Geodatastyrelsen

NSHC TWG26 - Unifying the vertical reference of
bathymetric surveys within the Danish EEZ
Kristian Kristmar & Nicki Andreasen
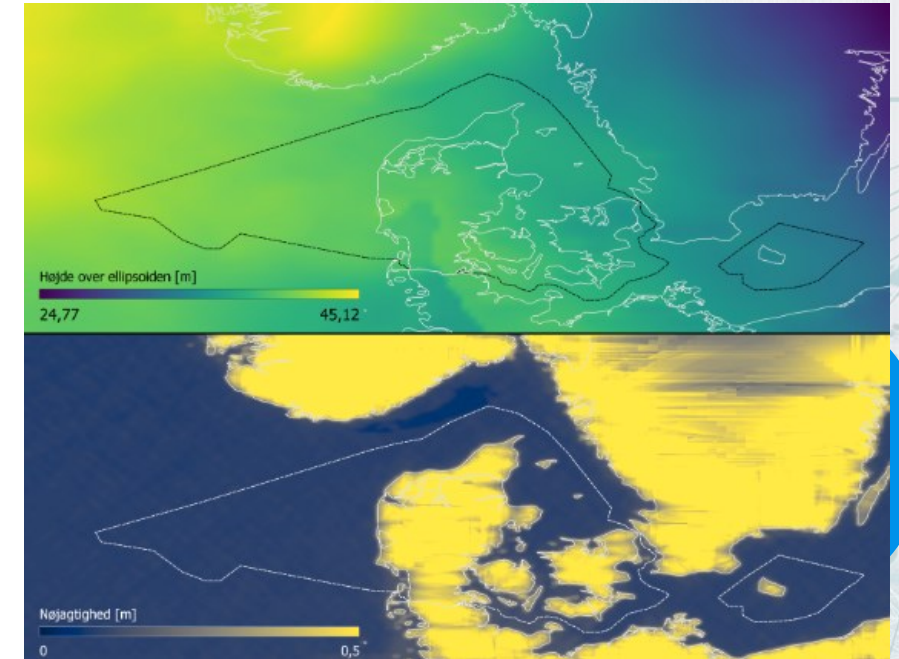
New vertical references

- Satellite altimetry based LAT and MSS surfaces have been published by The Danish Agency for Data Supply and Infrastructure (SDFI)

- Well defined reference surfaces at sea as compared to land first surfaces

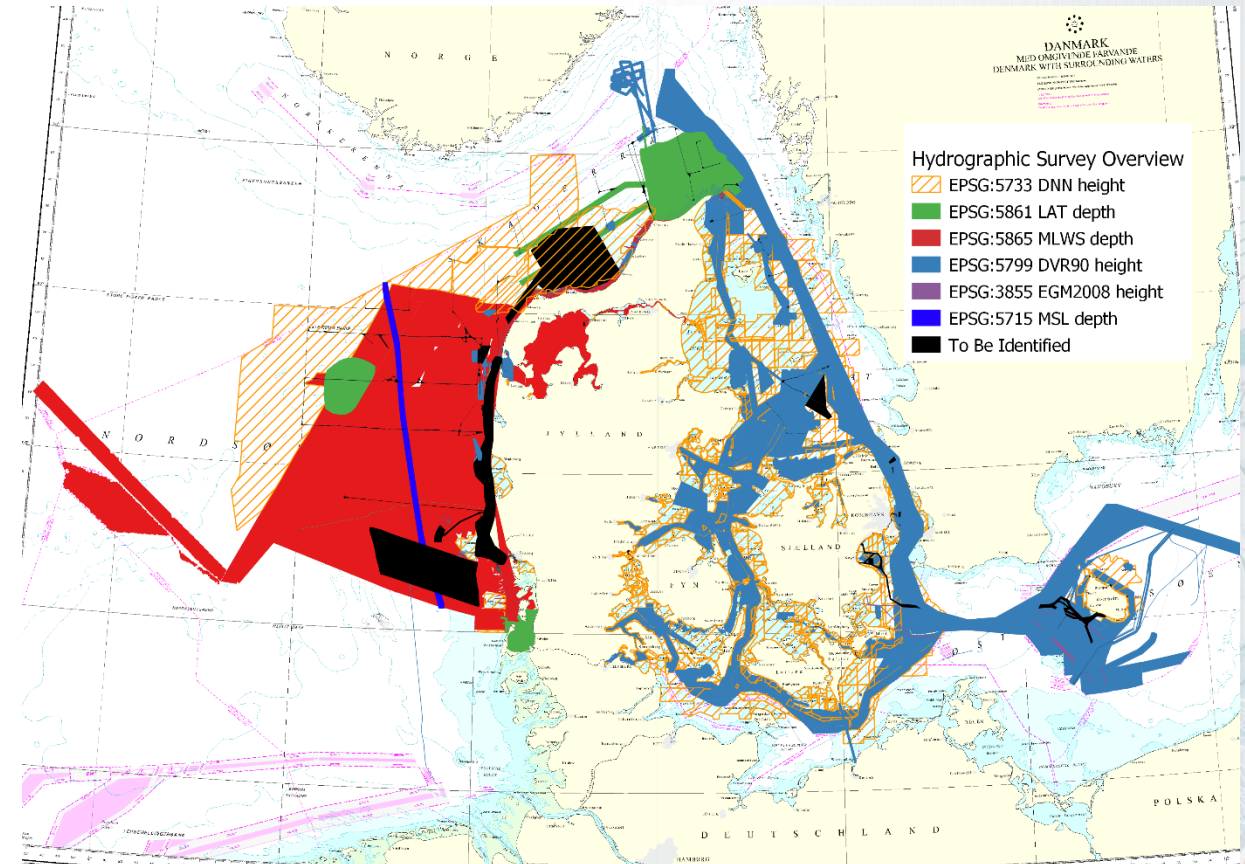- Simplifies transformation of surveys

SDFI 2023;
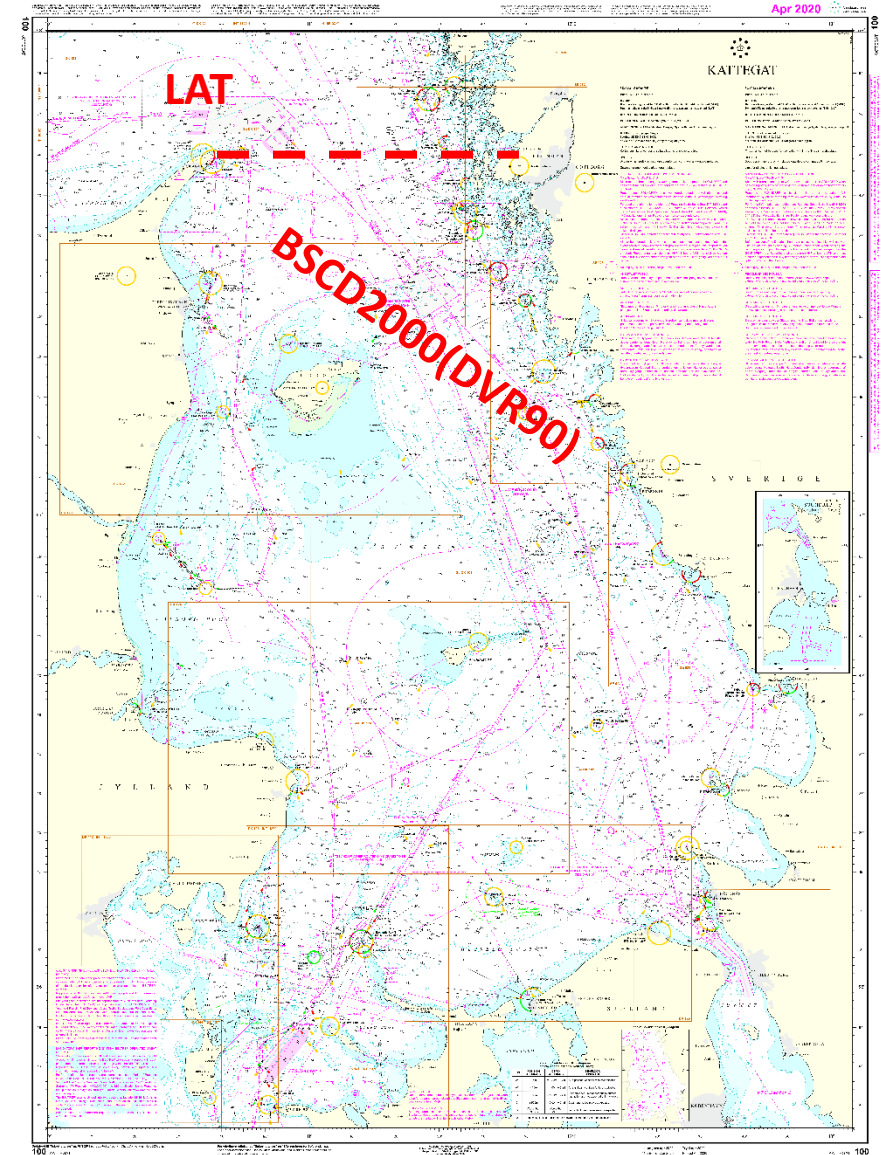"DKLAT: Referenceflade for laveste astronomiske tidevand i og omkring Danmark"
https://sdfi.dk/Media/638167943651552271/007-DKLAT.pdf

More than 100 year old surveys

- Old charts with unknown origin of survey data

- Loss of meta-data through time

Hydrographic Survey Overview
- EPSG:5733 DNN height
- EPSG:5861 LAT depth
- EPSG:5865 MLWS depth
- EPSG:5799 DVR90 height
- EPSG:3855 EGM2008 height
- EPSG:5715 MSL depth
- To Be Identified

Geodatastyrelsen

Between 2 sea's

- Two official datums

- LAT in the North Sea

- BSCD2000(DVR90) in the Baltic

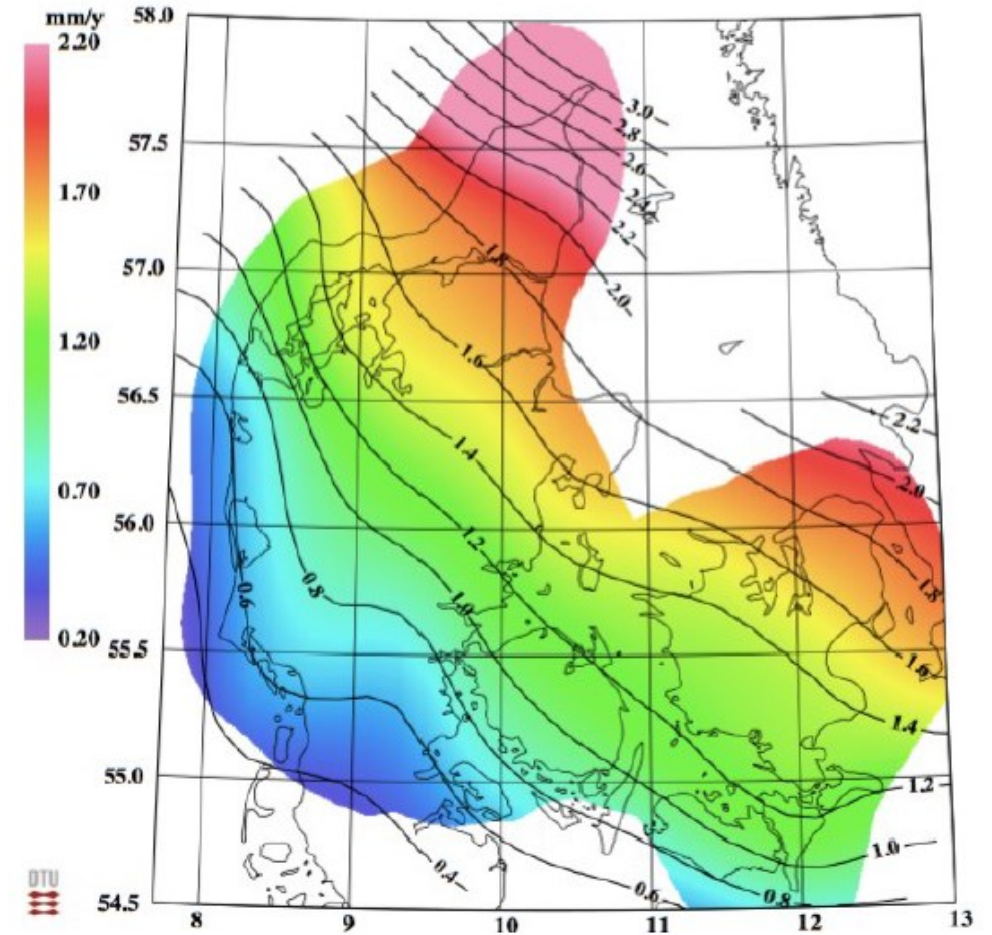- Multiple older datums in old data and charts.

Acceptable approximation

- For some surveys measurement was done in deci meter

- Internal survey quality indicators can guide decisions with regards to how precise a transformation needs to be

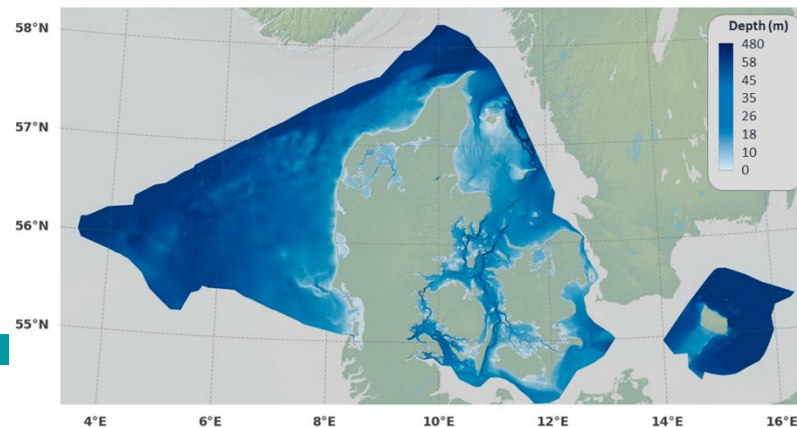- For old enough surveys the bathymetry is expected to have changed

Per Knudsen DTU SPACE 2016;
"Kortlægning af landbevægelser fra satellit"
https://sdfe.dk/media/2920028/leverancer_monitorering-af-infrastruktur-og-landbevaegelser-fra-satellit_2020.pdf

Unify data in well defined destination datum

- As part of updating the Denmark Depth Model (Danish contribution to EMODnet Bathymetry) new and rediscovered surveys will be added. Some of these needs transformation.

- For old charts and surveys without a given reference the datum must be estimated based on age of data.

- Critical for implementation and interoperability of S-100 products

Masetti, G.; Andersen, O.; Andreasen, N.R.; Christiansen, P.S.; Cole, M.A.; Harris, J.P.; Langdahl, K.; Schwenger, L.M.; Sonne, I.B. Denmark's Depth Model: Compilation of Bathymetric Data within the Danish Waters. *Geomatics* **2022**, *2*, 486-498. https://doi.org/10.3390/geomatics2040026