

Arctic Heritage At Risk

-measurements of climate parameters to
evaluate climate change induced geo-
hazards and preservation threats to coastal
cultural heritage sites and landscapes

CULTCOAST



CULTCOAST: Cultural Heritage Sites in Coastal Areas. Monitor, Manage and Preserve Sites and Landscapes under Climate Change and Development Pressure. Research project NFR MILJØFORSK/ RCN environmental research, Project Number: 294314, April 2019-March 2023.

Vibeke Vandrup Martens, NIKU – Norwegian Institute for Cultural Heritage Research. CAPARDUS & CULTCOAST workshop, Longyearbyen, Svalbard, August 6th, 2022



Photo: Høyvika settlement mound, Andøya, Norway. VVM/NIKU 2021



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

The Pomor people had a 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: House remains, Russekeila, Svalbard. VVM/NIKU 2019

Photo: house remains, Russekeila, the Governor of Svalbard, 2013

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



Photo: House remains, Russekeila, Svalbard. VVM/NIKU 2019

House remains at the edge of the coastal slope. Heavily degraded wood and very vulnerable. Active coastal erosion (windblown) – and gravity doing the rest

Graves on eastern bank threatened by decreasing permafrost and solifuction



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

Refuse deposit at Russekeila threatened by erosion



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

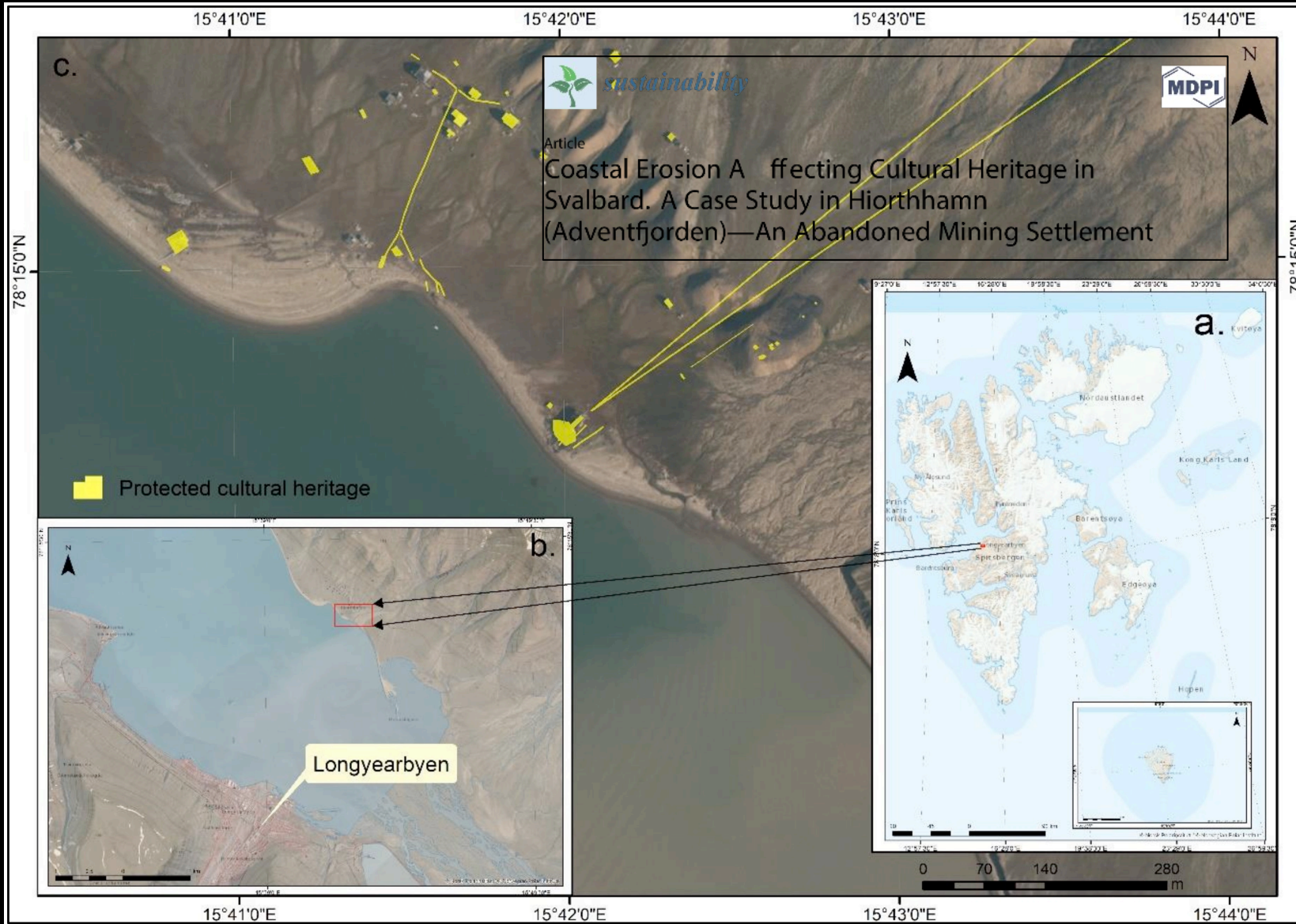


Photo: overview Russekeila, Svalbard, Lena Rubensdotter, NGU, 2020

Hiorthhamn from the air



Hiorthhamn, Svalbard



Nicu et al. 2020
(Sustainability)

Figure 2. (a). Geographical location of the study area in the context of Svalbard; (b) Local context; (c) Location of the protected cultural heritage (base orthophoto from Norwegian Polar Institute) [66].

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)



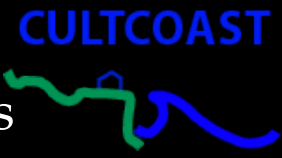


Nicu et al. 2021, Figure 4. Comparison of shoreline position and morphology between 2019 and 2020 around some of the most important cultural heritage buildings and remnants along the sea in Sector 1 (no. 4 and no. 7). White ellipse and hexagons represent identical objects in the respective photographs.

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<https://doi.org/10.3390/w13060784>

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.



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

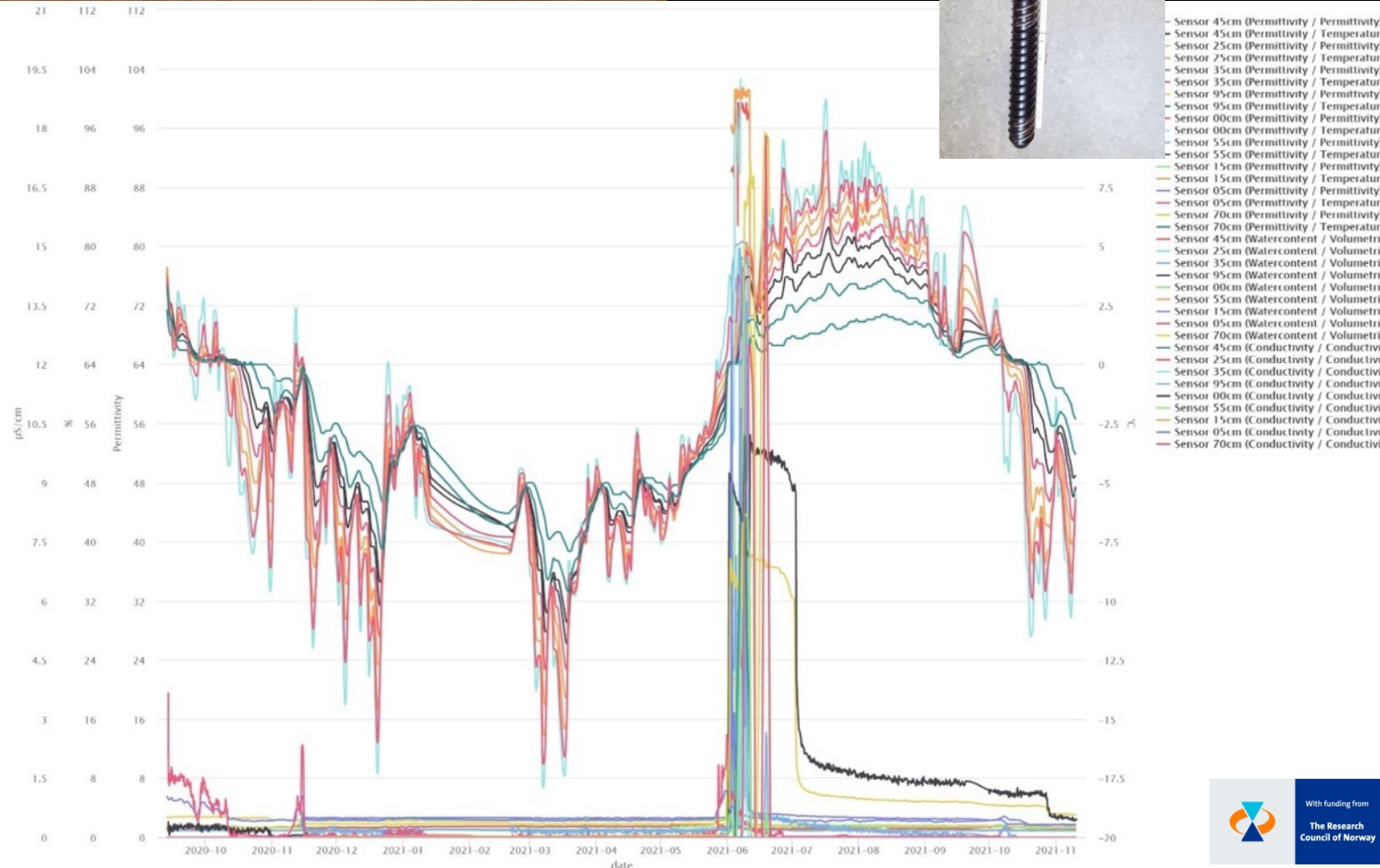
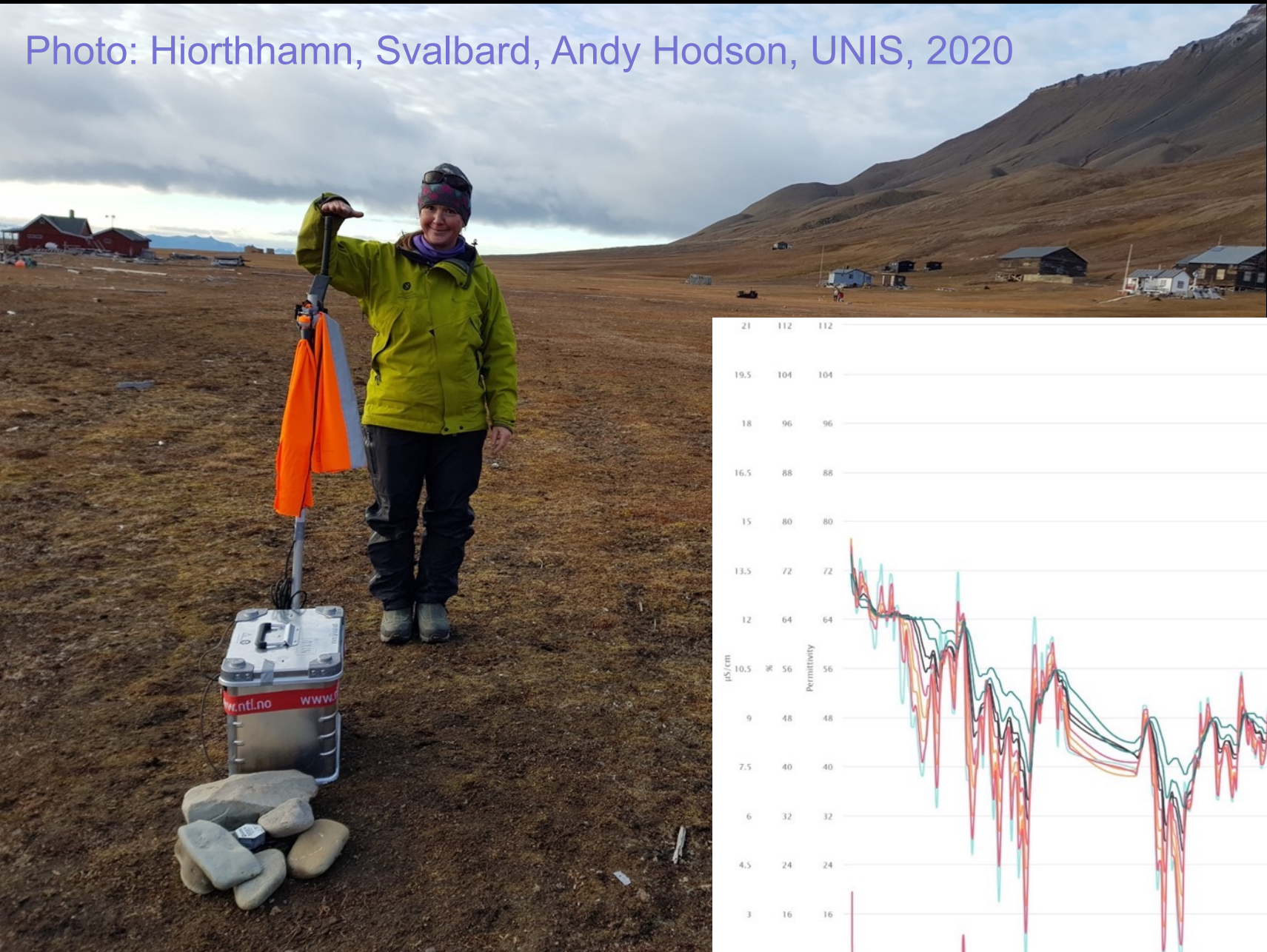


Longyearbyen seen from Hiorthhamn

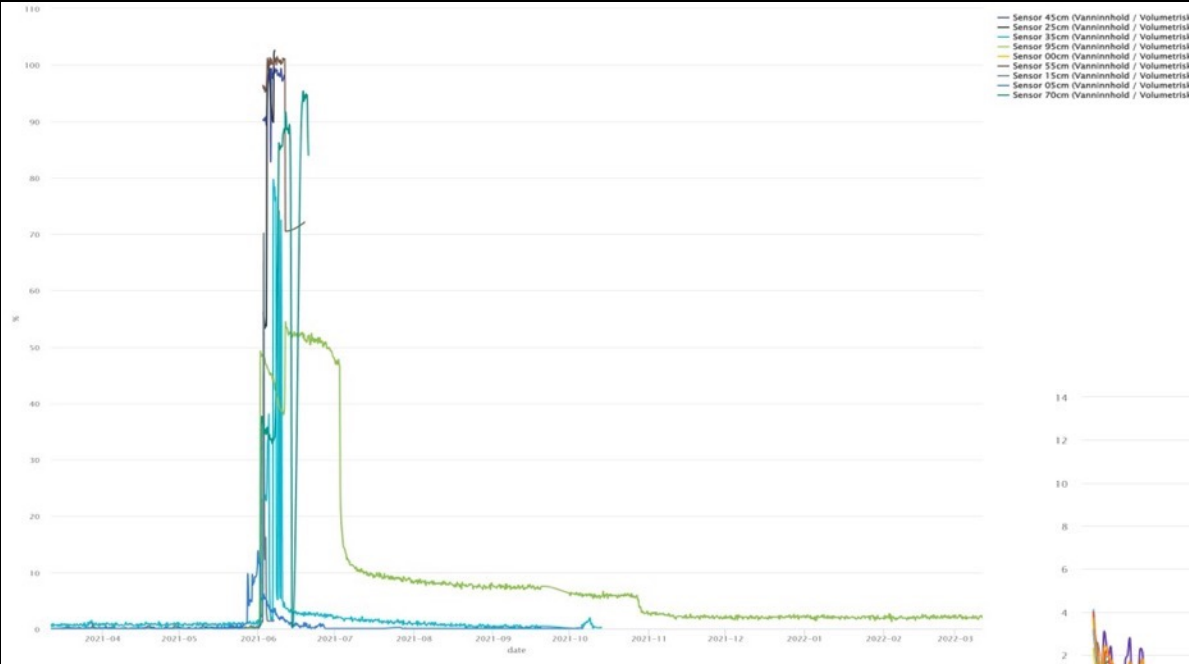
...the proximity of the town increases the site vulnerability. It is easy to reach by a short boat or kayak ride, and it is a popular access point into the mountains behind the site



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



Svalbard monitoring point –water content and temperature



Svalbard monitoring point –conductivity and permittivity

