BMVI mFUND joint research project: EasyGSH-DB
Creation of application-oriented synoptic reference data on geomorphology, sedimentology and hydrodynamics in the German Bight (EasyGSH-DB)

Motivation and objectives
The heterogenous and sectorally distributed administrative data will be made accessible for multiple use. Currently, there is a lack of homogenous, nationwide, gapless data and metadata for longer periods of time -> Big Data. Quality-assured synoptic reference data on geomorphology, sedimentology, hydrodynamics and sea state are generated as hindcast from existing datasets. Together with a variety of analyses, these are made available to different target groups via established branch Web portals. Users come from a wide range of organizations in the maritime industry, the administrations and representatives of public interests. Interactive product development ensures a high degree of practical relevance through a stakeholder participation process.

Project structure

Project partner
- Federal Waterways Engineering and Research Institute (BAW): Project management, simulations, analyses, data management and publication
- Federal Maritime and Hydrographic Agency (BSH): Provision of soil-related field data and products
- Hamburg University of Technology (TUHH): Simulations (multi-model-approach) as well as E-Learning applications
- smile consult GmbH: Creation of time-variant bathymetries by interpolation model grids
- Küste und Raum GbR (KUR): Participative product development and stakeholder surveys

Sea bed data for bathymetry and sedimentology
Variable bathymetry on the coast and in the wadden sea:
- consistent digital annual bathymetries
- by a space-time interpolation
- for each year from 1996 to 2016
- as a synoptic basis for the different computational grids -> model depths
- grid-based deployment

Sedimentology:
- grain size distribution function
- spatial interpolation on different computational grids -> sediment distribution
- variable number of grain fractions
- constant for all simulation years
- grid-based deployment

Simulation data and analyses from modeling
Simulation duration:
01.01.1996 - 01.01.2016
Simulation models:
BAW: UTRIM², SediMorph, UnixK
TUHH: TELEMAC, TOMAWAC, SYSIPHE
Simulation results:
- tidal dynamics, salinity & sediment transport
- sea state parameters
Analyses of simulation data (per year):
- partial tides: amplitudes/ phases
- constant values: wave height, length and direction
- extreme values: water level, currents and salinity
- sea state parameters: wave height, length and direction

Open Data Catalog
Data Management for Big Data:
Data management for Big Data consists of a hierarchical, distributed database system and context-adapted data models in combination with a metadata management system.

Quality assurance:
Quality assurance is ensured by the chosen multi-model-approach and detailed documentation by metadata.

E-Learning:
The E-Learning modules (https://e-learning.tu-harburg.de/studip) for teaching and practice ensures easy usage of all data sets by potential users.

Publication and use of the data products
The annual analyses of the state variables are provided as
- WMS for visualization with shape files,
- WFS for download as raster data in netCDF or CSV files and
- CS-W for documentation with INSPIRE compliant metadata.
The data products are searchable
- in the EasyGSH-DB Web portal (http://easygsh-db.org), being
- a branch Web portal of the Marine Data Infrastructure Germany MDI-DE (https://wwwmdi.de/mdiportalu), which is connected to
- the national spatial data infrastructure GDI-DE (http://wwwgeoportal.de/DE/GDI-DE) as well as
- in the mCLOUD (https://wwwmccloud.de) of the BMVI.