

National Museum of Denmark - Frederiksholm Kanal 12
DK-1220 Copenhagen Denmark

Resources, Mobility, and Cultural Identity in Norse Greenland AD
980 - 1450

Annual report to the Commission for Scientific Research in
Greenland. December 2008.

Jette Arneborg
30-12-2008

RESOURCES, MOBILITY, AND CULTURAL IDENTITY IN NORSE GREENLAND AD 980 – 1450



Vatnahverfi – with the many lakes

CONTENTS

Background.....	3
National and international cooperation	4
Investigations in the Vatnahverfi region.....	5
Animal bones from the Norse middens.....	6
Recording fences, pens and enclosures in Vatnahverfi	6
Ancient DNA	6
Pollen and plant remains	6
Archaeological investigations in Norse churches and cemeteries.....	6
<i>The church at Ø64. In the foreground the circular dyke surrounding church and churchyard</i>	7
Carbon & Nitrogen Isotopes	8
Strontium isotopes	8
Genetics	8
Agent Based Modeling	8
Archaeological fieldwork in Vatnahverfi	8
Field season 2007.....	9
Field season 2008.....	10
"Kids archeology Program - Forneifaskóli barnanna"	11
Field season 2009.....	11
Reports	12
Publications.....	12
Conferences, Symposia, workshops.....	12
Student papers	13
Other Outreach.....	13

BACKGROUND

The project Resources, Mobility, and Cultural Identity in Norse Greenland AD 980 – 1450 integrates studies of single sites and a regional study of the Vatnahverfi region in the Norse Eastern Settlement.

The Vatnahverfi region was densely populated in the Middle Ages and the same is true today, where several of the Norse farms have been resettled by modern sheep farmers. The project connects the past with the present, among other things through the “Kids Archaeology programme”.

The site investigations have targeted both high status farms with churches and more humble farms.

The project integrates traditional archaeological method, environmental archaeology, zooarchaeology, analysis of pollen and macro fossils, soil analysis, aDNA, human genetic studies, climate and landscape modeling.

Among other things the project seeks to highlight:

- What were the natural preconditions for settlement
- What was the economic basis for the Norse settlement in Greenland
- How was Vatnahverfi settled? Which farms were first settled; which farms were first depopulated. And why?
- Depopulation of the Norse Greenland settlements - when and why?
- How did the social and economic relationship between farms develop?

The project has been funded by IPY funds from The Commission for Scientific Research in Greenland and NSF.

NATIONAL AND INTERNATIONAL COOPERATION

The project joins a research network of similar settlement research projects that take place in Iceland, The Faroe Islands and Shetland. The overarching goal is to study human interaction with the natural environment, and the interaction between people or between groups of people.

Primary partner are:

Dr. Georg Nyegaard, The Greenland National Museum & Archives.

Research student Christian Koch Madsen. National Museum of Denmark & University of Copenhagen.

Professor, laboratory director Niels Lynnerup, University of Copenhagen, Faculty of Health Sciences. Department of Forensic Medicine. Laboratory of Biological Anthropology.

PhD. Martin Hebsgaard. University of Copenhagen. Department of Biology. Ancient DNA and Evolution/ University of Edinburgh, The Hayworth Laboratories.

Professor Thomas McGovern, CUNY, Hunter College. New York

Konrad Smiarowski, Doctoral Research Student. CUNY graduate centre, Phd programme in Archaeology.

Professor Sophia Perdikaris. CUNY, Brooklyn College, New York.

Professor Doug Price. Dept. of Anthropology. University of Wisconsin, Madison.

Professor Andy Dugmore. Geosciences, University of Edinburgh.

Dr. Andy Casely, Geosciences, University of Edinburgh.

Professor Kevin Edwards, Geosciences, University of Aberdeen.

Professor Ian Simpson, Environmental Sciences. University of Stirling

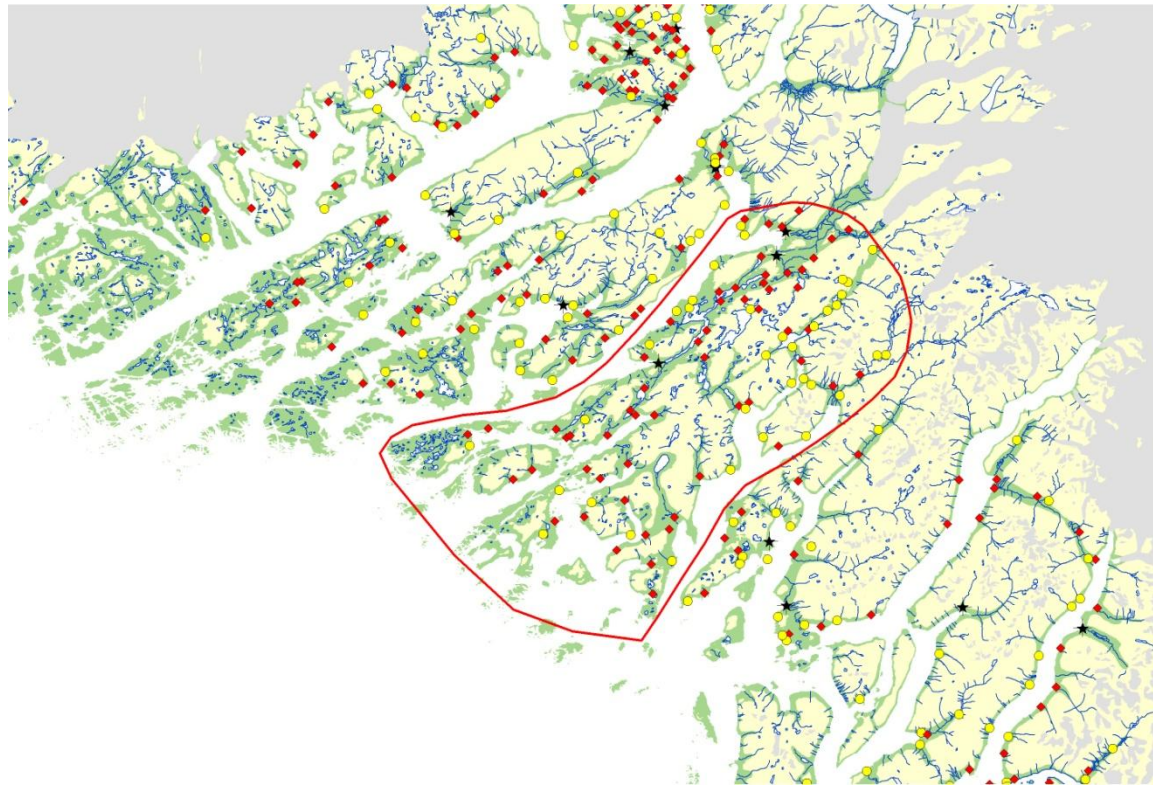
And

Colleagues in the NABO network.

INVESTIGATIONS IN THE VATNAHVERFI REGION

The Vatnahverfi project is the first ever that investigates the dynamics between farms in a regional, well-defined area. Vatnahverfi reflects the settlement pattern found in the Norse settlements in Greenland in general, and experiences from Vatnahverfi will be used to define well argued development models for the further research in the Norse Greenland history.

Today the landscape in Vatnahverfi is dominated by the modern agricultural use and – at places – heavy erosion. Some of the ruins of the Norse farms are covered by thick layers of sand others are situated at wind blow sites completely exposed and barren. Archaeological investigations, geomorphology, soil and vegetation studies have shown that erosion is not only a modern phenomenon. The landscape was also devastated by erosion while the Norse farms were still inhabited, and previously the erosion in the Middle Ages was solely explained as a result of Norse farming. New research has however shown that climate changes may also have caused erosion.



Vatnahverfi - The survey area

Archaeological excavations of the Norse houses and middens are done to collect animal bones and other samples for scientific studies that can tell us of how the Norse farmers lived in Vatnahverfi. The animal bones tell of the economic base of the farms – from what people lived. Pollen and plant remains tell us how the landscape looked like and it tells about the climate.

Archaeological excavations of the remains of the buildings tell about how the Norse built and furnished their houses and churches. Byres, stables, barns and enclosures show how they kept their domesticates.

ANIMAL BONES FROM THE NORSE MIDDENS

Earlier studies have shown that there were differences in the livestock in the individual farms. The bigger and richer the farm was the more cattle had the farmer. On medium sized and small farms sheep and goats dominated. The animal bones record suggests that the domestic animals were kept primarily for the milk, butter and cheese – and the sheep also for the wool. The meat in the Norse diet came primarily from seal.

The animal bones studies show that through time the Norse became more dependent on seal catching.

Analyses of the animal bones are done by Konrad Smiarowski at CUNY, New York.

RECORDING FENCES, PENS AND ENCLOSURES IN VATNAHVERFI

The Vatnahverfi project sheds light on a humble – and hitherto neglected type of ruins: fences, pens and enclosures of various kinds. Enclosures, pens and fences tell about how the Norse farmers kept their animals and – perhaps – tried to grow crops of some kind. Large common enclosures may tell about social relationships between farms.

The Fences, pens and Enclosures project are carried out by Christian Koch Madsen, National Museum DK.

ANCIENT DNA

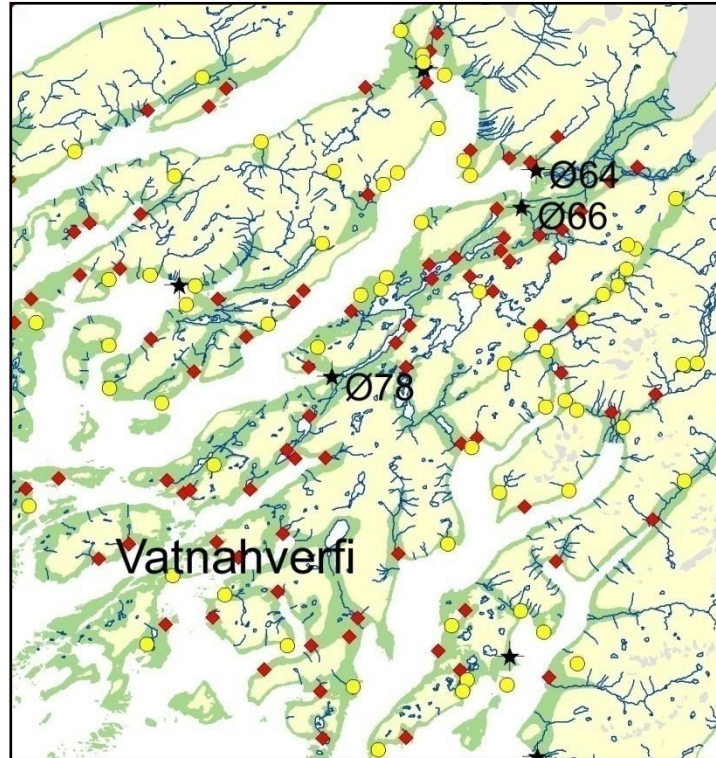
In connection to the Fences and Enclosures project PhD Martin Hebsgaard in collaboration with Christian Koch Madsen has collected samples for ancient DNA analysis to determine the use of the enclosures and pens (which animals were kept in the enclosures? – or which crops were grown?).

POLLEN AND PLANT REMAINS

Pollen from plants and other plant remains growing at and adjacent to the farms can also show possible crops grown at the farms, and they can help to illuminate climate and climate changes. Our collaborators from University of Aberdeen have collected pollen and plant remains from four Vatnahverfi farms.

ARCHAEOLOGICAL INVESTIGATIONS IN NORSE CHURCHES AND CEMETERIES

The archaeological investigations at the Norse churches concentrate on a small group of



churches that are small compared to the majority of churches. Why are these churches smaller than the majority of churches? Did they have a special position in the Norse society? Who are the buried in the cemetery? Under what conditions did they live when they were alive?

Our studies do not indicate that there is a correlation between church size and its age. But judged in

Farms with churches in Vatnahverfi

in conjunction with the form of the cemetery and the construction of the church building, it appears that small churches, built primarily of turf - in contrast to the later stone churches – with their circular cemeteries are the oldest. It also appears that several of these small churches have been taken out of use presumably during the 12th and 13th centuries. These findings immediately raised new questions: Why were some of churches taken out of use? What role did Christianity play in the Norse settlements? Or was it only the cemetery, which was no longer in use? Who lies buried in the cemeteries? How did the early settlers live, compared to those that lived in later periods?



The church at Ø64. In the foreground the circular dyke surrounding church and churchyard

CARBON & NITROGEN ISOTOPES

Measurements of the stable isotope $\delta^{13}\text{C}$ of human and animal bones reveal the proportion of marine food humans and animals digested through life. Nitrogen ^{15}N isotope rises on its way up through the food chain and the amount of isotope $\delta^{15}\text{N}$ of the bones will reveal where on the food chain the individual – human or animal – has received its diet.

By measuring the two isotopes we can gain insight into Norse diet. Isotopic studies of Norse skeletons show that the Norse eventually became more and more dependent on the marine diet.

Isotope analysis has been carried out in collaboration with the Anthropological Laboratory, Zoological Museum - both of Copenhagen University, the AMS dating laboratory at Aarhus University and Simon Fraser University in Vancouver. In the future we will also work with Dr Philippa Ascough, SUERC at Glasgow University.

STRONTIUM ISOTOPES

The geological diversity that exists in the North Atlantic can be "read" in human bones and teeth through analysis of strontium content. The measurement of strontium isotopes gives knowledge of where a person was brought up. Our teeth are formed in childhood, while our bones are reshaped over the years. By comparing strontium isotope content of Norse teeth with the contents of the bones or by comparing the switch on the strontium content of the geology of the area where the skeletons were found, one can detect whether the individual has moved from one area to another, for example from Iceland to Greenland. As Carbon and Nitrogen Strontium isotopes can also illuminate Norse diet.

We provide samples to Professor Doug Price, University of Wisconsin, Madison, and our joint research project North Atlantic Migration.

GENETICS

We collaborate with Professor Niels Lynnerup, Department of Forensic Medicine by providing him with samples for genetic analysis. Lynnerup and his research group is mapping Inuit and Norse genes – in our project we are focusing on both the origin of the Greenland Norse population (compared with strontium-project) and also on internal family relationships between people buried in the cemeteries.

AGENT BASED MODELING

In collaboration with Professor Andy Dugmore and his research team (1 post doc, and 2 PhD students) from Edinburgh University, School of GeoSciences, we will - with input from the studies described above and GIS surveys in Vatnahverfi (see below) – explore the limitations and consequences of environmental changes and human choices.

ARCHAEOLOGICAL FIELDWORK IN VATNAHVERFI GPS SURVEYS IN 2005 AND 2006

Prerequisite for the archaeological investigations in Vatnahverfi is a thorough knowledge of all the Norse ruins in the area. Therefore, in field seasons 2005 and 2006 all previously

registered and newly discovered ruins initially were measured with GPS by M.A. students Niels Algreen Møller and Christian Koch Madsen.



Mapping ruins with GPS

In total, until the summer of 2008 in Vatnahverfi 81 sites or ruin groups with a varied number of ruins on each site have been recorded and mapped with GPS.

FIELD SEASON 2007

In the summer of 2007 we continued recording sites, we however also made minor archaeological excavations to collect samples for AMS dating to date the sites. We also made test excavations in the cemeteries of two small churches at the ruin groups Ø64 and Ø78.

At Ø78 the density of the graves in the churchyard was relatively high. Unfortunately the collected samples of the skeletons proved to contain nearly no collagen and it was not possible to AMS-date the skeletons, just as it was not possible to measure isotopic carbon and nitrogen isotopes. Charcoal samples from the graves were dated instead and dated the graves to the first centuries of settlement.

At the ruin group Ø64 only a few graves were recognized in the trench excavated in the cemetery. The graves have not been dated yet.

In 2007 also middens at several Vatnahverfi farms were drilled to evaluate the conservation conditions for future excavations and the midden at the small coastal farm, ruin group Ø172 were excavated. Preservation was especially good at Ø172 and the midden here will be one of the objectives of the studies in field season 2009.

FIELD SEASON 2008

In the field season 2008 archaeological excavations were continued at the farm Ø64 in Kujalleq. The farm with its small church is considered a *landnam* farm – one of the first settled and among oldest in the region. Excavations were continued in the cemetery, and to highlight farm economy we also excavated the midden.

Excavations were also carried out in the midden of the inland farm Ø69, and we collected samples for ancient DNA analysis to determine the use of the many enclosures and pens in the area.

While the midden at farm Ø64 gave a poor outcome, the results from the cemetery were overwhelming. The 2007-ditch was reopened and enlarged, and in contrast to the 2007 excavation in the extension of the ditch we uncovered several graves one of which was a large common grave with a yet unknown number of deceased. Skeletal parts of approx. 18 individuals were taken to the Anthropological Laboratory in Copenhagen for further analysis. Samples for strontium analysis and for genetic studies have been retrieved, and at the beginning of 2009 samples were sent to Aarhus for AMS dating, carbon and nitrogen isotope analysis. More samples will be sent to SUERC at Glasgow University.



"KIDS ARCHEOLOGY PROGRAM - FORNLEIFASKÓLI BARNANNA"

School children from the small school in Vatnahverfi attended the archaeological excavations one day at the Norse farm Ø69.

After the field season contact was established between school teacher Sofianguaq Lund from the school in Vatnahverfi and the Icelandic Fornleifaskóli barnanna (Kids archeology Program) and we hope that in the near future the kids from Vatnahverfi will participate in the programme together with school kids from Iceland.



School kids from the school in Vatnahverfi excavating Norse midden, august 2008.

FIELD SEASON 2009

The aim of the field work in 2009 will be GPS surveys of the remaining farms in the southeastern part of Vatnahverfi, more midden excavations and collecting more samples for dating the farms. The last-mentioned is of special importance to our Agent Based Modeling project.

REPORTS

Algreen Møller, Niels & Koch Madsen, Christian: Rapport om rekognoscering og opmåling af nordboruiner i Vatnahverfi sommeren 2005. SILA feltrapport 24.

Algreen Møller, Niels & Koch Madsen, Christian:
Gård og Sæter, Hus og Fold - Vatnahverfi 2006. Rapport om besigtigelser og opmålinger i Vatnahverfi, sommeren 2006. SILA Feltrapport nr. 25

Algreen Møller, Niels (ed.), Lund Johansen, Louise, Koch Madsen, Christian, Felding, Louise, Baltzer Heide, Poul & Smiarowzki, Konrad: Udgravninger af norrøne kirkegårde og møddinger. Rapport om opmålinger og udgravninger i Vatnahverfi, Sommeren 2007. SILA Feltrapport nr. 26

Smiarowski, Konrad: Greenland 2007 Field Season Preliminary Report. CUNY Graduate Center PhD Program in Archaeology. 2007

Christian Koch Madsen: Rapport fra feltarbejde i Island 2008: Herding Structures in Northern Iceland.

Oscar Aldred & Christian Koch Madsen. Rapport fra feltarbejde i Island 2008: Réttir in the landscape

The reports are available online on www.natmus.dk and www.nabohome.org

PUBLICATIONS

Madsen, Christian Koch: Får, geder og folde i det norrøne Vatnahverfi. *Grønland* 1 2008:4-14

Møller, Niels Algreen & Christian Koch Madsen: Med friske skridt i forgængeres fodspor. *Grønland* 5-6, 2007:306-314

Bishop, Rosie R., Mike J. Church, Andrew J. Dugmore, Phil Clogg, Christian Koch Madsen & Niels A. Møller: Palaeoenvironmental Investigations at Ø69, Greenland. Submitted: *JONA – Journal of the North Atlantic*.

Hebsgaard, Martin B.¹, Jette Arneborg², M. Thomas P. Gilbert¹, Patricia Heyn¹, Morten E. Allentoft³, Mike Bunce⁴, Kasper Munch⁵, Rasmus Nielsen⁵, Charles Schweger⁶, Eske Willerslev¹: "The Farm Beneath the Sand" - An Archaeological Case Study on Ancient "Dirt" DNA. Accepted *Antiquity*.

CONFERENCES, SYMPOSIA, WORKSHOPS

Arneborg, Jette, Niels Algreen Møller & Christian Koch Madsen: *Vatnahverfi, Settlement and abandonment in the Norse Eastern Settlement, Greenland. A new research project*. Poster. Holar-konference. Nordisland 2006.

Jette Arneborg: *Vatnahverfi-projektet*. International Polar Year Workshop- Human ecodynamics in the Norse North Atlantic. University of Edinburgh Dec. 2007

Christian Koch Madsen: Pens and enclosures in the Vatnahverfi region. South Greenland. Indlæg NABO08. Bradford September 2008.

Jette Arneborg: Resources, mobility, and Cultural Identity in Norse Greenland AD 980 – 1450. IPY-outreach Nuuk 16. – 20. februar 2009.

STUDENT PAPERS

Madsen, Christian Koch: "One ewe lost in spring is the same as three sheep lost in the fall" – A study of Dynamics in Ovicaprine Pastoralism in Norse Greenland. Københavns Universitet, Saxo instituttet, Forhistorisk Arkæologi. Tema II opgave. Vinter 2007.

Møller, Niels Algreen: Norrøne Bebyggelsesmønstre – Landskabsudnyttelse, bebyggelsedynamik og sociale systemer i Nordboernes Vatnahverfi. MA. Københavns Universitet, Saxo instituttet. Forhistorisk Arkæologi. Forår 2008.

OTHER OUTREACH

Polarfronten 1/2008. I Nordboernes fodspor. Af Jane Benarroch.

http://www.dpc.dk/graphics/Design/Danish/Nyhedsrum/Polarfronten_online/PF%20108/Nordboernes%20Fodspor.pdf

Nordboerne i Grønland. Jette Arneborg in Danish radio. PANORAMA. 17. september 2008

<http://www.dr.dk/P1/orientering/Panorama/2008/09/10153455.htm>

Polarfronten 4/2008. IPY i felten (*IPY in the field*). En nordbokirkegårds historie (*The history of a Norse church yard*). Af Uffe Wilkens.

http://dpc.inforce.dk/graphics/Design/Danish/Nyhedsrum/Polarfronten_online/Polarfronten%20Arkiv/IPY2008-DKweb.pdf