NSHC-37 – C.2.1 :

Satellite-based activities in DGA

Exploration of satellite-aided mapping

April, 9th 2024

Geodatastyrelsen

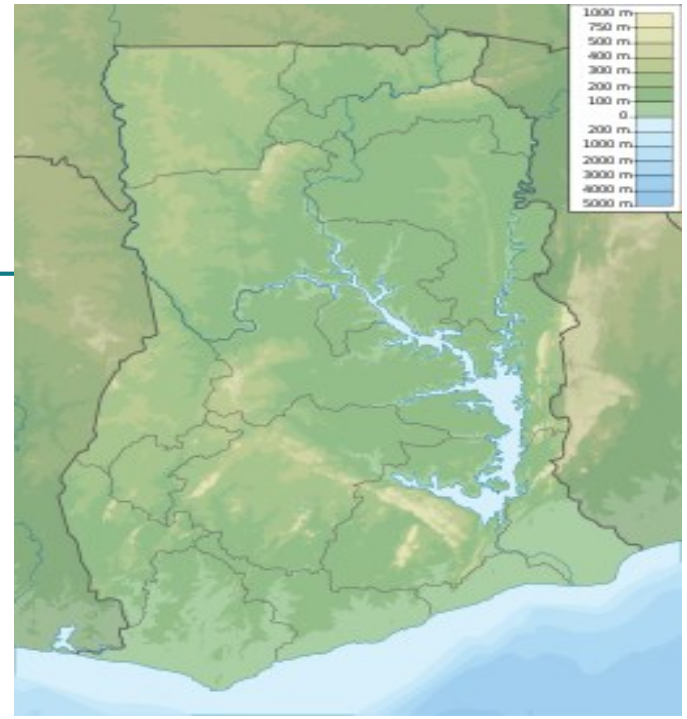
Satellite-based activities in DGA

Exploration of satellite-aided mapping through a variety of activities:

- Multi-year external projects and collaborations
  - Satellite derived products to increase navigational safety in Lake Volta, Ghana
  - Satellite-based mapping of shallow depth areas in Greenland
  - Incorporation of satellite-derived bathymetry into the Danish Depth Model v2.
- Internal activities
  - Semi-automatic coastline delineation: Comparison to hand-drawn products
  - Testing methods for computing satellite-derived bathymetry

Project: Lake Volta, Ghana

- World’s largest artificial reservoir (in terms of surface area)
- Essentially a flooded rainforest.
  - Thousands of trees still remain, posing a navigational hazard!
- The water level in the lake is both seasonally and artificially controlled
  - Low to high water level differ by more than 12 m!



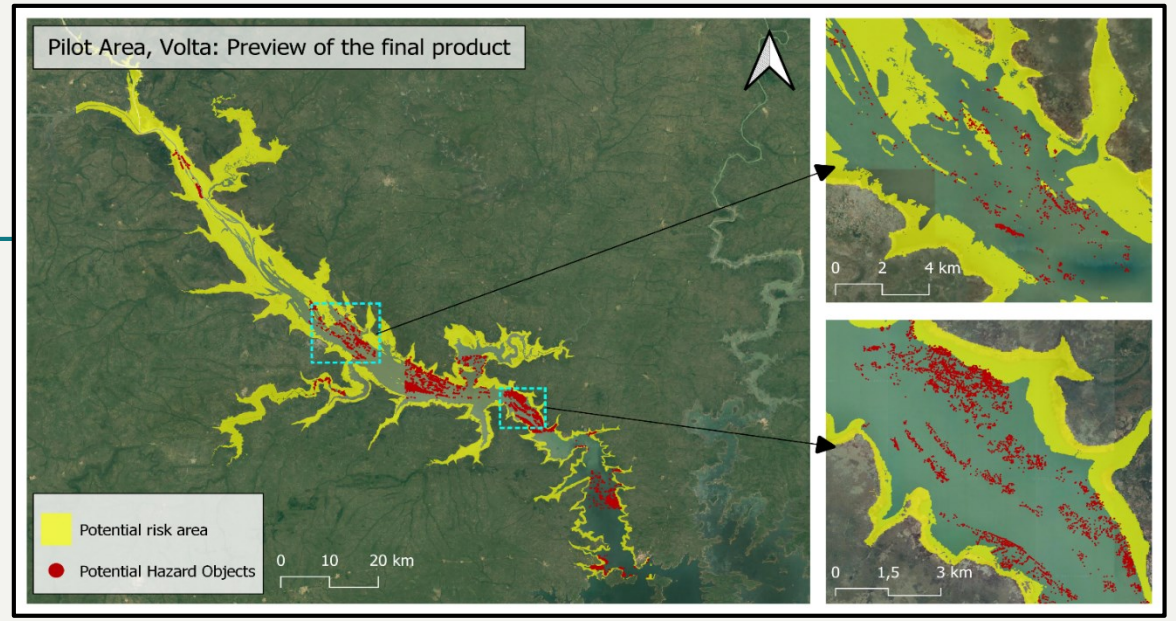
Lake Volta in Ghana

Project: Lake Volta, Ghana

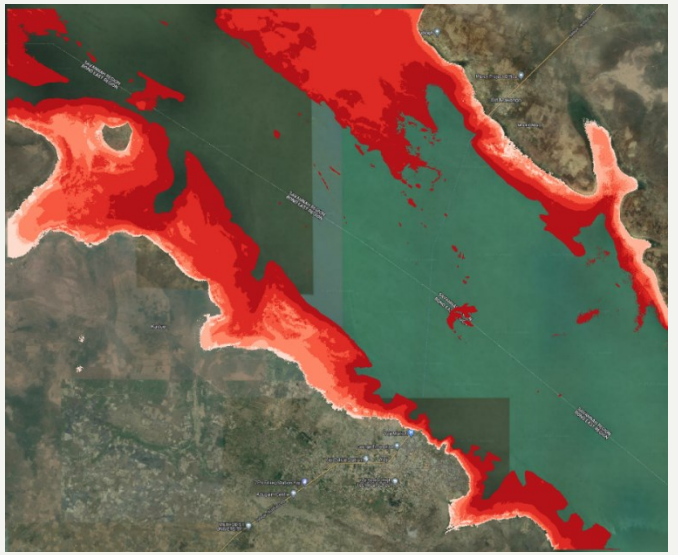
In July 2023, DGA delivered the first satellite-based product to Ghanaian Maritime Authority.

<u>Delivery included:</u>

- "Potential risk areas" (equivalent to intertidal zones)
  - › Based on free satellite data (Sentinel-2, 10m resolution)
- Identified more than <u>15 000</u> partially submerged trees
  - › Based on commercial imagery (40-50 cm resolution)



A second product delivery is planned for 2024, including shoreline at multiple water levels



Project: Satellite-based mapping of shallow depth areas in Greenland

Goals:

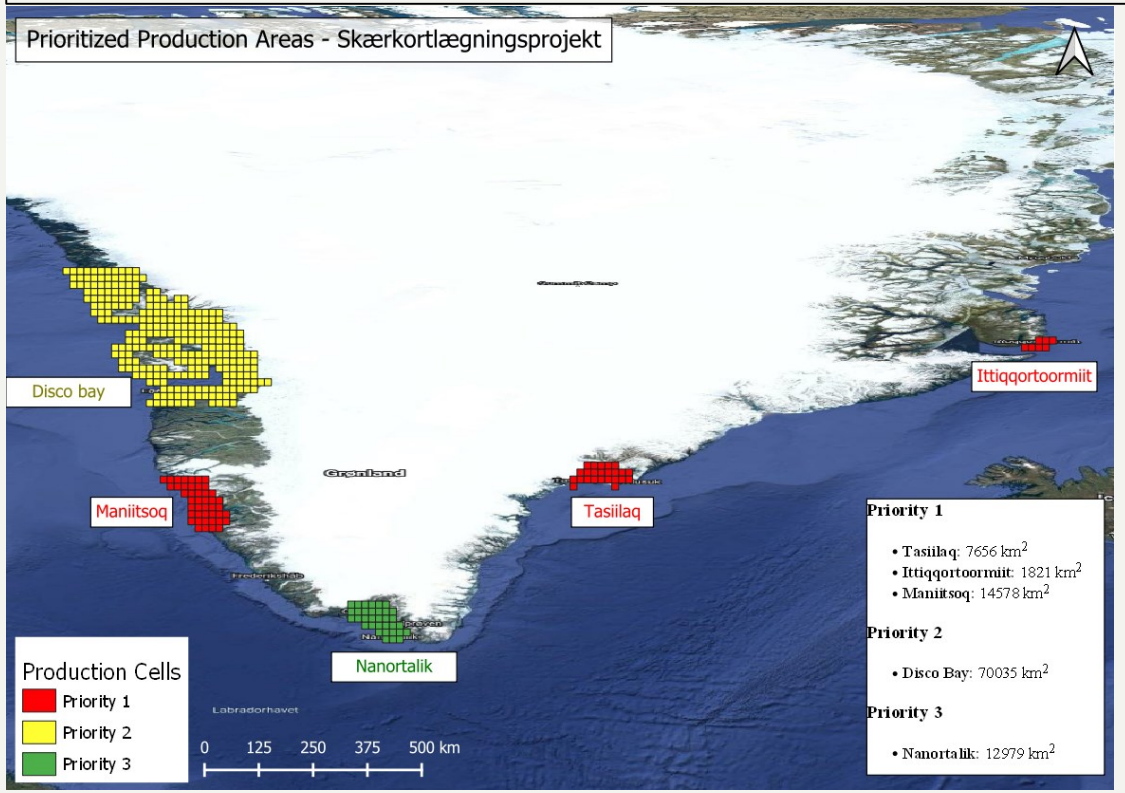
Derive the following from satellites:

- coastline,
- intertidal zones,
- rocks (navigational hazards)
- shallow water bathymetry

Build competences within DGA to carry out independent mapping in the future

- EOMAP chosen as external partner, to
  - Deliver all products for 3 pilot areas
  - Conduct capacity building
  - Provide software for satellite derived bathymetry.

Greenlandic stakeholders identified 5 areas of interest



Collaboration

The Danish Depth Model v2 will incorporate satellite-derived bathymetry

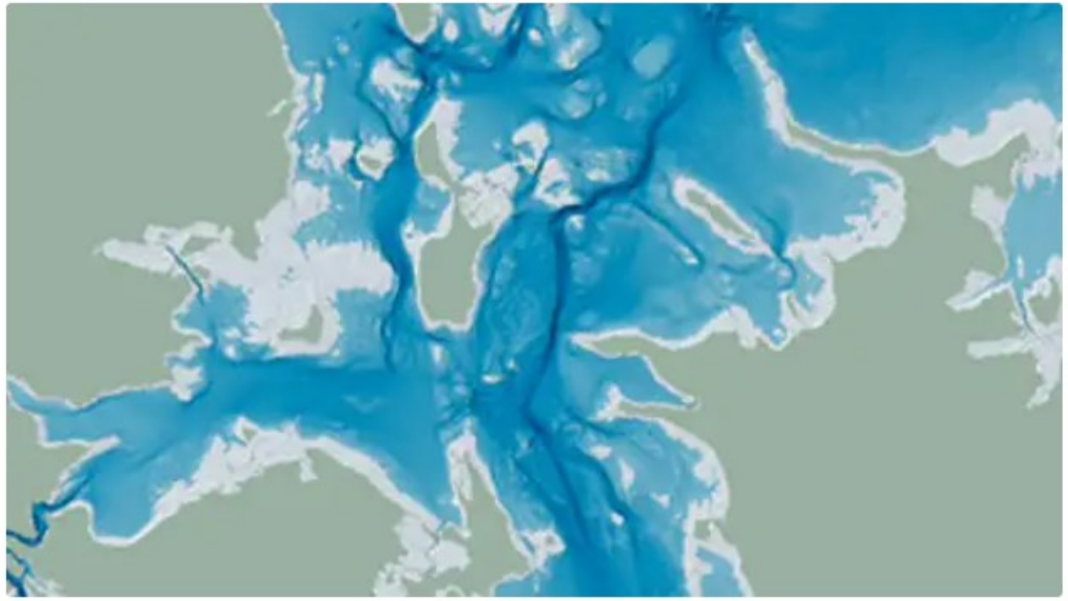
- In collaboration with EOMAP

European cooperation on satellite mapping

19-01-2024

Hydrography Front page

The Danish Geodata Agency and EOMAP will join efforts in mapping the shallow waters of Denmark.



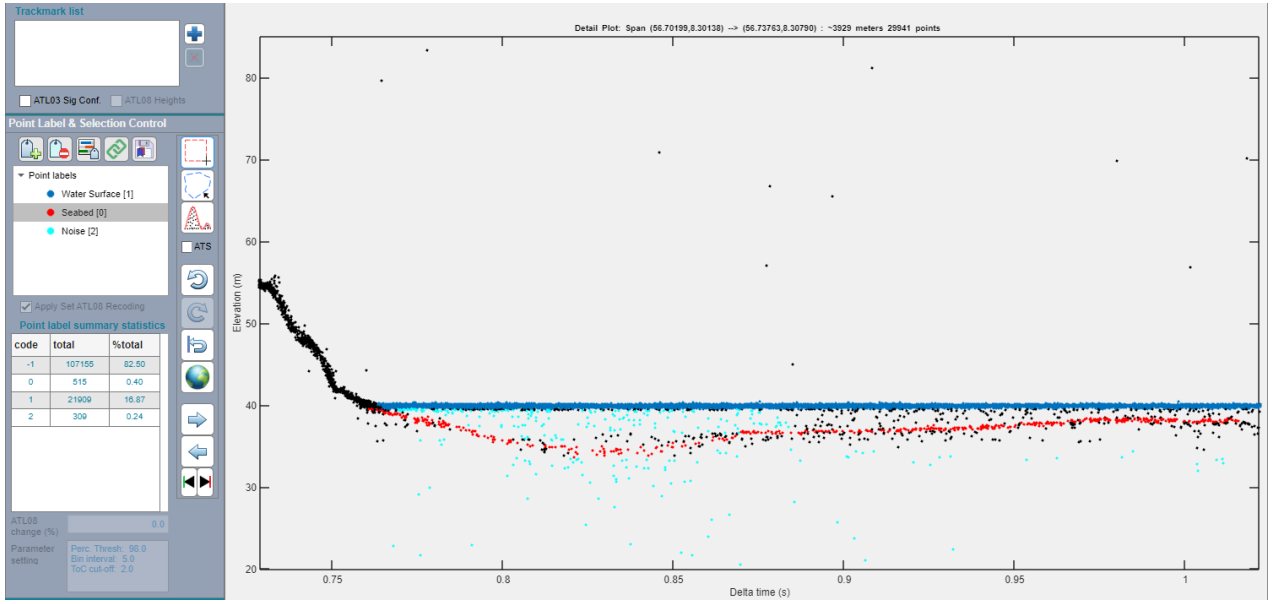
By using Satellite-Derived Bathymetry (SDB), the Danish Geodata Agency and EOMAP are joining forces to contribute to the European Marine Observation and Data Network (EMODnet) Bathymetry partnership, and to integrate the SDB data into the Danish Depth Model (DDM)

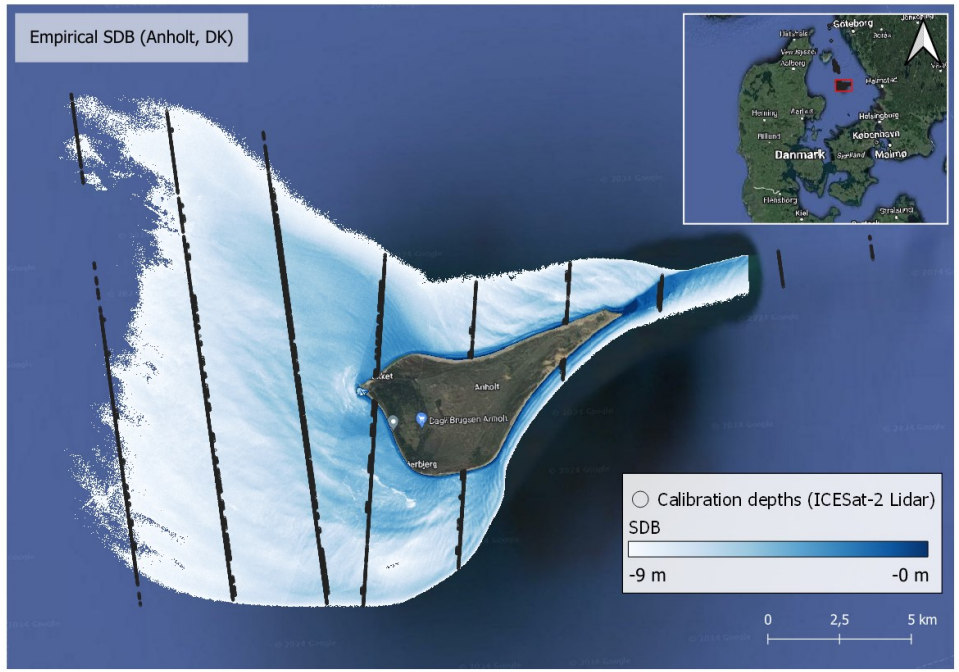
Internal mini-projects and other

- Tested semi-automatic coastline extraction in GL
  - › Reasonable results, though difficult to obtain human-like products
  - › Shadows can cause issues for automated methods…

Internal mini-projects and other

- Empirical testing of Satellite-Derived Bathymetry in Danish waters
  - › First steps
  - › ICESat-2 data (left) is used to compute SDB (right)





Satellite-derived bathymetry in Danish waters.
***ICESat-2** lidar depths used for calibration*

NSHC 37 is invited to note the briefing.

Thank you.

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