

ACTIVATING ARCTIC HERITAGE

EXPLORING UNESCO WORLD HERITAGE IN GREENLAND

ANNUAL REPORT 2021



The AAH Annual Report 2021 is compiled and edited by research professor and PI

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Cover photo: Anne Birgitte Gotfredsen, Angutinnguaq Olsen and Nanna Bjerregaard Pedersen at the profile of the excavation trench of the midden at Nipisat East. This trench was placed on the slope below the Inuit communal houses that were built inside the remains of the older colonial *Vaaningshuset*. Examination of cultural layers in the trench revealed evidence of the Inuit occupation following the burning down of the colonial building by Dutch whalers in 1731. The bone layers show an abundant and successful period of Inuit life at the site that stops abruptly at the end of the 18th century, most likely the result of epidemic diseases which ravaged the area and almost obliterated the entire local population (Photo: Bjarne Grønnow, August 2021).

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Project Summary

In 2017 and 2018, two new areas in Greenland, Kujataa and Aasivissuit – Nipisat, were added to the UNESCO World Heritage List. These prestigious appointments acknowledge the unique and diverse cultural assets of both properties and two diverse geographical and culturally distinct parts of the country.

Kujataa, in the South, is characterized by its rich Inuit, Norse and Colonial cultural history, with a thriving tradition of Arctic sheep herding and agriculture. Conversely, *Aasivissuit-Nipisat* in



West Greenland represents a 4,400 year old tradition of subsistence hunting and fishing that has remained largely similar across the Pre-Inuit, Thule and Historic/Modern Inuit periods. Families in this portion of West Greenland still make annual journeys from the coast to the inland to hunt caribou and fish Arctic char, retracing the same ancient pathways and camping on the same grounds as their ancestors.

The 'Activating Arctic Heritage' project benefits from the world-wide attention, the present momentum, and the unique research opportunities resulting from these two recent UNESCO appointments.

Within the project, novel approaches are explored to examine the many interconnected cultural and environmental historical issues connected through three overarching key topics:

- 1) *Dialogues on Arctic Cultural Heritage*, investigates the co-production of knowledge by local people, researchers and other stakeholders in Greenland's two new UNESCO World Heritage areas.
- 2) *New Scientific Approaches to UNESCO Sites in Greenland*, combines a wide range of non- and/or minimally destructive scientific methods to extract 'hidden' information from archaeological sites and to evaluate the vulnerability to these sites as a result of increasing human activities and climate change in the Arctic.
- 3) *Learning from and enriching cultural heritage*, addresses knowledge-gaps by focusing on cultural landscapes and previously undocumented Inuit and Norse sites in Greenland.

The project is a collaboration between the National Museum of Denmark in Copenhagen (NM) and the Greenland National Museum & Archives in Nuuk (NKA). The project is directed by Principal Investigator and Research Professor, Bjarne Grønnow Dr. Phil., Modern History and World Cultures at the National Museum. Christian Koch Madsen PhD, Deputy Director of the Greenland National Museum and Archives is the co-PI. Senior researchers and Postdocs from several departments at NM and NKA, as well as several external partners comprise the interdisciplinary AAH research team. AAH includes ten separate research-themed work packages (WPs) that integrate the humanities, social and natural sciences. The project is a Semper Ardens Project funded by The Carlsberg Foundation through a generous grant to the PI (2019 – 2023).

Members of the AAH Research Group, 2021



*The AAH research group at the internal seminar in Brede, October 2021.
(from left to right: Bjarne Grønnow, Jens Fog Jensen, Hans Harmsen, Catherine Jessen, Fuuja Larsen, Martin Mortensen, Anne Birgitte Gotfredsen, Peter Steen Henriksen, David Gregory, Niels Lynnerup, Henning Matthiesen, Sascha Krüger, Anne Mette Jørgensen, Dorte Dangvard Pedersen, Christian Koch Madsen, Jette Arneborg, Jørgen Hollesen, Anne Marie Høier Eriksen, Gorka Mendiguren Gonzalez, Rasmus Voss, Peter Andreas Toft)*

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2021 Overview

2021 was a great year for the AAH Project. Despite rising rates of Covid-19 in both Denmark and Greenland, it was still possible to carry out most of the research activities that had been postponed in 2020. All WPs were fully staffed which included the hiring of the three remaining Postdoc positions. A total of six Postdocs are now part of the AAH research group. In 2021 the project succeeded in conducting comprehensive field and lab work in relation to the two UNESCO areas that included several new archaeological, anthropological and natural scientific discoveries—as well as increasing to an ever increasingly large data set that has critical importance for Greenland after the conclusion of the project next year.

Beginning in the spring of 2021, the AAH project collaborated with the University of Aalborg and hosted an international conference titled, ‘Greenland-Denmark 1721 – 2021.’ The first two days of the conference were held at the National Museum and in the Royal Society for Science and Letters. Several members of the AAH team presented papers at the conference where the on-going research and new discoveries of the AAH projected received high praise from the colleagues in attendance.

We are also happy to share that the summer of 2021 witnessed one of the largest coordinated interdisciplinary field research campaigns ever seen in Greenland. In July and August, five work packages participated in archaeological excavations and environmental/historic climate research in Aasivissuit - Nipisat. At the same time, four interdisciplinary teams of scholars worked in the South Greenland Kujataa UNESCO WH area, employing over 35 researchers, students and local collaborators.

Excavations in the Aasivissuit-Nipisat UNESCO area concentrated on Nipisat, Arajutsit and Aasivissuit with the purpose of shedding new light on Thule Culture developments and historic entanglements of Inuit and European whalers/traders and early Danish/Norwegian colonizers (ca. 18th-19th centuries). Topographical surveys and excavations of excellently preserved, sometimes permanently frozen, cultural layers provided a plethora of new insights into the settlement and demography of Central West Greenland after the arrival of Hans Egede in Greenland in 1721. Excavations produced hundreds of artefacts and thousands of individual faunal remains. Excavations also included soil- and pollen-sampling to provide more nuanced understandings of the preservation and degradation of fragile organic materials. Additionally, the data offered new clues to help reconstruct the local paleoenvironment and understand climate fluctuations in Greenland in the past.

The historians of the project continued their analysis of a hitherto unknown collection of archival materials about the Napisene colony (1729-31), joining the archaeological field work that was carried out in August 2021. This interdisciplinary research resulted in important new discoveries on why the colony failed to establish a military fort and whaling station on Nipisat. Further inland, investigations of Aasivissuit (the 'Great Summer Camp') concentrated on the preservation of the submerged caribou bone bed in the lower midden area. Bones from this layer were sampled for AMS dating to determine the earliest culture phasing of the site (originally identified from the excavations performed in 1978). This is a unique opportunity to document possible changes in both the physical and chemical properties of the archaeological record, as well as examine the degradation of organic remains over the last four decades due to a warming climate in this part of the Arctic.



Drone photo (from north) of the historic features on the island of Nipisat. The ruins of the Inuit communal houses built on top of the colonial 'Vaainingshuset' (established 1729) are seen at the left on the grassy area, just above the bay (Nipisat East). To the right the tents of the AAH-camp are seen and behind these the ruins of the Inuit communal houses of Nipisat West appear. In the far distance the high mountains at the outer Kangerlussuaq fjord can be observed. (Photo: Bjarne Grønnow).

In Kujataa, both Norse and Inuit sites were targeted for archaeological, paleo-environmental and geographical investigations. On-going excavations of the Norse cemetery at the Bishops see at Garðar (Igaliku) continued, revealing eight new burials, some with very well-preserved human remains. Soil samples for aDNA-, parasite-, bacteriological-, and lipid-analyses were collected from these burials. Comprehensive samples of charred macrofossils, that provide new information on the Norse utilization of both local and exotic plant resources was extracted through the flotation of several tons of material excavated from midden deposits at the Norse farmstead of Ø49, near Igaliku.

A special effort was also made to collect new information on local climate/environmental change occurring over the last millennium with the extraction of lake sediment cores in the vicinity of Qassiarssuk in the Norse Eastern Settlement. Investigations into human and natural impacts (e.g. disturbance of archaeological remains, wear of vegetation, erosion, etc.) were conducted at several key sites, through a combination of ground observations,

remote sensing (i.e. drone surveys), and the installation of local climate and atmospheric monitors.

Finally, identification of Inuit sites in previously un-surveyed areas, including test excavations and topographical analyses, were continued in 2021 with promising results. Suitable preservation conditions for the retention of organic materials (particularly faunal remains) was much better than anticipated.

Despite the many Covid-19 restrictions that were in place in South Greenland during the period of fieldwork, many local citizens visited the AAH excavations and public events. These activities included more informal 'kaffemiks' (coffee gatherings) and a UNESCO World Heritage Day event which gave visitors a chance to directly interact with archaeologists excavating the cathedral cemetery.



A scene from one of the educational outreach activities arranged by the AAH team during the Sisimiut Science Week and UNESCO Festival. Students from the Sisimiut Gymnasium discuss how they see cultural history as relevant to their daily lives and future visions for the UNESCO WH area. (Photo: Bjarne Grønnow, July 2021).

Dissemination activities culminated in November, when many of the researchers of the AAH project team spent over three weeks in Greenland attending and participating in the

Greenland Science Week program in Sisimiut (1-7 November) and Nuuk (8-12 November), followed by a third trip by Senior AAH researchers to South Greenland.

In collaboration with the Sisimiut Museum staff, the Qeqqata Municipality and DTU Arctic, the AAH team helped coordinate and support the annual Sisimiut UNESCO Festival and Sisimiut Science Week. Among the many contributions the AAH team arranged public talks, ‘meet the researchers’ events, a 3D heritage workshop and several other educational outreach activities in the community halls, public schools and local museums in Sisimiut, Sarfannguit and Kangerlussuaq. In Qaqortoq, Narsaq and Qanisartuut (in the Kujataa UNESCO property), intensive parallel dissemination activities and dialogues were successfully arranged by the AAH team in collaboration with the UNESCO manager with the local citizens.

A very important presentation was delivered to a large and diverse international audience by the AAH-team at the ‘Making Science Matter’ Conference on 11 November, 2021. This talk was followed by a pop-up event hosted by AAH-researchers at the Greenland National Museum and Archives the following day. These many activities, taken as a whole, have provided a unique set of new insights and information for the overarching ‘Dialogues’ work package (WP 1.1) to examine as we move forward.

Lastly, in 2021 October, we succeed in gathering almost the entire AAH team for a physical meeting to report on the successes and outcomes of the summer fieldwork. The meeting provided the opportunity for all our Postdocs to present their work as well as plan and coordinate the analyses of archaeological finds, scientific samples and other proxy data in the lab. Additionally, the entire AAH group consulted on publication plans and an annual meeting with the AAH Advisory Board on 14 October.

During the last months of 2021, teams from the various work packages continued their summary reporting and laboratory work. This included data management and registration of samples and archaeological materials, comprehensive analyses on collected samples, as well as curation of special archaeological finds.

2021 Reports from the Work Packages

WP 1.1: Dialogues on Heritage and Society

NM Senior researchers Martin Appelt and Jens Fog Jensen, NKA National Heritage Resources Manager Hans Harmsen, Postdoc Anne Mette Randrup Jørgensen, & NKA Museum Leader, Frederik Fuuja Larsen

Introduction

After the cancellation of several planned activities due to the Covid-19 situation in Greenland and Denmark in 2020, it was a pleasure to re-invigorate the dialogical activities of Activating Arctic Heritage in 2021. WP 1.1 carried out an intense three-week ‘dialogue-tour’ in November in connection with Greenland Science Week and the UNESCO WH festivals in Sisimiut and South Greenland, collaboratively organized between the AAH Project, Qeqqata and Kujalleq municipality administrators, UNESCO managers and local museum staff.



A large map was the starting point of fruitful dialogue between researchers and local citizens on resources and place names in the Aasivissuit-Nipisat UNESCO area. The event took place at the community meeting house in Sarfannugit in November 2021. (Photo: Martin Appelt).

The Dialogue work package is developing along two axes: the first axis involves merging practice and theory. The second axis is more process-driven, anchoring the results of our dialogical work in the two UNESCO-areas and supporting institutions. Chief among our discussions are considerations on how research projects like AAH can ensure that the insights and results achieved can continue to have a positive impact in Greenland after the project is completed. This has led to the development of a model that we now refer to as the “catalyst concept”. We suggest it is possible to create local ownership to “products”, co-created during a research-project – ownership that takes the insights beyond the AAH project’s limited lifespan.

Parallel discussions related to the above feed directly back into the growing body of scientific insights and datasets created by the research itself. For example, through dialogues we frequently gain otherwise ‘hidden’ or overlooked information on both the historic and present-day use of various sites and landscapes by local people and communities. Dialogues with the local citizens have led to the exposition of crucial information on the evolving characteristics of lakes in Kujataa as they relate to the extraction of sediment cores for reconstructing paleo-climatic histories for the region. Our interpretive framework is enriched by local collaboration and moreover it challenges us to think deeper on the types of research questions we design and how local knowledge can drastically shift our methodologies and the expected outcomes. The anthropological research in our work package is heavily dependent on developing confidence and trust with people in the two WH areas and our results thus far have demonstrated how our dialogical approach helps to nourish these types of meaningful relationships.

Ongoing discussions and dialogues have also included finding a balance between the public use of protected heritage sites and the stewardship of remote Key Heritage sites in Aasivissuit – Nipisat. Hans Harmsen, the National Heritage Resources Manager of the

Greenland National Museum (and co-work package leader in WP 1.1), is developing a data informed approach to formulating “Site-specific Guidelines” for visitors inspired by similar work in Svalbard to encourage sustainable use of the Key heritage sites in the Aasivissuit – Nipisat WH area. Partners and local stakeholders in this work include: the Aasivissuit – Nipisat UNESCO Steering Group, Qeqqata Municipality, Greenland Nature Institute, Norwegian Institute of Nature (NINA), the Association of Arctic Expedition Cruise Operators (AECO), Greenland Visitors Centre (GVC).

Additionally, an important ad hoc collaboration was initiated between AAH and the Greenlandic Campus Kujalleq Adventure Guide School. Guide school students enrolled in the ADV2021 program hiked from Kangerlussuaq to Aasivissuit (See work-package 3.4) in early September for a full-day program hosted by AAH researchers. Activities included an immersive introduction to the site, interpretation of Aasivissuit’s history and archaeological significance and discussion of the future development of Aasivissuit as a high-profile tourist destination.

During late 2020 and early 2021, the artist Nuka Konrad Godtfredsen painted several watercolours with (fictive/historically inspired) 18th century scenes from four archaeological sites in West Greenland: Nipisat, Arajutsisut, Aasivissuit, and Taseralik. These highly detailed illustrations will be used in future articles produced by the AAH-members, inspiration for our Aasivissuit-Nipisat community story-mapping project and as content for display on the Aasivissuit-Nipisat UNESCO website (<https://inuithunting.gl/>).

Members of the AAH-team continue to work closely with the two UNESCO Site managers to develop an international travelling exhibition. We plan to collaborate on this project with the Danish Ministry of Foreign Affairs and the Greenland Representation in Denmark so we can disseminate the exhibition to a wide international audience.

Activities in Kujataa

During the intense summer field-season, twelve AAH researchers and assistants worked at various locations throughout South Greenland and inside the five UNESCO component areas of Kujataa. During this time, anthropologist Anne Mette Randrup Jørgensen observed and participated in several dialogical activities along with the AAH researchers at Qassiarsuk and Igaliku. This work focused on conducting participatory interviews with community members, local authorities, representatives from Kommunia Kujalleq, tourists and UNESCO staff. She concluded her research with interviews in Narsaq and Narsarsuaq.



A fruitful dialogue-meeting was arranged at the farm of Qanisaartut, that included local sheep-farmers and AAH researchers in November 2021. (Photo: y Anne Mette Randrup Jørgensen).

By facilitating dialogues between community members and AAH researchers, Anne Mette Randrup Jørgensen created opportunities for important knowledge exchange between local stakeholders, interested citizens and AAH researchers on several different occasions. For example, the South Greenland sheep-farmers and their wives are particularly interesting partners for AAH as they are representatives of the living UNESCO tradition of animal husbandry and farming in Kujataa. Creating authentic relationships and building trust with this group has been pivotal for understanding their experiences, worldviews and perceptions of the *value* of UNESCO World Heritage in South Greenland from a local perspective. This included gaining insight into local opinions and attitudes to climate

change, strategies for growing new crops, expanding farming fields and infrastructure and exploiting the tourism potential in this unique sub-arctic farming landscape.

WP 1.1 UNESCO Kujataa Tour, South-Greenland November 16th – 23rd



Left: Public talks and a 'meet the researchers'-event at the communal hall in Qaqortoq. Right: Peter Steen Henriksen teaching 'macrofossils' at the public school in Narsaq (right). (Photo: Anne Mette Randrup Jørgensen, Nov. 2021).

A team of seven AAH researchers, together with the UNESCO Kujataa Site Manager, Alibak Hard, visited three locations in Kujataa and entered into dialogues with local citizens on their relationships to cultural heritage and future visions of how these heritage values could benefit the community. A full program provided opportunities for engagement with audiences in Narsaq and Qaqortoq and a lively exchange with students from the Campus Kujalleq Guide school. More informal meetings included discussions over coffee and cakes in sheep farmers' homes and one-day workshops in a public school and local museum that included excursions with local citizens to visit nearby archaeological sites. What we have found is that these direct engagements with local people are critical for creating the aforementioned 'catalysts' necessary for activating local engagement and capitalizing on the opportunities available that derive from living in UNESCO World Heritage area. It is also the prerequisite for creating long-term perspectives on sustainability and the will to develop meaningful relationships between visiting scientists and local communities.

Activities in Aasivissuit-Nipisat

In connection to our field campaign, we had originally planned to invite local citizens to partake in excavations at Nipisat and Arajutsisat—however, this plan was obstructed due to Covid-19 restrictions at the time. We adjusted to this setback by increasing our dissemination activities with the help of the Director of the Sisimiut Museum, Dorthe Katrine Olsen, who arranged several public meetings where AAH researchers presented their work. These presentations were live-streamed on the Sisimiut Museum’s Facebook page, reaching a national audience. She also filmed and shared numerous videos and interviews from the archaeological field work taking place on Nipisat. The AAH field team was also joined by a professional local filmmaker, Aannguaq Reimer, who is now in the process of editing several short video ‘mini-features,’ that focus on the history and archaeology of Nipisat. These short films were commissioned by the Aasivissuit - Nipisat UNESCO manager, Paninguaq Fleischer.

UNESCO-festival in Qeqqata Kommunia, 2–10 November 2021

During a week in November, members of the AAH group co-organised the second annual UNESCO festival in Sisimiut that overlapped with the Sisimiut Science Week 2021. AAH researchers and partners delivered several presentations to the public at the Taseralik Cultural House and Sisimiut Museum, Sarfannguit community house and the Kangerlussuaq Museum. At the same time, a 3-D heritage workshop co-sponsored by the US Consulate in Nuuk and dialogical and teaching sessions were hosted by WP 1.1, with students and teachers from the local gymnasium—all of which resulted in very positive outcomes for the participants.

Senior researcher Jens Fog Jensen splits his work between the AAH-project a position in Qeqqata Kommunia, and this has helped to facilitate excellent communication between AAH and the Aasivissuit - Nipisat working group (an advisory board to the UNESCO Site

Manager). His dual position has greatly benefitted both the Dialogues work package, the Aasivissuit – Nipisat UNESCO Steering Group and the AAH project as a whole.



NKA Museum leader, Frederik Fuuja Larsen, discusses the Community story-mapping and citizen-mapping project with students from the gymnasium in Sisimiut. (Photo: Martin Appelt).

Greenland Science Week in Nuuk

WP 1.1 also contributed to the Greenland Science Week in Nuuk ('Making Science Matter'), from 9 – 11 November 2021. In addition to delivering papers at the conference, AAH researchers in attendance co-organized a pop-up museum event at the Greenland National Museum. The event engaged a wide audience in Nuuk, that included local citizens and visiting foreign research attending the Science Week conference. Guests at the event engaged in a relaxed and welcoming atmosphere inside the museum that allowed AAH researchers the chance to introduce their work with table displays and demos at various spots inside the permanent exhibition. The event was an overwhelming success.

WP 2.1: Hidden in the Midden: Unfolding the Research Potentials

Senior Researchers Henning Matthiesen, Anne Birgitte Gotfredsen, Martin Mortensen and PostDoc Anne Marie Høier Eriksen

WP 2.1 focuses on revealing the information stored in middens found within Arctic environments. The work package has three aims: 1) develop, test and compare a suite of methods for unpacking the information potential of middens, 2) study of the taphonomy and future preservation of selected organic materials, and 3) collect detailed information on selected sites that can feed directly into the other AAH work packages.

WP 2.1's work in 2021 has included comprehensive fieldwork in the Nipisat-Aasivissuit WH area. This included measurement of the current environmental conditions found within archaeological deposits (for example, pH, water content, salinity). The main studies were



Measurement of environmental conditions in the middens was performed at all sites. The photo shows pH measurements being taken at Nipisat. (Photo: Anne Birgitte Gotfredsen).



Extremely well-preserved organic materials were found in permafrozen layers at Arajutsisut, that included delicate materials such as feathers, baleen, fish bone and wood. (Photo: Henning Matthiesen).

carried out in two excavation trenches on Nipisat, two trenches at Arajutsisut, one test pit at Saqqarliit, and two trenches/pits at Aasivissuit.

There was a remarkable difference observed in the state of preservation and environmental conditions found between different sites and even between trenches and test pits at the same site.

A comprehensive sampling program was carried out that included collecting soil samples to perform analyses on DNA, lipids and pollen, in addition to measuring basic physical parameters (e.g., porosity, organic content, soil particle size). Automatic monitoring equipment for measuring temperature, water content and matrix potential was installed at all sites and all sampling and field measurements are summarised in *Hidden in the Midden field report 2021*. An extraordinary amount of bone material was collected in 2021 (18 large storage containers) from the three study sites of Nipisat, Arajutsisut and Aasivissuit. Adverse weather conditions during the fieldwork made it challenging to sufficiently dry the bone samples for transport, so cleaning the bones to remove any mold growth was necessary after the samples arrived in Denmark.

Back in the laboratory, bone analyses began with the examination of the Aasivissuit faunal material: bones were morphologically identified, and their state of preservation described in detail. Comparative material from a sub-sample of animal bones collected in 1978 at Aasivissuit (previously in storage at the Natural History Museum of Denmark) was examined using the same methodology. The state of preservation of both collections was assessed using a systematic and standardized description protocol developed in 2019. A comparison between the new and old material provides a guide for identifying the degree of degradation that has taken place both on site and in storage over the last 43 years. Furthermore, caribou ribs from the new and old material were sampled for DNA analysis to identify if the degradation of DNA is fastest in the natural environment or in museum storage.



Drying tent, where excavated bones are slowly dried to avoid both cracks and mould. (Photo: Anne Birgitte Gotfredsen).

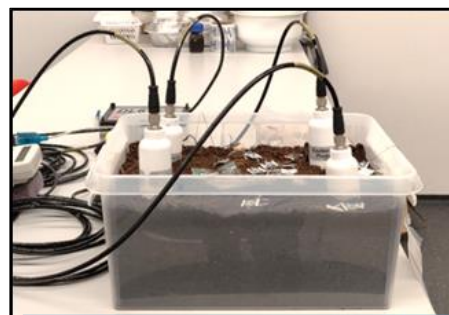


Bone samples ready for identification, sampling and analysis in the laboratory (Photo: Anne Marie Højer Eriksen).

The analysis of soil from all sites continues and this data has already provided information that will help with the interpretation of environmental monitoring data in the coming years. Extraction of both DNA and lipids from soil samples is also planned to occur in 2022. A few of the midden samples have been analyzed for pollen. Overall, the analyses are providing a very detailed picture of past activities that occurred at the various sites which can greatly inform archaeological interpretation.



Extraction of DNA from the midden samples is carried out in sterile lab (Photo: Zaruhi Vardanyan).



A "micro-midden" is used for decay studies of different types of archaeological materials under controlled conditions. (Photo: Henning Matthiesen).

Degradation experiments with different archaeological materials also continue using bone (seal, bird, caribou, and fish), antler, baleen, feather, wood and iron. These materials have been buried inside an artificial 'micro-midden' to observe the rate of decay. The conditions

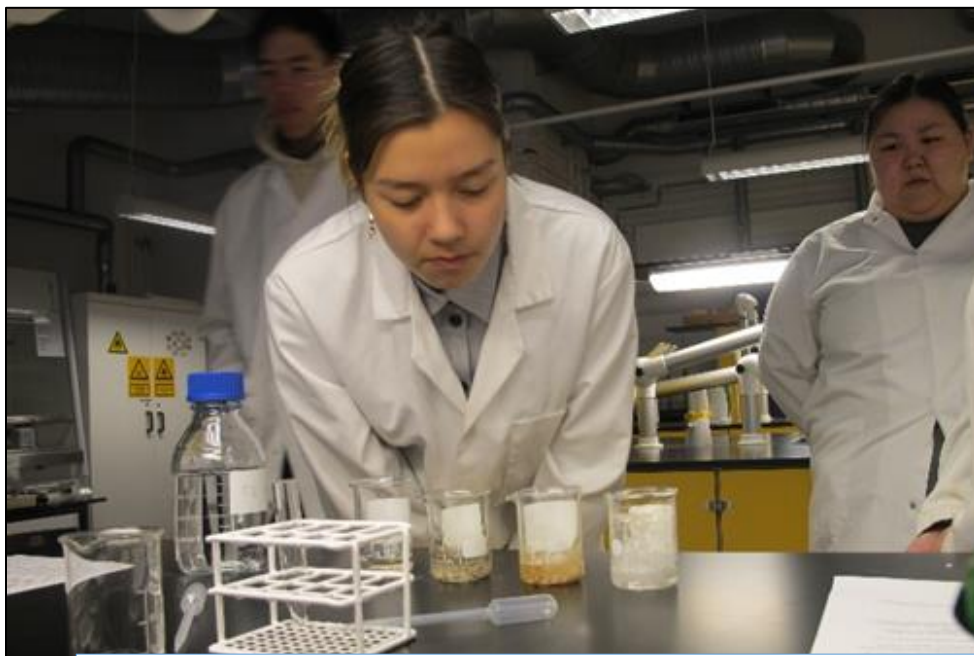
in the micro-midden are controlled and monitored using the same equipment and parameters used in the field. Archaeological samples are embedded at various depths in the micro-midden to measure their changes and decay rates under specific conditions. This baseline data will be used in combination with the site data to estimate the in-situ decay rates for archaeological materials in West Greenland.



Presentation of our fieldwork to a group of Adventure Guide students that visited the AAH-team at Aasivissuit in September 2021 (Photo: Henning Matthiesen).

Dissemination to the public was performed in the field with several site visits in the UNESCO WH area this past summer. At Aasivissuit, a group of Guide School students from Campus Kujalleq hiked from Kangerlussuaq to our base camp, staying two nights and a full day to learn about the archaeology and vulnerability of the area. Public talks and workshops were also hosted at the Sisimiut and Kangerlussuaq Museums to highlight the field work. In November, we went back to Sisimiut for the Greenland Science Week events, where we presented the project and work at several different venues. Specially themed outreach activities included a chemistry lesson at Sisimiut Gymnasium, where students were provided the opportunity to examine the degradation of bone and shell material under different conditions and learn about what happens to organic matter inside a midden over

time. Public talks and small demonstrations at the Sisimiut and Kangerlussuaq events attracted interest from a wide audience of all ages.



Experiments with bones and shells from middens were used to teach chemistry at Sisimiut GUX. (Photo: Jens Fog Jensen).

WP 2.2: The Loss of Cultural Heritage: Human and Natural Impacts on Arctic Sites

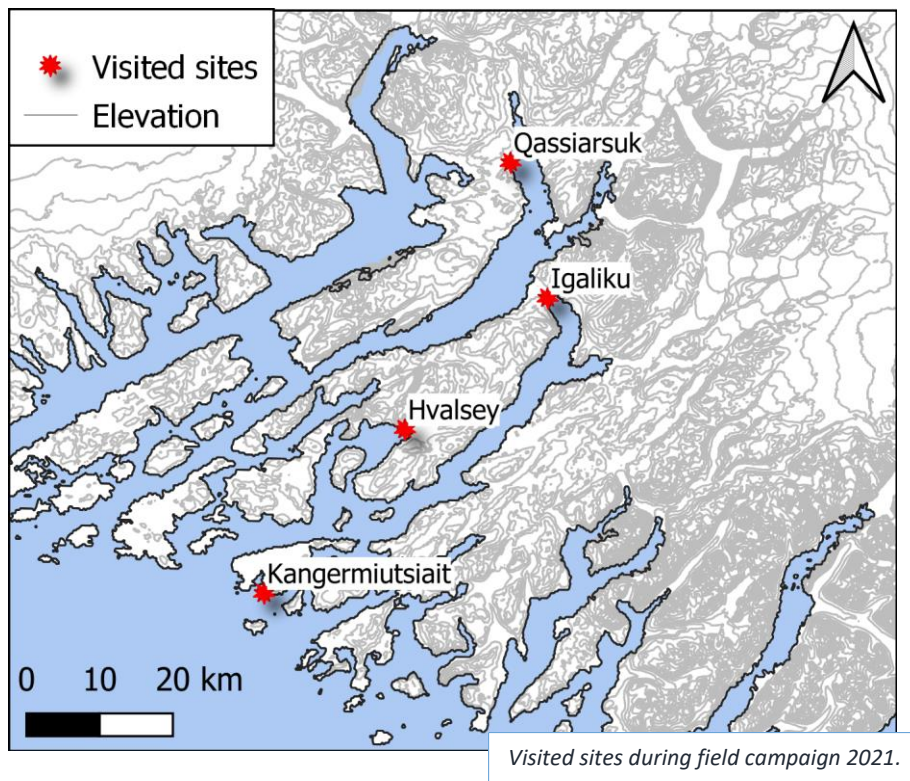
Senior Researcher Jørgen Hollesen, NKA National Heritage Resources Manager Hans Harmsen & Postdoc. Gorka Mendiguren Gonzalez

During 2021, WP 2.2 performed fieldwork in both Kujataa and Aasivissuit - Nipisat. Research activities included investigations and data collection both above and below the ground, examining a combination of environmental conditions, terrain, present-day site use, vulnerabilities and hydrology. On May 1st, Gorka Mendiguren Gonzalez joined our team as a Postdoc researcher specializing in multispectral data collection and environmental analysis. Preparations leading up to the 2021 fieldwork included buying and programming environmental monitoring equipment, development of a flight protocol for

a new heavy-duty drone and testing a new thermal/multispectral camera. Additionally, work proceeded on the refinement of a Vulnerability Assessment protocol that included the quantifying and documentation of sensitivities at several key sites in the UNESCO WH areas. Environmental monitoring stations installed by WP 2.2 will collect time-series on soil temperature, soil water content, air temperature and precipitation for the next couple of years. As the map shows, the study sites are located along a transect stretching from the outer coast (maritime climate) to the inner fjord (continental climate). The data will provide valuable information to assess sub-surface preservation conditions at sites with variable microclimates and different geographies across South Greenland.



*Hollesen and Gonzalez installing environmental monitoring equipment at Kangermiutsiat in early August, 2021.
(Photo: H. Harmsen)*



Kujataa

The first stage of the summer field campaign took place in Kujataa from 26 July to 12 August 2021. The trip centered on fieldwork at four different archaeological sites, that included: (1) Qassiarsuk, (2) Igaliku, (3) Hvalsø Church and (4) Kangermiutsiat on the outer coast. The four locations provided a near linear transect of variable environmental contexts running north to south in South Greenland, stretching from the inner fjord to the outer coast.

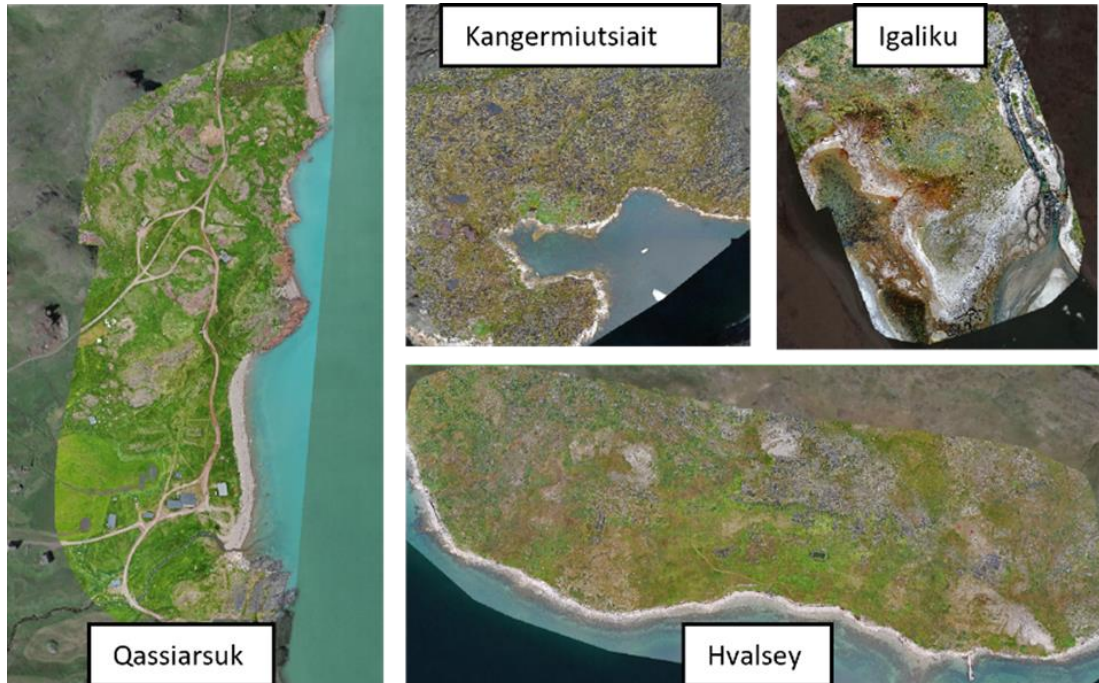
At Qassiarsuk, Qaqortukuloq and Kangermiutsiat, small test pits measuring 50 x 50 cm wide were excavated by hand to a depth of ca. 40-50 cm to embed the monitor's sensors in the wall profile and simultaneously anchor the unit. A monitor was also installed in the excavation trench completed by WP 3.2 at the Norse farmstead of Ø49 near Igaliku. All pits and trenches were excavated at incremental depths or by cultural context when possible to document the existing preservation conditions found below the ground surface (e.g. water content, porosity, organic content, thermal properties).



Environmental monitoring stations were installed at Hvalsey during the field campaign 2021. The station will collect time-series data on soil temperature, soil water content, air temperature and precipitation for the next couple of years. (Photo: Jørgen Hollesen).

Sites were also mapped with drones to create multispectral images and detail surface temperature and soil moisture. Vegetation samples were collected at Qassiarsuk and Qaqortukuloq. The data collected with the drone has been used to generate high-resolution spatial mosaics and digital surface models. These models, when combined with the reference data, provides valuable information to fill the resolution gap between site-specific studies using the drone and coarser resolution regional drone satellite imagery. A summary of the full spectrum of work performed and data collected in 2021 is provided in the Table below:

Site Name	Brunn Nr.	Soil temp	Soil water content	Air temp	Annual Precipitation	Vegetation sample	Thermal/multi-spectral analysis	Vulnerability Assessment protocol
Qassiarsuk	Ø29a	X	X	X	X	X	X	X
Igaliku	Ø47	X	X	X	X		X	X
Qaqortukuloq (Hvalsey Church)	Ø83	X	X	X	X	X	X	X
Kangermiutiat (NKAH 2116)	-	X	X	X	X		X	-



RGB mosaics of the visited sites during the 2021 field campaign.

During the Kujataa field campaign, Gonzalez, Harmsen and Hollesen assisted and presented their work to local citizens at an informal kaffemik in Qassiarsuk (30 July 2021) and at the Igaliku UNESCO Days festival (8 July 2021). Our work connecting climate change impacts on archaeological sites was met with great interest and it was clear that people living in Kujataa are witnessing climate change first-hand and are concerned about the changes that might occur in the future.

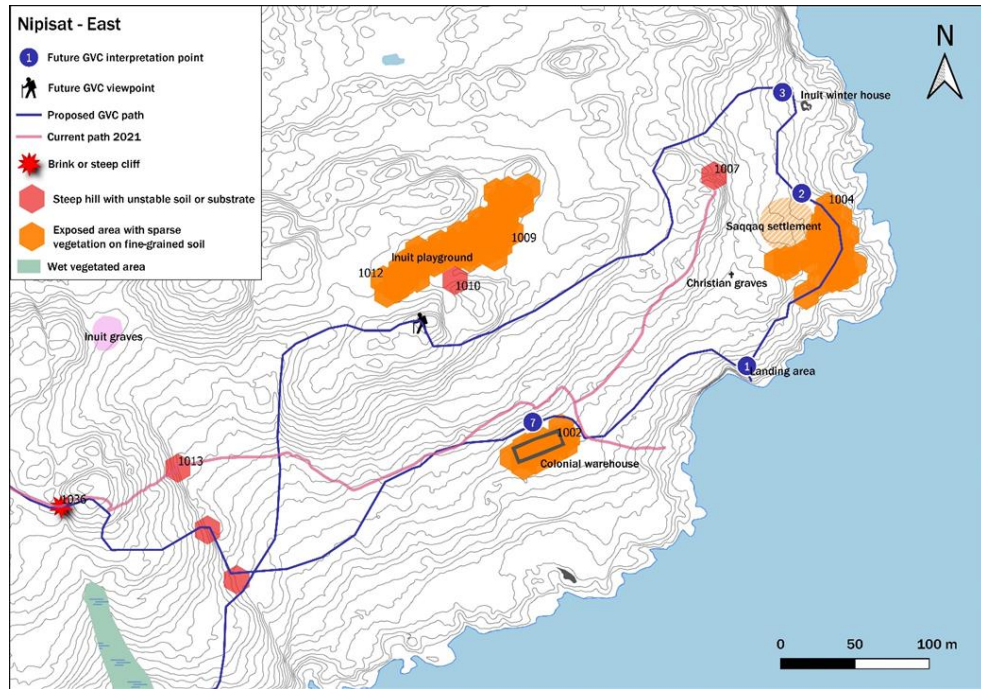
Aasivissuit-Nipisat

In collaboration with biologists from The Grønlands Naturinstitut (Victoria Quotoq Buschman, PhD) and Norwegian Institute for Nature Research (Dagmar Hagan, PhD), Harmsen helped facilitate vulnerability surveys at four key-sites within Aasivissuit – Nipisat

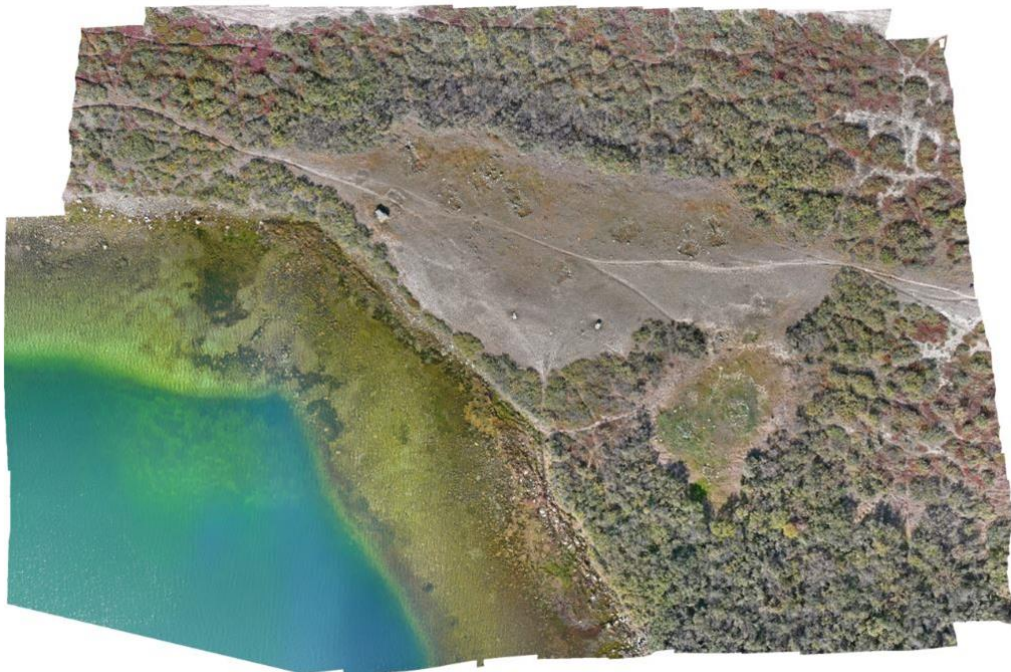


Buschman and Harmsen inspecting the possible remains of an Inuit turf house at Arajutsisut in August 2021.

World Heritage Area from 16-23 August 2021 and included Nipisat, Arajutsisut, Inaap Nuaa and Itinnerup Tupersuai (with special thanks to Jens Fog Jensen who assisted in the recording and evaluation of cultural heritage vulnerabilities at Itinnerup Tupersuai). The purpose of the surveys was to establish a thorough overview and improve knowledge of the sites, identify sensitive vegetation, wildlife, and cultural features and highlight weak points that could become problematic as a consequence of increasing tourist visits. The outcome of the surveys will become the methodology by which AECO Site-Specific guidelines for the key sites will be created in the future and used to create a set of 'best-practices' for cruise operators sailing and landing at the key sites in the coming years.



Vulnerability map of Nipisat showing several weak points for creating a path observed on the eastern side of the island (Harmsen 2021).



Orthomosaic model of the 'core camp' area at Aasivissuit, September 2021. Grønnow and Harmsen experimented with a new mapping that combined drone imagery, dGPS precision point georeferencing and on-site photo notation.

In conjunction with WPs 2.2 and 3.3, Harmsen joined in the fieldwork performed at Aasivissuit from 1-7 September of 2021. Recording and documentation of Aasivissuit's large number of cultural features continued from the previous year's work, resulting in a more detailed and up-to-date gazetteer of Aasivissuit's growing collection of ancient remains, as well as identifying where significant vegetation and landscape changes have occurred since the fieldwork performed by the National Museum of Denmark in 1978. Additionally, Grønnow and Harmsen experimented with a new technique to document the core camp area of Aasivissuit that combined drone imagery, dGPS precision point georeferencing and on-site photo notation. The output is planned to result in a set of new technical drawings of the core camp features which show their current orientation and state of preservation in 2021.

WP 2.3: Rain or Shine: Local paleo-environments & paleo-climate in the UNESCO areas

Senior Researcher Catherine Jessen (NM) and Postdocs Sascha Krüger & Astrid Strunk

Aasivissuit-Nipisat

In January 2021, WP 2.3 welcomed two new Postdoc researchers: Sascha Krüger and Astrid Strunk. One of their first tasks was to begin analyses of sediments collected from the Aasivissuit-Nipisat UNESCO area (Lake NM1) in 2019. A working age-depth model based on the results of the radiocarbon dates was generated and there was a careful distribution of the available sediment samples within the different analyses. Both the pollen analysis and XRF analysis are now complete and the stable isotope analysis of chironomids head capsules is in-progress.

Pollen analyses of the samples revealed a major change in the composition of the vegetation in the catchment of Lake NM1. According to the working age-depth model, this change occurred somewhere between 1200-1450 AD. The shift corresponds well to previously published vegetation changes in Greenland from studies with lower temporal resolution. The additional recording of micro-charcoal particles (10-200 μm) allowed for the detection of a large-scale wildfire that further effected the local vegetation in the past during the respective transitional phase.

Non-pollen-palynomorphs (NPPs) were also recorded alongside the pollen analysis. In terms of frequency of occurrence, spores of coprophilous fungi are particularly worth mentioning in the Lake NM1 record, as their composition and quantity provide information on changes to the fauna of the area. Thanks to the sampling and analysis of different animal faeces collected during the 2021 field season, the taxonomic significance of the spores (especially *Sporormiella* sp. and *Sordaria* sp.) was investigated. As a result, phases of varying reindeer presence in the Lake NM1 record can be inferred in the catchment area of the lake.



Left: "birch bolete spores" from visible ordinary fungal fruit bodies. Right: sheep dung in the Kujataa area populated by the fungi that produce the spores seen in the image on



Upper left: *Sporormiella* sp. ascospore with significant scar found commonly on reindeer dung, $\sim 15 \mu\text{m}$. Lower left: *Sordaria* sp. ascospore, common to sheep dung, $\sim 20 \mu\text{m}$. Right: a large visible arranged network of Hyphae (Mycelium) seen growing on horse dung that can produce comparative spores.

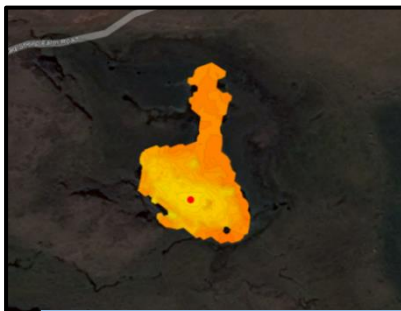
Kujataa

Preparation and planning of fieldwork in the Kujataa began in spring of 2021 and the field season beginning in July after a lengthy quarantine of some of the AAH team members in Narsarsuaq. A desktop survey of suitable lakes in the Qassiarsuk and Igaliku areas was compiled prior to fieldwork. Lake depth and bathymetry are strong indicators of lake suitability and each lake was visited and assessed using a small echo sounder. Only a few of the lakes selected during the desktop survey were found to have sufficient depth and a bathymetry that would promote sediment focussing. It is also important that there is year-round water in the lake basins, otherwise the lake surface sediments can become exposed and erode. In the weeks prior to fieldwork the area had experienced an unusually high rainfall and water levels in the lakes were above average. However, after discussions with local sheep farmers we were informed that most of the local lakes dry out most years. After careful consideration of the many different pieces of data—only one lake, NM4, was deemed suitable for further investigation.

A mobile coring raft was assembled and the bathymetry of NM4 recorded with the echo sounder by attaching it to the raft's platform. This device located the deepest point of the lake and the lake basin's morphology.



*Echo sounder surveys of selected lakes.
(Photo: Catherine Jessen et al.).*



Bathymetric map of NM4. The red dot shows the location where the core was taken in 2021.



Gravity coring at NM4

A gravity corer was used to collect the soft surface lake sediments and a chamber corer used to collect the deeper sediments. Both cores were sampled on site at 0.25 and 0.50 cm depth intervals. This process was repeated at an adjacent position. The sediment sample depths for both cores are shown in the Table below:

Sediment depths retrieved from the two NM4 cores

NM4	BH1	BH2
Gravity corer	35.50 cm	36.00 cm
Chamber corer	26.75 cm	47.00 cm

BH2 was selected for further analysis and samples were extracted for AMS ¹⁴C dating. There were insufficient terrestrial macrofossils found, so mosses were also submitted for dating. The remainder of the samples were frozen for further analysis in 2022.



Left: sub-sampling of the gravity core. Right: inspection of the chamber core.

Dissemination activities

Along with several informal meetings that took place over the course of the fieldwork, our work package had the opportunity to publicly present our research to local citizens in Qassarsuk and Igaliku. These presentations were both low-key and relaxed, giving us the opportunity to answer questions and engage in dialogues with local people and sheep farmers. One key outcome of these conversations was learning about how local people have experienced climate changes in South Greenland. These types of discussions are invaluable when considering how seasonal anomalies in weather patterns can affect farming practices. This work package was also part of the dissemination activities in November 2021 in Sisimuit, Narsaq and other settlements in South Greenland.

WP 3.1: Human Experiences in Norse Greenland: Health, Well-being and Trade-offs

Senior Researcher Jette Arneborg, Professor Niels Lynnerup, and Postdoc Dorthe Dangvard Pedersen

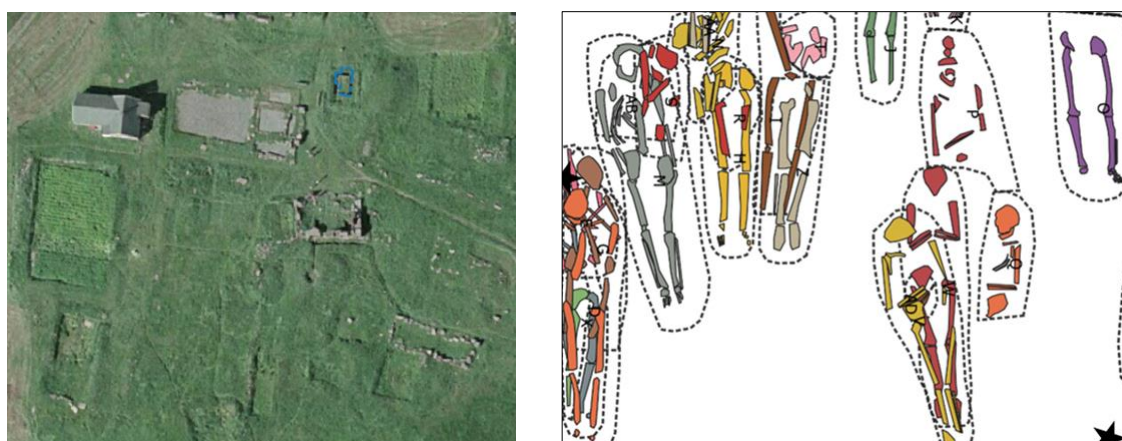
Postdoc Dorthe Dangvard Pedersen returned from maternity leave in April 2021 to coordinate preparations for the 2021 field work season. The main goal for the summer was to return to Igaliku and re-open and expand the 2019 excavation at the churchyard cemetery of Garðar Cathedral. The 2021 team consisted of Dorthe Dangvard Pedersen, head of the excavation, archaeologists Rikke Dahl Olsen and Frederikke Reimer (employed by the National Museum of Denmark) and Greenlandic students Birte Olsen and Avaaraq Bendtsen Ottosen (employed through the Greenland National Museum). The excavation at Garðar Cathedral took place from 28 July to 10 August 2021.



The 2021 Igaliku excavation team. From left: Birte Olsen, Frederikke Reimer, Avaaraq Bendtsen Ottosen, Dorthe Dangvard Pedersen and Rikke Dahl Olsen.

In 2021, the excavation team re-opened the 2019 trench expanding it to an area measuring 12 m². In 2019, seven graves and one bone heap were found. In 2021, the discoveries were more comprehensive as the lower we dug more the burial density increased (which is typical for a medieval church graveyard). What we observed was that many graves had

been disturbed by later interments with several large bones found randomly distributed throughout the lower layers as a result of post-burial disturbances (i.e. the result of later burials that would have cut older burials and disturbed their placement). It was also clear that some efforts had been made to consolidate these loose bones in the past—evidenced by deliberately consolidated deposits of stray bones. Thus, the stratigraphic relationships between burials was extremely complicated resulting in slow, methodical excavation. Consequently, we did not manage to empty the trench to the sterile substrate. In total, 20 additional graves and two bone heaps were recorded in 2021. Fourteen of the graves and both bone heaps were fully excavated and collected for analysis.



Left: the 2019- excavation was located northeast of the cathedral grounds marked in blue. Right: excavation plan view of the 2021 trench in Igaliku. The black stars mark the areas where the soil corer was used.

As mentioned above the trench was not fully excavated in 2021. Approximately 4 m² of the trench (blank portions seen in the excavation plan) were left for 2022. Soil coring indicates that at least 30 cm of preserved cemetery soil is still present in the 8 m² area that we focused on in 2021 and approximately 4 m² of cemetery soil still remains to be excavated (see black stars on excavation map, above). Due to Covid-19 restrictions and limited access to labs, the post excavation work has been delayed which includes cleaning and recording

of morphological data from the skeletal remains. However, as of January 2022, all skeletons have been cleaned and the data recording has commenced.



Left: The skull of skeleton W just after extraction. Right: the skull after it has been cleaned in the laboratory. (Photo: Dorthe Dangvard Pedersen).

The plan is to send bone samples from five individuals to the SUERC laboratory, University of Glasgow, Scotland for further analysis and dating.

Publications

Besides the 2021 field and post excavation work, WP 3.1 researchers have focused on finishing chapters for a forthcoming publication about the Norse site Ø64, edited by Jette Arneborg, to be published by *Nordiske Fortidsminder*. The members of WP 3.1. have contributed 7 out of 15 chapters in the volume, which includes an introduction to the site, excavation of the cemetery, graves and burial customs, health of the Norse population in South Greenland, diet, population structure, and conclusions.

Two additional publications are under preparation:

- 1) An article about the association of bone mineral content (BMC) and diet of 26 Norse individuals. Comparative studies of Inuit populations have shown low BMC values and it has been suggested that an animal protein rich diet is part of the explanation. We want to know if similar correlations can be traced in the

Greenland Norse, who over the years developed more protein rich diets. The BMC values of 26 individuals are already available from a study by Lynnerup and von Wöhrn (1997). Of these 11 have associated diet isotope values. Bone samples from the remaining 15 skeletons will be analyzed at SUERC laboratory in Scotland.

- 2) A paper on the excavations at the churchyard in Igaliku and Norse demography is being prepared. Archaeological data from cemeteries and farms, demographic data from the skeletons and the temporal frame of the archaeological findings are used in a model that will provide a detailed estimate of population size and structure throughout the Norse settlement period in Greenland.

Other dissemination activities

WP 3.1. researchers have also been active in dissemination to both public and academic audiences. Niels Lynnerup and Dorthe Dangvard Pedersen attended the NatArk (Naturvidenskab I Arkæologi) seminar in October 2021 presenting a paper on reconstructing ancient population size and structure through archaeological data from cemeteries and demographic data derived from individual skeletons. Also in October 2021, Dorthe Dangvard Pedersen attended the yearly *Organisationen af danske museer* (ODM) seminar presenting results from the 2021 excavation at Garðar Cathedral. She also attended the Greenland Science Week in Nuuk in November presenting a paper on the modelling of the Norse population size and structure at the Arctic Research Days conference. Shortly after Jette Arneborg participated in the AAH outreach tour in South Greenland, disseminating the research of work package in Narsaq, Qaqortoq and at the sheep farm in Qanisartuut with other AAH researchers in late November 2021.



Visit to the ruins of the Norse farm, 'Dyrnæs', close to Narsaaq, during the AAH visit to the UNESCO area of Kujataa, November 2021. (Photo: Christian Koch Madsen).

WP 3.2: Plant Resources in the Norse Society

Work Package leader and Researcher, Peter Steen Henriksen

Fieldwork postponed from 2020 was carried out in August 2021. The midden of a small Norse farm Ø49, found approximately 2 km north of Igaliku in South Greenland was excavated to obtain carbonized plant remains from the Norse household. In 2011, one barley grain was collected during the course of a small excavation at the site. The goal of the 2021 excavation was to obtain more material for study. By analysing the strontium isotopes in barley grains, it is possible to conclude whether the cereals were locally grown or exotic (imported from Iceland or Norway).

The excavation

An area of 1 x 2 m was excavated to the subsoil in the midden found in front of the house structure at Ø49. The midden layer was only about 50-60 cm thick, however in some spots it ranged between 40 and 75 cm due to the uneven subsoil surface and heavy erosion on

the surface (caused by the occasional flooding of the area by the river, situated just to the east of Ø49).



*The excavation at the Norse farm, Ø49, facing north
(Photo: Peter Steen Henriksen).*

Due to the absence of visible stratigraphy, the trench was excavated in arbitrary 5 cm layers resulting in 12 sequential contexts. To collect as much organic material as possible a soil flotation process was used to capture all organics and small particulates. During flotation the soil is soaked in water in a tray which causes charcoal and other carbonized material to float to the top of the water and separate from the non-carbonized material, which sinks to the bottom of the flotation tank. The floating material is then sieved and dried. Thirty litres of material from each of the upper six layers and approximately 100 litres of material from each of the lower six layers were processed in this manner.

Sample collection

The carbonized material collected from the 12 layers resulted in approximately 120 litres of macrofossil samples containing charcoal and other plant remains, as well as a significant amount of modern root material from the surface vegetation. A further 13

samples were collected for pollen analysis from the southern profile wall of the excavation along with a sediment column for loss of ignition (LOI) and lipid analyses. Soil, water and vegetation samples were taken from three selected areas adjacent to Ø49 for strontium isotope baseline construction. This baseline is necessary for the determination of the provenance of cereal grains through strontium isotope analysis.



*Flotation of the soil from the midden excavation at Ø49.
(Photo: Peter Steen Henriksen).*



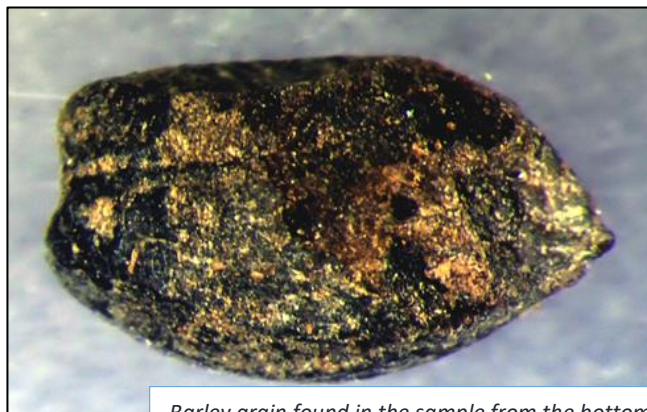
Left: macrofossil samples from Ø49. Right: carbonised material, bone fragments and modern roots from the bottom layer of the excavation trench (Photo: Peter Steen Henriksen).

Analyses of samples

Analysis of the samples began in December 2021. A few barley grains were found in the first macrofossil samples and the initial pollen analyses also show promising results. Further analyses will continue in 2022.

Dissemination

The project has been introduced to local citizens in South Greenland several times. In July and August, public meetings were held in Qassiarsuk and Igaliku where the different AAH work packages were presented. In November 2022, the project was presented in community houses and schools in Narsaq and Qaqortoq and to the sheep farmers living in Vatnahverfi.



Barley grain found in the sample from the bottom layer of the midden trench at Ø49. (Photo: Peter Steen Henriksen).

WP 3.3: Inuit Landscapes, Arctic Agency (ILAA): Thule Inuit in Kujataa

Co-PI and NKA Deputy Director Christian Koch Madsen

The goals of WP 3.3 are: 1) provide a social-ecological overview of Thule Inuit settlement, land- and sea use in the region surrounding the Kujataa UNESCO World Heritage area; to help improve the NKA and Kujataa UNESCO office's heritage management capacities; 2) increase the site inventory from other cultural periods in the same geographic area (a formal request by the UNESCO World Heritage office to the Steering Group); and 3)

increase competencies and archaeological knowledge of local heritage stakeholders and custodians through direct field training.

Work package 3.3 is carried out in close collaboration with the National Science Foundation funded project, *Co-production of scientific knowledge and the building of local archeological capacity in Greenland* (RESPONSE), 2019-23, in which the author leads a sub-project investigating similar topics described here for WP 3.3, but in a different region. The close collaboration between these two projects allows for efficient cost-sharing of logistics and expenses, including full use of a 150 hp zodiac as the project's main means of transportation. This following interim report, however, only concerns the progress and results of WP: 3.3.

Summer 2021 field work and activities

Whereas the 2020 ILAA field season targeted Thule Inuit sites in the middle fjord region, the 2021 field season focused on both the inner and outer fjord environments. The 2021 field crew consisted of work package leader Christian Koch Madsen, NKA archaeologist Michael Nielsen, and Ilisimatusarfik MA students Aka Bendtsen and Birte Olsen. Århus University MA student Avaaraq Bendtsen Ottosen and UNESCO Park Ranger Else (Arnaq)



Aided by local, Karoline Egede, WP 3.3 excavated part of an eroding midden in front of summer hunting camp in the Igaliku Fjord in 2021, one of the first such camps to be excavated in South Greenland (Photo: Christian K. Madsen).

Bjerge Petersen also assisted in the work. The field team also included independent Greenlandic film director, David Heilman Otttosen, who was hired to make five short documentaries covering specific themes of the project. Concept and content of the short films were developed as a student project with David and Aka in the lead.

The ILAA fieldwork was carried out between 2-13 July and 28 July to 8 August (the time interval in between was dedicated to the RESPONSE project taking place in the Uunartoq Fjord). The main objectives of the 2021 work are summarized as follows:

- **Site investigations:** 1) Identification and precision mapping (DGPS and drone) of Thule culture winter and summer settlements; 2) judgmental probing with a 2 cm corer of midden areas and floor layers suitable for test excavation; 3) test excavation and sampling of middens and floor layers for ¹⁴C-dating to establish diachronic settlement patterns, including the retrieval of zooarchaeological assemblages for analysis of Inuit subsistence patterns.
- **Landscape surveys:** Identification and documentation of “wolf” or “bear traps”, as well as a comparable subset of fox traps. This focus in the project was at the request of the Kujataa UNESCO Site Manager, Alibak Hard, and is led by Aka Bendtsen who used the survey data as the primary data set for her MA thesis.

The 2021 ILAA field work was challenged by cold and wet weather for a good part of the field season, as well as by a Covid-19 upsurge in Qaqortoq in late July, which forced us to cancel a ‘kid’s archaeology day’ that was planned. A couple of field days were also lost to the aftereffects of Covid-19 vaccination on some of the students. The UNESCO Park Ranger Arnaq Bjerge Petersen also had to quarantine during parts of the fieldwork and it proved

impossible to carry out planned excursions with the museum leaders of the Narsaq and Qaqortoq Museums.

Nonetheless, we managed to complete test excavations at eight Thule Inuit sites in the ILAA study area. Unfortunately, only two sites had conditions with bone preservation worth noting, which ranged from average to poor. However, several sites in the Uunartoq area provided reasonably large and well-preserved bone assemblages which will be analyzed in 2022. In addition to the sites excavated as part of WP 3.3, 11 multi-component Thule Inuit sites were precession surveyed with dGPS, nine of them completely new and undocumented. Lastly, over 200 single features (data is still being processed) were identified across the South Greenland landscape, including several new large carnivore traps for Aka's MA project.



An Inuit meat cache under a large boulder, one of several hundred single features discovered and described by the 2021 WP 3.3 survey team. (Photo: C.K. Madsen).

Other ILAA activities included aiding WP 2.2 in setting up monitoring equipment at their study sites at Kangermiutasiat and Qaqortukuloq, giving a public talk at the Qaqortoq local museum on the evening of 29 August, opening an exhibition at the same museum on 31 August and presenting archaeological artifacts and results at a ‘meet-your-AAH-scientists’ event in Igaliku on August 6. Local sheep farmers also took part in the excavations at At Qassiarsuk and the Karo Site.



Interviewing and filming of Jusvasen Aggu, a local resident in the Uunartoq area, which provided invaluable local historical information for the archaeological investigations and material for the film (Photo: C.K. Madsen).

Post-excavation processes and lab work 2021

A major outcome of WP 3.3 is the mapping of new Thule Inuit sites, which include GIS-analysis to provide a robust and uniform dataset of site and landscape features and patterning. Coupled with the results and dating from targeted test excavations, this data will provide new insights into the sequence of changing social-ecological patterns in South Greenland in the ancient past. Throughout the winter of 2021-22, we have begun processing the data and excavation materials from the 2021 season and building a database that will form the core of the landscape analysis. This work has been carried out with the aid of student helpers hired by the NKA, thereby instructing them in important post-excavation processes and analysis, as well as the building of local knowledge of South Greenland and professional archaeological and heritage management competencies.

WP 3.4: Dynamic Glocal Networks – Settlement, Trade and Exchange in West Greenland

Senior Researchers Jens Fog Jensen and Martin Appelt

Introduction

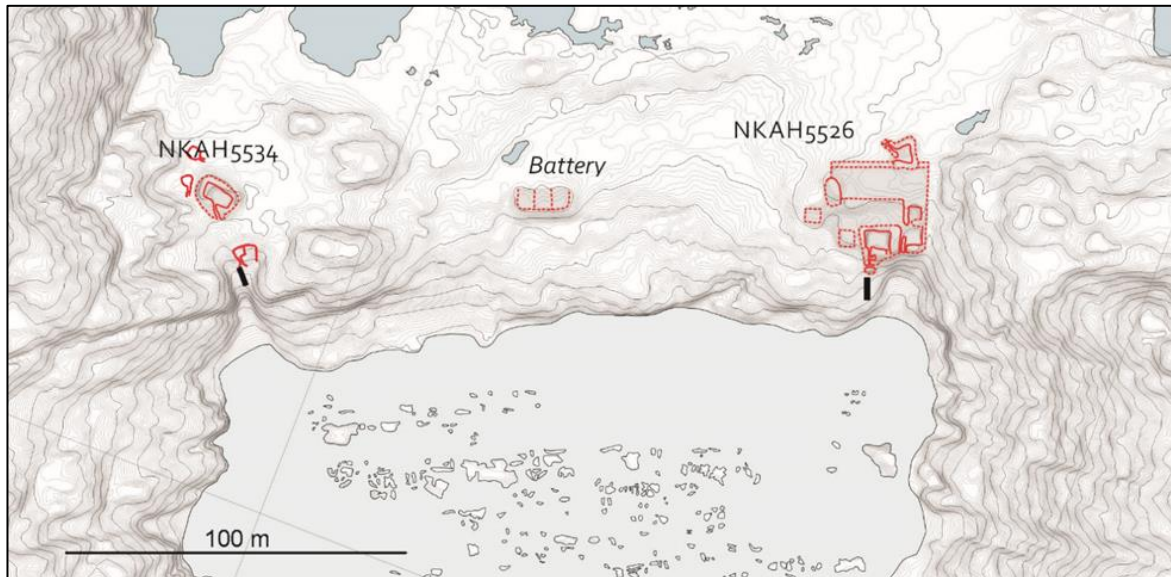
Field Work in the Aasivissuit – Nipisat area in 2021 focused on excavations at Nipisat, Arajutsisut and Aasivissuit. Through the coordinated efforts of W.P 3.4, the interdisciplinary investigations combined the expertise of W.P. 2.1 Hidden in the Midden and 3.5 History. During this period of intense fieldwork, over 20 persons stayed at the base camp on Nipisa at various times. A dining tent with a raised plywood floor was constructed to minimize wear and tear on the vegetation and provide a reasonable eating and resting space for researchers. Mobilization and logistics were arranged from 22 July through the end of the month, with the aid of local Sisimiut logistics operator Sirius Aps. Excavations were initiated at Nipisat East (NKAH 5526), Nipisat West (NKAH 5534), and on two localities on the site of Arajutsisut/Arajutsisat (NKAH 285) in early August. On 25 August, the camp was dismantled and six researchers from W.P. 3.4, 2.1 and 2.2 travelled to Aasivissuit (NKAH 2845) where



Left: Construction of plywood floor for dining tent at Nipisat. Right: Dining tent at base camp on Nipisat. (Photos: Jens Fog Jensen).

monitoring equipment was installed in the former 1978 midden excavation. The main crew doing fields work at these key sites consisted of Jens Fog Jensen, Martin Appelt, Bjarne Grønnow, Peter Andreas Toft, Angutinnuaq Olsen, Jens Kanutsen, Sean Desjardins, Mikkel Sørensen, Fuoja Larsen, Allan Lyng, Henning Matthiesen, David Gregory, Nanna

Bjerregaard Pedersen, Anne Birgitte Gotfredsen, Hans Harmsen, Sascha Krüger, Rasmus Voss, and Christian Sune Pedersen.



Inuit and colonial settlements in cove on southern shore of Nipisat. Walls of visible ruins are outlined with red line. NKAH 5526 in the right side of the bay is the Danish colony with later Inuit dwellings superimposed on the colonial structures. NKAH 5534 in the western (left) side of the cove is a locality dominated by Thule culture and historical Inuit dwellings. Excavated sections are marked with black rectangles.



Nipisat East seen from the east towards west. The ground plan of the three-winged colonial complex can be discerned. The clearest and well preserved wall sections towards north (right side) and south (left side towards the sea) are Inuit houses used after the colony was abandoned. Excavation at Nipisat East is in progress in the trench in upper left part of the image. (Photo: Jens Fog Jensen).

Procedure of Excavation

The areas selected for excavation on Nipisat were midden deposits located on the slopes directly below an Inuit winter house (Nipisat West) and the remains of the old Nipisene

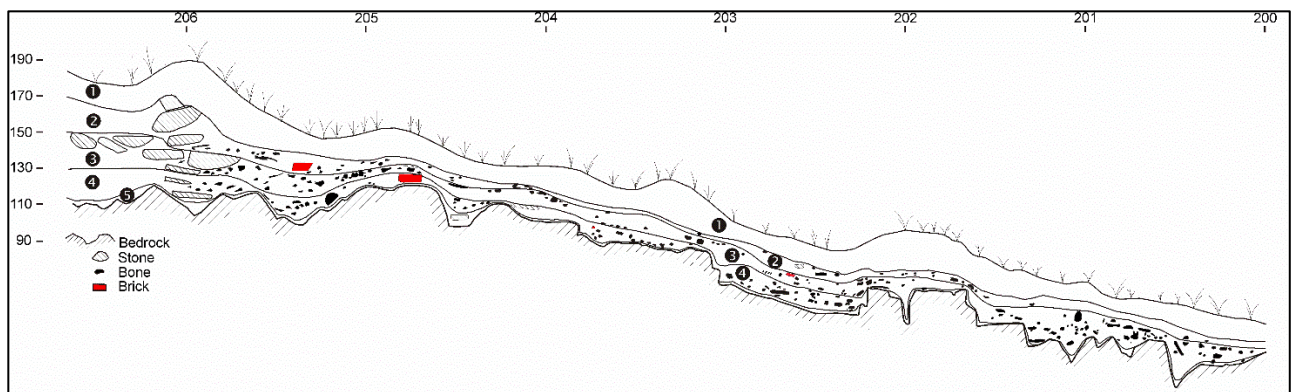
colonial house (Nipisat East). Excavations focused on documenting archaeological sections to describe the settlement history of Nipisat and followed a simple procedure: 1) opening of a one-meter-wide trench, 2) documentation of the stratigraphy, and 3) excavation of selected trench sections with high-artifact density and environmental data.

Artefacts and bones recovered during excavations were recorded and cataloged by excavation unit, with stratigraphic soil layers defined by differences observed in color and texture. In general, definitions of cultural horizons were identified and recorded to illustrate the major phasing of the site's formation process. Excavation in the trench stopped when the sterile natural subsoil was reached. Detailed excavation of selected quarter square meters was performed after the careful documentation of the various profile sections. During this stage of excavation, layer changes could also be observed in neighboring units, giving optimal conditions for stratigraphic control. At the same time, artifacts were point-plotted, fauna materials were collected, and numerous samples for sieving and laboratory analysis collected.

Nipisat East (NKAH 5526)

The area selected for excavation on Nipisat East was a similar midden deposit that lay below a Lyme grass covered slope a few meters above the present-day shoreline. The location was chosen because it lay directly in front of the former cold trap entrance of a Inuit winter house, built in the footprint of the southern wing of the 'colonial house' building complex erected by Danish authorities in early 18th century. The sedimentary basement of igneous rock formed a heavily undulating substratum for the overlying sediments. East–west oriented rock protrusions are separated by hollows, where domestic refuse had accumulated over the various phases of the site's occupation.

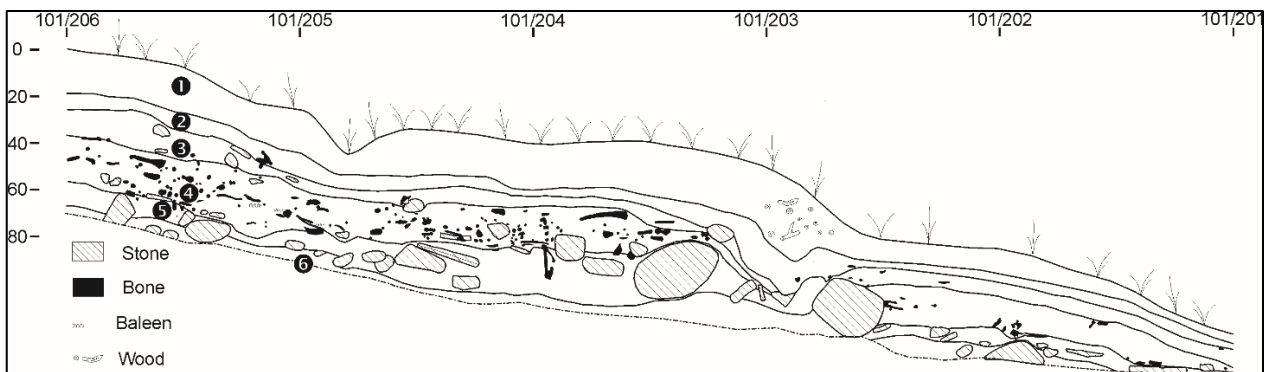
The midden at Nipisat East comprised of a series of well-constrained stratified deposits of cultural remains, primarily dominated by seal bones, but also waterfowl and fish. Artefacts were generally of Inuit origin but did include a mix of European objects such as pearls, clay pipe stems, faience, glass and brick fragments originating from the colonial house's brick oven. These European objects were found in the uppermost layers down to layer 4 near the bottom of the trench. The upper cultural deposits are therefore interpreted as household waste and refuse deposited during the several consecutive episodes of Inuit occupation in the decades following the Danish abandonment of the island in 1731. From historical sources we know that Nipisat was resettled in the 1770s when Danish authorities established whaling lodges along the coast. After just a year or two, the lodge on Nipisat was moved further north to Qerrortusoq in the Amerloq fjord, where it lived on as a fishing settlement until it was abandoned in 1969. The deepest layer, Layer 5, rested directly on the bedrock. This layer was characterized as a black, dense charcoal layer believed to have been deposited when the Dutch burned down the colony in 1731.



Section from Nipisat East NKAH 5526 (left side towards North). Note: European bricks are illustrated in red. (Angutinnguaq Olsen and Bjarne Grønnow del.).

Nipisat West NKAH 5534

The area selected for excavation at Nipisat West was similarly a Lyme grass covered slope lying below an Inuit winter house, situated behind minor rock knolls on the western side of the cove. The slope was a natural crevasse feature formed between sedimentary rocks, which would have acted as a natural passageway between the rocky beach shore and the houses. The slope was a natural crevasse feature formed between sedimentary rocks, which would have acted as a natural passageway between the rocky beach shore and the houses. The excavation trench was laid along a north-south orientation, travelling down the slope leading to the shore. The stratigraphy at Nipisat West tell a different story of life when compared to Nipisat East. What was similar, however, was that all the layers on Nipisat West appear to result from consecutive episodes of Inuit occupation. Several European objects were found in Layers 2 and 3. A high density of bones and Inuit artefacts emerged throughout layer 4, one diagnostic harpoon head found in Layer 5. The stratigraphy at Nipisat West demonstrates that Inuit occupation was quite extensive prior to the arrival of Danish Settlers on this side of the cove. Like Nipisat East, the use of the site appears to have lasted well into the late 1700s.



Section from Nipisat West, NKAH 5534 (left side towards North). Artefacts of European origin were found in Layers 2 and 3 but not in the underlying layers below. (Jens Fog Jensen and Peter Andreas Toft del.).

Summary of Nipisat excavations

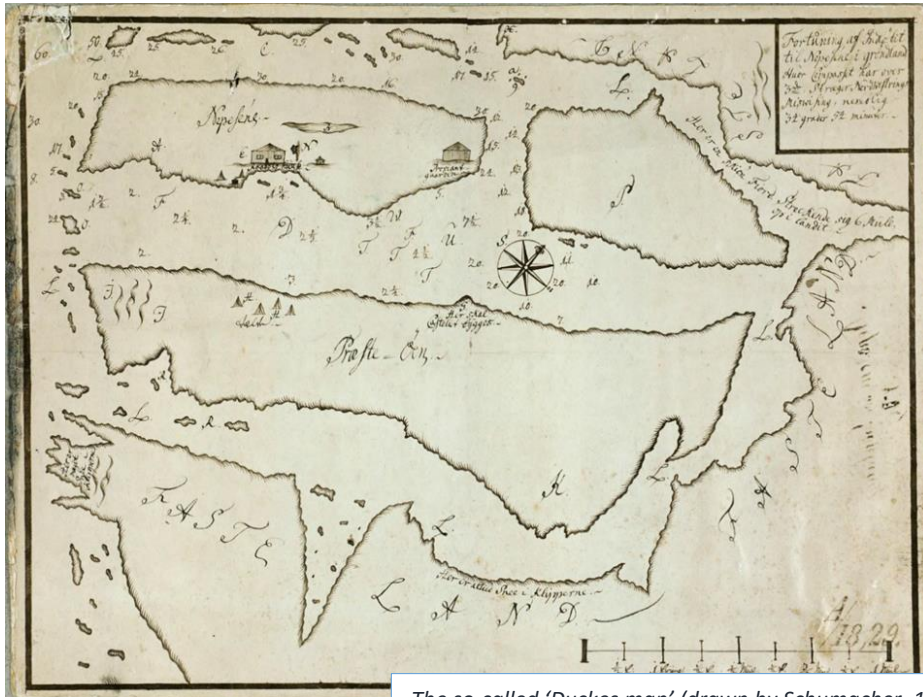
The 2021 excavations on the island of Nipisat have greatly advanced our knowledge of the settlement history of the island, and analysis of the archaeological materials and data continues in 2022. On the eastern side of the cove where the Danes established the colony of Nepisene in 1724, are well-preserved midden deposits formed as a result of Inuit occupation after the colonial project was abandoned. Presumably the use of the site ceased around the end of the 18th century. At Nipisat West, the settlement history is different: architectural evidence of early Inuit occupations in the form of old Inuit round houses are found behind (to the west and northwest) of the much more prominent Inuit communal house structures closer towards the shore. This portion of the site is characterized by a well-constrained midden deposit, densely packed with marine mammal and waterfowl bones and lenses of compacted fish bone. Inuit artefacts are present in all layers from Layers 2 to layer 5, but European objects are only found in the uppermost layers.

The stratigraphy shows that this locality was settled by Inuit long (probably centuries) before the Danish colonists arrived. These new insights are important for the dissemination of Nipisat as a Key site in the Aasivissuit – Nipisat WH area. These new and more detailed settlement histories are important for our understanding the phasing of Thule Culture Inuit settlement in West Greenland after 1200 AD. The ongoing analysis of artefacts and dating of layers will ultimately provide a much more nuanced understanding of this history in the years to come.

Præsteøen (Priest Island) survey

The earliest map of Nipisat (the Duckes map), depicts the archipelago of Nipisat with a citadel and an Inuit camp located on Præsteøen, situated just a few hundred meters across the water from the south shore of Nipisat. The map and the existence of historical sources

describing activities by the colonists of Nipisat on Præsteøen inspired WP 3.4 to perform a quick survey of the island. Investigations revealed rudimentary tent rings on the island in approximately the same location that Inuit tents are drawn on the Duckes map, as well as several other ancient/historic features. However, during the survey we did not find any visible signs of earthworks or remnants of the planned citadel shown on Duckes map.



The so-called 'Duckes map' (drawn by Schumacher, 1729) with Inuit tents and citadel.

Arajutsisut/Arajutsisat (NKAH 285)

We have been informed by local people that the correct name for the site is *Arajutsisat*, which can be directly translated to something like “the [important] place one overlooks when passing by”. We will contact the Oqaasileriffik, the Greenland Language Secretariat,



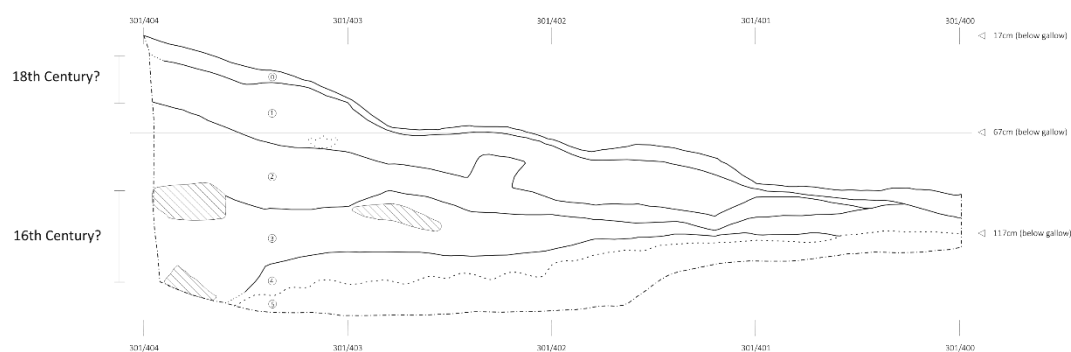
Arajutsisat at low tide with exposed whale bones in the intertidal zone, facing east. (Photo: Martin Appelt).

for further advice on the proper name of this ancient settlement. Arajutsisat has turned out to be one of the key locations that offer a strong potential for providing new clues on the timing of Inuit settlement and demographic change in West Greenland ca. 1500-1700 AD. Visually, the site stands out with its lush vegetation and many prominent ancient house ruins. Along the cliffs to the north, aeolian sands and rocky outcrops overlook provide shelter to a small, well-protected cove. Traversing up over to the cliffs on the island north shore, provides an excellent view of both the Ameralooq fjord and distant deep waters of Davis Strait, which would have made it an ideal place for spotting whales and other large sea mammals.

The site includes at least eight house ruins, although several other house phases and iterations may lie below these ruins. House 5 measures approximately 22 metres long and is one of the largest communal houses found in Greenland, at its peak use the house could have supported upwards of 40 to 50 inhabitants. About one kilometer from Arajutsisat are three other sites, each of which includes a single communal house. The re-examination of archival material from the Nepisene Colony has highlighted the numerous European interactions with Inuit whale hunters from the so-called “Amarlone site”, which according to the archives was located one nautical mile north of Nepisene (see WP 3.5). Thus, “Amarlone” may well be a reference to the Amerloq fiord, and we suggest that Arajutsisat is in fact the Amarlone settlement referred to in the written sources.

In 2021, WP 3.4 continued excavations at Arajutsisat, focusing on the re-opening and expanding the trench in the midden located in front of House 7, (deep permafrost layers prevented us from reaching sterile sub-soil in 2019.) The excavation was completed in 2021 despite the difficult conditions (slow thawing of the permafrost and heavy rain). Following our 2019 and 2021 excavations, we now conclude that the establishment and use of House 7 in all likelihood took place sometime in the 15th or 16th century AD and the site was used

periodically up until at least the late 18th/ early 19th century, (so for approximately 300-400 years in total). The timespan of the layers is based on the occurrence of diagnostic European trade goods and an Inuit walrus tusk hairpin from the deepest layer. Samples for AMS-dates are now being selected.



Western profile of the trench through the midden area of House 7 at Arajutsiat.

The lower cultural layers included two pieces of structural timber that seemed to be the remains of a collapsed and buried entrance, at least 150 cm longer than the overlying and younger cold trap entrance. Six complete seal crania were also discovered and appear to have been intentionally placed/rested on the deepest floor level of the entrance (we speculate their occurrence was perhaps a ritual “closing” of the house after its initial use). In 2021, a new excavation area, 3 x 1 metres, was opened in the midden of House 9, a large communal house situated on a plateau located to the south of the main site and overlooking the core dwelling area of Arajutsiat. Particularly excellent preservation conditions were discovered in the midden, however we did not reach the bottom of the

cultural deposits due to the permafrost which hampered progress when we reached a depth of 30 centimetres below the surface. The House 9 excavation will be completed during our 2022 campaign. The finds of European trade goods from the upper layers indicate that the house was abandoned in the late 18th or early 19th century and preliminary analysis of the artefacts collected in 2021 shows a wide range of hunting- and fishing activities based on the tools identified, and representing many different stages in the tools' crafting process. Among the most striking finds are a drum-handle and three well-executed small bladder-nozzles for bird-spears (one of them with the closing piece still in place). The excellent preservation of the House 9 midden was punctuated by the strong odour of seal-blubber and human urine and faeces. The quality of the preservation conditions at



Left: dense and permafrozen midden layers at House 9, Arajutsisat, contained excellently preserved finds, for example: a bladder-nozzle from a bird-spear (upper right) and several European trade beads (lower right). Similar beads were found at House 7 and at Nipisat. (Photos: Martin Appelt).

the site is furthermore illustrated by the many different types of materials recovered, such as wooden nails, small scraps of skin and baleen, iron and copper pegs, eider duck down and probably even human hair.

Aasivissuit (NKAH 2845)

At the end of the 2021 field campaign, a seven-day trip was carried out to Aasivissuit. The purpose of the excursion was three-fold: (1) to install monitoring-equipment inside the 1978 midden excavation area (see Matthiesen et al., this report), (2) to excavate supplementary material for radiocarbon dating; and (3) to continue documenting, cataloguing and mapping all ancient cultural features at Aasivissuit using drones and high precision dGPS.

Two metres of the 1978-excavation trench (Section A [Y= 171-169], see Grønnow et al. 1978) were re-opened, followed by a 25 cm wide expansion of the trench to the east of Section A to provide a fresh profile to obtain organic materials for new radiocarbon dates. The excavations confirmed the 1978 observations of the midden's stratigraphy and it was possible to extract several pieces of samples for radiocarbon dating (especially from the early/classic Thule Culture layers.) A separate .25 m² unit was excavated by hand, immediately NE of the Section A trench. This was done to anchor a monitoring station that



Two meters of the south end of Trench A midden were re-opened at Aasivissuit in September 2021 (Photo: Bjarne Grønnow).

will collect time-series atmospheric and environmental data at Aasivissuit. Additionally, one full day was spent hosting and dialoguing with a visiting group of Arctic Adventure Guide students (see WP 1.1 and WP 2.1 above).



Quaternary zoologist Anne Birgitte Gotfredsen preparing the profile in Trench A, prior to photographing and drawing. (Photo: Martin Appelt).

WP 3.5: History

Historians Rasmus Voss and Christian Sune Pedersen

WP 3.5 was officially created as its own separate work package at the end of 2019. The work package is headed by historians Rasmus Voss and Christian Sune Pedersen, both from the National Museum of Denmark, and supported by MA student Emil Andersen from Uppsala University. The goal of WP 3.5 is to uncover the history of the Napisene colony project, 1724-25 and 1729-31 through examination of archival materials in the Danish National Archive. Attention in this work is paid to identifying the many details which have survived from this period a new story can be told that incorporates a micro-historical perspective (i.e., daily life, hardships, internal conflicts, encounters with Inuit, use of natural resources). This micro-history can then be juxtaposed against the larger well-documented history of Danish aspirations to build a global trade network, increase whaling and expand the colonial reach of the Kingdom in the 18th century. Andersen's MA thesis (to be defended in late May 2022) is a case study of the interpersonal conflicts between the colonial leadership and their fatal consequences for the failure of the Napisene colonial

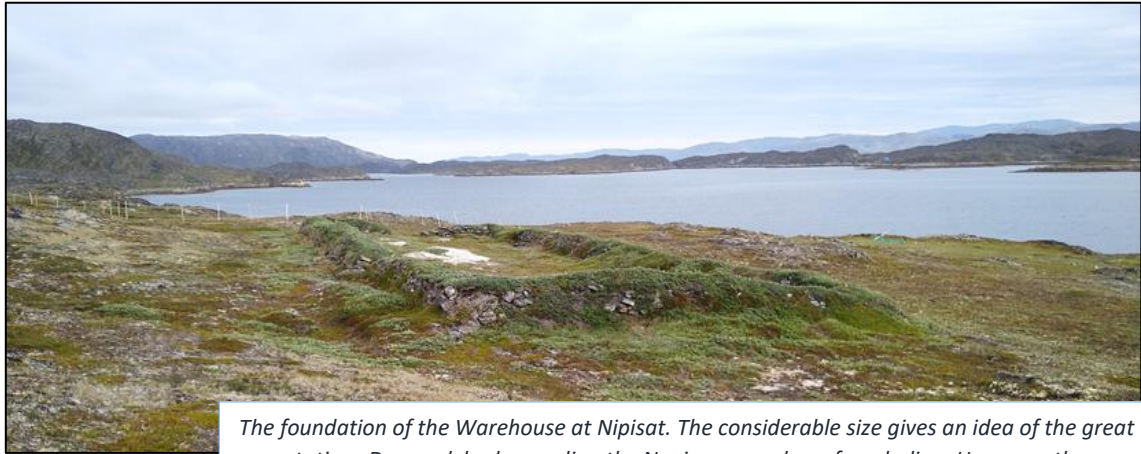
project. Parts of the book, planned as an outcome of WP 3.5, will be based on the findings of this in-depth historical analysis.

Furthermore, WP 3.5 provides archival data to support the archaeological, natural science and dialogical activities found in the other work packages by examining the comprehensive records of building materials, supplies, trading goods, and the positioning of buildings and structures on Nipisat in relation to the other Inuit settlements mentioned in the archives. This work is taking place on an ongoing basis, guided by the requirements of the other work packages and archaeological discoveries made in the summer of 2021.



Foundation of the colonial house complex on Nipisat. The main house was divided into U-shaped building. Officials lived in the wing to the right side of the photo, soldiers and slaves in the wing on the left close to the shore. A bakery, brewery and stables were situated in between. (Photo: Rasmus Voss).

Our primary task in 2021 was to finish the archival work at the National Archives which was greatly hampered by the ongoing Covid-19 situation. Despite these obstacles, much of the archival source material (roughly two-thousand pages) has now been organized, transcribed and in some cases summarized within an internal reference system.



The foundation of the Warehouse at Nipisat. The considerable size gives an idea of the great expectations Denmark had regarding the Nepisene as a base for whaling. However, the results were disappointing—had the colonists had more luck, the colony might not have been abandoned. (Photo: Rasmus Voss).

In June 2021, researchers from WP 3.5 attended the Greenland-Denmark conference at the National Museum in Copenhagen and presented the scope and driving research questions of our investigations of the colonial Nepisene project. It was exciting to present the preliminary findings and status of the project and receive feedback and questions from the audience. The outcome of the conference paper was very positive and demonstrated



Christian Sune Pedersen performing a metal detector survey on Nipisat. Among other discoveries, we identified an area with several metal objects (probably nails and rivets) embedded in the turf layers next to a small creek. This location may have been where the colony's 'water house' (outhouse) was once situated according to the written sources (Photo: Rasmus Voss).

a wide interest in this relatively unknown and unexplored chapter of Greenland's and Denmark's joint history.

In August 2021, Rasmus Voss and Christian Sune Pedersen joined the fieldwork on Nipisat to gain a better understanding of the island's cultural remains, terrain and landscape and use this experiences as a starting point for a better interpretation of the sources for a planned monograph.

We concluded the trip by delivering a presentation at the Sisimiut Museum; however due to Covid-19 the presentation was only live-streamed over the Museum's Facebook page, however we received a lot of helpful and constructive feedback from the audience.

As of autumn 2021, we have begun preparation for a monograph on the history of Nipisene—specifically the creation of a detailed timeline of events in Nipisat's eighteenth-century history based on the archival sources. This also includes writing chapters focusing on the biography of missionary Hans Egede and the establishment of the first Nepisene colony ca. 1724-25. This book will be co-authored by Christian Sune Pedersen, Rasmus Voss and Emil Andersen. The book explores the Danish Kingdom's years of discovery between 1728 and 1731, with a distinct focus on the Nipisat period. The micro-historical approach will focus on the historical agents themselves and their connections to the wider world of cultural encounters and entanglements, colonisation, trade, missionary activities and international politics. The book will be about 300 pages long (including endnotes). The manuscript is planned to be completed and published in 2023.

WP 3.6: Marine Archaeology

Senior Researcher, Visiting Research Professor David Gregory

Remote sensing marine archaeological surveys were carried out at three locations: Nipisat, Arajutsisut and in Ikertooq Fjord south of the village of Sarfannguit.

Background

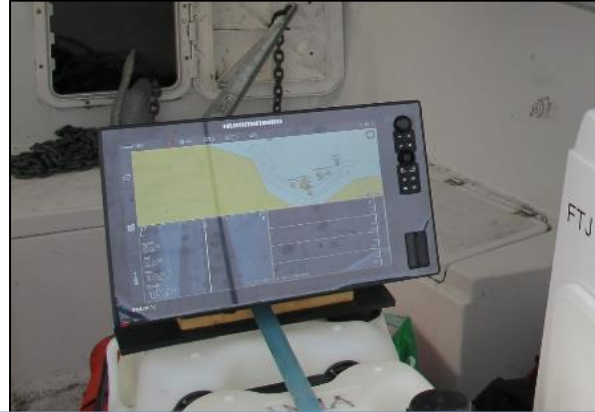
As an add on to the Activating Arctic Heritage Project, several areas in and around Sisimiut Fjord were surveyed to investigate aspects of surviving underwater cultural heritage. Remote sensing techniques using side scan sonar and single beam echosounder were used to prepare bathymetric charts of areas and obtain acoustic pictures of the seabed. If any anomalies (potential artefacts) were located by these methods, their positions were marked with a buoy and an underwater drone used to visually examine the seabed around the marked areas. The overall idea for the project came from the rumoured remains of a Viking period trading vessel that was discovered in the 1980s during sand extraction in connection with the expansion / building of Sisimiut airport. “Wreck Bay” was an area where timbers and walrus teeth were dredged up, whilst collecting sand and were reported to Sisimiut Museum. Further tantalising evidence for Viking period evidence was a Queen chess piece, that was discovered on Peat Island (Tørveøen) a few hundred metres away from the Wreck Bay.



A Norse chess piece carved from walrus ivory was found years ago by local people on the tiny island, Tørveøen ('Peat Island'), situated in the Ikertoq Fjord south of Sarfannuit.

In addition to surveys to locate the possible Viking period wreck, the seabed around the areas of the Warehouse on Nipisat were surveyed along with the foreshore in front of the

dwellings at Arajutsisut in an attempt to locate potential carcasses / bones of whales that may have been discarded.

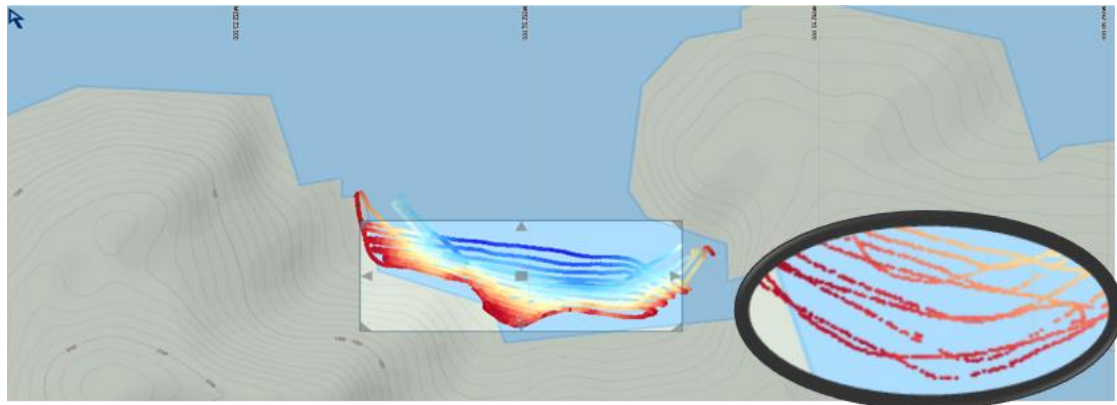


Left: Alan Lyngge (Greenland National Museum) holding the working end of the side scan system. At the lower end of the pole the transducer is shown, the upper end shows the GPS antenna. The pole is mounted on the outside of the survey vessel with the transducer being submerged in the water. Right: The transducer and GPS are connected to the top side computer unit which stores data and shows it in real time. The side scan sonar system sends out a “fan of sound” below the transducer; as the sound hits the seabed it returns to the transducer and it shown on the screen of the top side unit. A range of data can be shown in real time. (Photos: David Gregory).

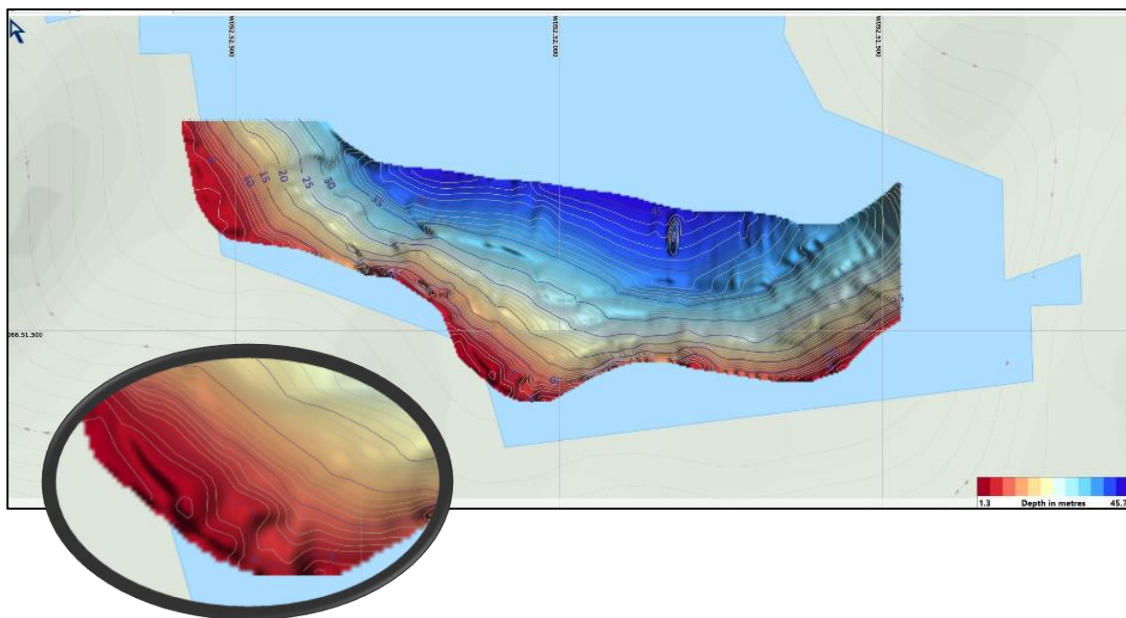
Side scan sonar and Echo sounding

Are acoustic methods that are used to create an acoustic image of what lies exposed on the seabed and record the depth of water in order to produce depth charts (bathymetric charts) of the seabed. The system used for these surveys was a Humminbird Solix 15 unit. This consists of a transducer mounted to the side of a survey vessels that sends out a range of sound frequencies that both measure the depth of water (bathymetry) and creates acoustic images of the seabed. The transducer is coupled with a GPS antenna so that the position of where depths and images are taken is known. The Transducer is connected a top side computer unit consisting of hard and software that displays the images and data of the seabed in real time. The data is simultaneously stored in order to be able to post process the data in the laboratory.

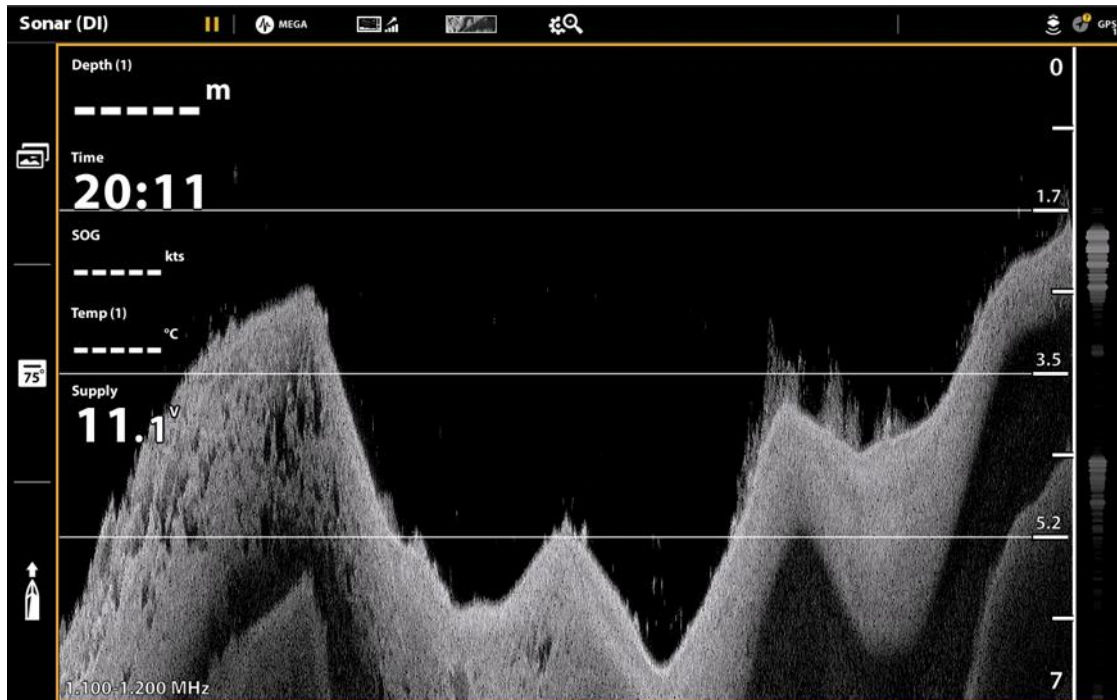
The area shown below is just a “snap shot” of the small area of the Wreck bay that was surveyed. By collecting multiple track lines, the area of the bay where the wreck was reported to have been located was surveyed. Using post processing software (Reefmaster) it was possible to collate all the data to generate a bathymetric map of the bay (below).



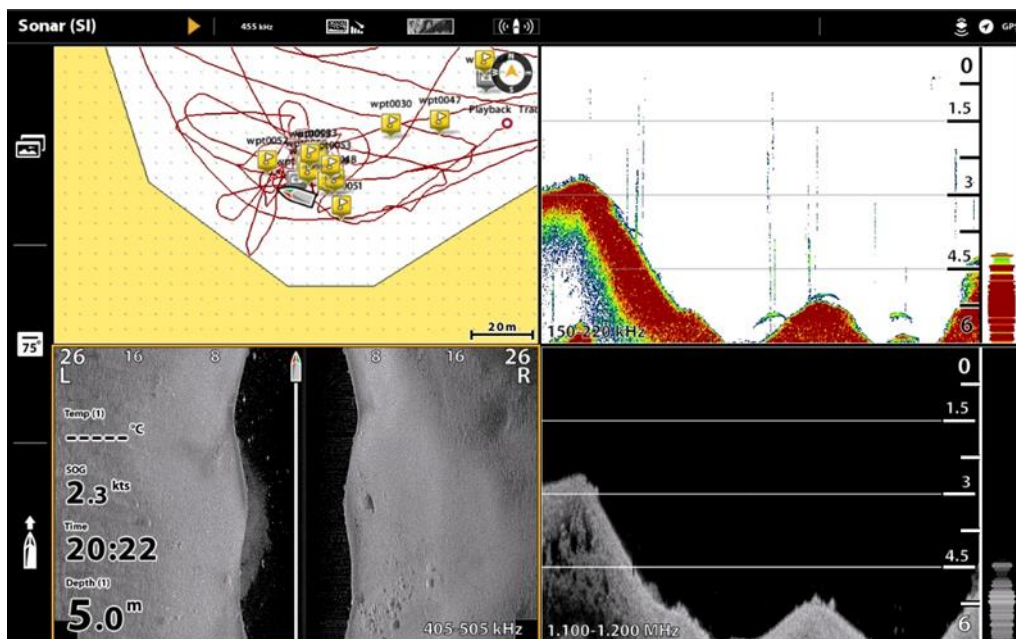
The overall track lines surveyed in the bay. The inset image shows the resolution of the data collected, with each coloured dot representing a data point including, water depth, and geographical position (latitude and longitude). Following validation of these data, gaps between the data were interpolated to generate a contour map of the seabed.



The contour map showed that there was a shallow area at the edges of the bay (red colour) which after about 50 metres, shelved away to deep water (blue areas). The inset image shows the area where it was clearly seen that sand had been dredged up in an area of about 100 x 100 metres.



Cross section of the area of seabed in the bay where sand was extracted. The natural seabed was ca 2m deep but where sand was dredged the seabed depth was increased to almost 7 metres in depth.



Top left: GPS track of where the vessel has surveyed showing track lines. The yellow flags are areas marked where a possible anomaly was located and would be investigated with the underwater drone. Top Right: A cross section of the water column, showing the depth of water and type of seabed. – the water depth was 6.5 metres and the red colour of the profile shows that it was a hard sandy seabed. Bottom left: Side scan image showing the seabed below the survey vessel to left (port) and right (starboard). Rocks can be seen on the right of the image. Bottom right. Acoustic image of the cross section of the water column (different representation of data from the other profile) showing seaweed in the peaks and troughs of the seabed. (Photos: David Gregory).

Drone surveys

The areas where dredging had taken place and where the side scan surveys identified “anomalies” on the seabed were surveyed using an underwater drone. As noted previously anomalies seen in real time on the side scan unit can be marked to give their position. These positions were then buoyed and an underwater drone used to investigate whether they were manmade or natural features. The drone used for this was a Chasing M2 tethered drone, which has still and video camera, lights and a “grabber arm” for raising small samples. It is tethered by a thin wire to the survey vessel and operated via a tablet, showing imagery in real time. Although an exceptional tool this particular drone does not have its own positioning system, hence the need to buoy anomalies located by the side scan and use these as the initial points where to start visually surveying.

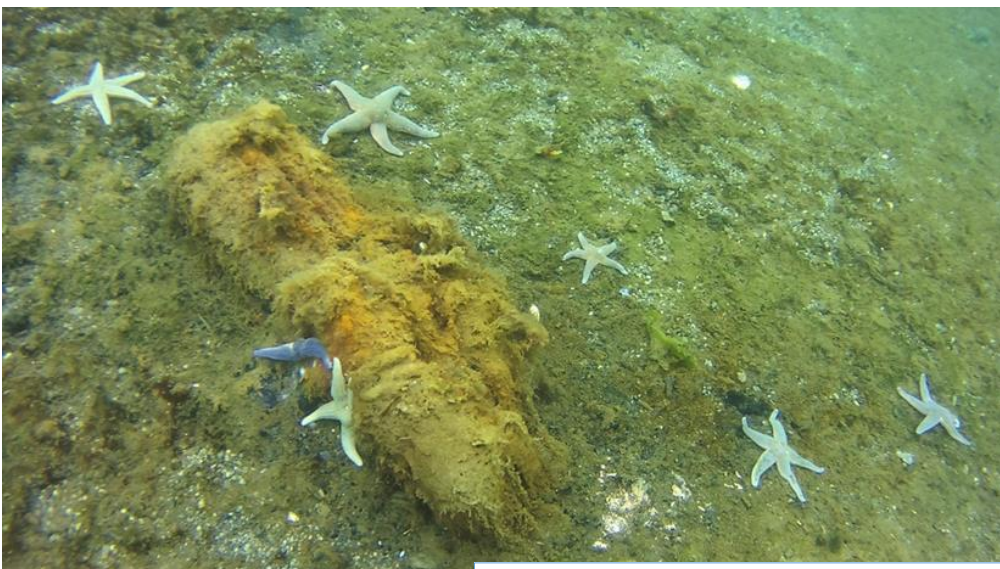


Chasing M2 tethered drone, which has still and video camera, lights and a ‘grabber arm’.

The drone was successful in locating a range of both natural and manmade anomalies / features on the seabed, as shown in the range of photos below:



However, the only man made “artefact” that was identified is shown below and it is speculated that this is modern metal. Nevertheless, it shows the methodology used i.e side scan sonar to map and visualise large areas of seabed and identify anomalies which were then validated by drone was successful and cost effective.



Metal artefact on the sea bed in 'Wreck Bay'. Probably the remains of a winch from a modern ship.

Conclusions and further work

This report highlights the methodologies that were used to survey and assess potential anomalies during surveys of three areas around Nipisat, Arajutsisut and Ikertooq Fjord. The focus of the report has been on the work carried out to localise the possible Viking age vessel that was reported to Sisimiut Museum. Although unsuccessful on this occasion surveying and assessment of anomalies was carried out over only two days – with an area of over 250,000 square metres being mapped, which identified the area where sand dredging had been taken place and using the drone over 50 anomalies were examined. Although these by and large turned out to be rock or natural seabed formations, manmade artefacts such as the fish box and metal artefact were localised. The methods used only identify anomalies that are standing proud of the seabed, so if there had subsequently been seabed movement and the wreck was covered, it would not be seen by these methods. There are other acoustic methods, using a lower sound frequency that can penetrate the seabed, could be used. Similarly carrying out diving operations in the relatively small area where the dredging area was located would also be feasible, should there be an interest / possibility.

In the other areas of Arajutsisut, no whale carcasses or anomalies resembling whale bones were identified – speaking to local fishermen in Sisimiut, they also said they would not expect the carcasses to have been discarded so close to the location of the dwellings at Arajutsisut, simply due to not wanting to leave their rubbish on their doorstep. Similarly no obvious artefacts were found immediately off the areas of the Colonial warehouse of Nipisat. Interestingly the bathymetry of the seabed was extremely deep and (>60 metres only 200 metres off shore) and would certainly not be an obvious anchorage area. However, it is documented that large iron rings were placed in the rocks to aid with mooring of ships – these too were not located.

Future work will include continued post processing of the data and reporting of the work carried out for the archives of the National and Sisimiut Museums. The results will also be added to the AAH story map.

Dissemination and other impacts of the work

The field work was presented at the Sisimiut Museum on an online talk, which was well attended – over 140 participants live and subsequently seen by 300+ people.

Researchers in North America, working with the use of British and Dutch historic whaling records to map the location and extent of sea ice, have shown great interest in the methodology used during the 2021 field season, and a Memorandum of Understanding with researchers from Parks Canada has almost been agreed in order to set up a mutual collaboration investigating the discovery and conservation of underwater cultural heritage sites.

Other Activities

In Spring of 2021, the much-anticipated AAH Project webpage went live. Hans Harmsen of the Greenland National Museum & Archives is the editor and designer of the webpage, which includes a detailed overview of the project, information on the various work packages, Key sites, and AAH researcher bios. A link to the webpage can be found below:

[Activating Arctic Heritage: Exploring UNESCO World Heritage in Greenland](#)

Outreach overview

The entire AAH research group contributed to the dialogical activities described above (see WP 1.1) and as is described in this annual report, dissemination and outreach has proven to be an integral part of each work package. The dissemination activities were intensified

in Denmark and Greenland during 2021 as much as the Covid-19 allowed. The most important activities completed are listed below:

1. Several public talks and lectures in Denmark and Greenland by AAH team researchers
2. 'Open excavations' and several semi-informal social meetings (i.e. kaffemiks) hosted with the help and coordination of local museums and citizens during the 2021 field season.
3. Collaboration with DTU Arctic, Sisimiut museum leader, and the local UNESCO management staff for activities related to the Sisimiut Science Week and UNESCO Festival, 2-8 November. Public Talks, educational activities (for students) and 'meet the AAH researchers' events were held in Sisimiut, Sarfannguit and Kangerlussuaq.
4. 3D Heritage Workshops: several full day programs at Sisimiut Museum, Sarfannguit, and Sisimiut Cultural House, Taseralik, 3-7 November 2021.
5. An AAH pop-up event for the public held on 12 November in the Greenland National Museum & Archives permanent exhibitions. The event was connected to the Nuuk Science Week conference and five AAH-researchers set up demo tables to encourage Q&As and dialogues with guests.
6. UNESCO Festival arranged by AAH in Kujataa, South Greenland. Seven AAH researchers and the local UNESCO manager travelled to Narsaq, Qaortoq and Qanisaartut to deliver public talks at the local museums, schools, museums and even family homes of the sheep farmers. AAH hosted several 'meet the researchers' events and gave 'activating' lectures to public school and gymnasium students, as well as other educational institutions (e.g. Campus Kujalleq Guide School) between 16-23 November.

Online dissemination of the project

- *The Activating Arctic Heritage Home Page*: <https://arcq.is/1rCme4>
- *The Carlsberg Foundation*:
https://www.carlsbergfondet.dk/da/Forskningsaktiviteter/Bevillingsstatistik/Bevillingsoversigt/CF18_1106_Bjarne-Gronnow
- *The National Museum of Denmark*: <https://natmus.dk/historisk-viden/forskning/forskningsprojekter/activating-arctic-heritage/>
- *ISAAFFIK*: <https://www.isaaffik.org/activating-arctic-heritage-0>

Publications

Appelt, Martin; Grønnow, Bjarne & Randrup Jørgensen, Anne Mette 2021

Inuit pencil drawings and co-creation: rediscovering the artwork made during the Fifth Thule Expedition. - *Alaska Journal of Anthropology*, vol. 19, no. 1&2 (2021): 212 – 228.

Arneborg, J., 2021

Early European and Greenlandic Walrus Hunting: motivations, techniques and practices. *The Atlantic Walrus: Multidisciplinary Insights into Human-Animal Interactions*. Keighley, X., Tange Olsen, M., Jordan, P. & S. Desjardins (eds.). London, San Diego, Cambridge, Oxford: Elsevier Academic Press, s. 149-168

Grønnow, Bjarne 2021 (in press):

Arctic Pioneers: The Initial Peopling of the Circumpolar North. – In: Adrian Howkins and Peder Roberts eds.: *Cambridge History of the Polar Regions*. University of Cambridge Press: Chapter 7.

Grønnow, Bjarne (ed.) 2021

Activating Arctic Heritage: Exploring UNESCO World Heritage in Greenland. Project Overview and Annual Report 2020. The National Museum of Denmark: 36 pp.

Matthiesen, Henning 2021

Hidden in the Midden. Field report 2021: Investigations at Nipisat, Arajutsisut, Saqqarliit and Aasivissuit. M&M, The National Museum of Denmark.

Grimm, S. B., Eriksen, B. V., Krüger, S., Reuter, T., Wild, M., & Weber, M. J. 2021

Late Glacial Occupation of Northern Germany and Adjacent Areas. Revisiting the Archives. In: *The Beef Behind All Possible Pasts: The Tandem-Festschrift in Honour of Elaine Turner and Martin Street* (pp. 433-457).

Conference papers

Bjarne Grønnow co-headed the conference 'Greenland – Denmark 1721 – 2021', held in Copenhagen (The National Museum, The Royal Society of Science and Letters, University of Aalborg). Peter Andreas Toft from the AAH Project chaired a session: 'Co-existence, conflicts and negotiations: The 18th Century Beginnings of Cross Cultural relations between Europeans and the Inuit of Greenland' including several papers presented by members of the AAH team.

Grønnow, B., Madsen, C.K., J. Fog Jensen, Pedersen, D. & Harmsen, H.

Activating Arctic Heritage: Making UNESCO World Heritage Matter,' papers delivered at the international conference 'Making Science Matter' in Nuuk, 11 November, 2021.

Contributions by AAH Project researchers at several international virtual conferences during 2021.