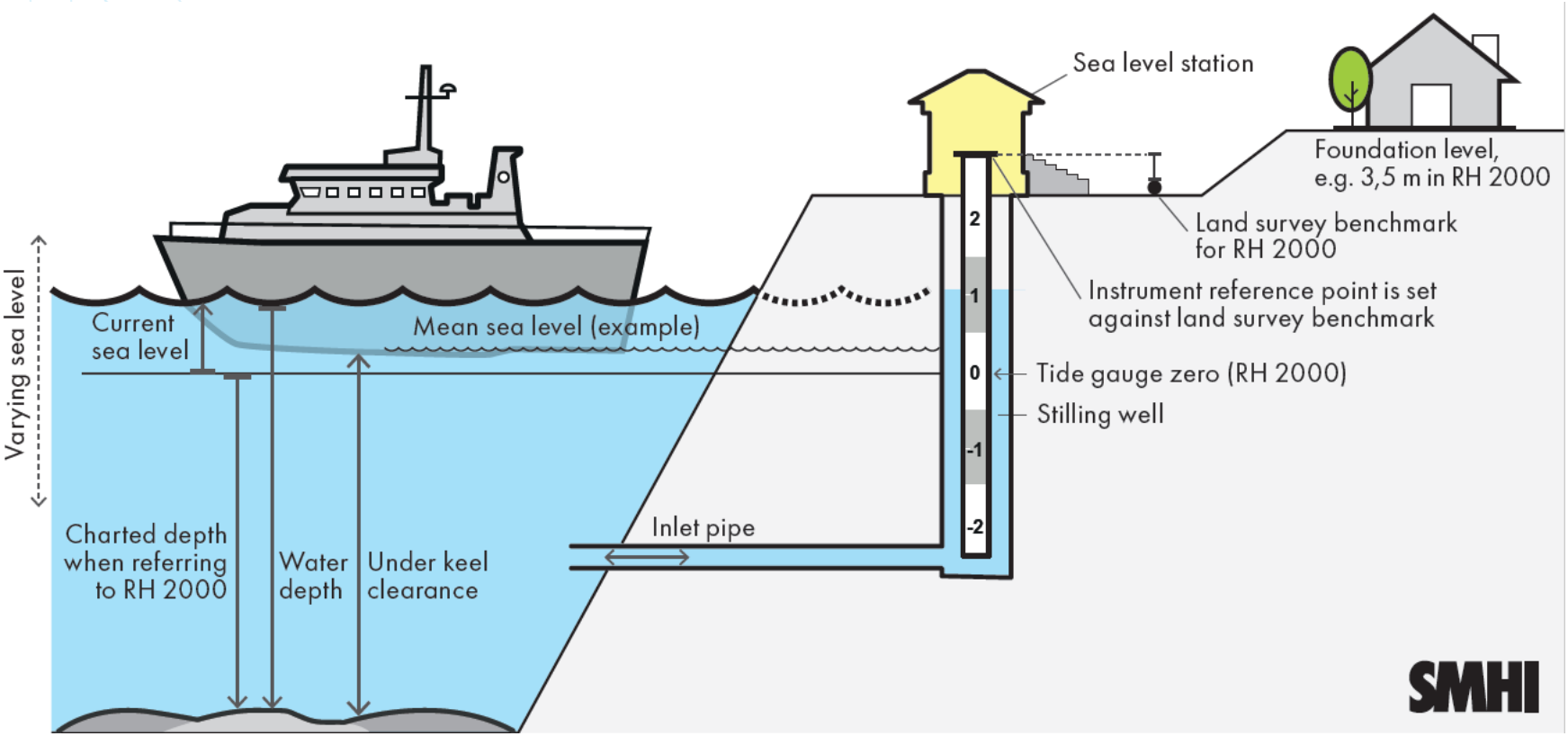

Illustration Veronica Wärn SMHI

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Thanks!

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Thomas.Hammarklint@sjofartsverket.se

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