



# North Norwegian Heritage At Risk

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

Additional information from the GEOCULT project led by Cris Nicu (NIKU), and from archaeologist Lise Loktu from the Governor at Svalbard

Vibeke Vandrup Martens, NIKU – Norwegian Institute for Cultural Heritage Research.  
Arctic Science Summit Week ASSW 2022-03-31



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

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



- PI: **Vibeke Vandrup Martens**, NIKU. Researcher, PhD, geoarchaeology and Medieval archaeology, environmental monitoring of archaeological sites, climate change and heritage.
- Co-PI and PhD candidate: **Anne-Cathrine Flyen**, NIKU. Researcher, architect, preservation and degradation studies, Svalbard.
- Co-PI: **Knut Stalsberg**, Norway's Geological Survey (NGU). Researcher, PhD, geology, geo-hazards
- ▶ & **Lena Rubensdotter**, NGU. Researcher, PhD, physical geographer, geo-hazards.
- Co-PI: **Hans Renssen**, University of South-East Norway, (USN). Professor, PhD, quaternary geology, climate change.
- Co-PI: **Cecilie Flyen**, SINTEF Community. Researcher, architect, climate change adaptation, stakeholder involvement, citizen science.
- Co-PI: **Tom Dawson**, University of St Andrews, Scotland, UK. Researcher, PhD, archaeologist, climate change adaptation and public archaeology.
- Co-PI: **Ionuț Cristi Nicu**, NIKU / Kazan Federal University, Russia / Flinders University, Australia. Researcher, adjunct lecturer, PhD, geographer, geo-hazards, GIS.

Photo: Russekeila, Svalbard, 2019, VVM/NIKU



Vibeke



Anne-Cathrine



Knut



Lena



Hans



Cecilie



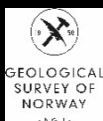
Tom



Cris



Norwegian Institute for Cultural Heritage Research



University of  
St Andrews



Kazan Federal  
UNIVERSITY





# Russekeila, Kapp Linné, Svalbard. Russian hunting station 1700-1859

The Pomor people had a hunting station at the mouth of the Linné river.

Russekeila is one of the largest archaeological sites of this kind in Svalbard, with visible house remains (with increasingly degrading wood) and a large cemetery, partly threatened by solifluction, partly by river erosion.



Photo: Russekeila, Svalbard. VVM/NIKU 2019



Photo: Russekeila, Svalbard. DJ drone photo 2020





Photo: overview Russekeila, Svalbard, Lena Rubensdotter, NGU, 2020



# Russekeila, Kapp Linné, Svalbard. Russian hunting station a. 1700-1859

CULTCOAST



Photo: House remains, Russekeila, Svalbard, Lena Rubensdotter, NGU, 2020



Photo: House remains, Russekeila, Svalbard, Lena Rubensdotter, NGU, 2020



Photo: grave, Russekeila, Svalbard. VVM/NIKU 2019



# Russekeila, Kapp Linné, Svalbard.

## Norwegian hunting cabin from a. 1850-1900



Photo: House remains, Russekeila, Svalbard. Lise Loktu, Sysselmannen 2020

Remains of house on the plateau above the western river bank. Refuse deposit containing textile, wood, animal bones, ammunition shells etc., buried beneath eroded coastal deposits.



Photo: Russekeila, Svalbard. Lise Loktu, Sysselmannen 2020



Photo: Refuse deposit, Russekeila, Svalbard. Lise Loktu, Sysselmannen 2020



# Hiorthhamn, Svalbard. Coal mine site

Hiorthhamn holds the second largest amount of listed buildings and other traces of coal mining activity in Svalbard. 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)



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



Cableway station, rails and steam engine on the beach

ACF/NIKU 2011



# Longyearbyen seen from Hiorthhamn

CULTCOAST





# Hiorthhamn

Nicu et al.2021, Figure 5. Textured 3D mesh model of the cultural heritage objects no. 1–7. 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.

**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>

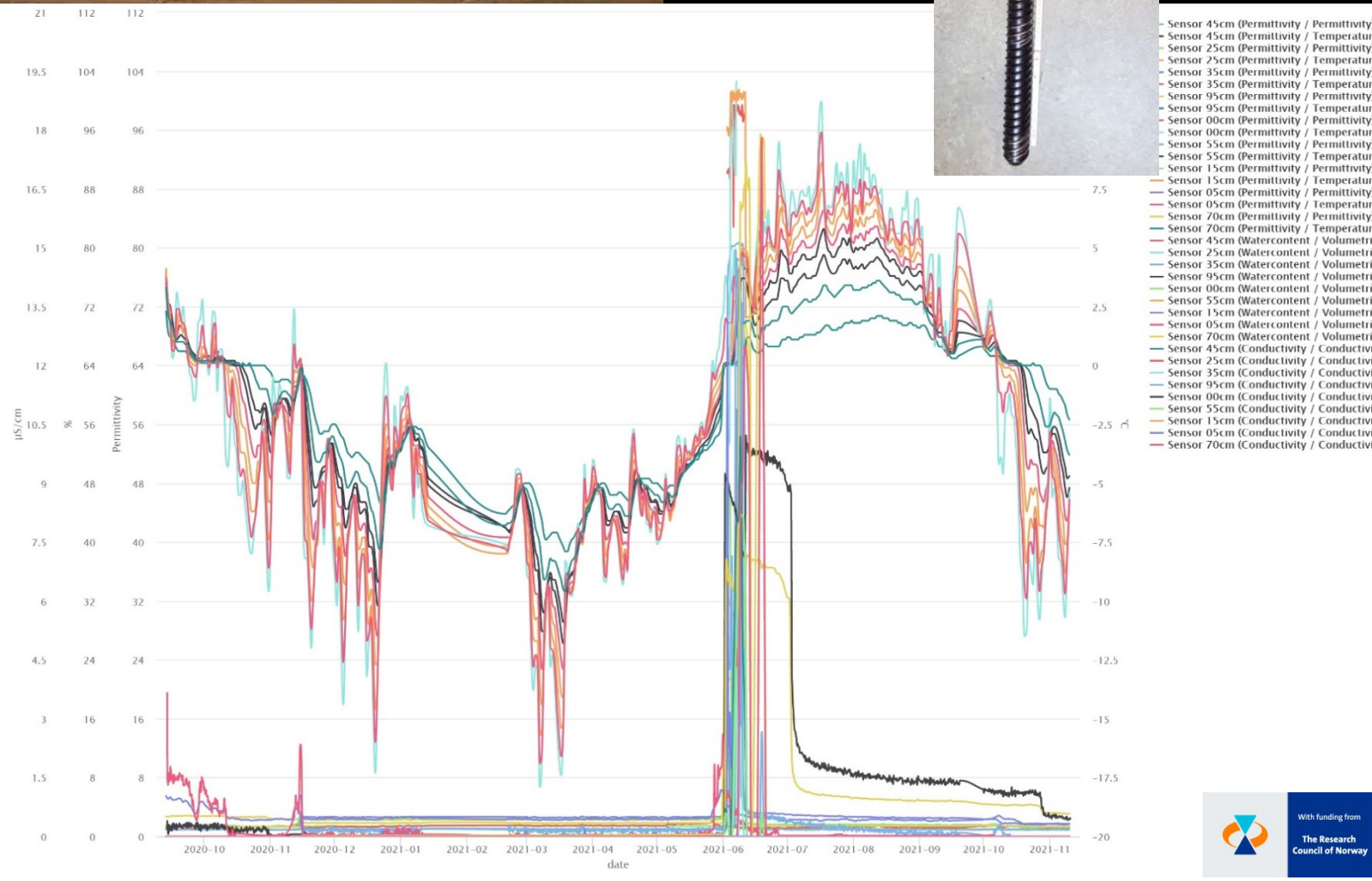
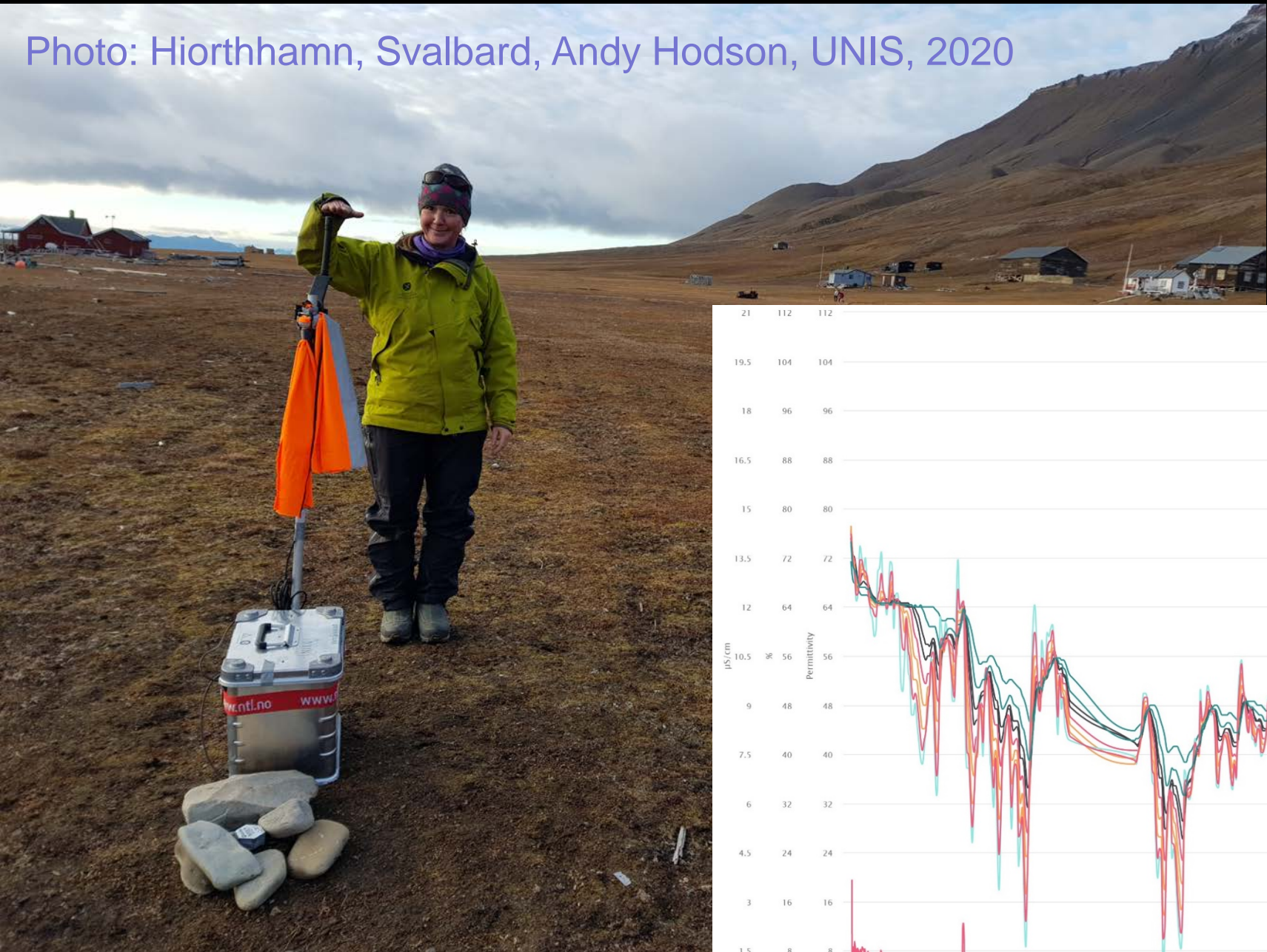


Article

Coastal Erosion Affecting Cultural Heritage in Svalbard. A Case Study in Hiorthhamn (Adventfjorden)—An Abandoned Mining Settlement



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








# 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](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

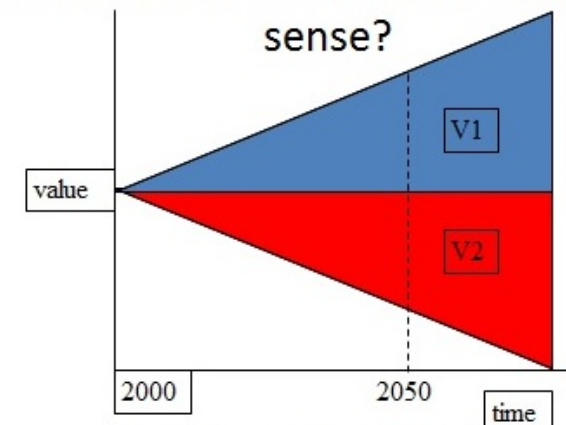
1= lousy  
2= poor  
3= medium  
4= good  
5= excellent

## 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

*In situ* Preservation: Does it make sense?



$V_1 > V_2$  preservation is the best option

$V_1 < V_2$  irreversible loss of information: excavation is the best option

© Henk Kars

vvm@niku.no