TrilaWatt

Federal Ministry for Digital and Transport

mFUND
Das Startkapital für die Mobilität 4.0

BAW
Federal Waterways Engineering and Research Institute

Dr. –Ing. Andreas Plüß

Digital hydro-morphological twin of the trilateral Wadden Sea TrilaWatt → (https://trilawatt.eu/)

Introduction

CoU Wadden Sea Sediment Solutions

4th Webinar on 11th of March 2022

Introduction to TrilaWatt

The research project **TrilaWatt** is funded by the German Federal Ministry of Digital Affairs and Transport for 3 years (start: 01.01.2022) and is managed by the Federal Waterways Engineering and Research Institute (BAW), smile consult GmbH, Wadden Sea Forum e. V. and planGIS GmbH.

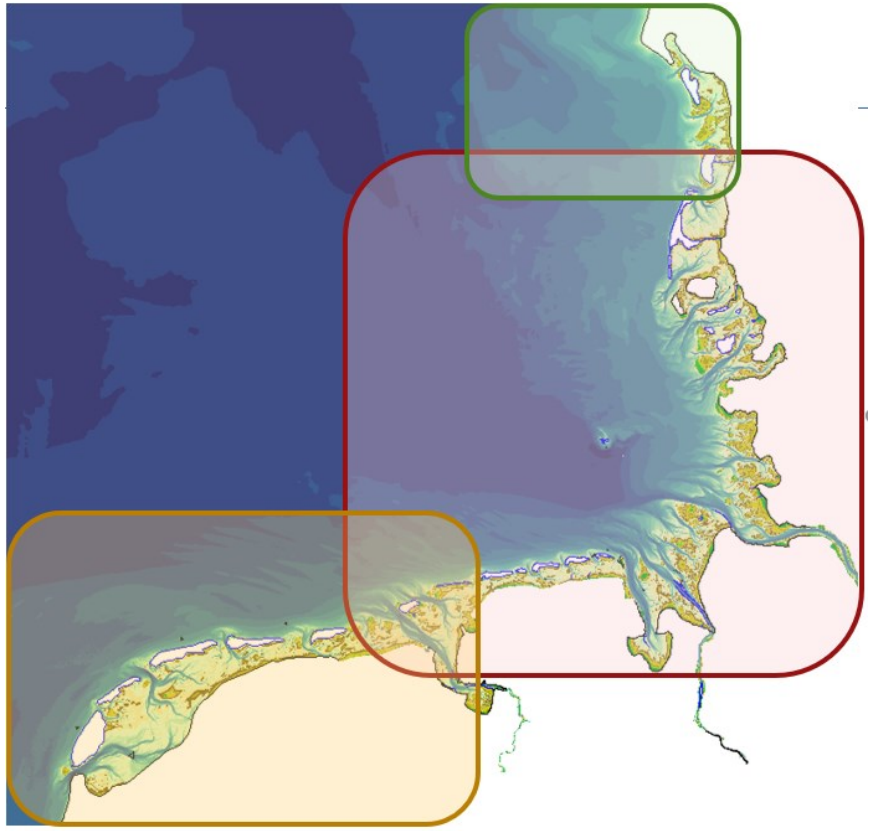
TrilaWatt develops an innovative digital geodata and analysis infrastructure for the **Trilateral Wadden Sea:**

Denmark,

Germany and

The Netherlands

It supports the planning and maintenance of transport infrastructure with harmonized, quality-assured data on **geomorphology**, **sedimentology**, and **hydrodynamics**. Geodata, analyses, and documentation methods are linked via Web portals and services to form a **planning assistance system**.



Challenges and Innovation

A major **challenge** of **TrilaWatt** is to **model** and **understand** the **complex physical processes** in coastal and especially wadden regions together with large-scale **sediment transport** in order to evaluate them for various purposes!

All of this depends on **accurate data**, which has so far been **heterogeneous, patchy**, and **not harmonized** across borders, and on appropriate tools that allow **efficient navigation** of such **Big Data**.

Planning and decision-making processes for detailed and comprehensive assessment of the mutual interactions between **sustainable use** and minimization or avoidance of adverse **environmental impacts** require sound knowledge of **hydromorphology** and **sediment transport processes.**

Preliminary work and project goals

In the previous research project Easy**GSH**-DB (easygsh/EasyEN), areal data of **geomorphology** and **sedimentology** formed the basis for synoptic long-term **numerical simulations** (1996-2015) combined with extensive analyses. However, all this was mainly focused on the **German Bight** region!
These data are freely available via Geoportals such as **MDI-DE** (mdi-de.org), *mCLOUD* (www.mcloud.de/web/BAW) and GOVDATA (www.govdata.de/web/baw/).

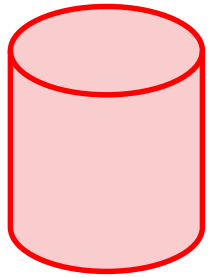
The **preceding work** in MDI-DE and EasyGSH-DB is the basis for this project and will be **extended** to the **whole Wadden Sea** area. Project goals are:

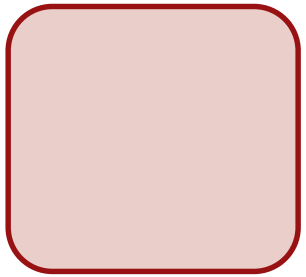
- **Extension** and **completion** of the **data base** of geomorphology, and numerical simulations (2005, 2010, 2015 and 2020) for the **entire trilateral Wadden Sea**
- Development of a **data management system** and implementation of **documentation** and **analyses components**
- **Integration into MDI-DE** as user interface and provision of **web services**
- **Stakeholder participation process** from NL, DK and DE

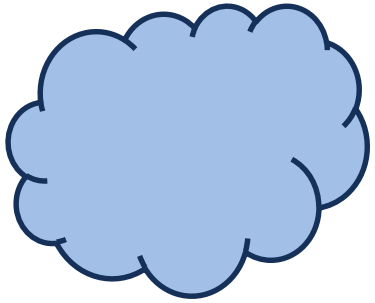
Work flow

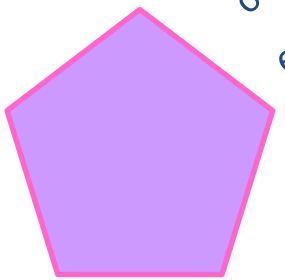
Data infrastructure

Analyses infrastructure









cable route design

expertise report (BAW, WSV)

planning of infrastructure

reporting obligations (MSRL, …)

sedimentation in coastal harbors

Geo-Data base:

Trilateral Wadden Sea

yearly bathymetries: 2005 – 2021 consistent and synoptic sedimentology with areal analyses morphological mass budget

Hydrodynamic:

Trilateral Wadden Sea

HN-simulations 2005 - 2020 based on Geo-Data spec. sediment transport extensive analyses documentation

Delivery:

simple / easy search

detailed reporting

meaningful pictures

easy / fast download

data / metadata

German / English

Application:

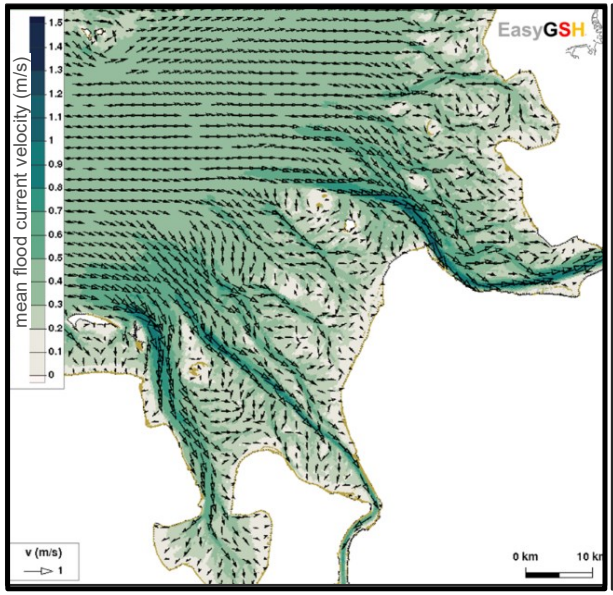
use-cases

stakeholder requirements

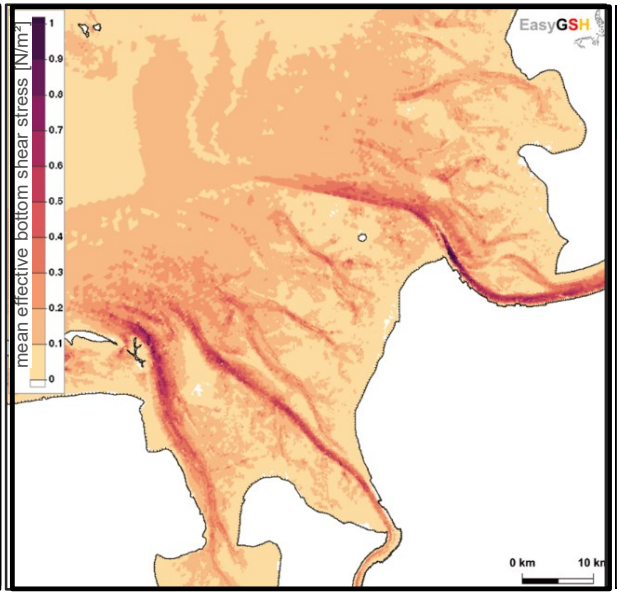
governmental aspects

NGO-aspects

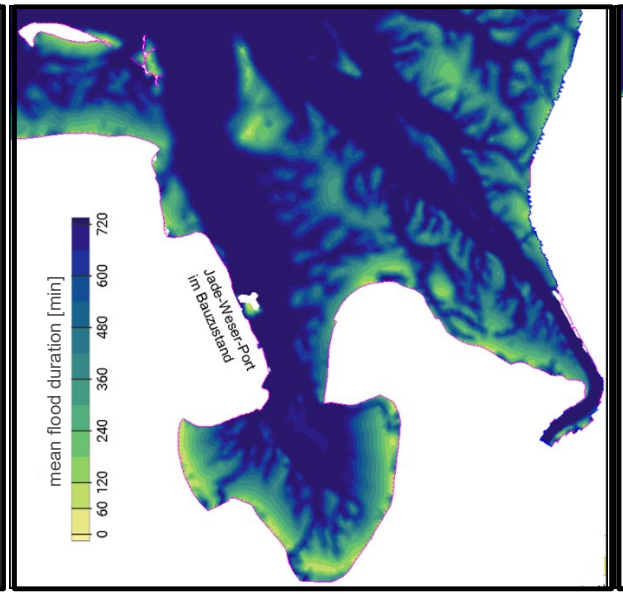
Examples



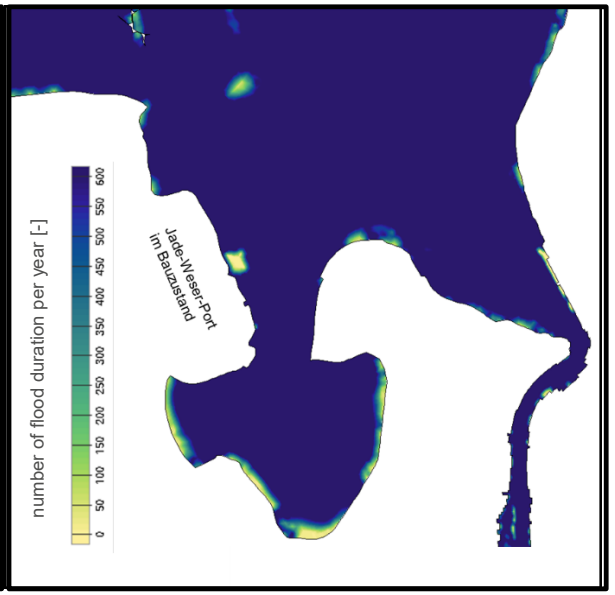
Mean flood velocity [m/s]



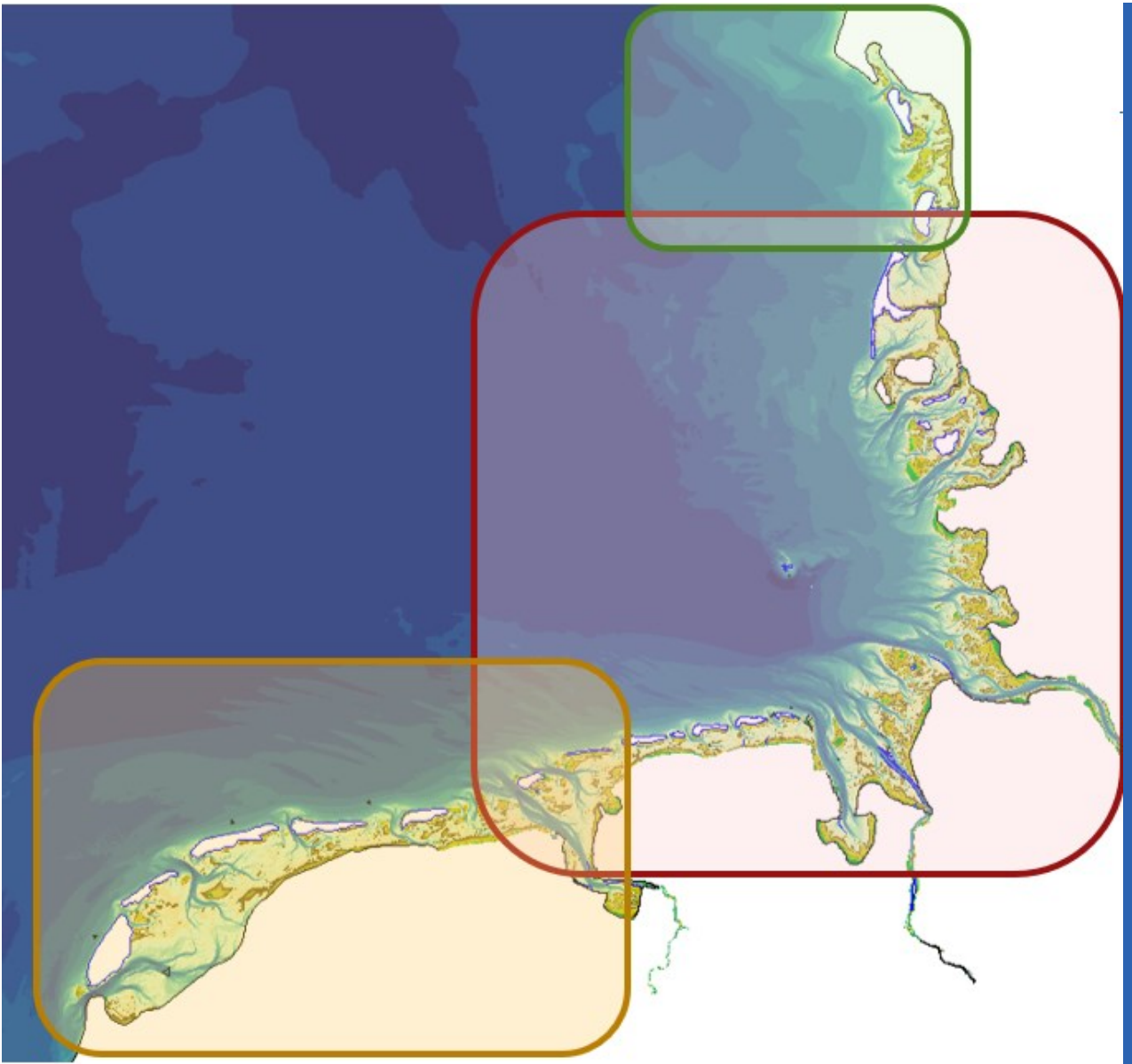
Mean effective shear stress [N/m²]



Mean flood duration [min]



Number of flood events [-]



Thank you for your attention –
and now it’s time for questions,
remarks, hints, …

Federal Waterways Engineering and
Research Institute
22559 Hamburg, Germany

www.baw.de

Vielen Dank!
hartelijk dank!
mange tak!

Literature / Product list

TrilaWatt

Related literature:

- Sievers, J. et al. (2021): An integrated marine data collection for the German Bight – Part 1: Subaqueous geomorphology and surface sedimentology (1996–2016). Earth Syst. Sci. Data, 13, 4053-4065, https://doi.org/10.5194/essd-13-4053-2021/a> / https://essd.copernicus.org/articles/13/4053/2021/
- Hagen, R. et al. (2021): An integrated marine data collection for the German Bight – Part 2: Tides, salinity, and waves (1996–2015). Earth Syst. Sci. Data, 13, 2573–2594, https://doi.org/10.5194/essd-13-2573-2021 https://essd.copernicus.org/articles/13/2573/2021/essd-13-2573-2021.html
- Hagen, R., et al. (2018): Impact of small bathymetric changes on large-scale hydrodynamics, PECS - Galveston, Texas, https://mdi-de.baw.de/easygsh/assets/Dokumente/Veroeffentlichungen/Hagen_2018_PECS_TX.pdf
- Plüß, A., et.al., (2020): Wissenschaftlicher Abschlussbericht zum mFUND-Projekt: EasyGSH-DB (German), https://doi.org/10.2314/KXP:1744505187
- Hagen, R., et.al., (2019): Validierungsdokument - EasyGSH-DB - Teil: UnTRIM-SediMorph-Unk (German), doi: https://doi.org/10.18451/k2_easygsh_1
- Freund, J., et.al., (2020): Flächenhafte Analysen numerischer Simulationen aus EasyGSH-DB (German), doi: https://doi.org/10.18451/k2_easygsh_fans_2

Product list:

Geomorphology: yearly bathymetries: 1996 - 2016 (https://mdi-de.baw.de/easygsh/EasyEN_DownloadG.html#home)

Sedimentology: Petrographic maps, d50, sorting, skewness and porosity for 1996, 2006 and 2016 (https://mdi-de.baw.de/easygsh/EasyEN_DownloadS.html#home

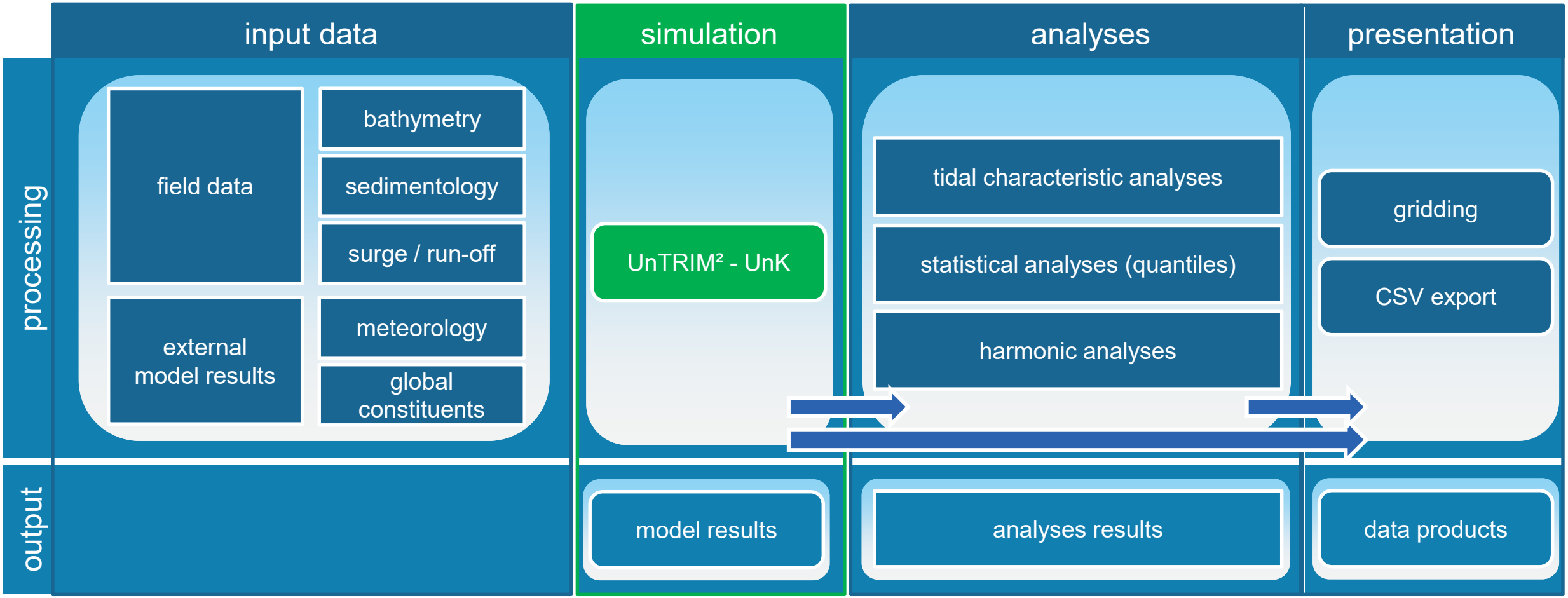
Hydrodynamic / Analyses: (mdi-de.baw.de/EasyEN_Download)

- Tidal characteristic numbers / values (1996 - 2016):
  water level, currents, salinity, effective bed shear stress
- harmonic analysis of water level: 1996 – 2016
- characteristic numbers of wave and sea state,
  independent of tides: 1996 – 2016

Synoptic hydrodynamics: (mdi-de.baw.de/EasyEN_Viewer_syn)

- Synoptic values on a 1000 m - grid (1996 - 2015):
  water level, currents, salinity, effective bed shear stress, sea state
- sea state data at selected locations (1996 – 2015)

Product lineage



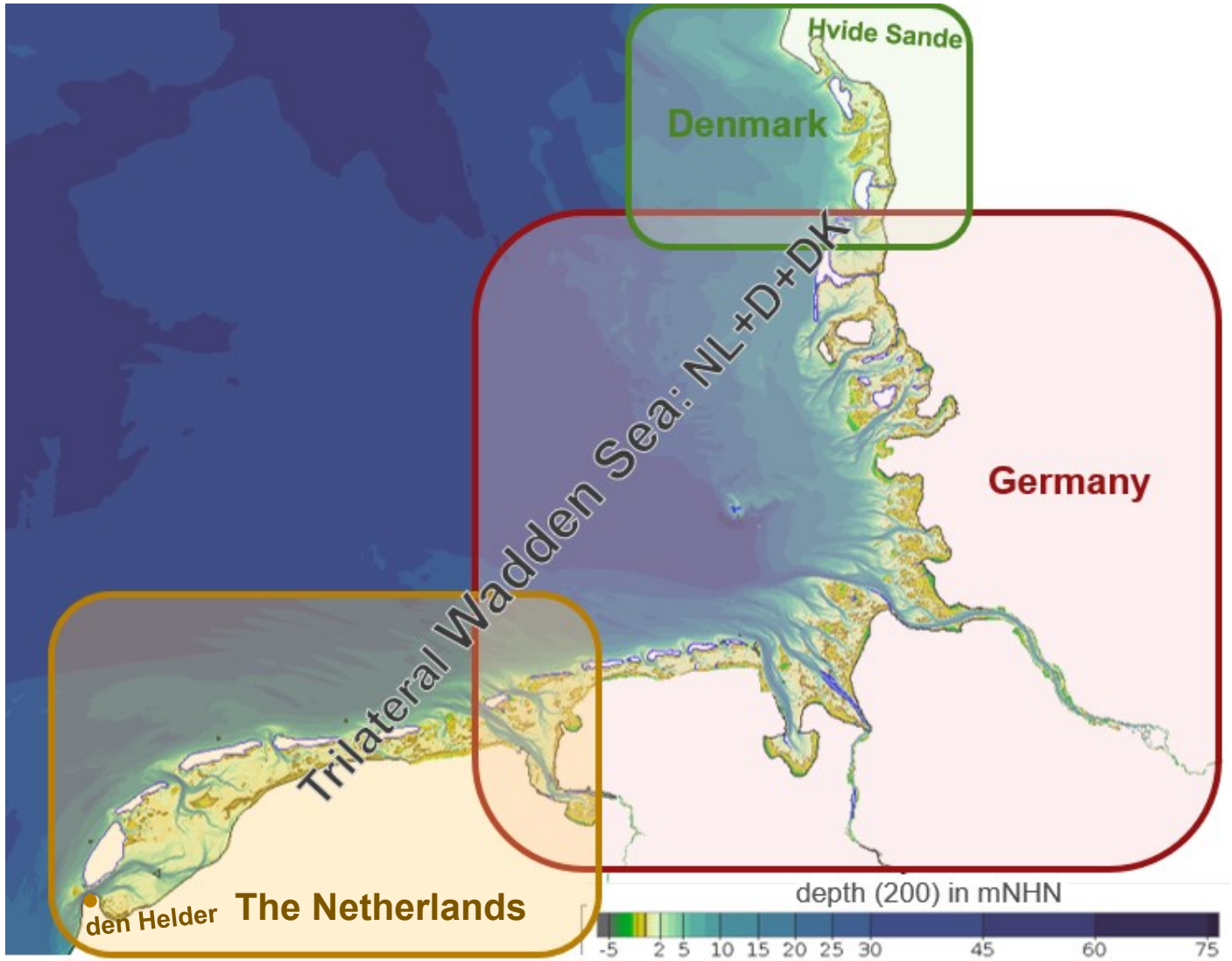
Project Area

the **project area** comprises the **entire Trilateral Wadden Sea:**

The Netherlands

Germany

Denmark



Project participants

Funding:

German Federal Ministry of Digital and Transport
within the call of the *mFUND*-Initiative

Project Partner:

- Federal Waterways Engineering and Research Institute (BAW)
- smile consult GmbH
- Wadden Sea (WSF)
- Marine Data Infrastructure Germany (MDI-DE)
- planGIS GmbH

TrilaWatt-portal (https://trilawatt.eu/)
MDI-DE (mdi-de.org)
mCLOUD (www.mcloud.de/web/BAW)
GOVDATA (www.govdata.de/web/baw/)