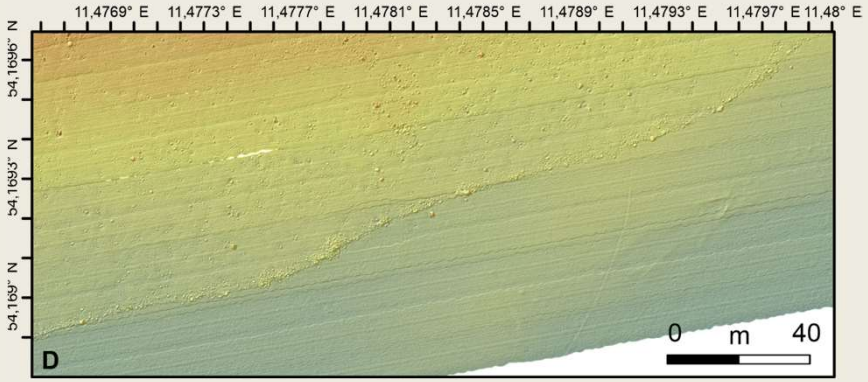
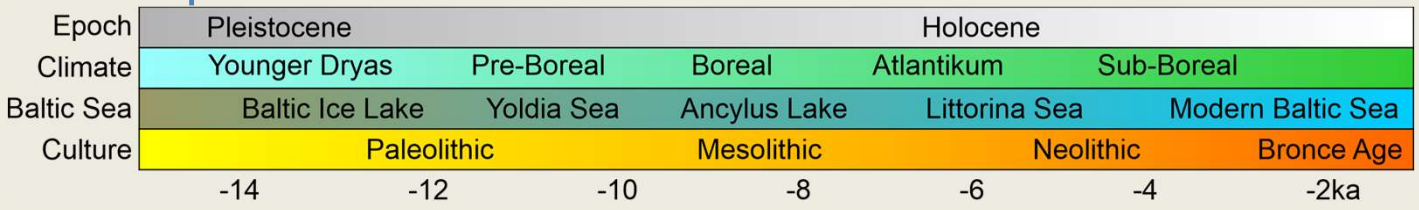
A submerged stone age hunting architecture from the Western Baltic Sea

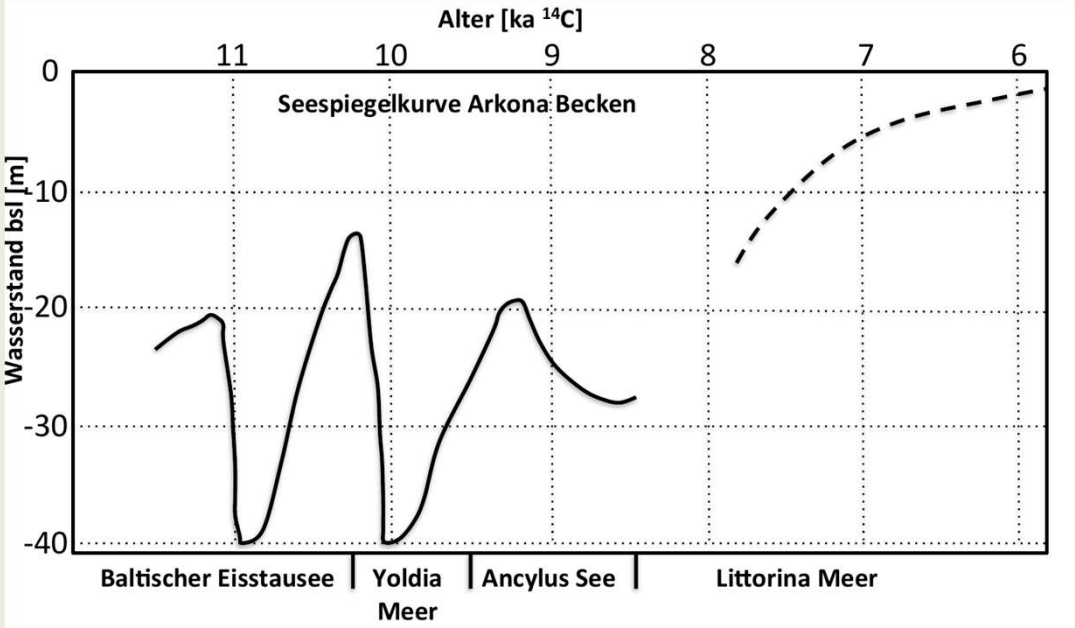
Geersen, J., Bradtmöller, M., Schneider von Deimling, J., Feldens, P., Auer, J., Held, P., Lohrberg, A., Supka, R., Hoffmann, J.J.L., Eriksen, B.V., Rabbel, W., Karlsen, H-J., Krastel, S., Brandt, D., Heuskin, D., Lübke, H.



Leibniz-Institut für Ostseeforschung Warnemünde
Universität Rostock
C A U Christian-Albrechts-Universität zu Kiel
DLR
MV tut gut.

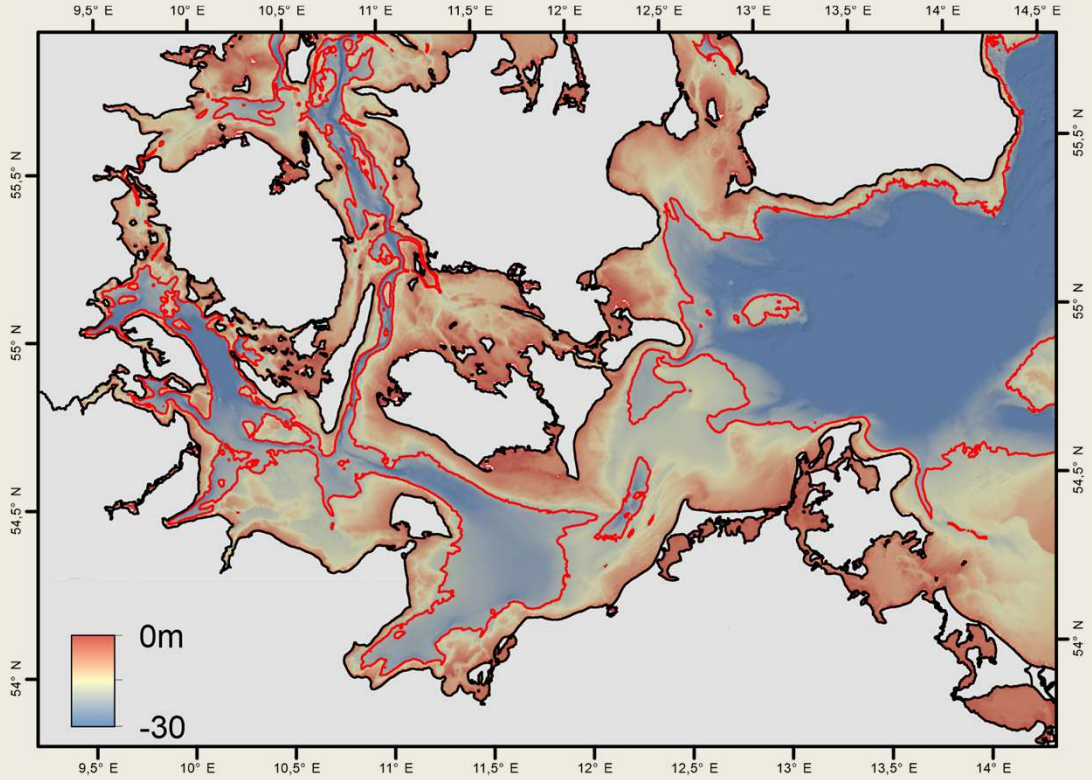
Weichselian glaciation

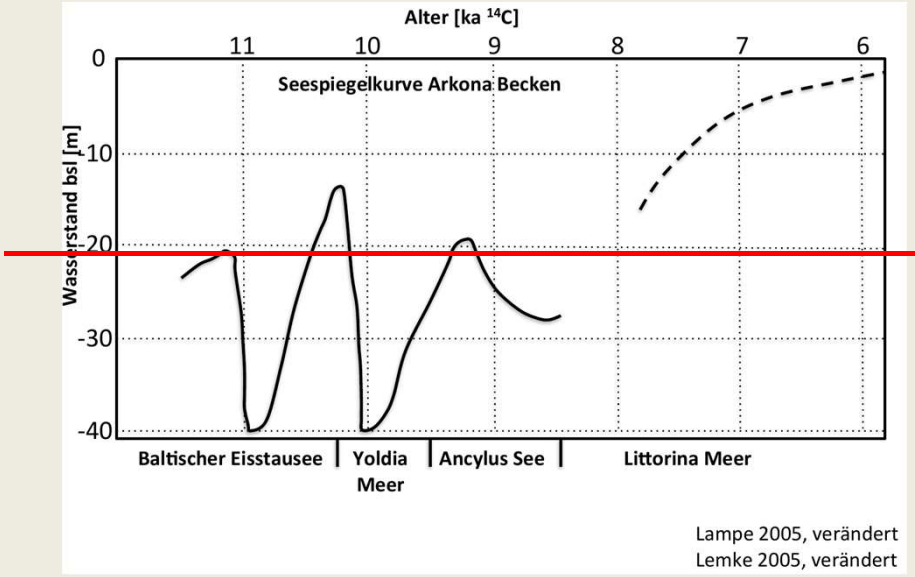


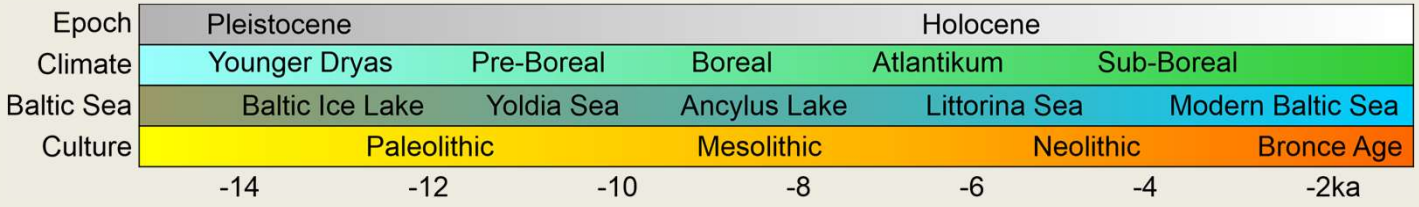


Lampe 2005, verändert
Lemke 2005, verändert

Epoch	Pleistocene				Holocene		
Climate	Younger Dryas		Pre-Boreal	Boreal	Atlantikum	Sub-Boreal	
Baltic Sea	Baltic Ice Lake		Yoldia Sea	Ancylus Lake	Littorina Sea		Modern Baltic Sea
Culture	Paleolithic			Mesolithic	Neolithic		Bronce Age
	-14	-12	-10	-8	-6	-4	-2ka


9,5° E
10° E
10,5° E
11° E
11,5° E
12° E
12,5° E
13° E
13,5° E
14° E
14,5° E
55,5° N
55° N
54,5° N
54° N
0m
-30


Alter [ka ¹⁴C]
11
10
9
8
7
6
0
-10
-20
-30
-40
Seespiegelkurve Arkona Becken
Wasserstand bsl [m]
Baltischer Eisstausee
Yoldia Meer
Ancylus See
Littorina Meer
Lampe 2005, verändert
Lemke 2005, verändert


Epoch
Pleistocene
Holocene
Climate
Younger Dryas
Pre-Boreal
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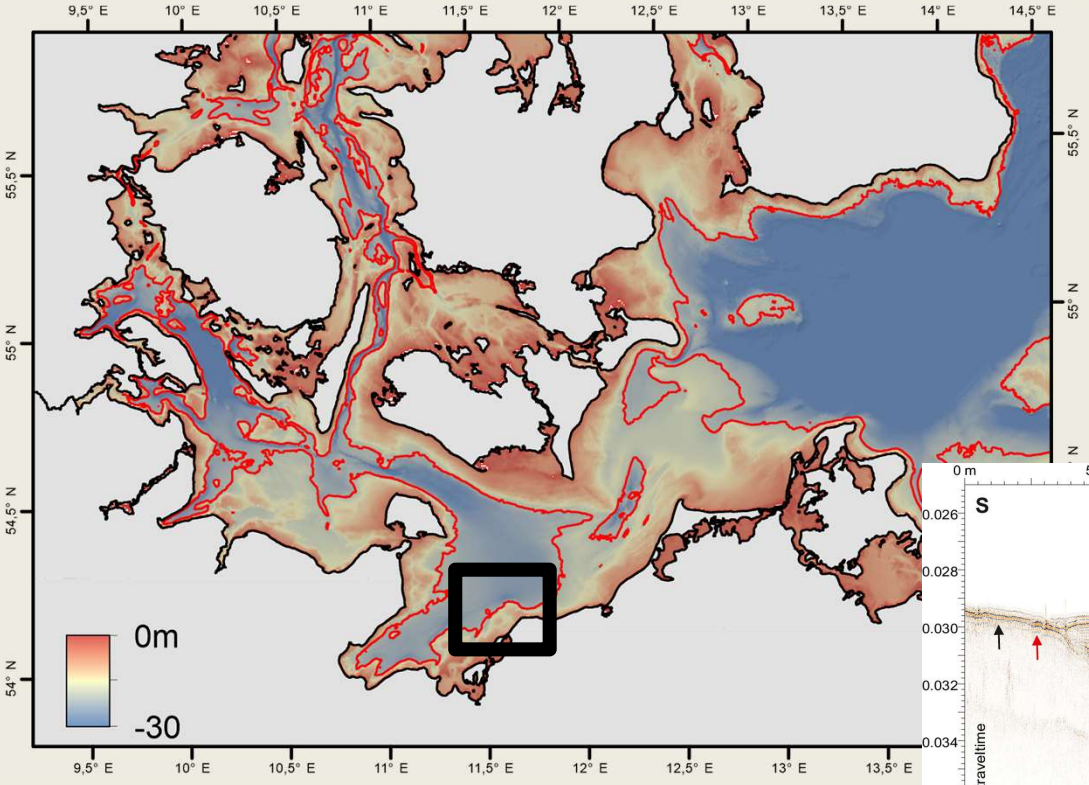
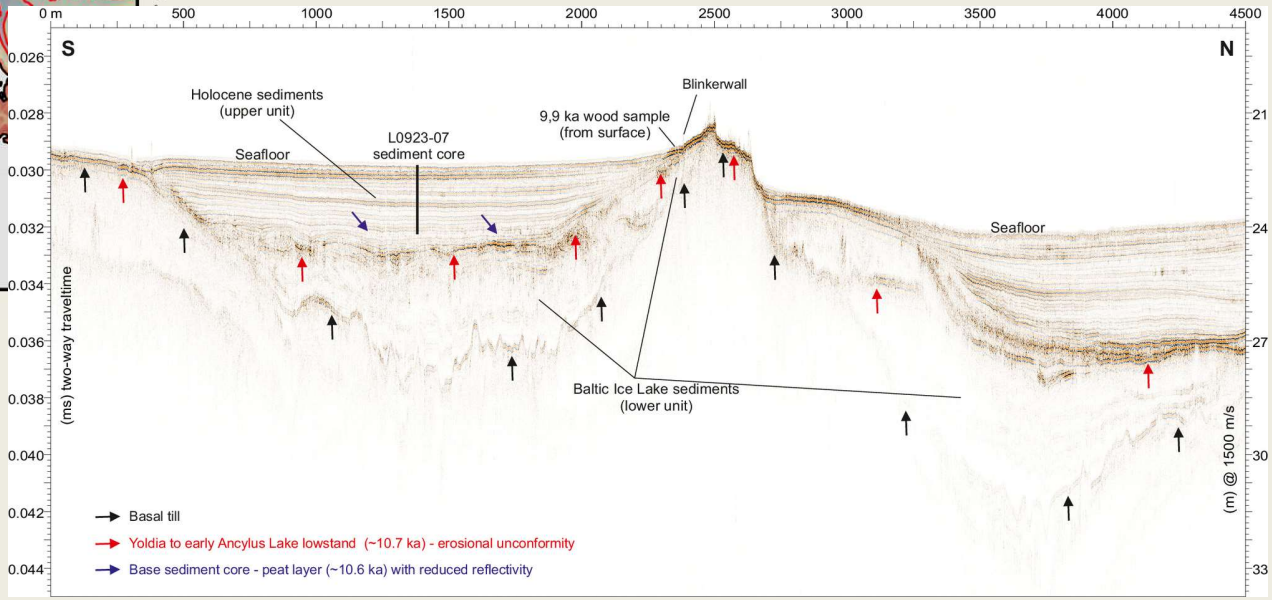
HYDRO 2024 / 5 – 7 November 2024 / Rostock-Warnemünde



- Large areas have been terrestrial over last 15 ka
- Many of these areas not yet covered by sediment



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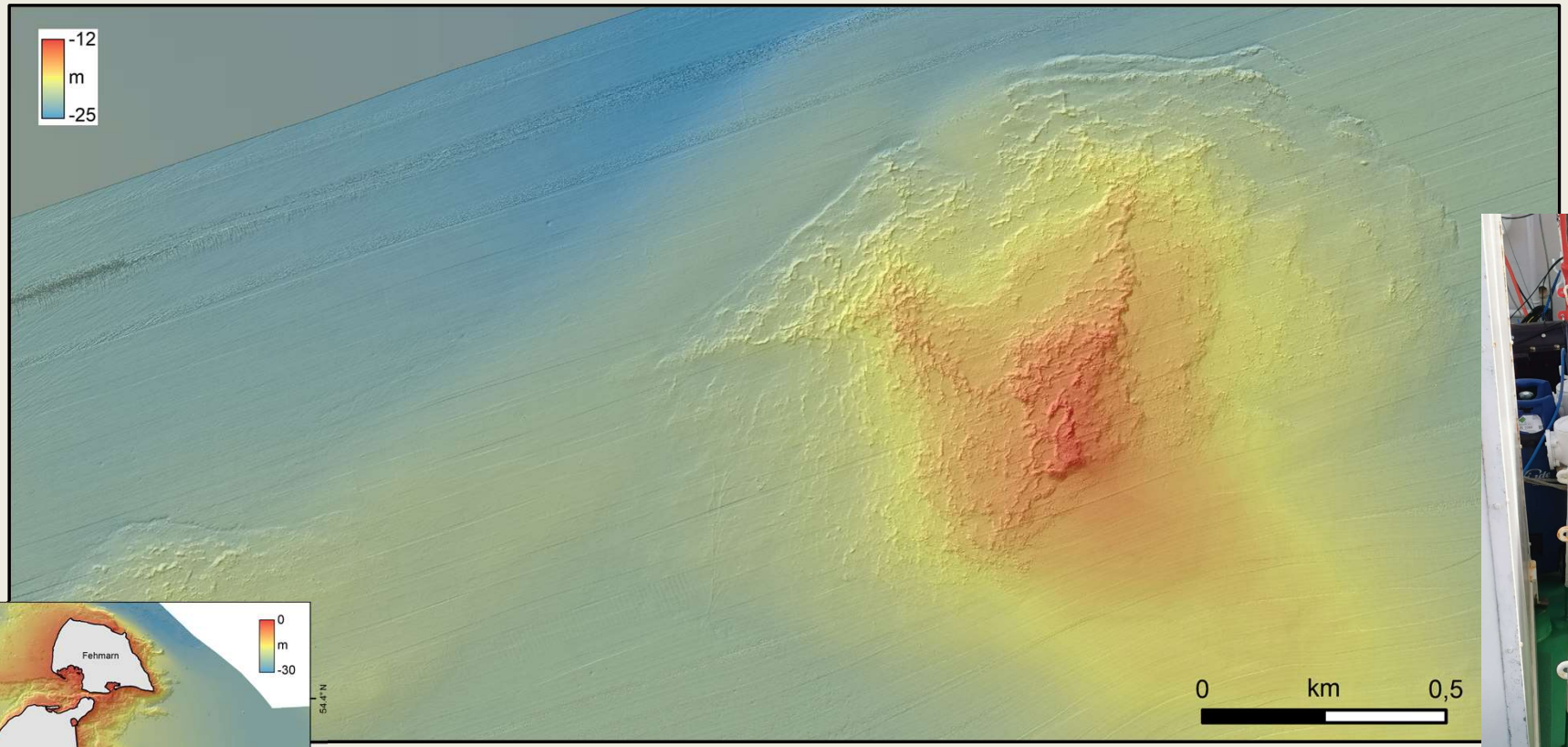
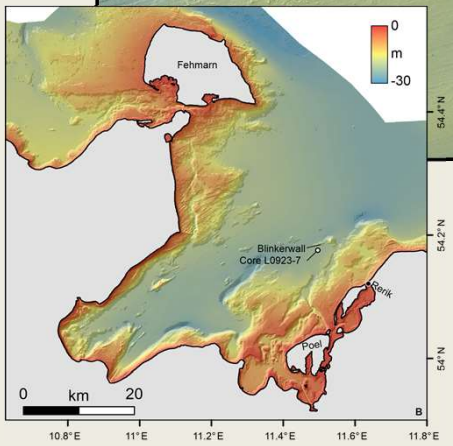
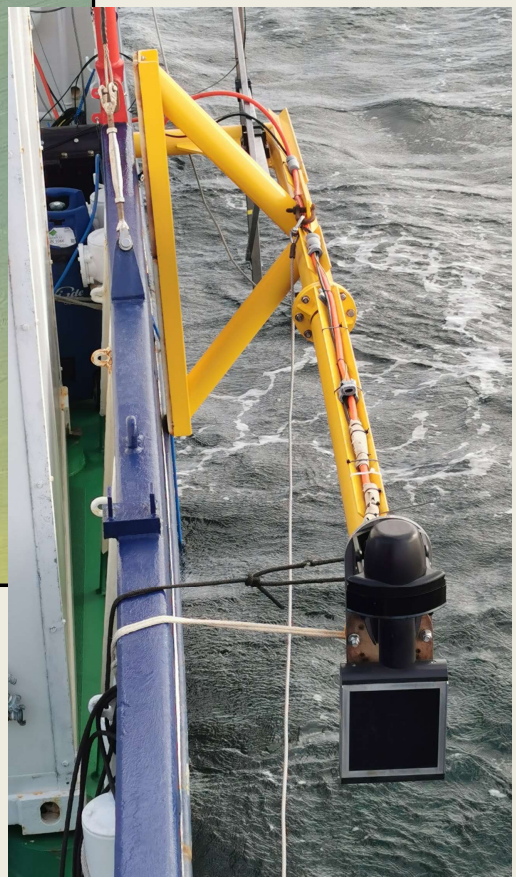




NORBIT MBES:

- 400 kHz chirp
- RTK MBES Survey
- Point Cloud Analyses
- Range resolution: **1-3 cm**




0
km
0.15

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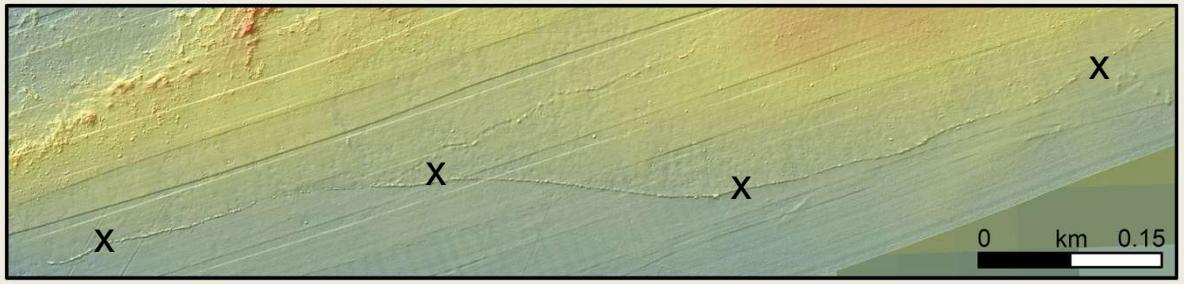
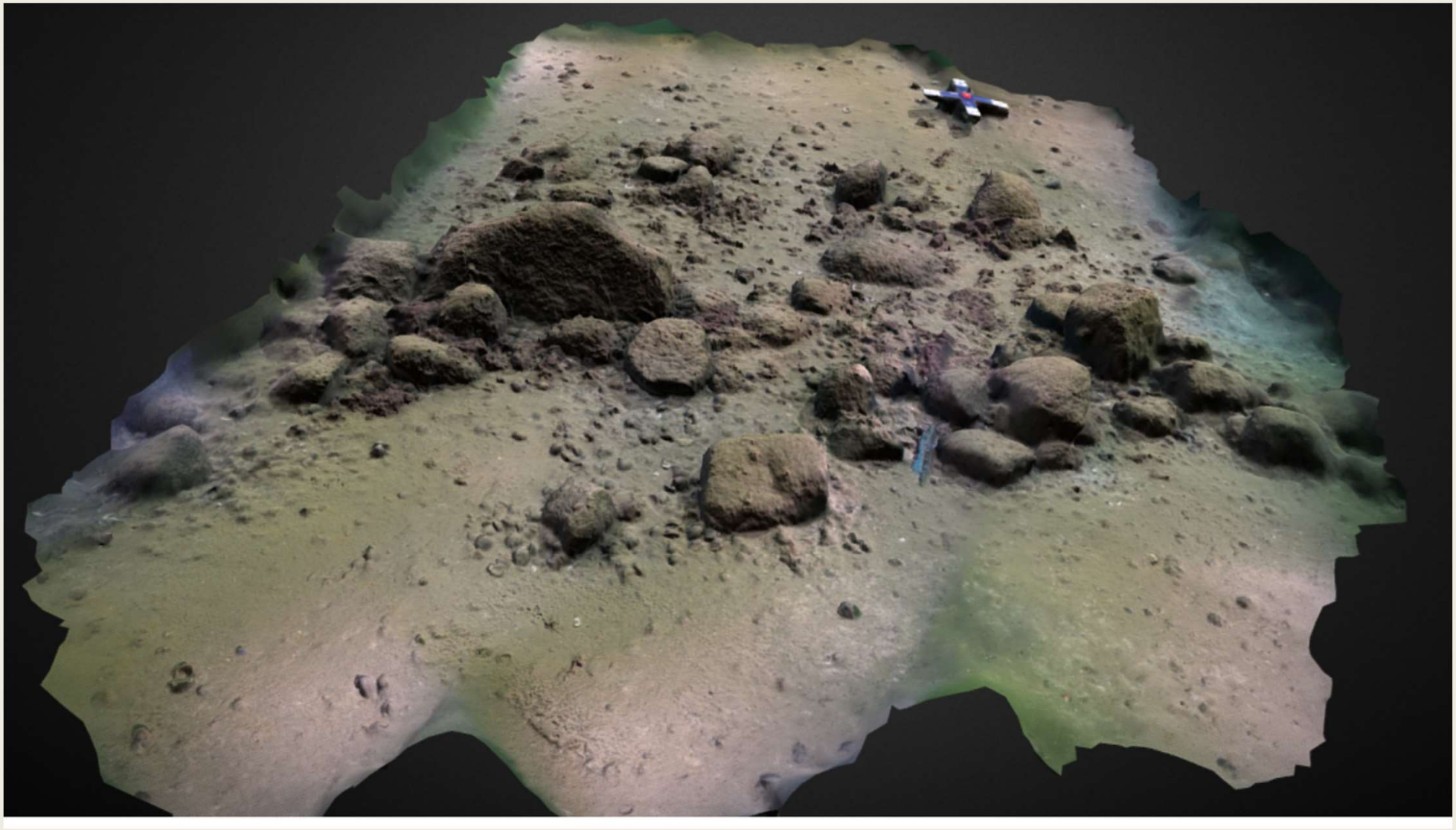
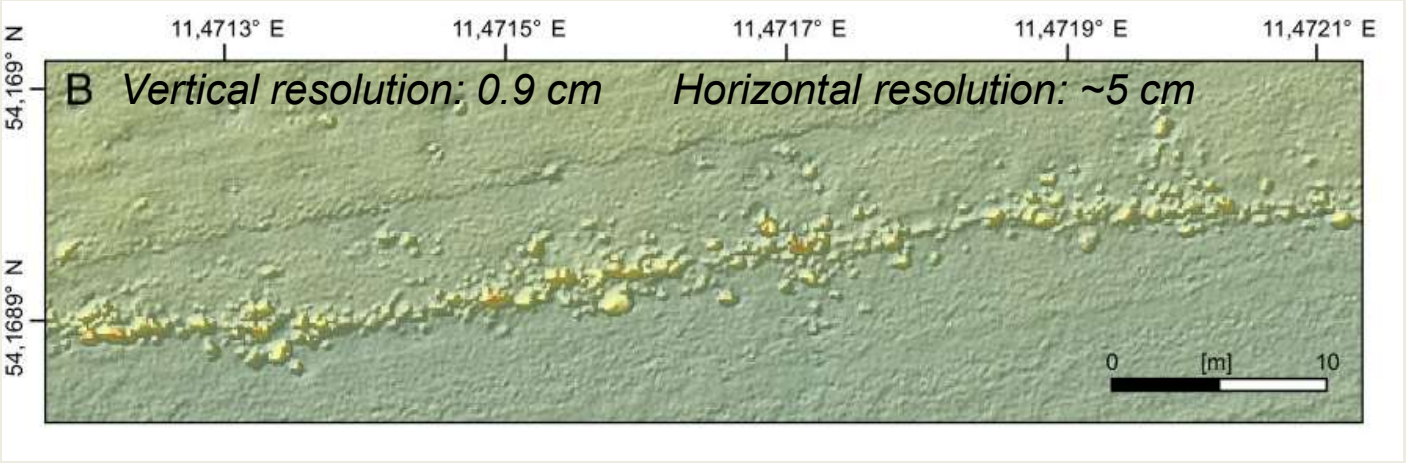
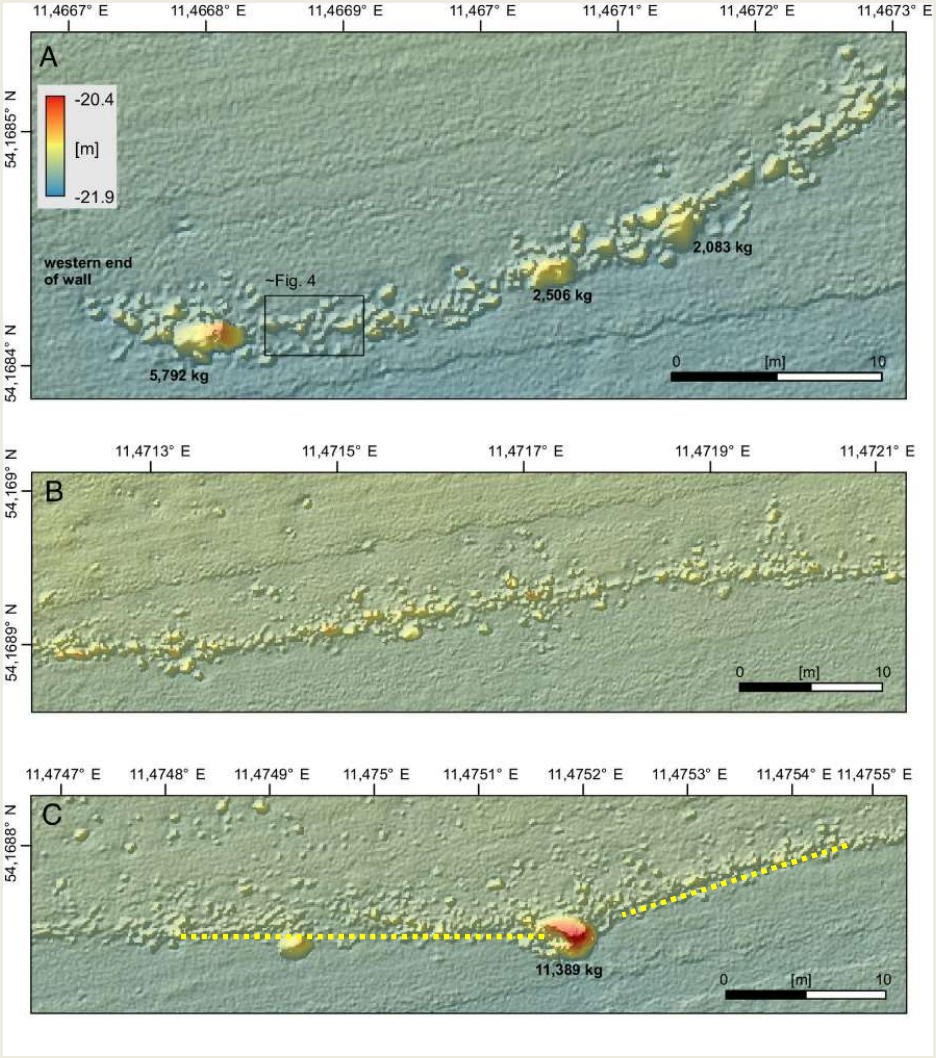
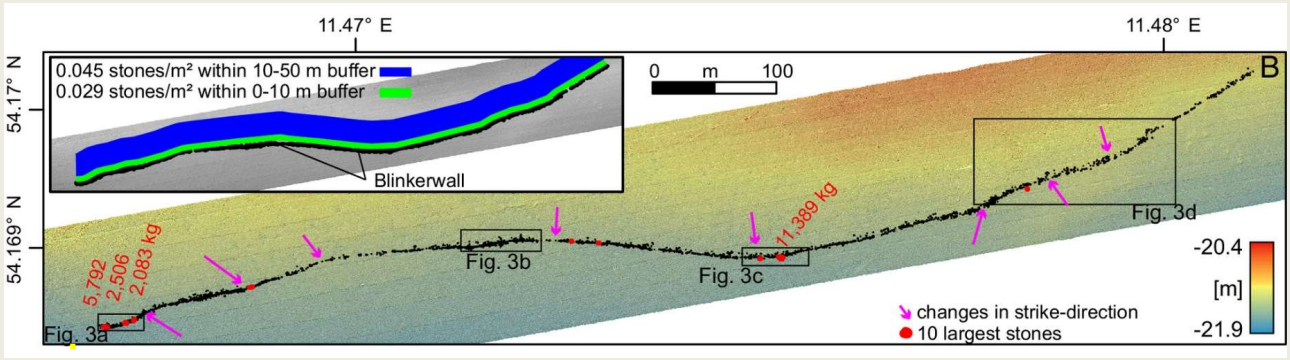


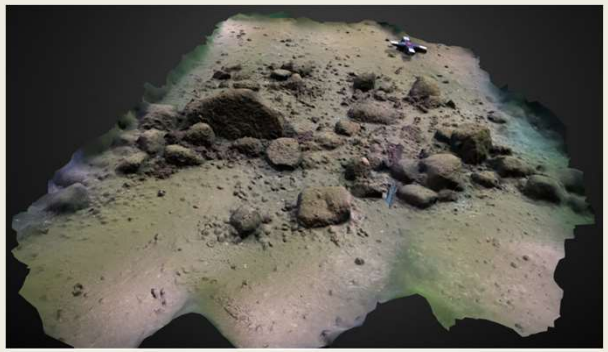


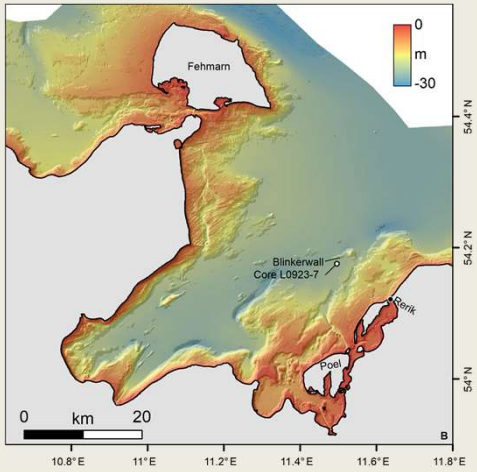
AUV (NORBIT MBES) survey on FK LITTORINA (2022) collected by CAU & DLR







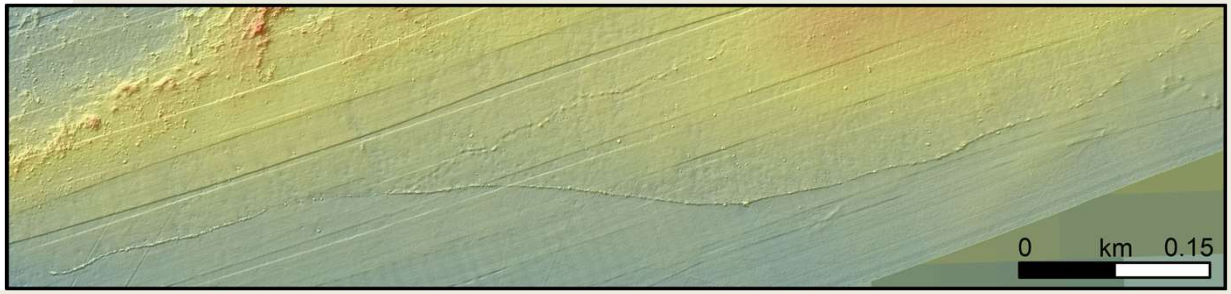




Blinkerwall

- 970 m long
- <1 m high / <2 m wide
- >1630 stones
- 21 m water depth
- 10 largest rocks in regions where the wall changes its strike direction
- First 10 m to the north rock density 50% lower than farther north

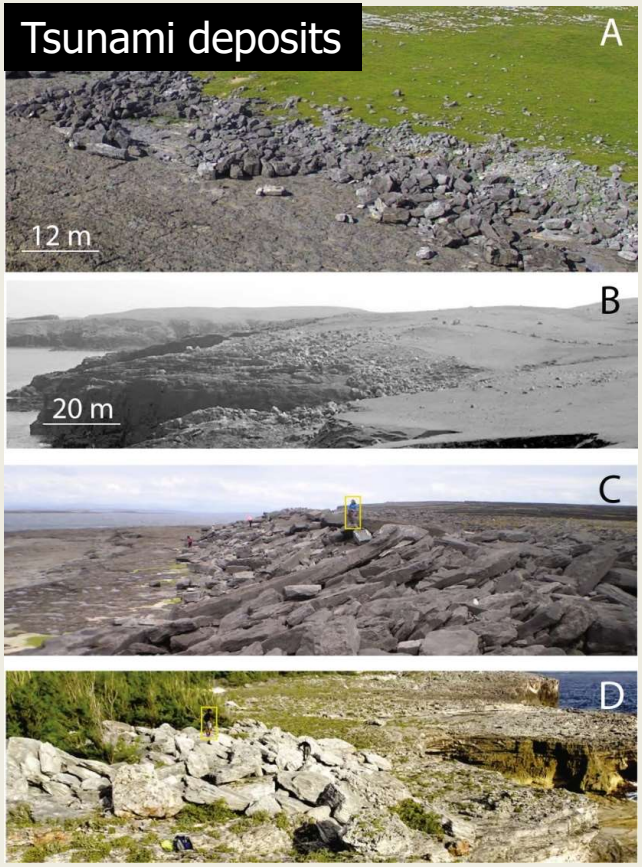
How does such a structure develop on today's Baltic Sea floor?



No direct proof possible

Therefore, first according to the exclusion principle

Tsunami deposits



Cox et al. 2019

Lateral moraine

https://www.nps.gov/articles/000/aps-20-1-2.htm

Paleoshore

Martini and Morrison 2013

Geological processes that move rocks

Glaciers (drop-stones, moraines)

Esker

Shoreline influenced by drifting ice

Tsunamis

Storm-waves

Good sorting
No comparable structure
Lack of small rocks

Esker

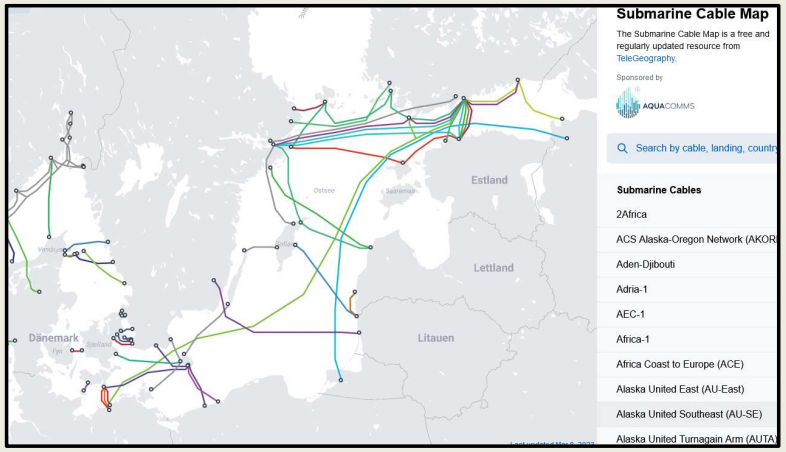


Abb. 9: Steinzange im Sassnitzer Hafenmuseum

Stone fishing

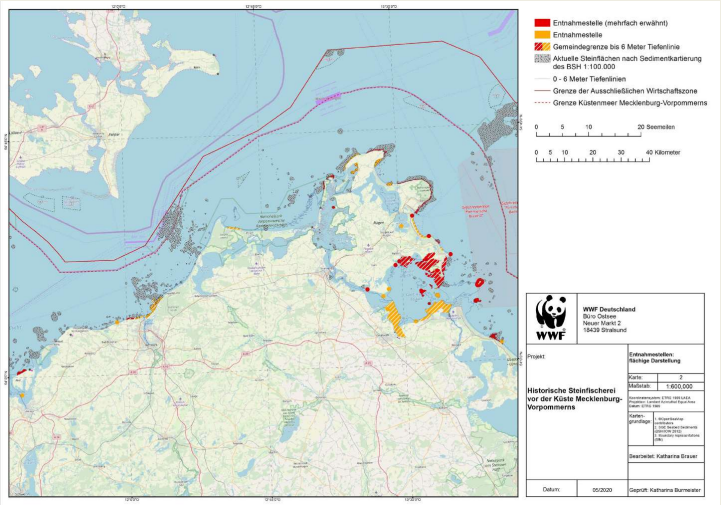
- Only in shallow water and not in the deep basins
- Wanted to remove the stones and use them on land

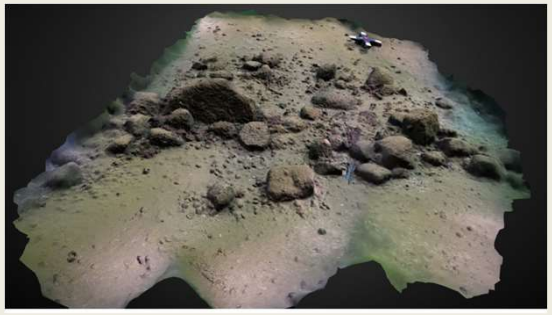
Cable or pipeline construction

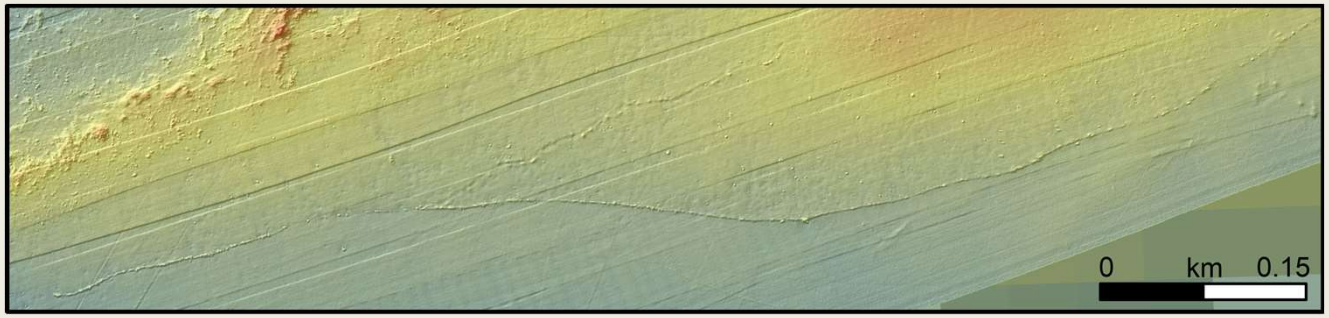
- Next cable 3 km further north

Military / Navy

- Unclear function

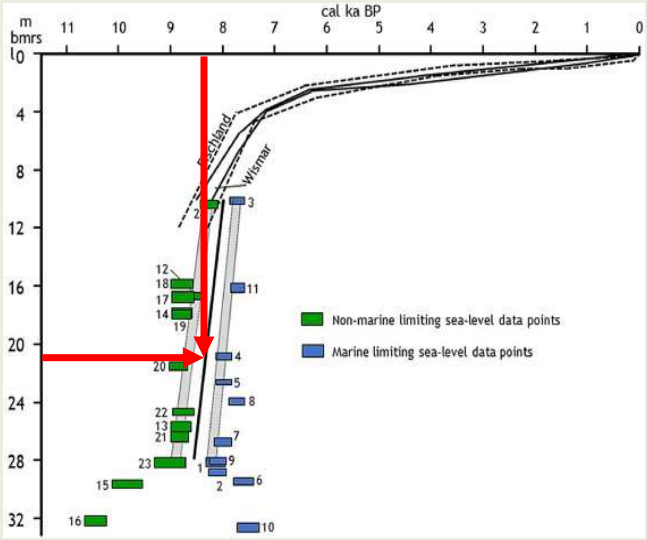






Conclusion

- Natural origin and modern origin unlikely
- Possibly a man-made structure with minimum age of 8,500 BP



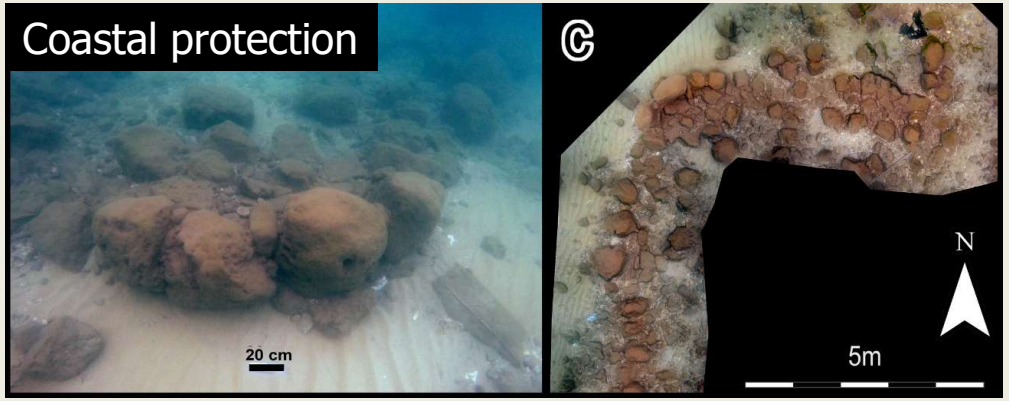
Stattegger & Leszczyńska 2023

National Penghu University of Science and Technology Department of Tourism and Leisure

Fish trap

Awak Pah (Jeffery 2004)

Coastal protection

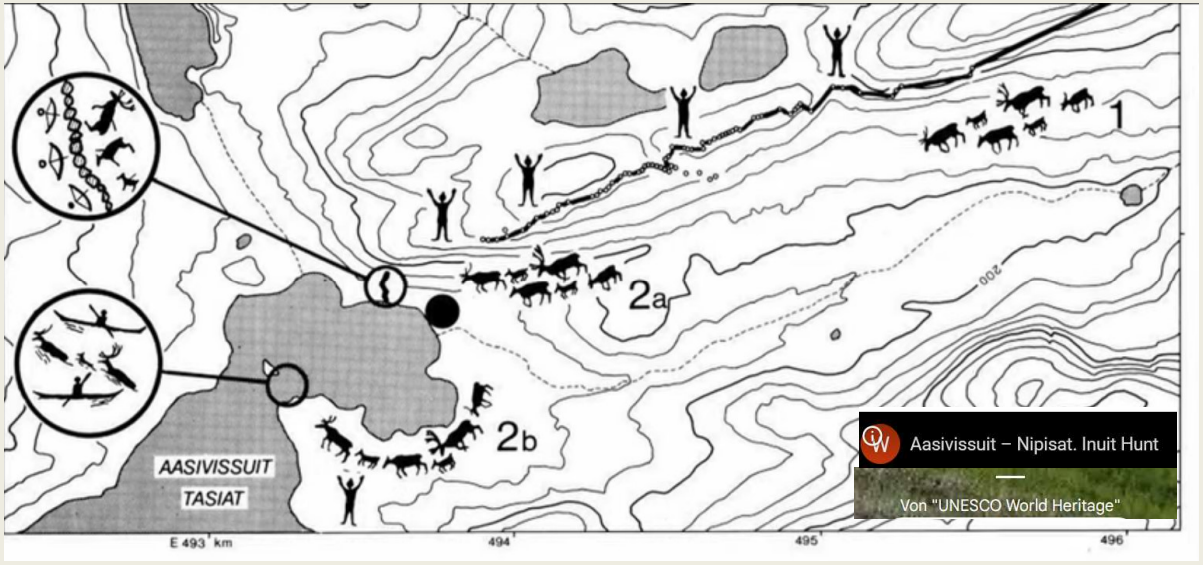


Galili et al. 2019

Harbour

Fish trap	• Only works with high tidal difference
Coastal protection	• Not high enough to provide effective shelter • South of the main ridge (open Baltic to the North) • High mobility of hunter-gatherers
Harbour	• Boots (canoes) were able to land on beach

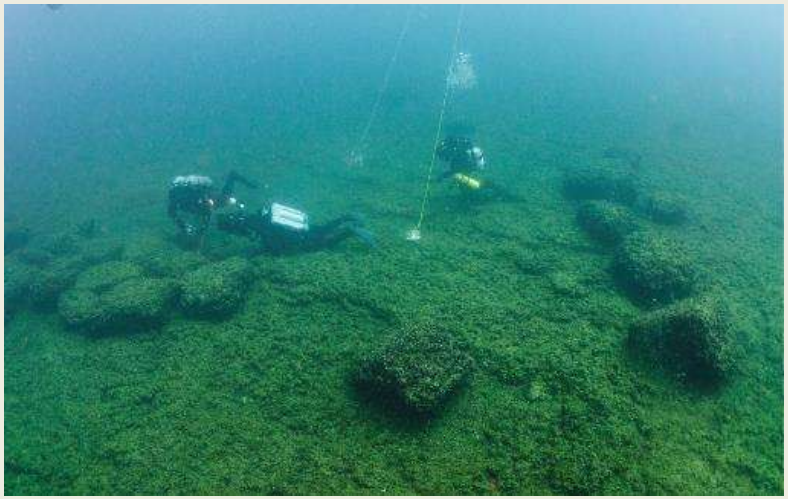
Current research hypothesis: the stone wall was used for herd hunting




Pasda & Odgaard 2011

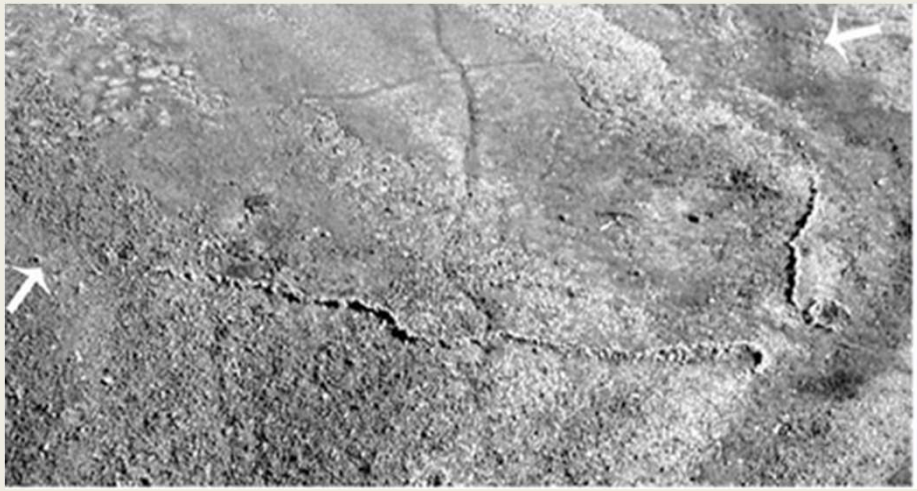
Comparable structures

Chile (Moore, 2014)



Lake Huron, US

Olson site
Colorado
Belle and Pelton 2013

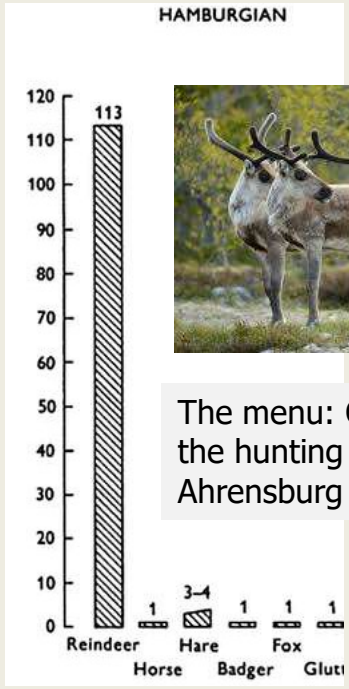


Victoria Island (Canada)

Current research hypothesis: the stone wall was used for herd hunting

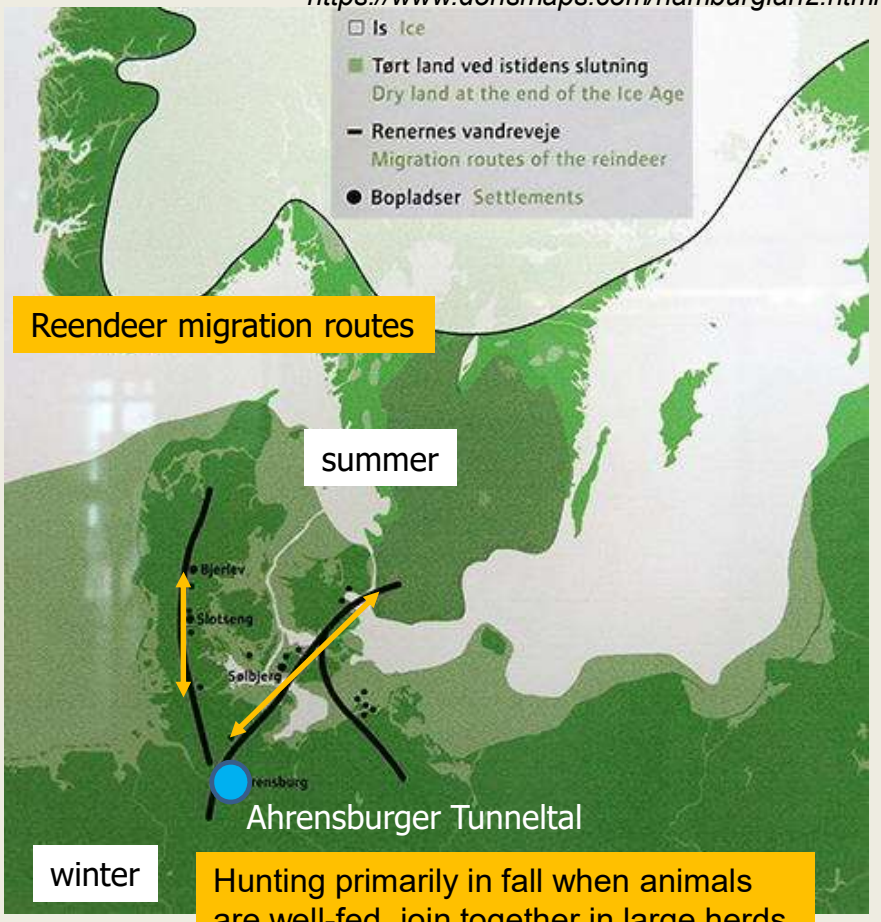
The only herd animals in question at this time were reindeer (until about 10 ka BP)

Colección Rauner



The menu: Composition of the hunting fauna in the Ahrensburg tunnel valley

https://www.donsmaps.com/hamburgian2.html



Outlook

Leibniz SAW project (*SEASCAPE*) 1 Mio € / 3 y
- systematically search for Stone Age architectures in the SW Baltic
- reconstruct paleo-environmental conditions
- 3 PhD & 2 Postdoc positions

RV Elisabeth Mann Borgese (EMB354) 26.11 - 3.12.2024
- hydroacoustic and visual seafloor mapping
- 3D boomer seismic data for paleo-landscape reconstruction
- sediment cores for paleo-environment

ERC Synergy Grant (*SubNordica*) 1 PhD / 3 years
- Paleolandcsape reconstructions
- Innomar, 3D-Boomer, sediment cores for dating

Diving campaigns at Blinkerwall
- search for artifacts
- photogrammetric reconstruction