



BUNDESAMT FÜR
SEESCHIFFFAHRT
UND
HYDROGRAPHIE

Sea-level services at BSH for North and Baltic seas

Karina Stockmann



BSH - Federal Maritime and Hydrographic Agency



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Rostock



Hamburg

BSH section “Forecasting Services”

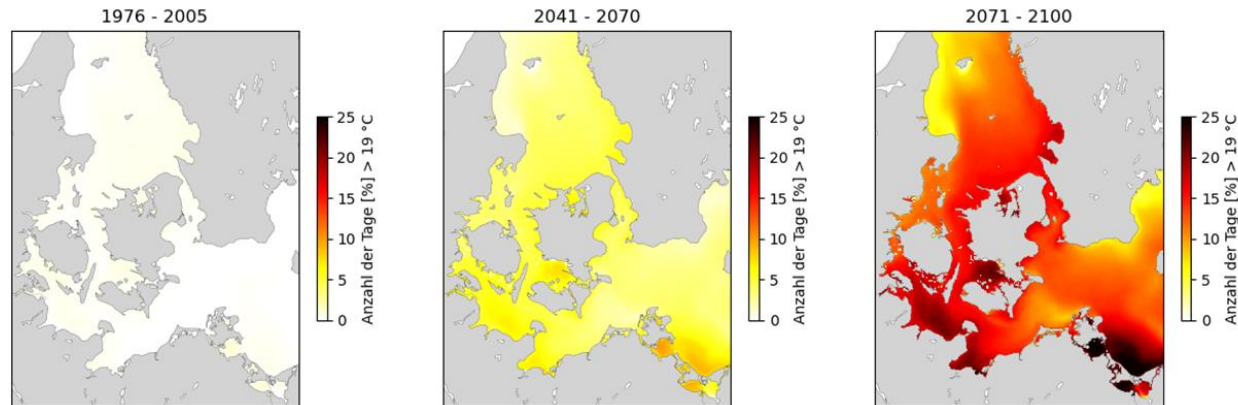
- **DAS – Basisdienst**
- **Water Level Forecast Service for the Baltic Sea**
- **Water Level Forecast Service for the North Sea**



DAS: Deutsche Anpassungsstrategie an den Klimawandel - German adaptation strategy to climate change

Duties:

- Consulting service about the IPCC report regarding future developments at the German coasts
- Advisory service about regional developments of the sea level
- Evaluation of available research information
- Advancement of the Relocatable Ocean Atmosphere Model ROAM on a regional scale (work in progress)
- Climate projections
- Cooperation with DWD, Hereon, IOW, DMI etc.



DAS: Deutsche Anpassungsstrategie an den Klimawandel - German adaptation strategy to climate change

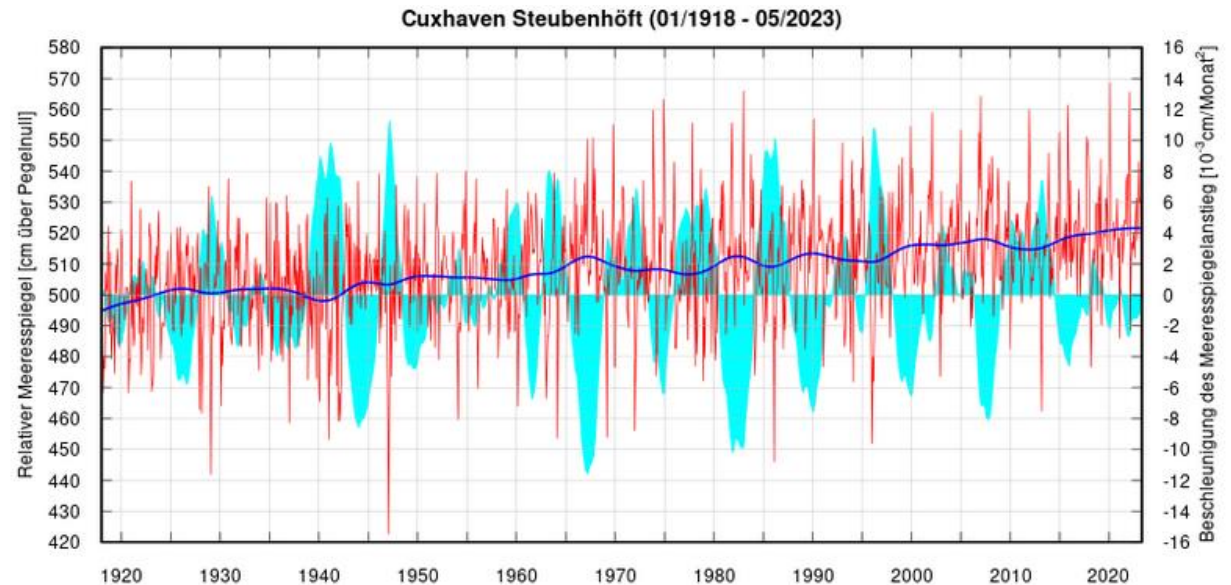
Close collaboration with BSH section “Ocean Physics and Climate”, Dr. Kerstin Jochumsen

- Marine Climate
- Oceanographic Assessments
- Mobile and stationary Measurements
- Marine Technics

and Water Level Forecast Service for the North Sea, Hamburg.

https://www.bsh.de/DE/THEMEN/Klima/Relativer_Meeresspiegel/relativer-meeresspiegel_node.html

Kontakt: Ludwig Schenk (WVD HH)



Monatsmittelwerte (rot) des relativen Meeresspiegels (über Pegelnullpunkt) am Pegel Cuxhaven Steubenhöft von 1/1918 bis zum Ende des Vormonats mit geglätteter Kurve (dunkelblau) sowie Beschleunigung des Anstiegs (hellblau). Die Grafik wird monatlich aktualisiert.

Water Level Forecast Services

North Sea - Hamburg (since 1924)



4 daily forecasts:
01:00, 08:00, 14:00, 20:00
(MEZ/MESZ)

Service presence:
On workdays: 06:00-20:30
Weekends, holidays:
06:00-13:30 und 18:00-20:30
else: call-on duty
During storm surges: throughout
presence

Baltic Sea - Rostock (since 1952)



2 daily forecasts:
08:00, 14:00
(MEZ/MESZ)

Service presence:
On workdays: 06:30-15:00

else: call-on duty
During storm surges: throughout
presence

Water levels and Storm surge warnings - Baltic Sea

Wasserstandsvorhersage für die Ostseeküste

Vorhersage erstellt am 02.06.2023, 07:22 Uhr

Kieler Bucht	Lübecker Bucht	westlich Rügens	östlich Rügens	Kleines Haff
Bis Freitag Abend				
+40 -15 ⇒	+40 +0 ⇒	+30 +0 ⇒	+30 +5 ⇒	+35 +15 ⇒
Freitag in der Nacht				
+25 -15 ⇒	+25 -5 ⇒	+20 -10 ⇒	+25 -10 ⇒	+30 +10 ⇒
Samstag im Tagesverlauf				
+10 -25 ⇒	+15 -15 ⇒	+10 -15 ⇒	+10 -10 ⇒	+25 +5 ⇒
Grafik→	Grafik→	Grafik→	Grafik→	Grafik→
Maximum und Minimum der Abweichungen vom mittleren Wasserstand in Zentimeter plus Tendenz				



Duties:

- Daily forecasts

Higher water levels/ storm surges

- Information about water levels of + 0.75 m above mean sea level
- Warnings about water levels of more than 1 m above mean sea level

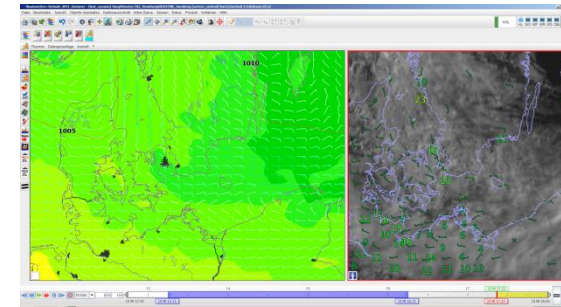
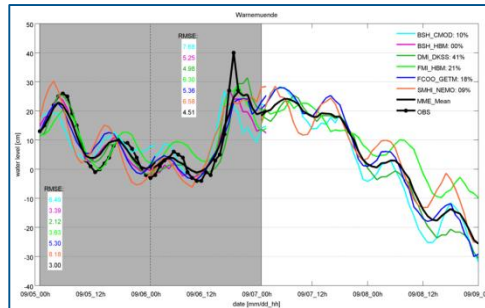
Lower water level

- Information about water levels of - 0.6 m below mean sea level
- Warnings about water levels of - 1 m

Via Navtex, automatic phone calls, Smart phones, BSH website

Water levels and Storm surge warnings - Baltic Sea

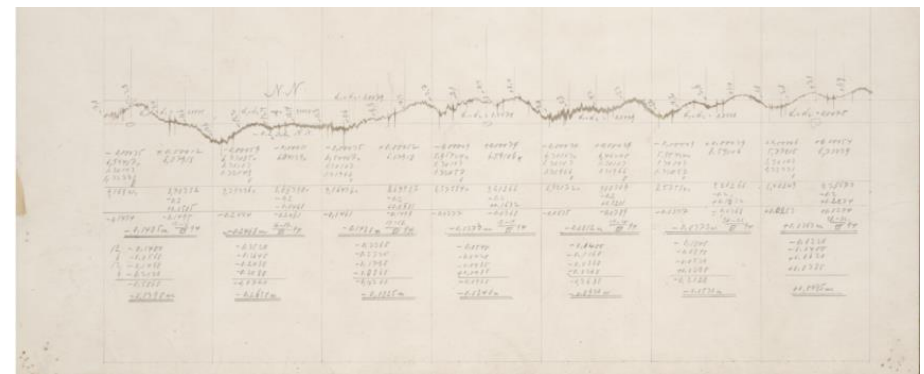
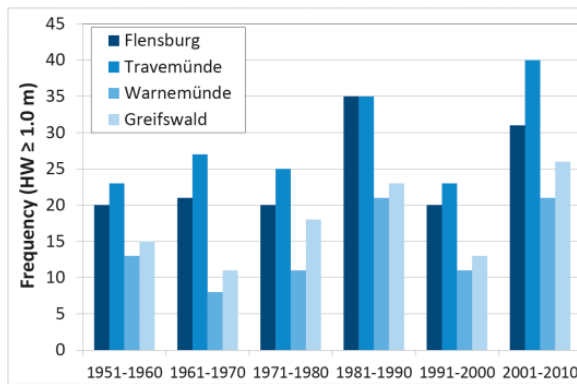
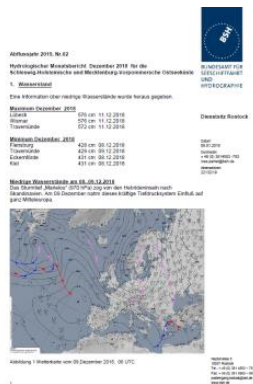
The most important input parameters are gauge observations along the German coasts (WSV), numeric models (BSH-M13, but also other baltic countries) and weather predictions provided by the DWD.



Monthly reports

Statistics

Digitization of historic gauge data sheets (since ~1954, but also older back to 1895)



Water levels and Storm surge warnings - North Sea

- Forecast of water level for the German Bight and the rivers Elbe, Weser and Ems
- 4 times a day, 7 days a week for the next 2 high waters and 2 low waters
- Special focus on 16 main gauges
- Automatic MOS forecasts for app. 40 gauges
- Presented on www.bsh.de, filebox, by FAX for special customers
- Special case: **storm surge warning**
 - Mean high water + 150 cm
 - Office permanently manned
 - Individual warnings for special regions
 - Northern– Eastern Friesland, Weser, Elbe and Hamburg



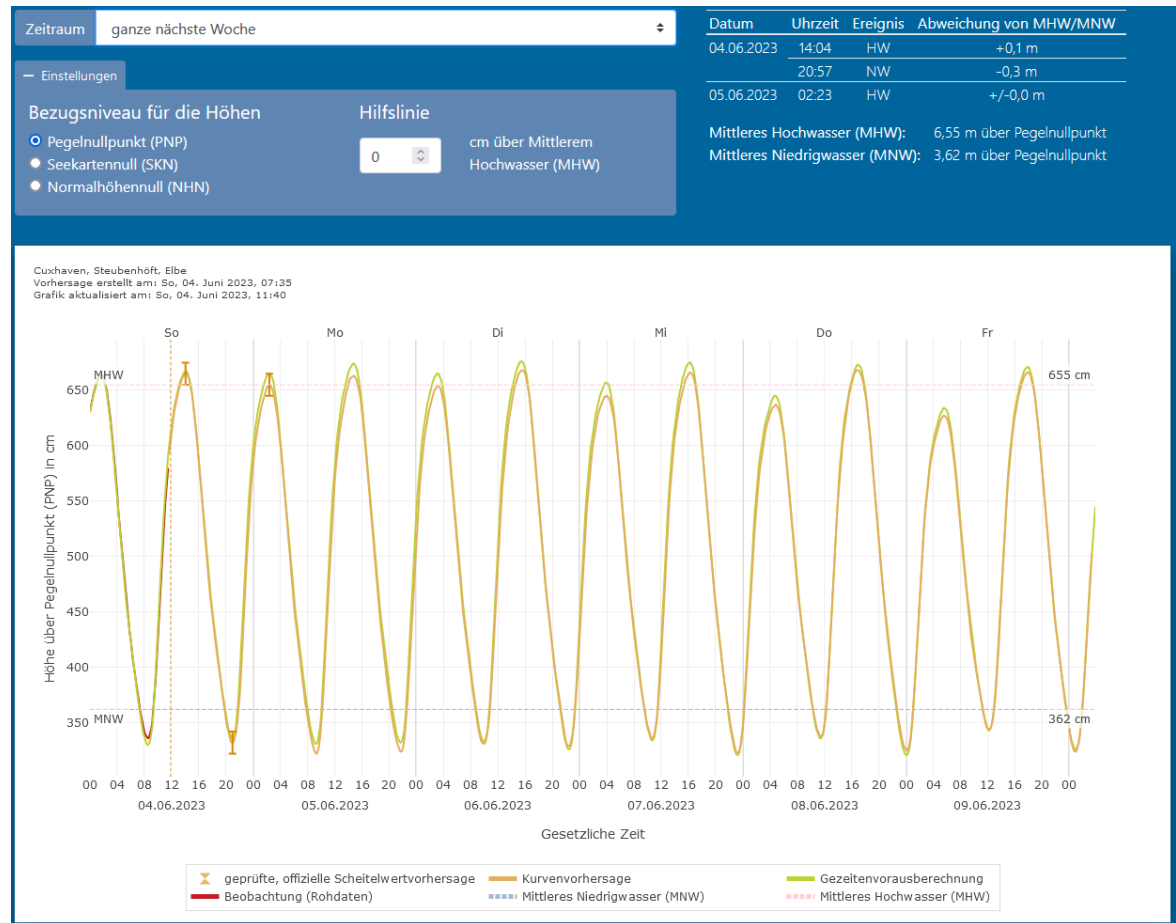
Water levels and Storm surge warnings - North Sea



BUNDESAMT FÜR SEESCHIFFFAHRT UND HYDROGRAPHIE

Duties:

- Tides
- Reviewed forecasts (next 24h)
- Automated forecasts (next 6 days)
- Customized predictions for shipping companies (14 days, for vessels restricted by their draught)
- Information on high high water level (+0.75 above mean high water - MHW)
- Storm surge warnings (MHW +1.5 m and more)
- Information on lower low water levels (-0.75 m below mean low water level)



M11: Water Level Forecast Service for the North Sea

Kontakt: Karina Stockmann

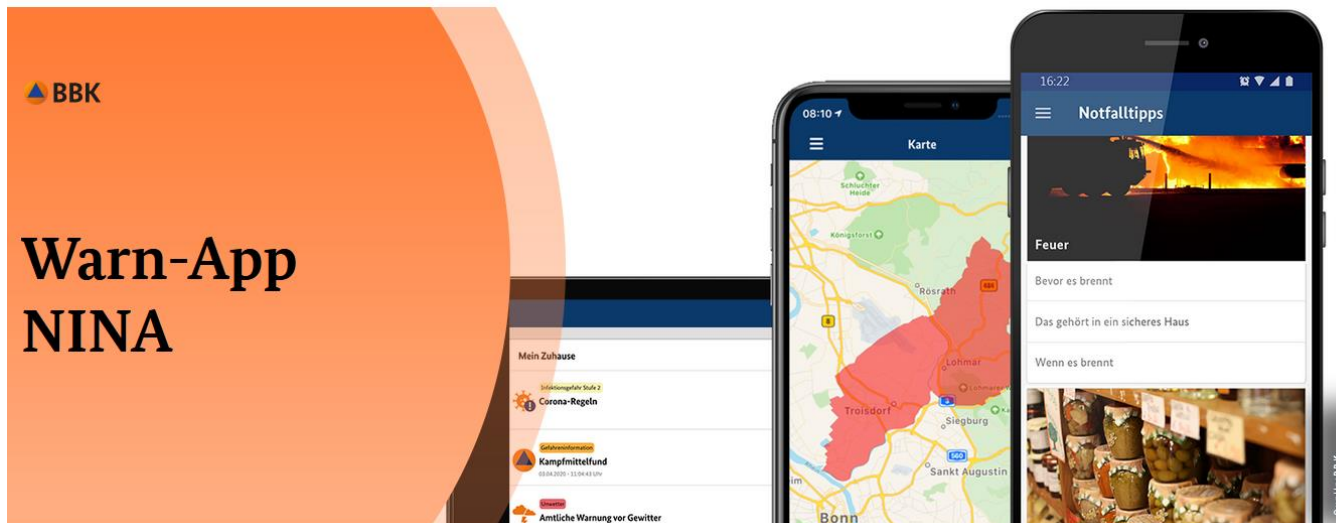
E-Mail: wvd@bsh.de

service line: +49 40 3190 3190

Water levels and Storm surge warnings - North Sea

Storm surge warnings

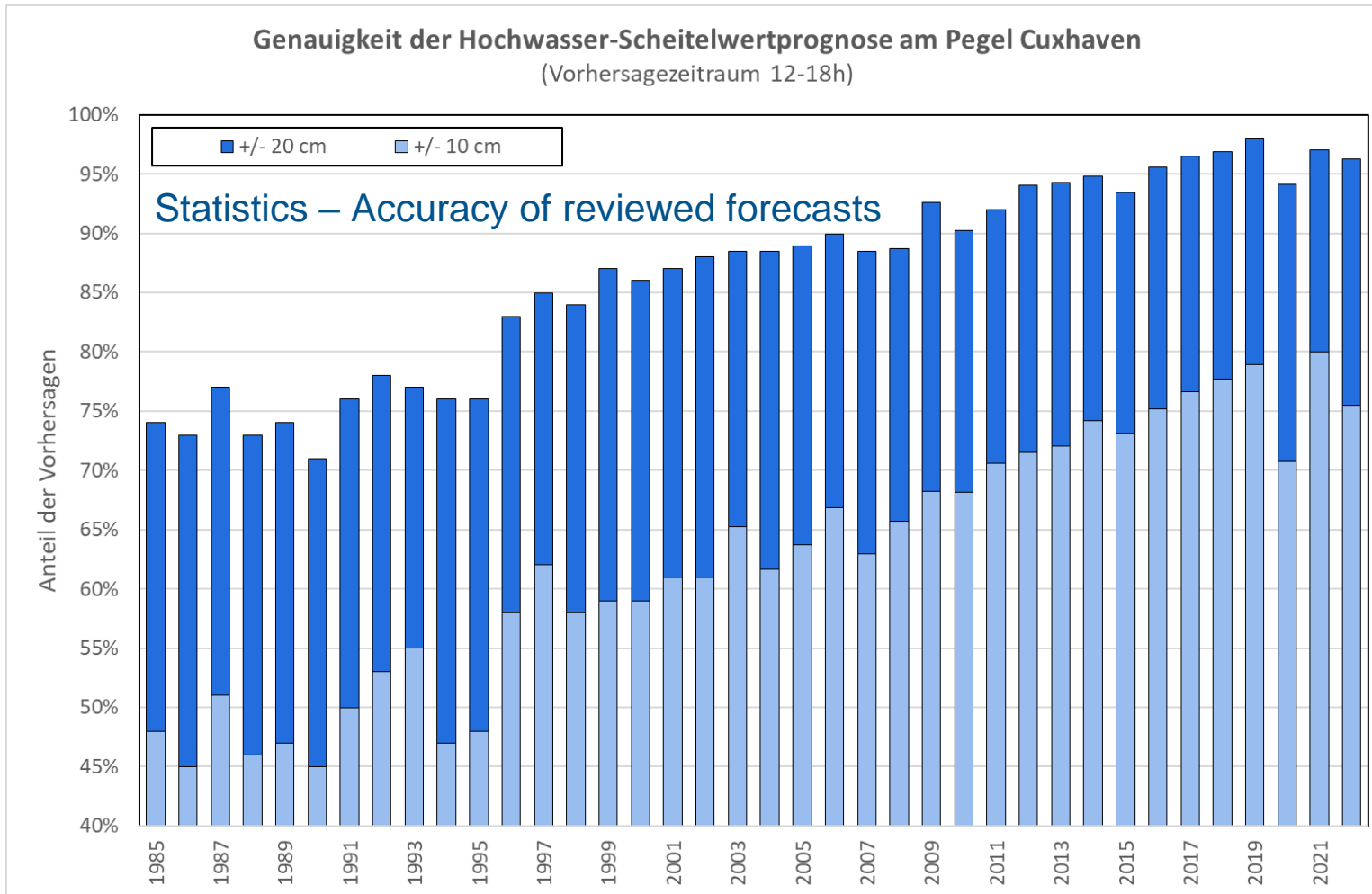
- Modular Warning System MoWaS, BBK – warnings per apps on smart phones since November 2021
- Automated phone calls
- BSH website
- Email, fax, filebox



Maintenance of reliable Emergency IT



Water levels and Storm surge warnings - North Sea



Water levels and Storm surge warnings - North Sea

MOS Method (Model Output Statistics)

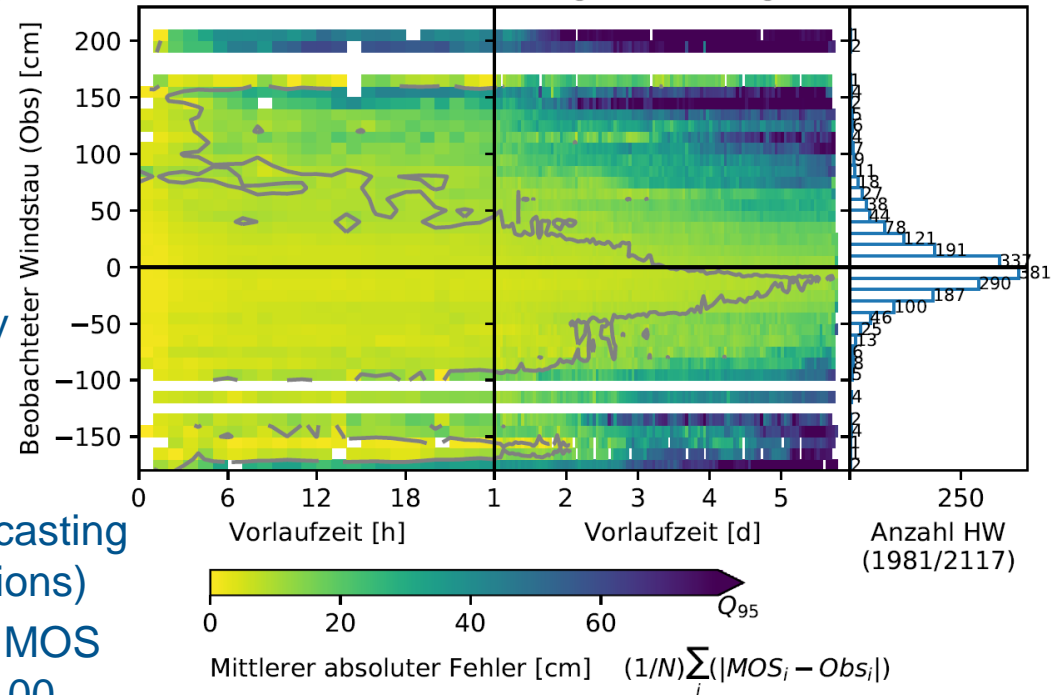
- Statistical linear regression method
- Calculating every 15 minutes, next 6 days

Statistics – MOS Accuracy

Future developments

- Optimisation and automation of the forecasting process (only non-critical weather situations)
- Coupling of BSH water level model with MOS results to receive Offshore forecasts (S100, Project ImoNav)

MOS-Verifikation für CUXHAVEN (506P)
Hochwasser (01.01.2018-31.12.2020)
Was ist der mittlere Betrag des Vorhersagefehlers?



Water levels and Storm surge warnings - North Sea

North Sea - Hamburg (since 1924)



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**Anniversary „100 years of storm surge
warning services at BSH“**

(September 2024)

Workshop to discuss future user needs and
planned developments

Public Open Day of the Water Level Forecast
Service for the North Sea

Announcement and invitations
this summer

Thank you for your attention!



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