

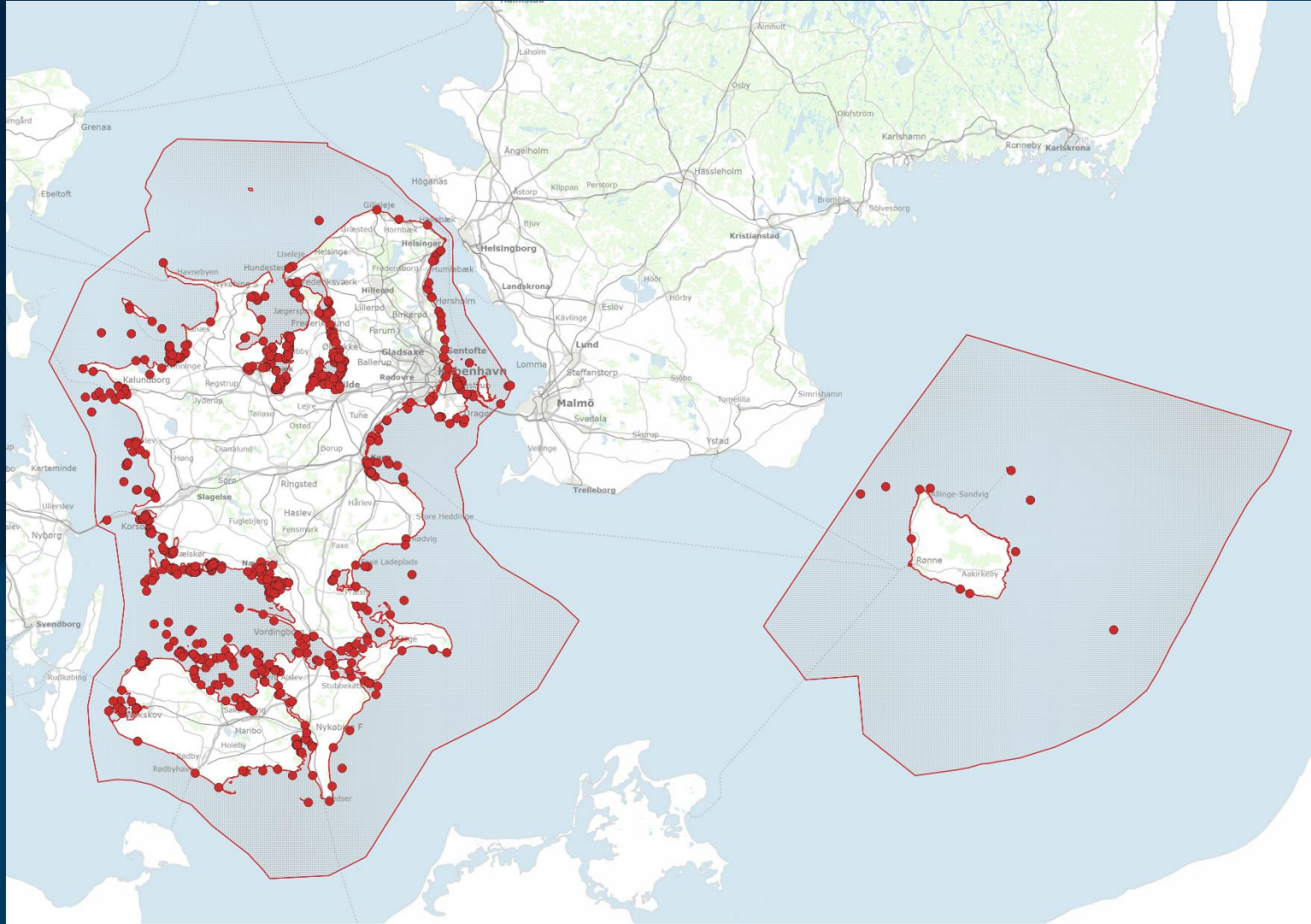
# Seeing Beneath the Waves:

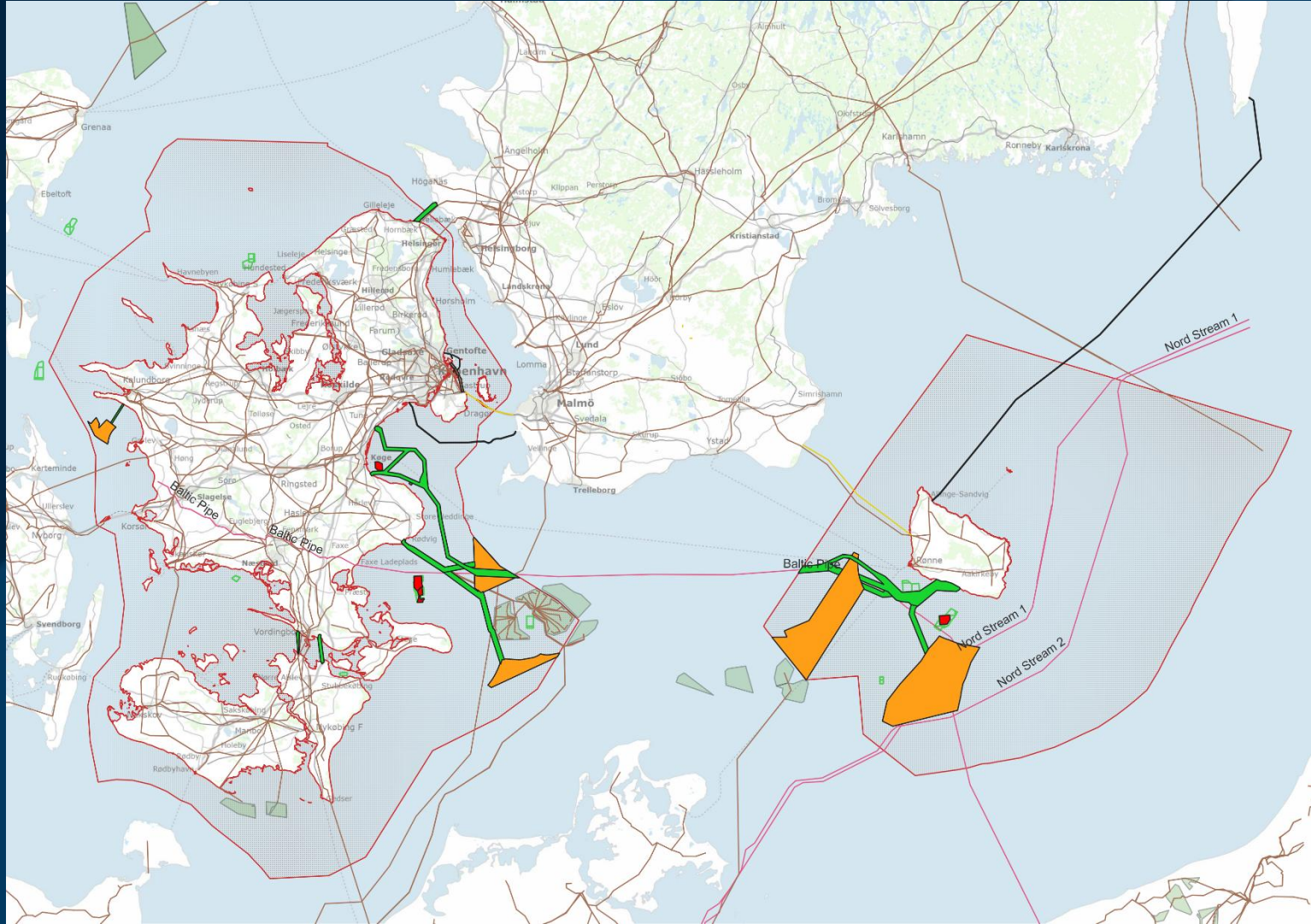
Exploring the role of remote sensing in Danish marine archaeology

John Howorth



VIKING SHIP  
MUSEUM





# Data Sources

- Multibeam Echo Sounder (MBES)
- Side-scan Sonar (SSS)
- Magnetometer (MAG)
- Sub-bottom Profiler (SBP)
- Vibrocore Samples (VC)

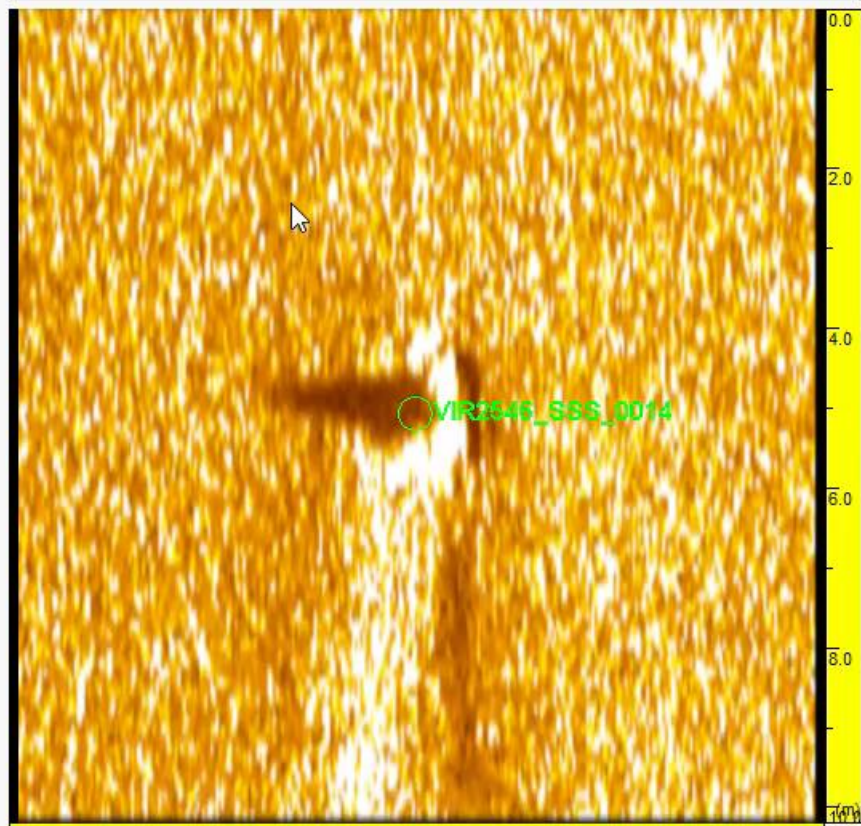
# Data Sources and Software

 **SONARWIZ**

 **QGIS**

Sidescan HF Contact: VIR2546\_SSS\_0014 (Port)

2023-10-18T10:54:07.580 54° 35.18188' N 011° 21.77171' E -- X:652685.55 Y:6051333.39



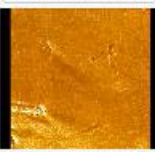
0.0 2.0 4.0 6.0 8.0 10.0 (m)

Zoom F3/F4  Fit to Window

Features

Point

Copy Info   
 Histogram Equalize  
 Invert  
 Stretch Intensity  
 Gamma Correct...  
 Contrast 0   
 Brightness 0   
 Restore  
 Move Contact F2



Previous Shift+F5



Next F5

Search Other Files for this Target...

Name VIR2546\_SSS\_0014

Info at Cursor

2023-10-18T10:54:06

Ping: 309902	DEP:15.71 (m)
54° 35.18343' N	N:6051333.39
011° 21.77062' E	E:652684.27
HDG:127.17	CMG:126.85
ALT: 3.44 (m)	SPD:7.60
MAG: 0.00	CBL: 0.00 (m)
Rng:-21.0/-21.3 (m)	
EVT: 0.00	
20231018105134_jsf-CH34_xtf-CH34.xtf	

Label and Symbol

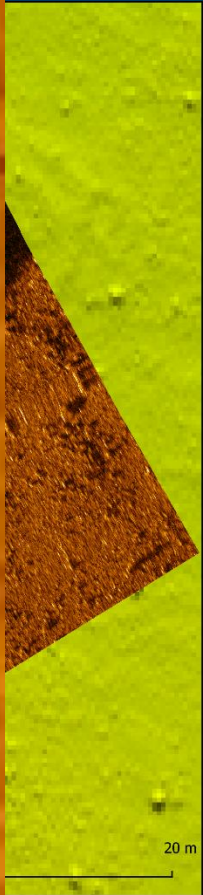
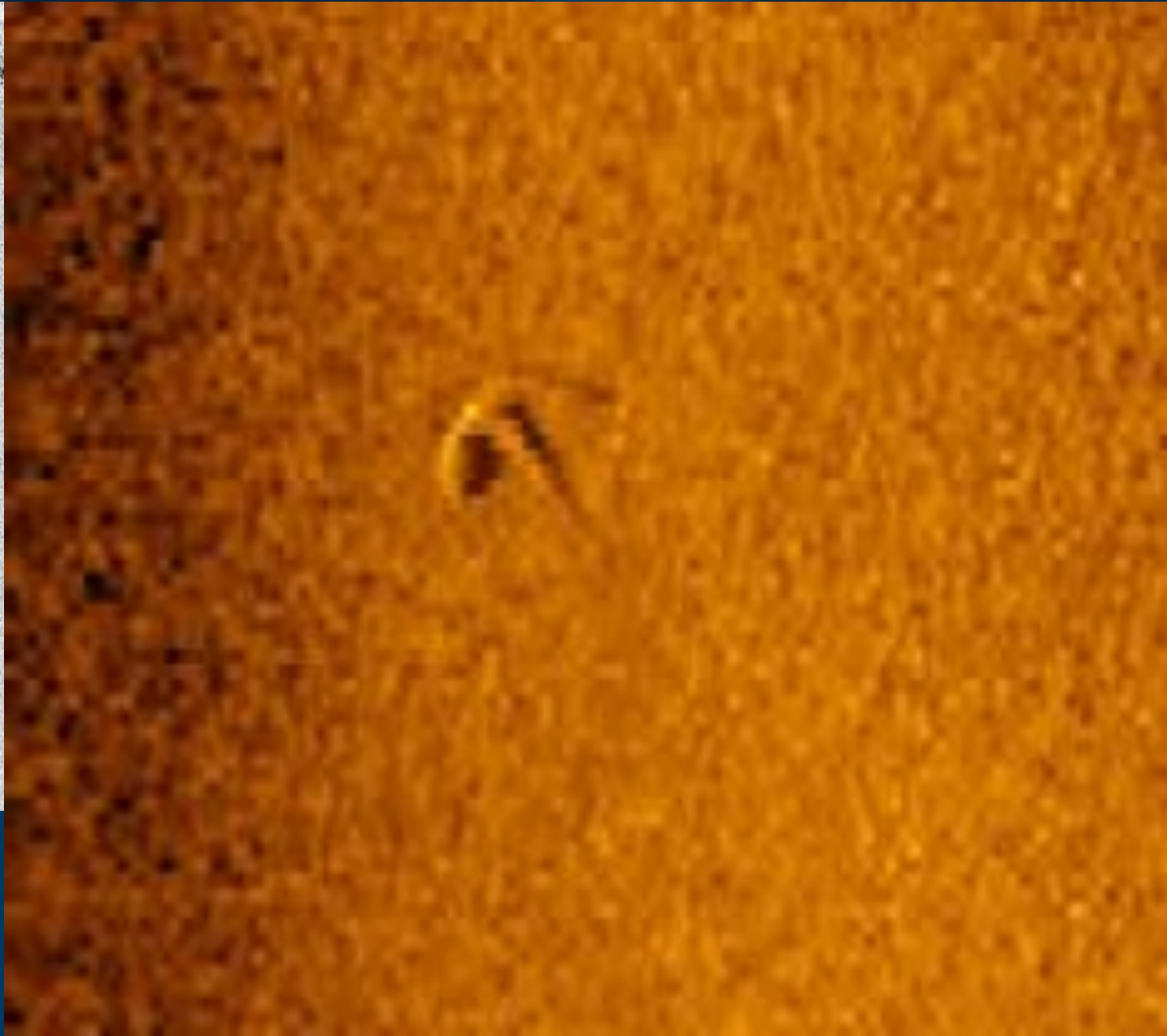
Draw Label  Rotate Label  
 Draw Symbol

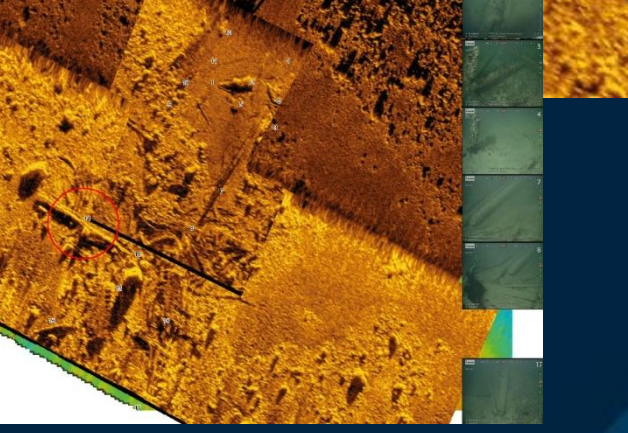
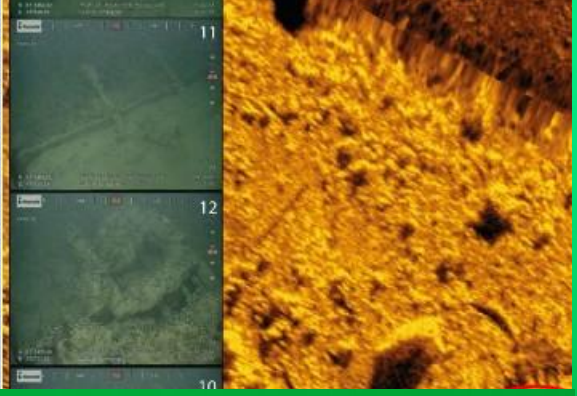
Mensuration

Length:0.0 Shadow: 0.00  
 Width: 0.0 Scour: 0.00  
    
 Hide all but sonar while measuring  
 [F1]: Measure [Length] [Width] [Shadow]  
 [F9]: Measure Length/Width using Box

User Entries

Class 1   
 Class 2   
 Area  Block   
 Avoid  Mag Anomaly   
 Target Description

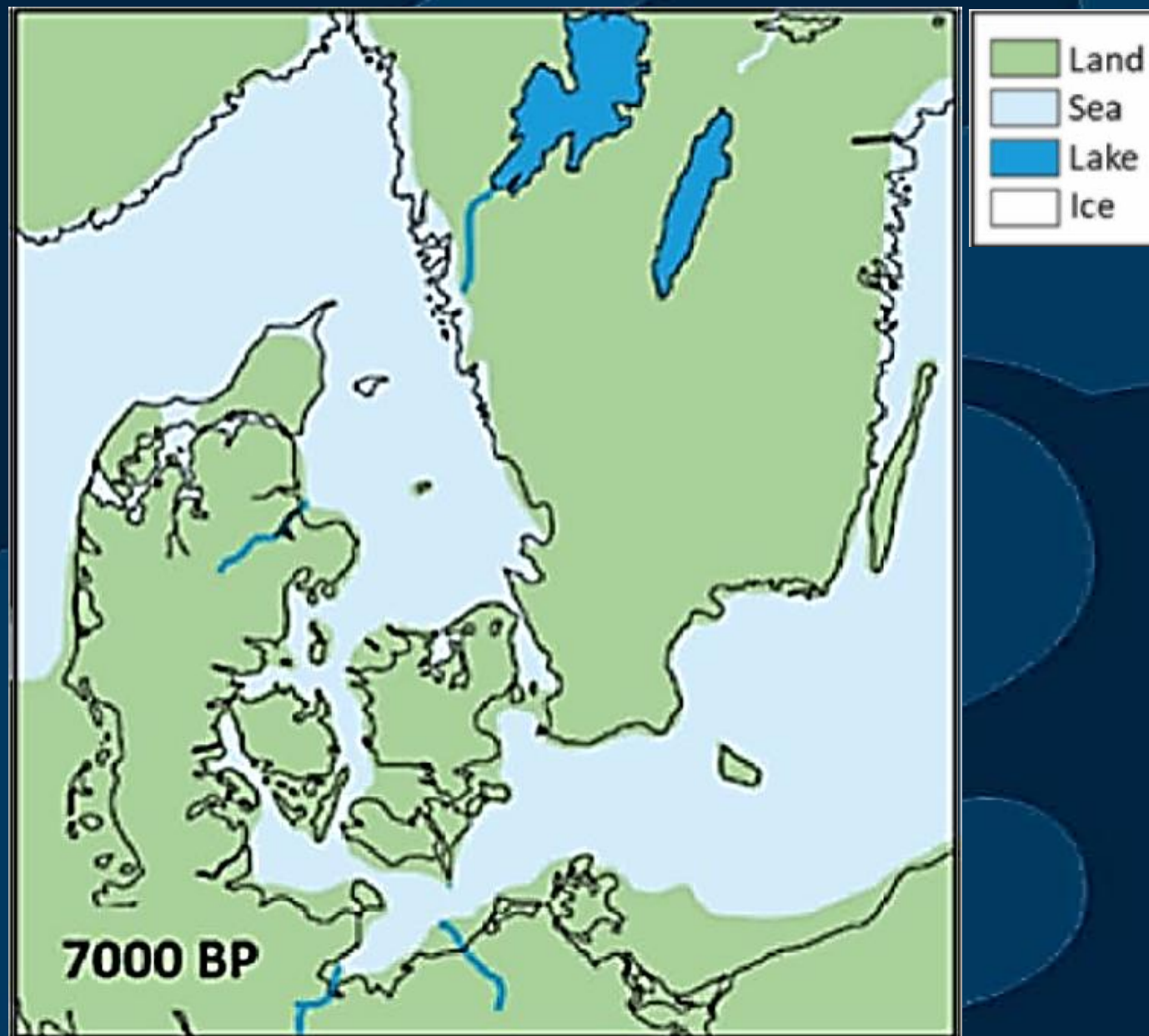


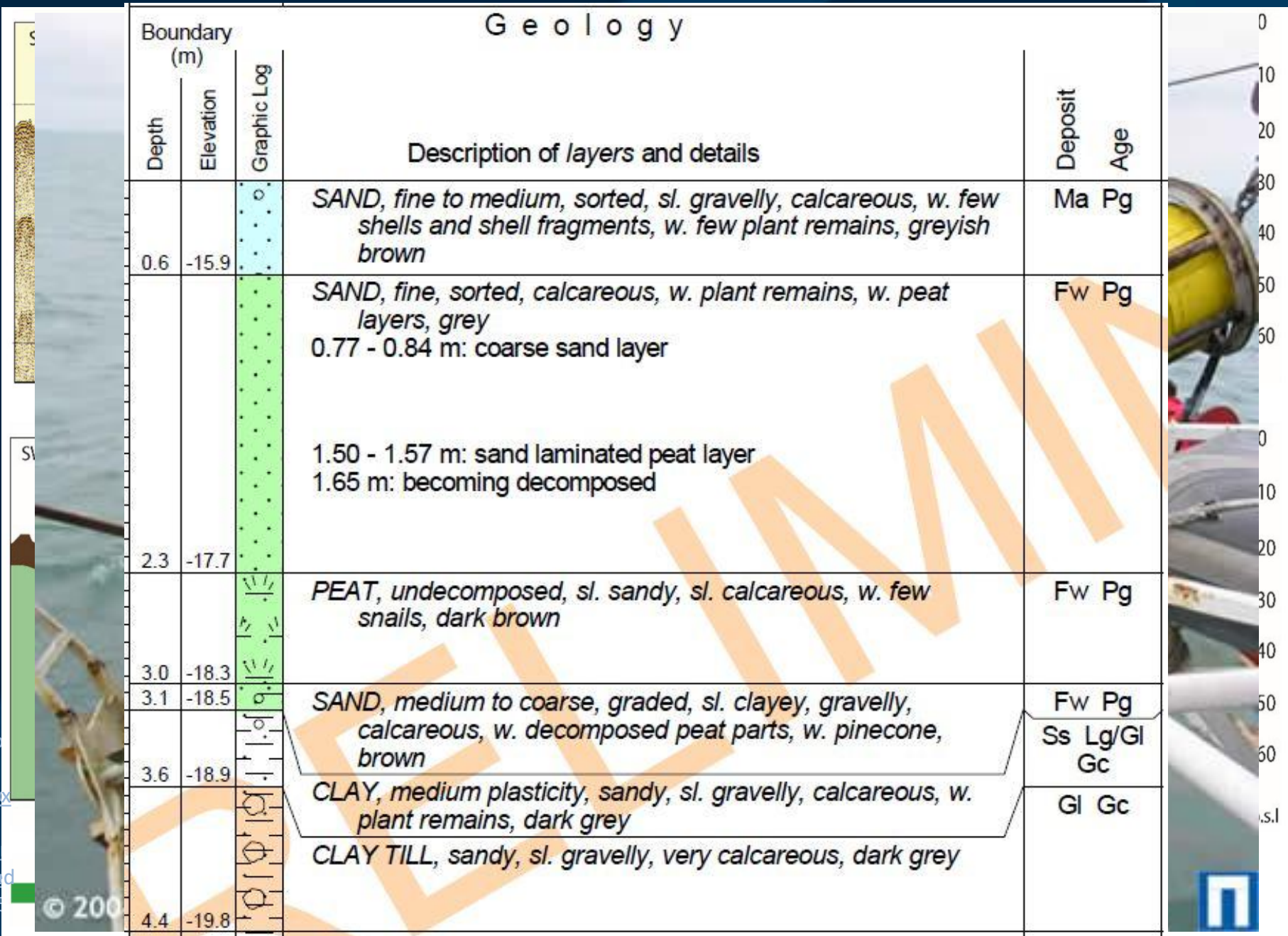


*Source:  
Screening of seabed geological  
conditions for  
the offshore wind farm areas Kriegers  
Flak II  
North and Kriegers Flak II South*

*Desk study for Energinet*

*Jørn Bo Jensen, Ole Bennike & Jørgen O.  
Leth - 2024*



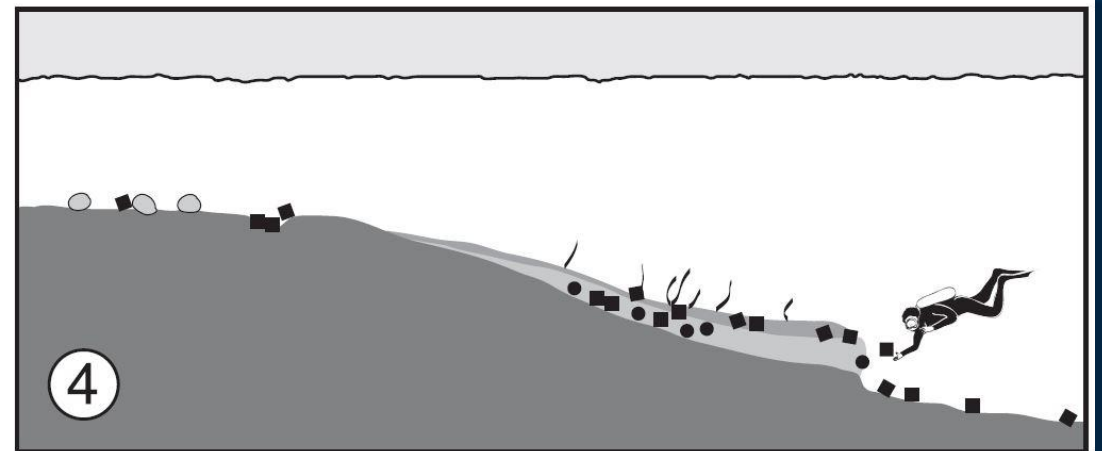
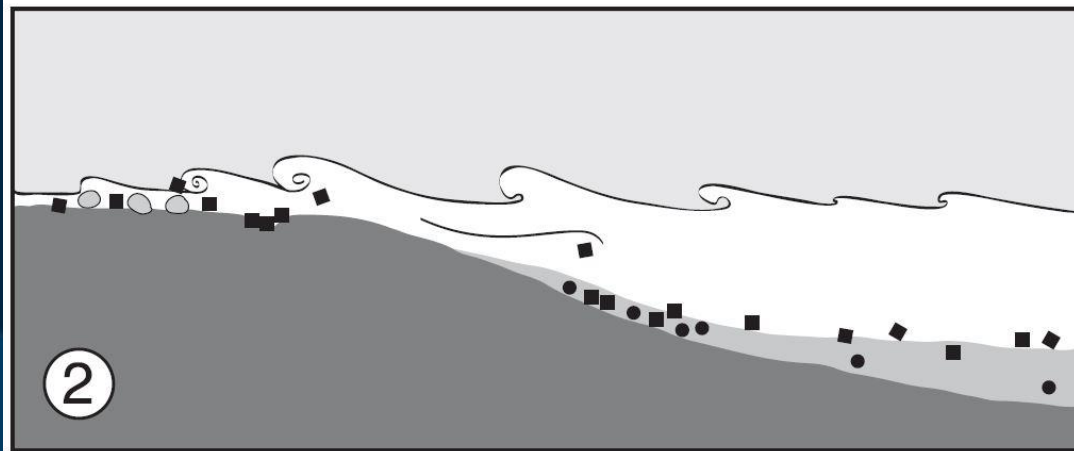
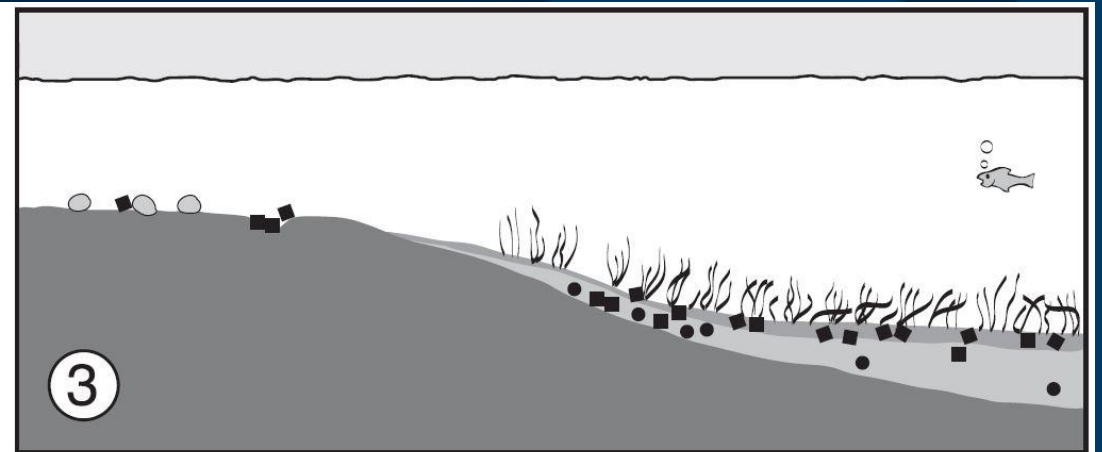
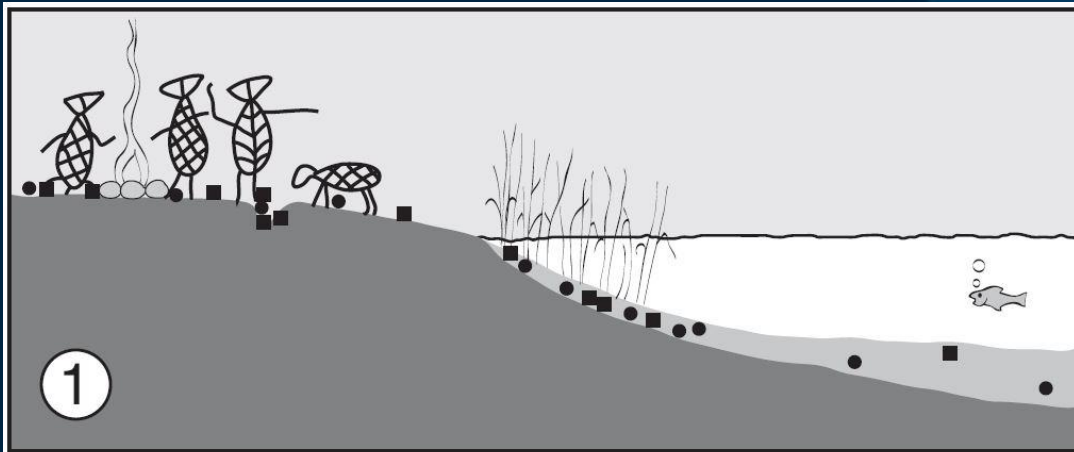


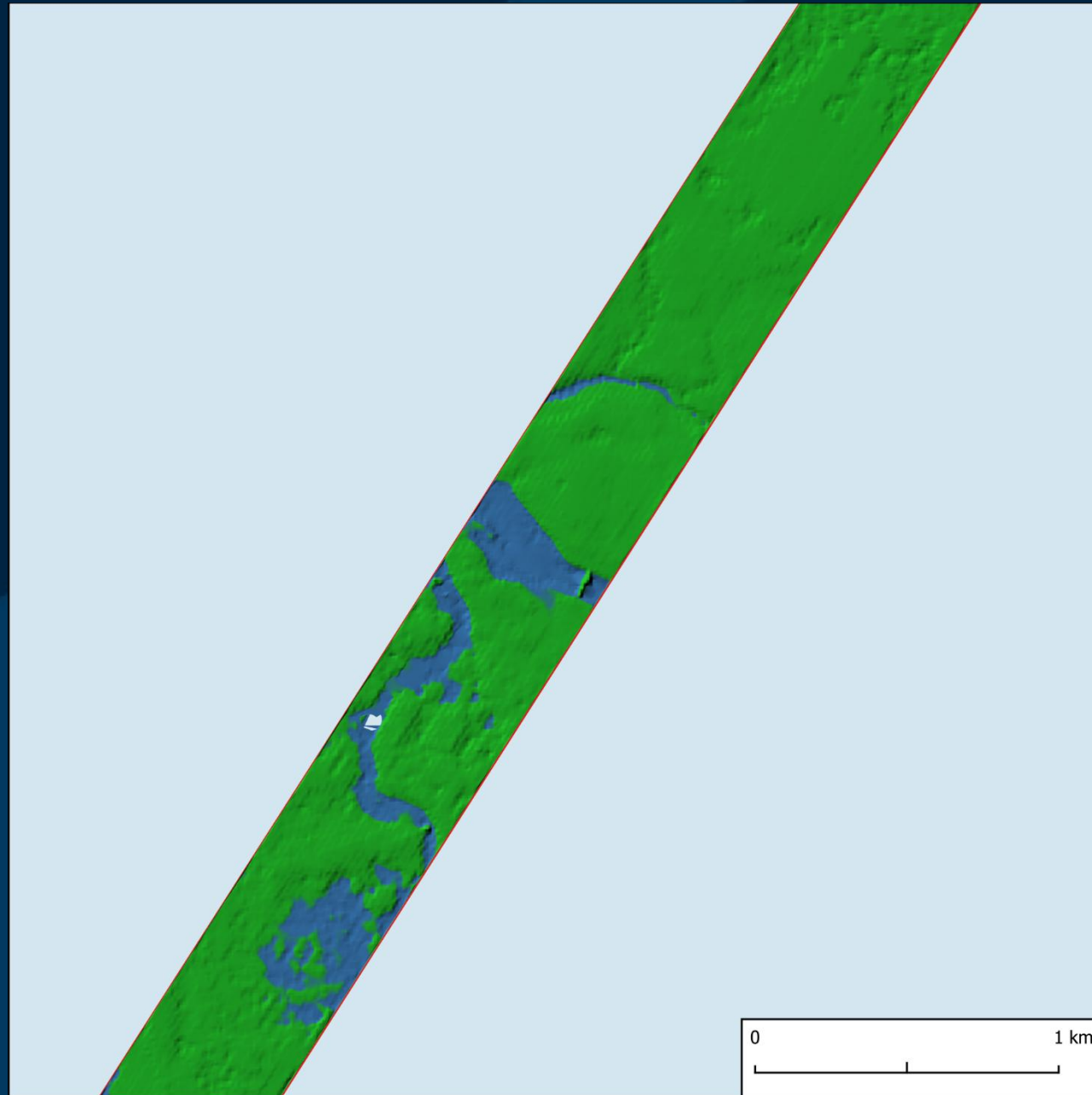
Screening of seabed geological conditions for the offshore wind farm areas Kriegers Flak II North and Kriegers Flak II South

© Wessex Archaeology  
 accessed at <https://www.wessexarch.co.uk/>  
 Desk study for EnergyNet  
 and extended for wind farm area  
 Jørn Bø Jensen, Ole Bennike & Jørgen S. Leth - 2024

© 200





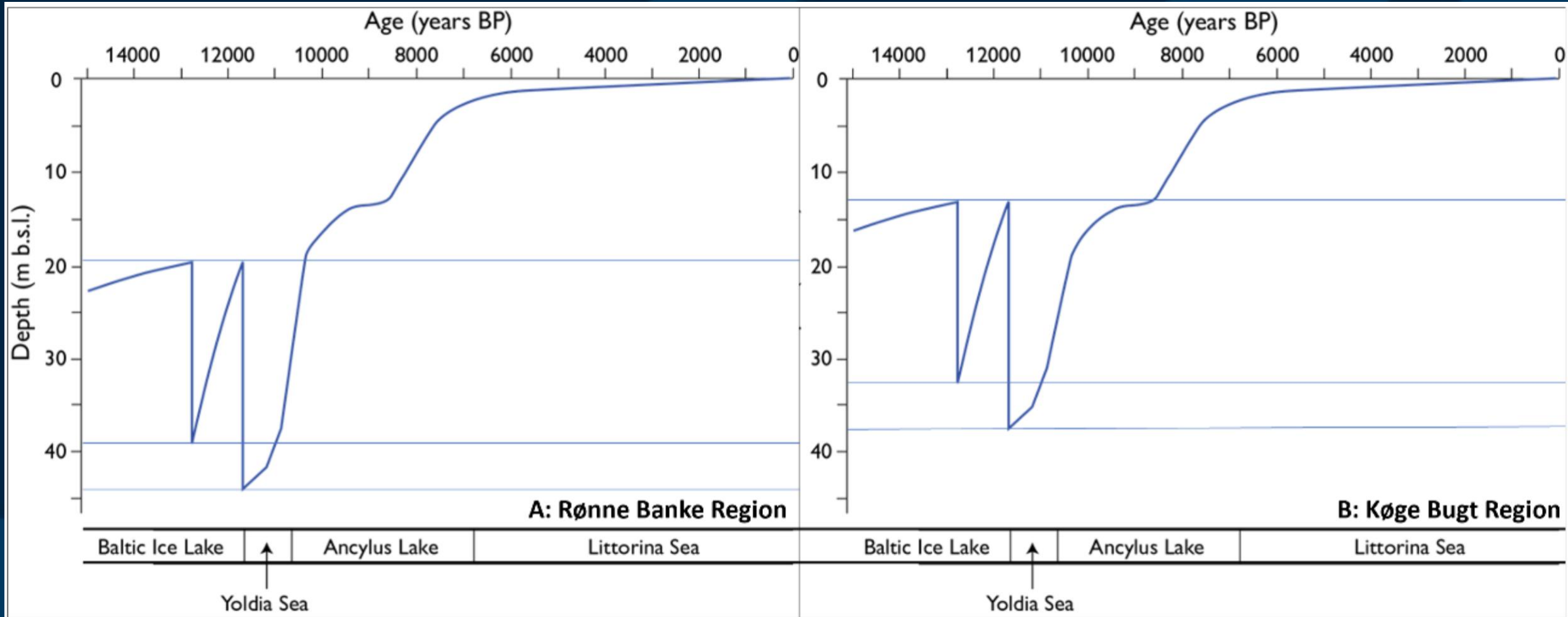


Bathymetry

SBP

False colour

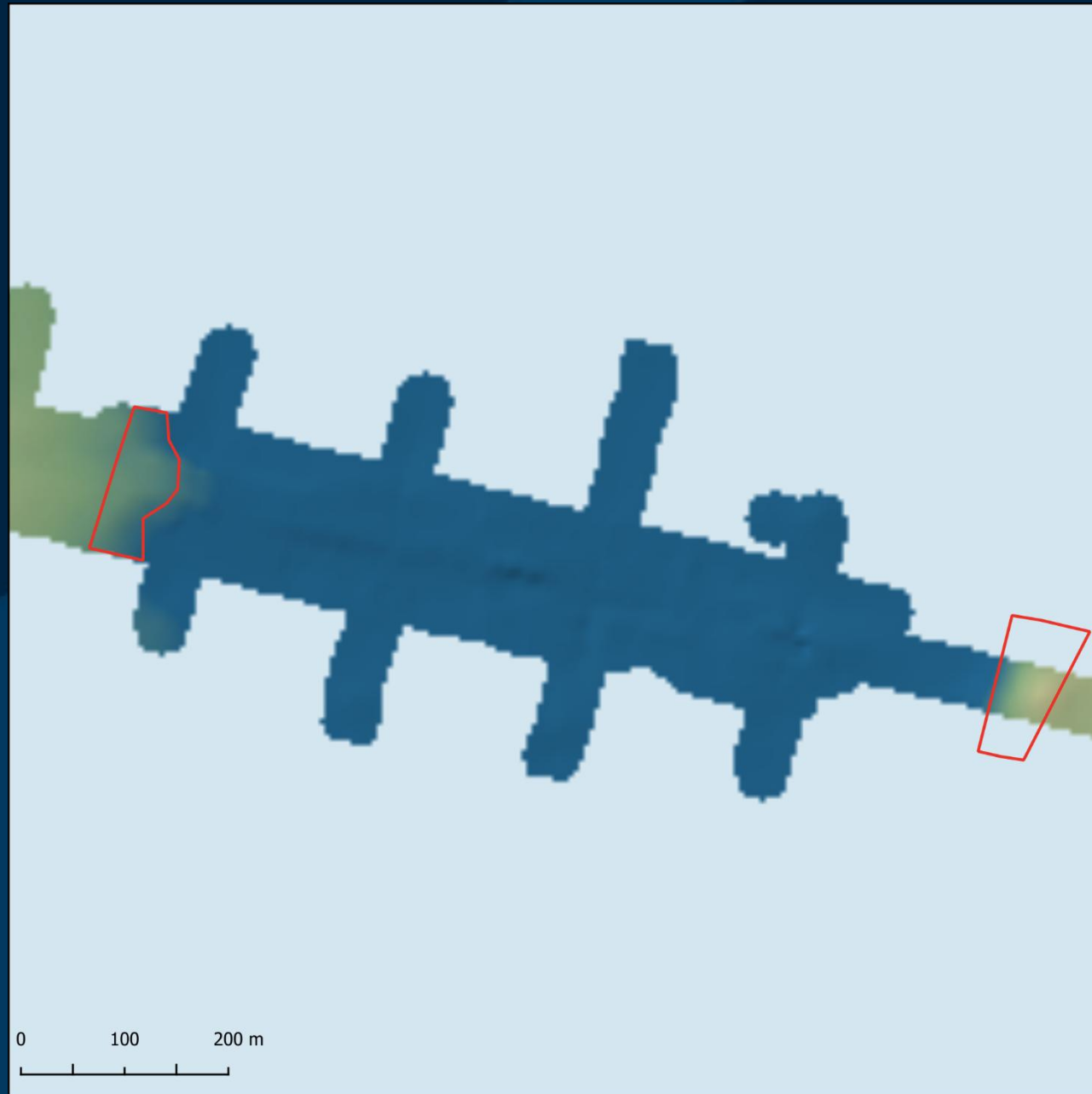
# Shore Displacement Curves

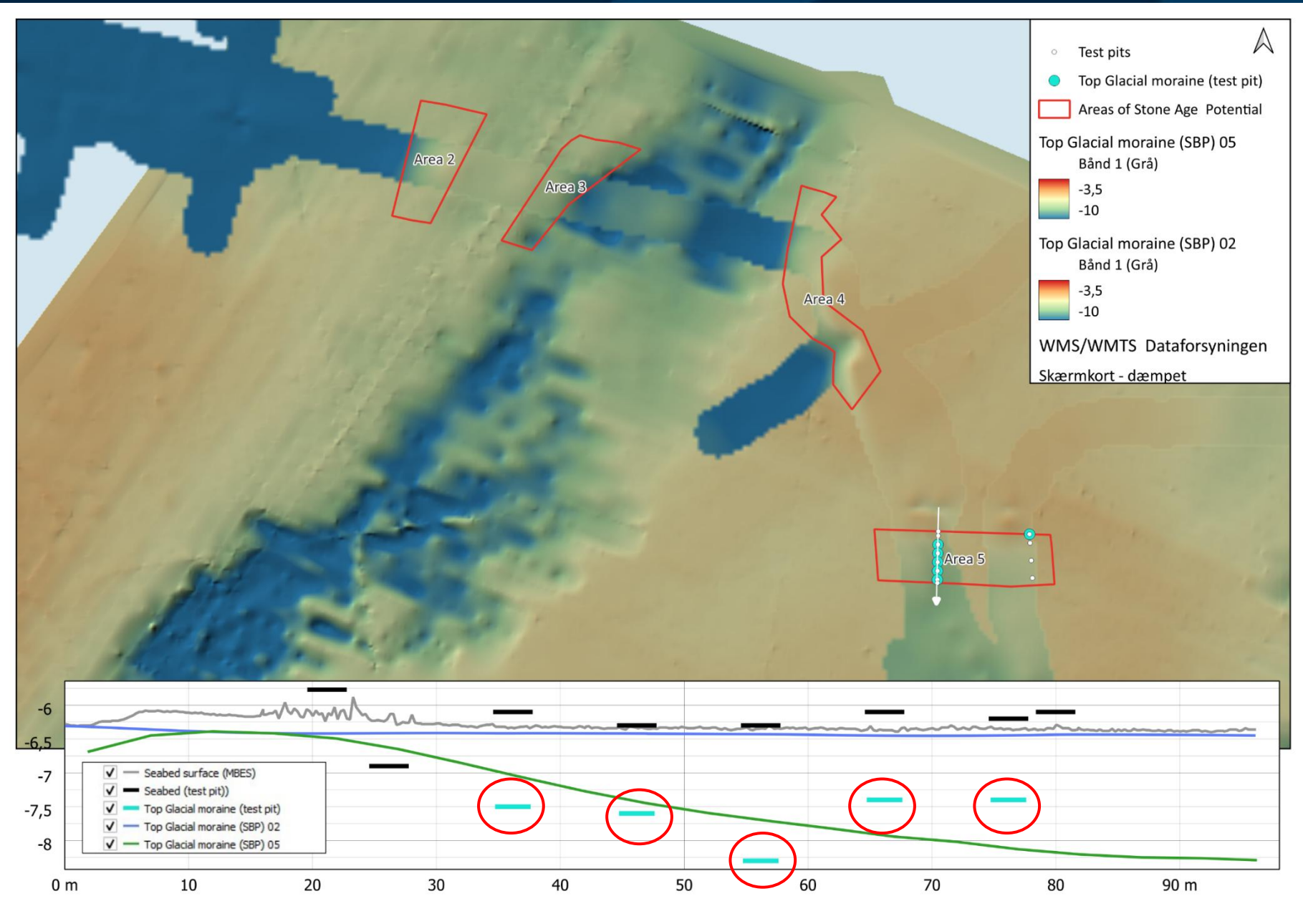


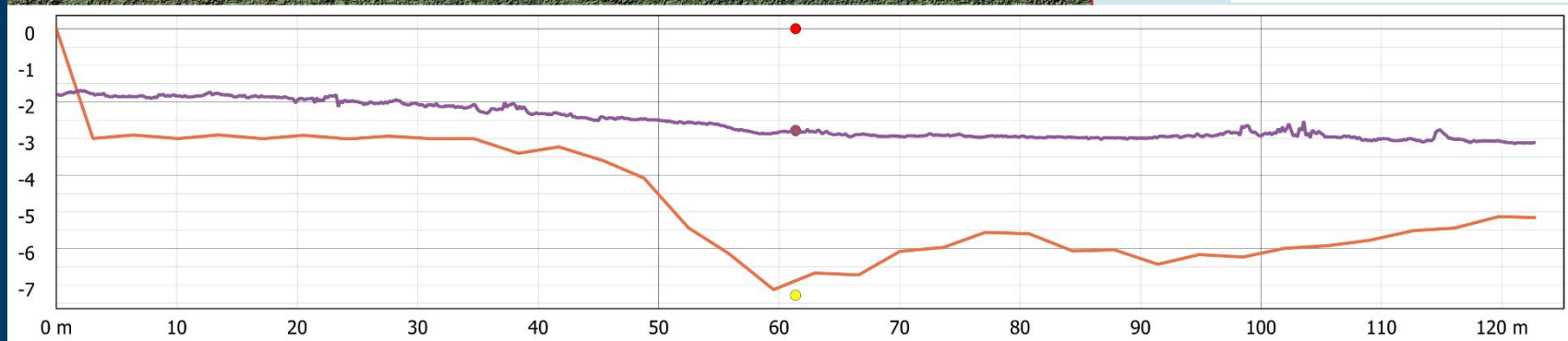
Source: Screening of seabed geological conditions for the offshore wind farm areas Kriegers Flak II North and Kriegers Flak II South: Desk study for Energinet - Jørn Bo Jensen, Ole Bennike & Jørgen O. Leth - 2024

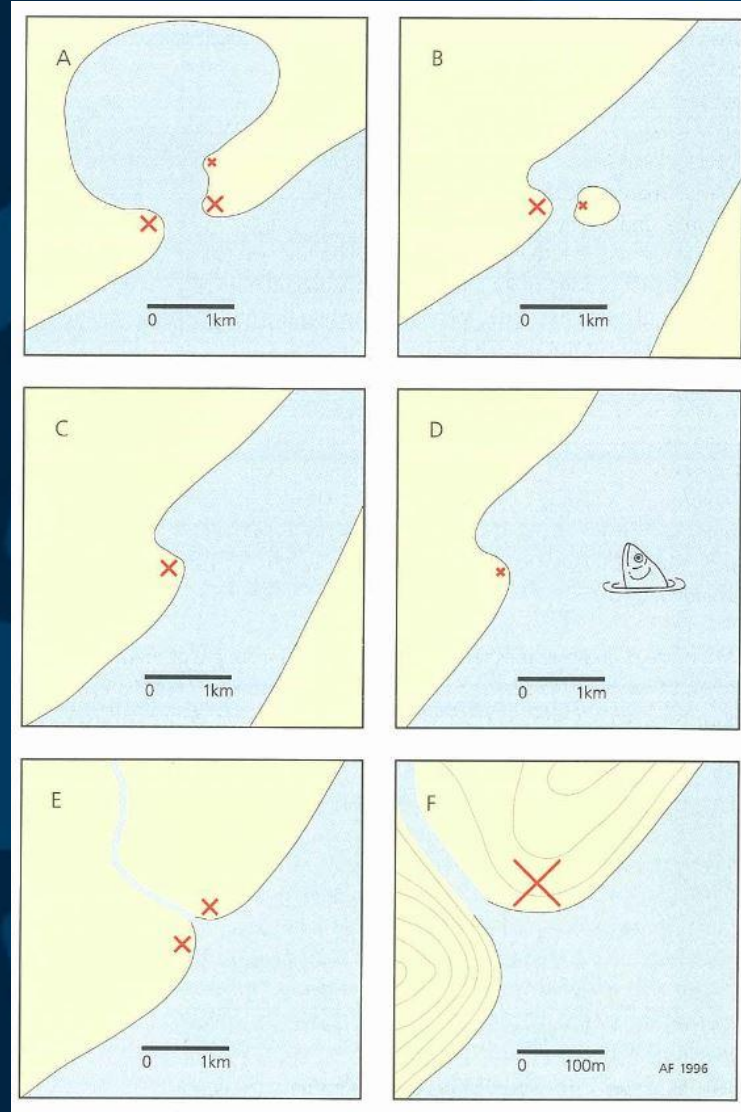
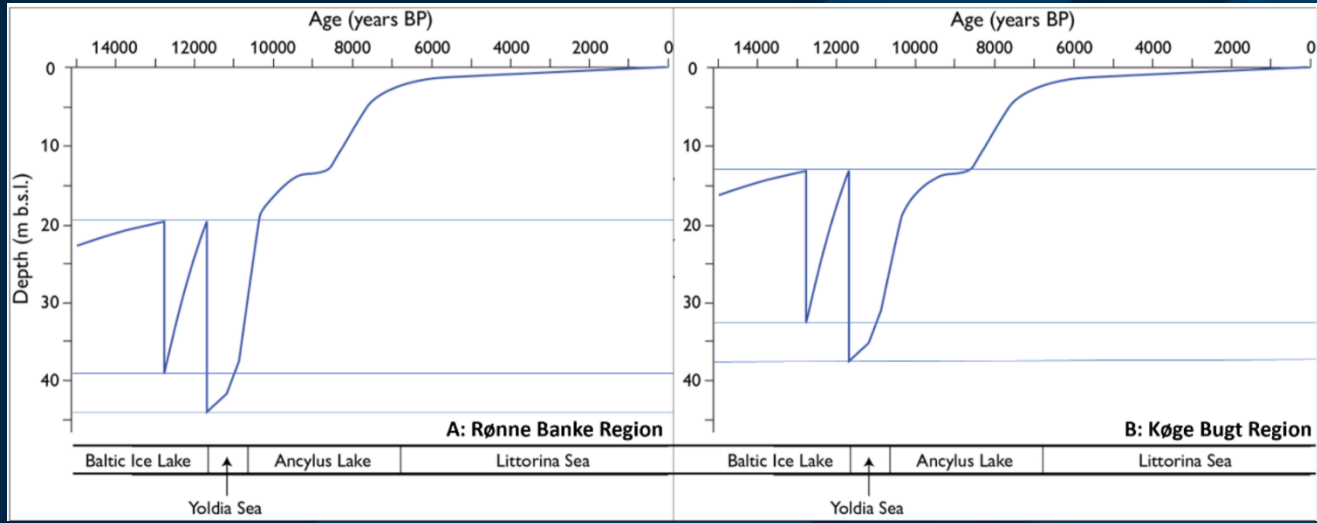


Source: People and the sea - settlement and fishing along the mesolithic coasts - Fischer (1997).









# Conclusions

1. Remote sensing is very useful and a necessity in developer led underwater archaeology
2. Side-scan sonar is particularly useful for identifying potential culturally historical objects
3. SBP data, shoreline displacement curves and the predictive settlement model can give a good indication of where prehistoric sites are likely to be found
4. In-house geologist or a dedicated out of house geologist

Any questions, comments or ideas?

