CULTCOAST

Cultural Heritage Sites in Coastal Areas. Monitor, Manage and Preserve Sites and Landscapes under Climate Change and Development Pressure (CULTCOAST)

April 2019-March 2023. Researcher project NFR MILJØFORSK/ RCN environmental research, Project Number: 294314

Vibeke Vandrup Martens & Anne-Cathrine Flyen, NIKU – Norwegian Institute for Cultural Heritage Research.

Photo: Russekeila, Kapp Linné, Svalbard, Lena Rubensdotter, NGU, 2020

With funding from The Research Council of Norway

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Photo: Russekeila, Svalbard, 2019, VVM/NIKU


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Hiorthhamn: former coal mining town

- The mining town was established in 1917.
- The mine entrance is 582 m above sea level
- After 1921 only intermittend mining. Lastyear of operation was 1940
- Automatically protected as cultural heritage site
- Holds the second largest amount of listed buildings in Svalbard.

Foto: AC Flyen/NIKU

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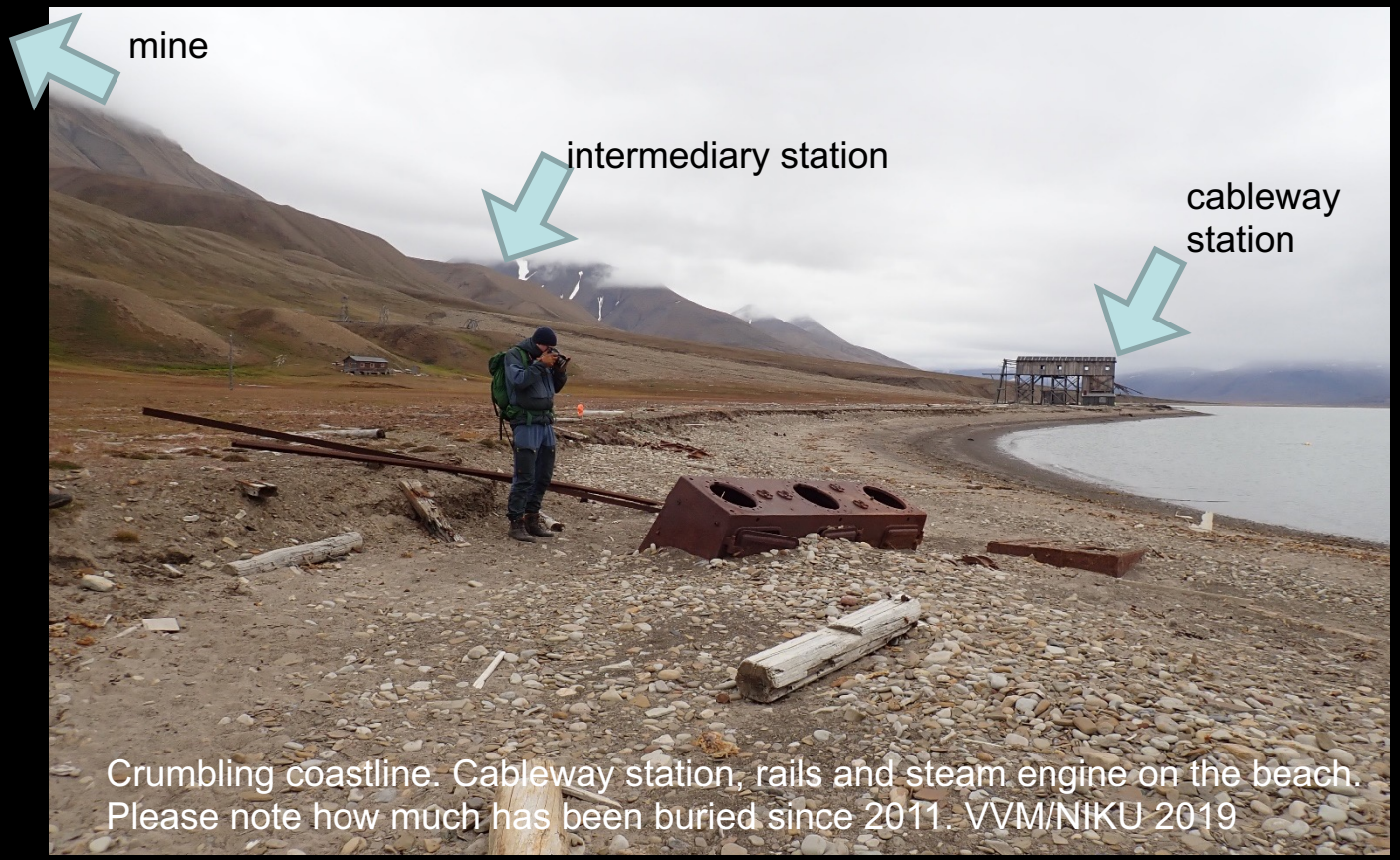
Hiorthhamn, Svalbard. Coal mine site

During fieldwork August 2019, we could see that the coast line has withdrawn, and the steam engine has sanded over. Listed buildings are damaged by solifluction (note the position of the foundation pile)



Crumbling coastline. Cableway station, rails and steam engine on the beach. Please note how much has been buried since 2011. VVM/NIKU 2019

Building pushed off its foundations by solifluction. VVM/NIKU 2019

Cableway station, rails and steam engine on the beach

ACF/NIKU 2011

NIKU Cultural Heritage Research

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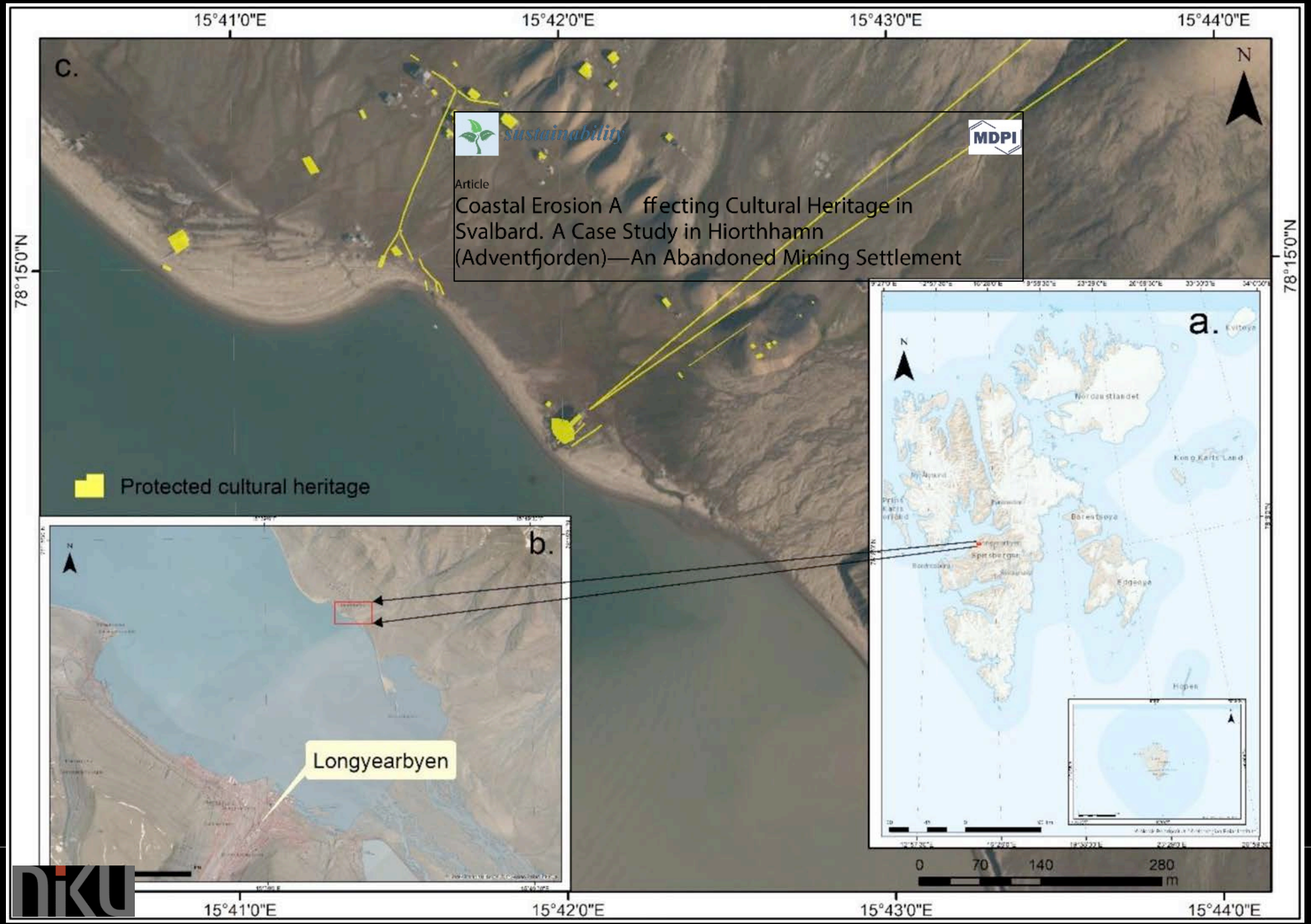

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Hiorthhamn

Nicu et al. 2020 (Sustainability)

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Hiorthhamn

Textured 3D mesh model of cultural heritage. The photogrammetric model was created using a combination of 3D laser scans and a series of single images. Geometry of the model is mainly based on laser scans, and photorealistic colour is derived from single images.

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Citation: Nicu, I.C.; Rubensdotter, L.; Stalsberg, K.; Nau, E. Coastal Erosion of Arctic Cultural Heritage in Danger: A Case Study from Svalbard, Norway. Water **2021**, 13, 784. https://doi.org/10.3390/w13060784

Longyearbyen seen from Hiorthhamn

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VVM/NIKU 2019

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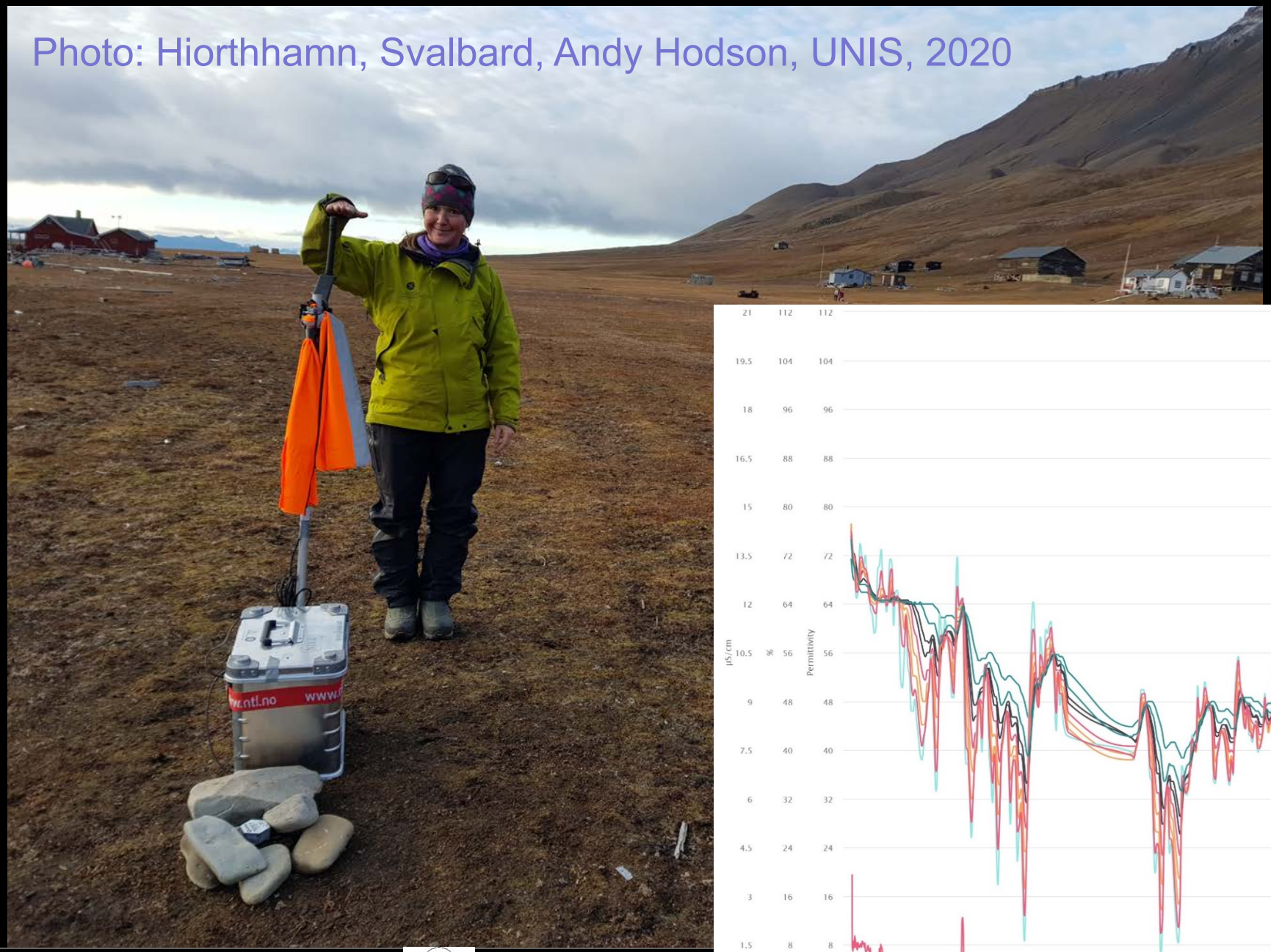
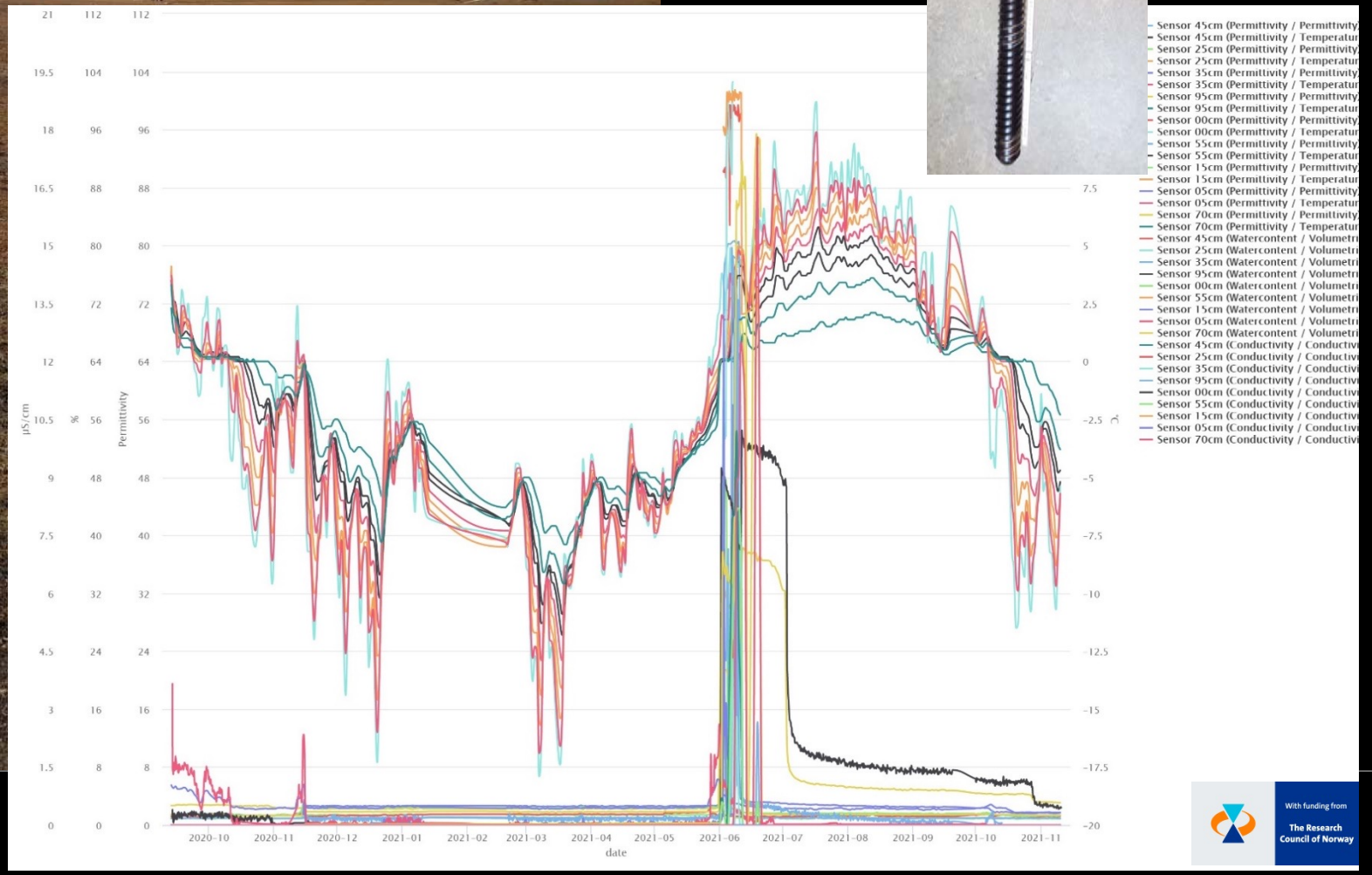
Hiorthhamn

Nicu et al. 2021, Figure 4. Comparison of shoreline position and morphology between 2019 and 2020 around some of the most important cultural heritage buildings and remnants along the sea in Sector 1 (no. 4 and no. 7). White ellipse and hexagons represent identical objects in the respective photographs.

Water **2021**, 13, 784.
https://doi.org/10.3390/w13060784

Photo: Hiorthhamn, Svalbard, Andy Hodson, UNIS, 2020





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Tools for cultural heritage management

Threshold levels

https://www.researchgate.net/publication/309391613_Preserving_Rural_Settlement_Sites_in_Norway_Investigations_of_Archaeological_Deposits_in_a_Changing_Climate

	% change of soil moisture (R. Hughes, EAA 2005)	% change of surface damage (Martens 2016)	°C change of temperature (Martens 2016)	% change of decay rate (Martens 2016)	% loss/ damage to site caused by continued use (Martens 2016)	% loss/ damage to site caused by new use/ development (Martens 2016)
🔴	11-	11-	2-	21-	21-	11-
🟡	6-10	6-10	1-1.9	11-20	11-20	6-10
🟢	0-5	0-5	0-0.9	0-10	0-10	0-5

©VVM 2016

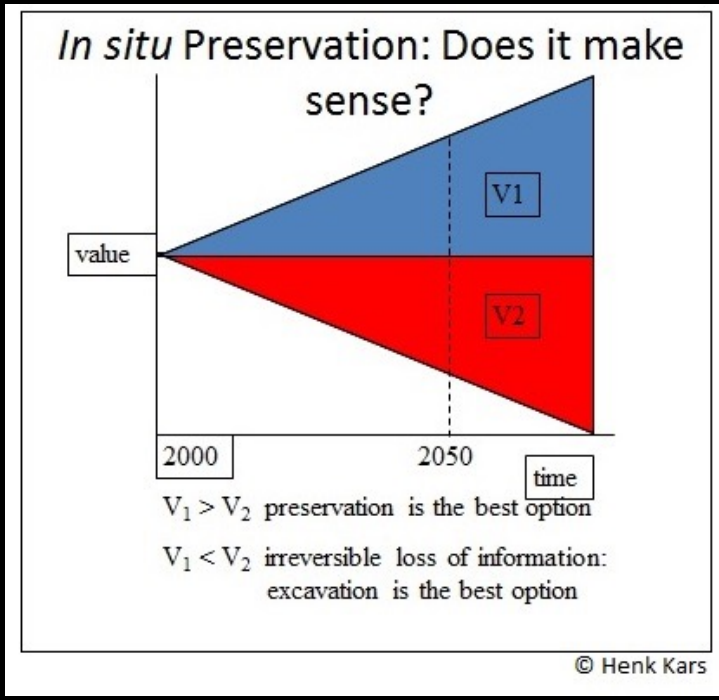
Preservation scale NS9451:2009

1= lousy
2= poor
3= medium
4= good
5= excellent

Threat evaluations

GIS position	Monument type	ID	Lived on	Distance to populated area	Monitored	Possible threats	Threshold levels	Possible mitigation actions
Free text/ numbers field	Dropdown menu from national CH database	Number from database	Y/N field	Free text/ numbers field	Y/N field	Dropdown menu of fields below + free text	Dropdown menu (see Table 16)	Free text field
						use (continued)		
						development/ new use		
						infrastructure		
						erosion/ surface		
						temperature change (air/ soil)		
						precipitation change (less/ more, other)	©VVM	

Site valuation



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VU VRIJE UNIVERSITEIT AMSTERDAM
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Excursion

- By boat from Longyearbyen to Hiorthhamn
- Survival suits for the crossing
- Dress warm!
- Lunch will be provided
- Security is vital: polar bear might appear

- Polar bears often visit Hiorthhamn
- Rifle and flare gun will be brought for safety
- Please behave as instructed by the guide