

Germany: National Developments

NSHC Tidal Working Group 27

04-05 February 2025

Taunton, UK



BUNDESAMT FÜR
SEESCHIFFFAHRT
UND
HYDROGRAPHIE



Content

- 100 years storm surge warning service
- Websites
- Update of Chart Datum Surface 2026
- Artefacts in 2D-tidal predictions

100 Years Storm Surge Warning Service North Sea

History:

- Autumn 1924: Start of public warning service with warnings via radio and permanently manned telephone line

Activities last September:

- Press conference and reception with the mayor of Hamburg
- Public exhibition
- Workshop with expert users

1924-2024



100 JAHRE
WASSERSTANDS-
VORHERSAGE- und
STURMFLUTWARN-
DIENST Nordsee



Websites

- Waterlevel forecasts and storm surge warnings:
<https://wasserstand-nordsee.bsh.de>
English translation available soon
- Tidal predictions:
<https://www.bsh.de/tides>
[new website](#) under construction
- Tide gauge observations:
<https://pegelonline.wsv.de>
Federal gauges operated by WSV
- Chart Datum (North Sea & Baltic Sea):
https://www.bsh.de/DE/THEMEN/Vermessung_und_Kartographie/Seekartennull/seekartennull_node.html
English translation available soon
- OpenCode:
<https://gitlab.opencode.de/bsh/>
Plan: new code will be added here gradually

Update of Chart Datum Surface 2026

First step: definition of chart datum at tide gauges based on latest LAT-values (2025)

LAT valid for year 2025

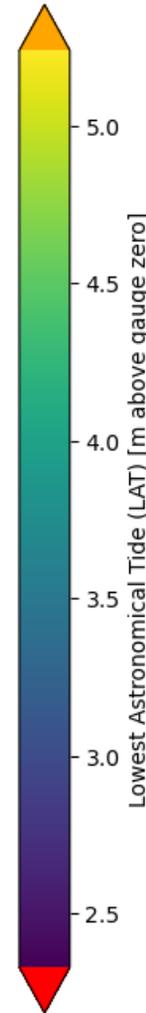
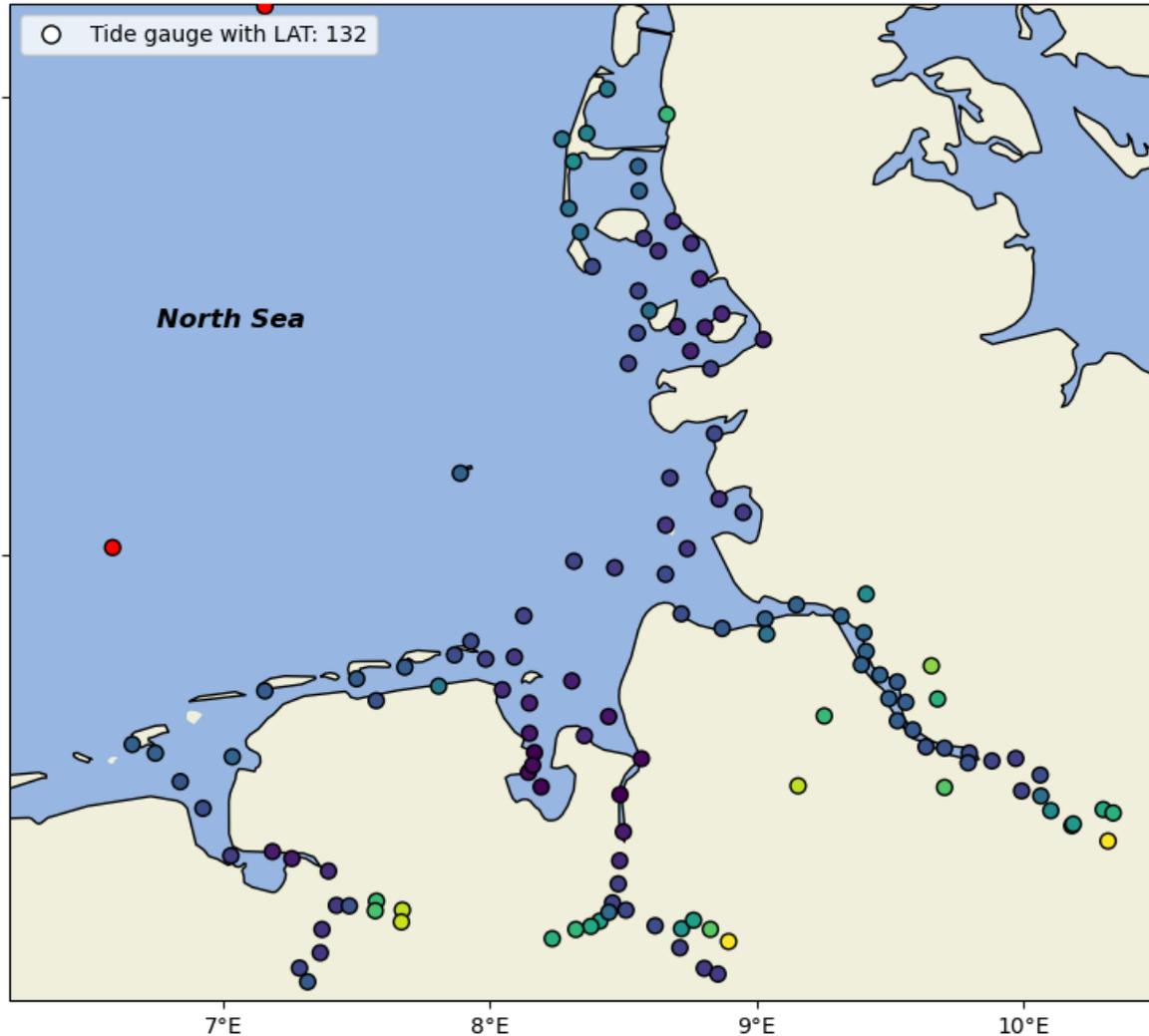
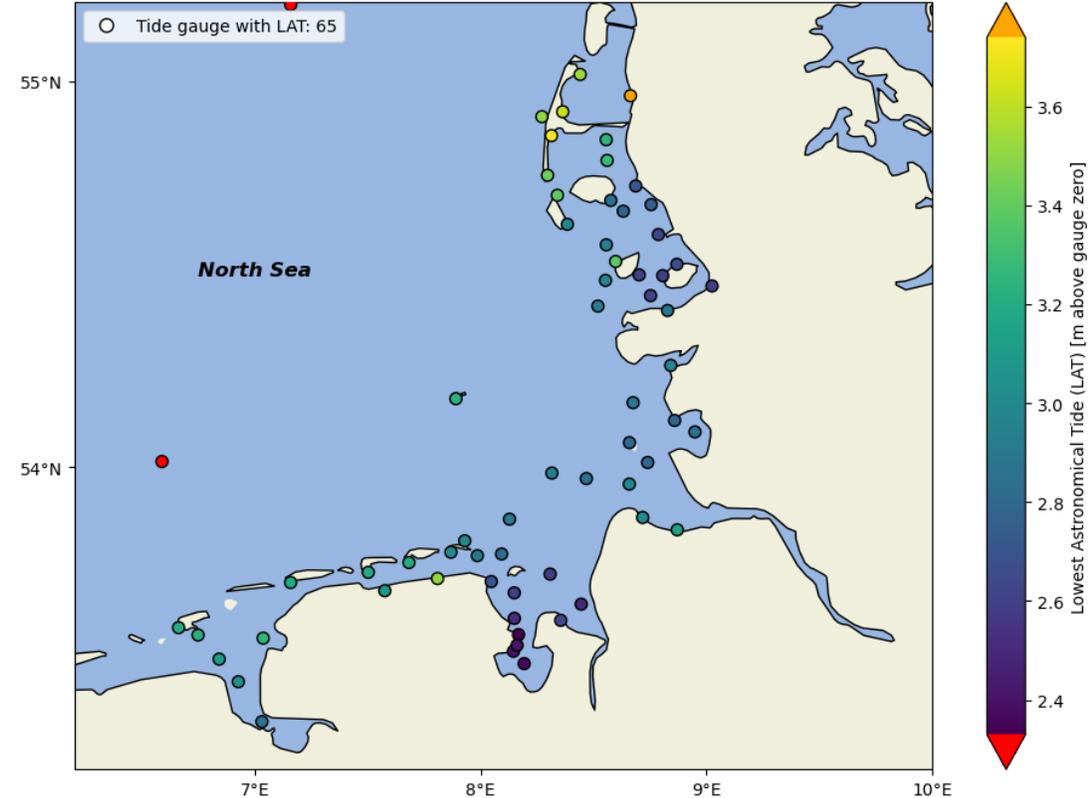


Chart datum surface is calculated only for the open sea

LAT valid for year 2025



Update of Chart Datum Surface 2026

Chart datum valid for year 2025 / LAT valid for year 2025

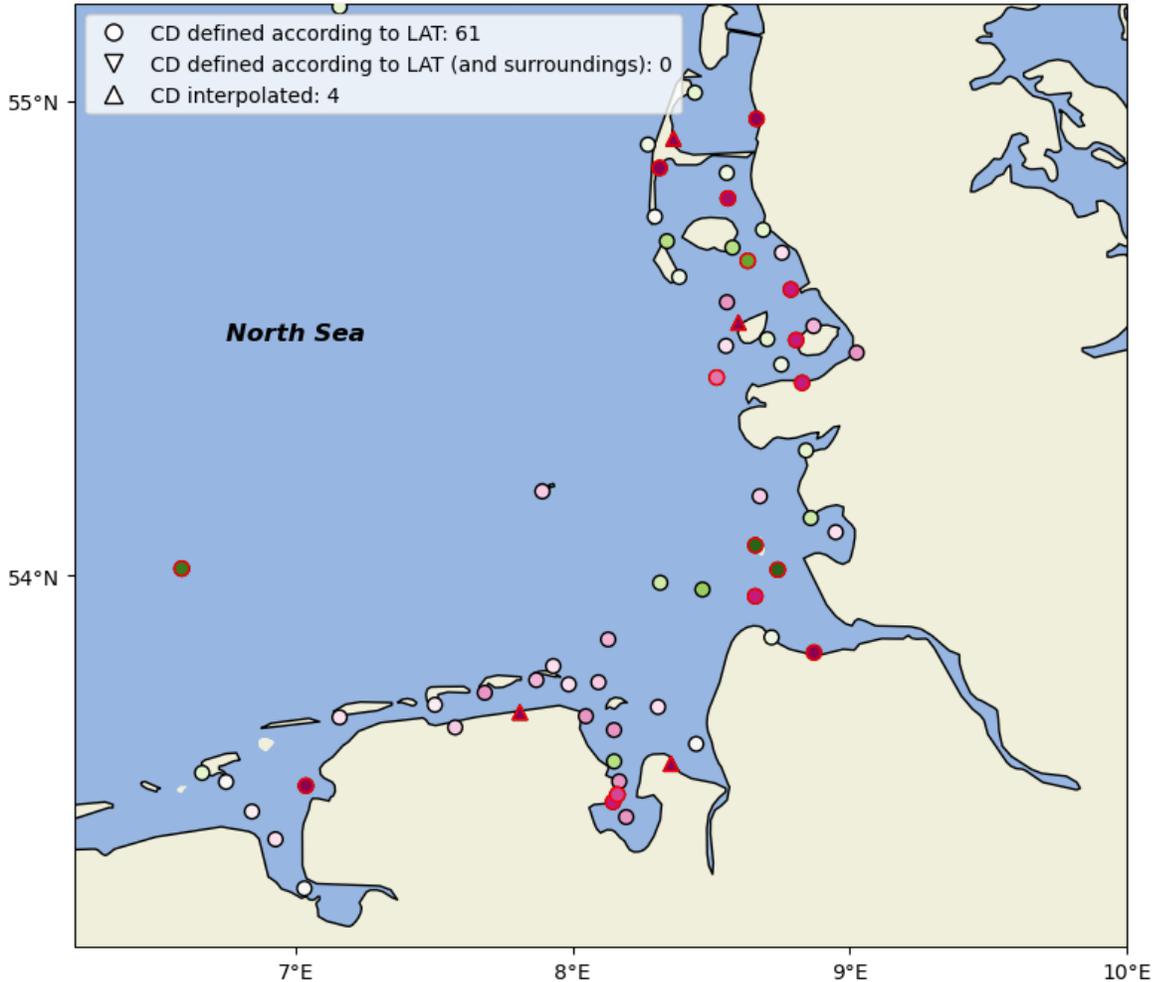
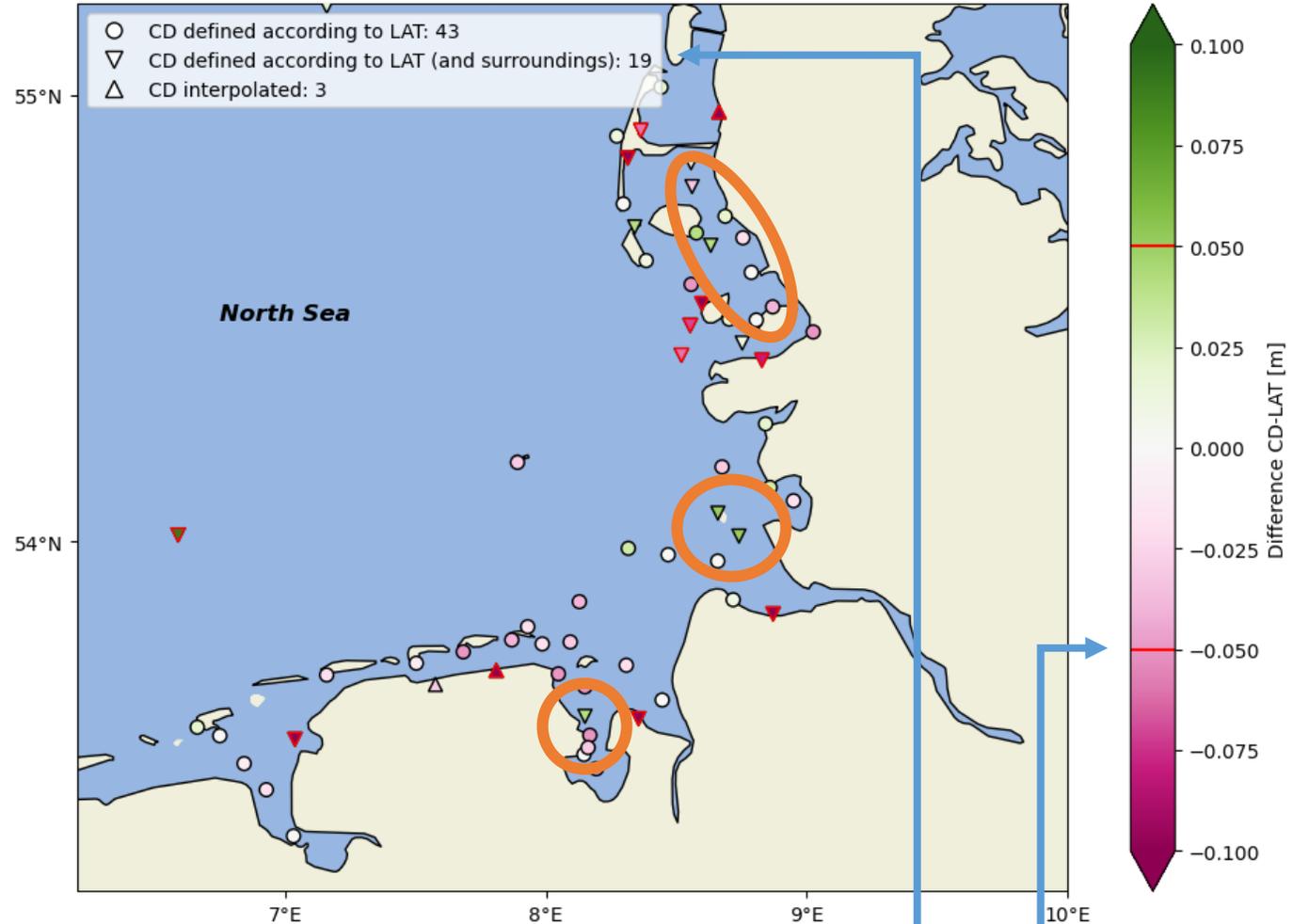


Chart datum valid for year 2026 / LAT valid for year 2025



- differences up to +/-5 cm are accepted
- some tide gauges run dry or have other dependencies, depending on surroundings

Artefacts in 2D-tidal predictions

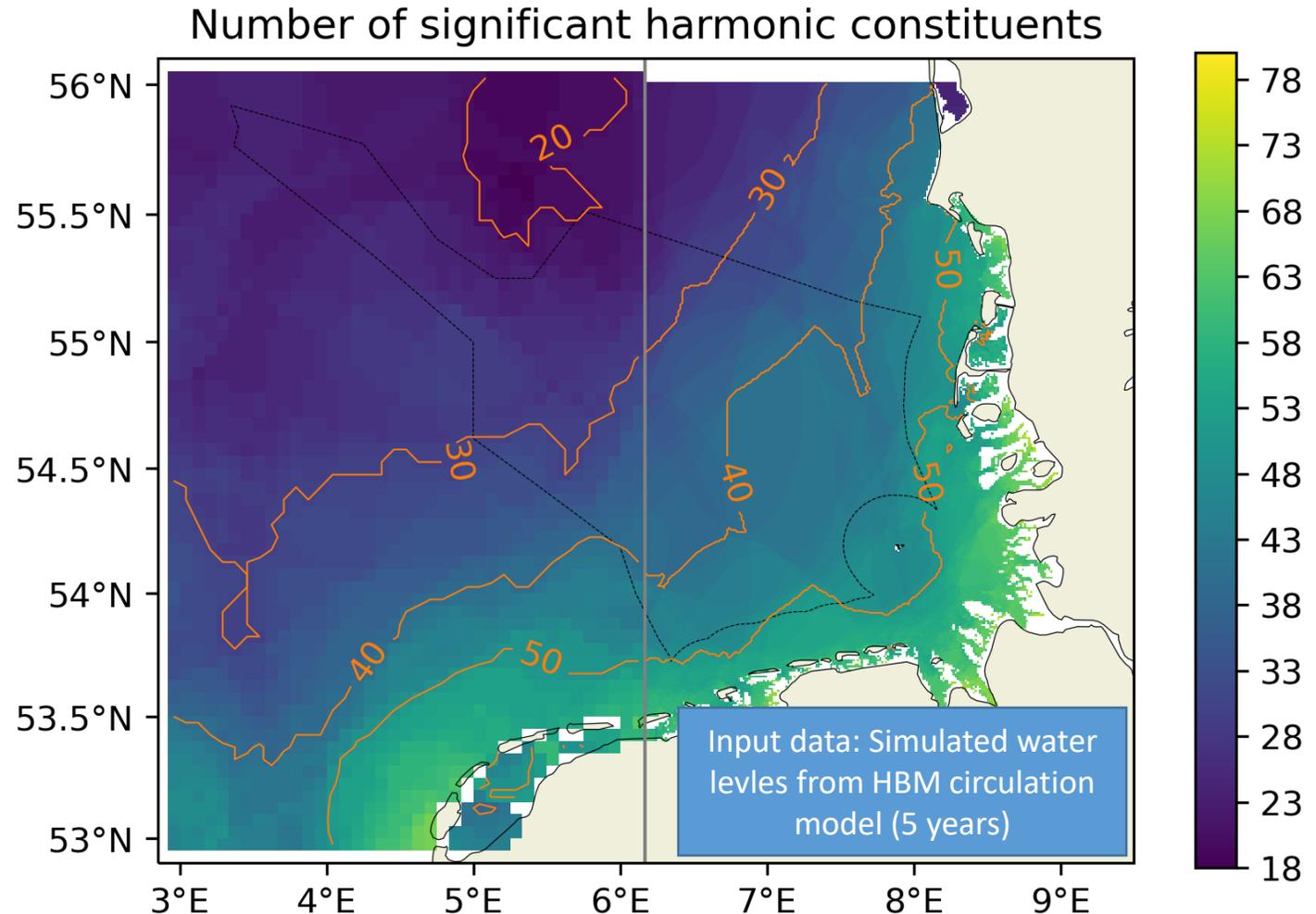
Procedure for harmonic analysis:

1. iteration:

- use all water level data provided
- Use resolvable partial tides (depending on the length of the time series) from a master list of 104 partial tides

2. iteration:

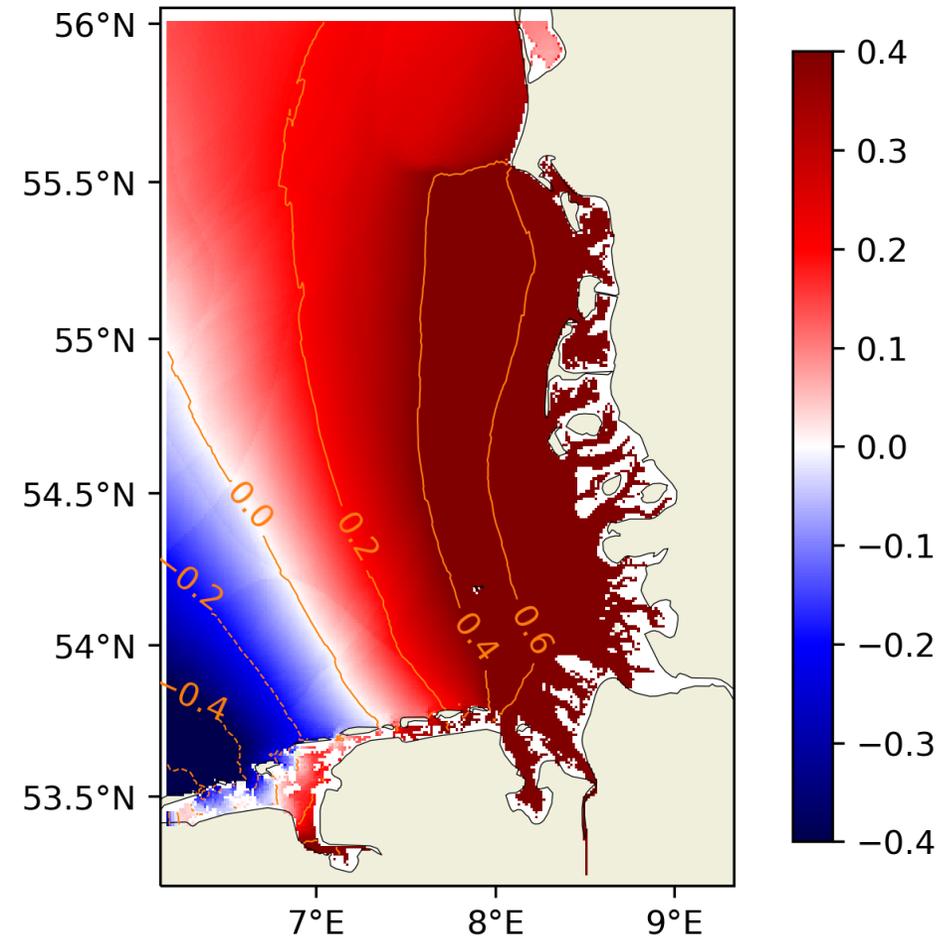
- Apply a 3-sigma-clipping to observations
- Use only „significant“ partial tides with $S/N > 2$



Artefacts in 2D-tidal predictions

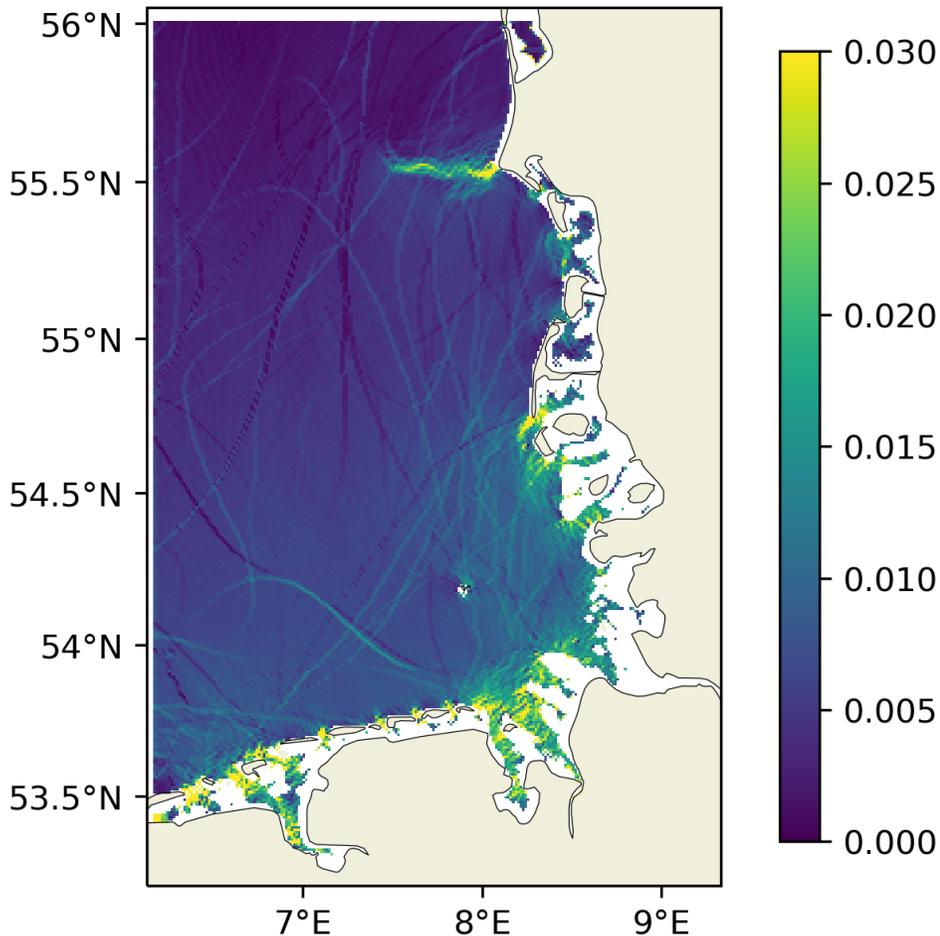
Tidal prediction

15.10.2024 23:45



Tidal prediction (Gradient)

15.10.2024 23:45



- Tidal predictions are not smooth in 2D
- Structure depends on distribution of the number of used partial tides
- No structure appears if the same number (101) of partial tides is used for all grid points

Question:

Is it better to use „too many“ (insignificant) partial tides in the analysis or should the structure in the predicted surface be accepted?