

Det brearkeologiske sikringsprogrammet i Innlandet

[Secretsoftheice.com](https://secretsoftheice.com)

Espen Finstad



Innlandet
fylkeskommune



Det brearkeologiske sikringsprogrammet i Innlandet

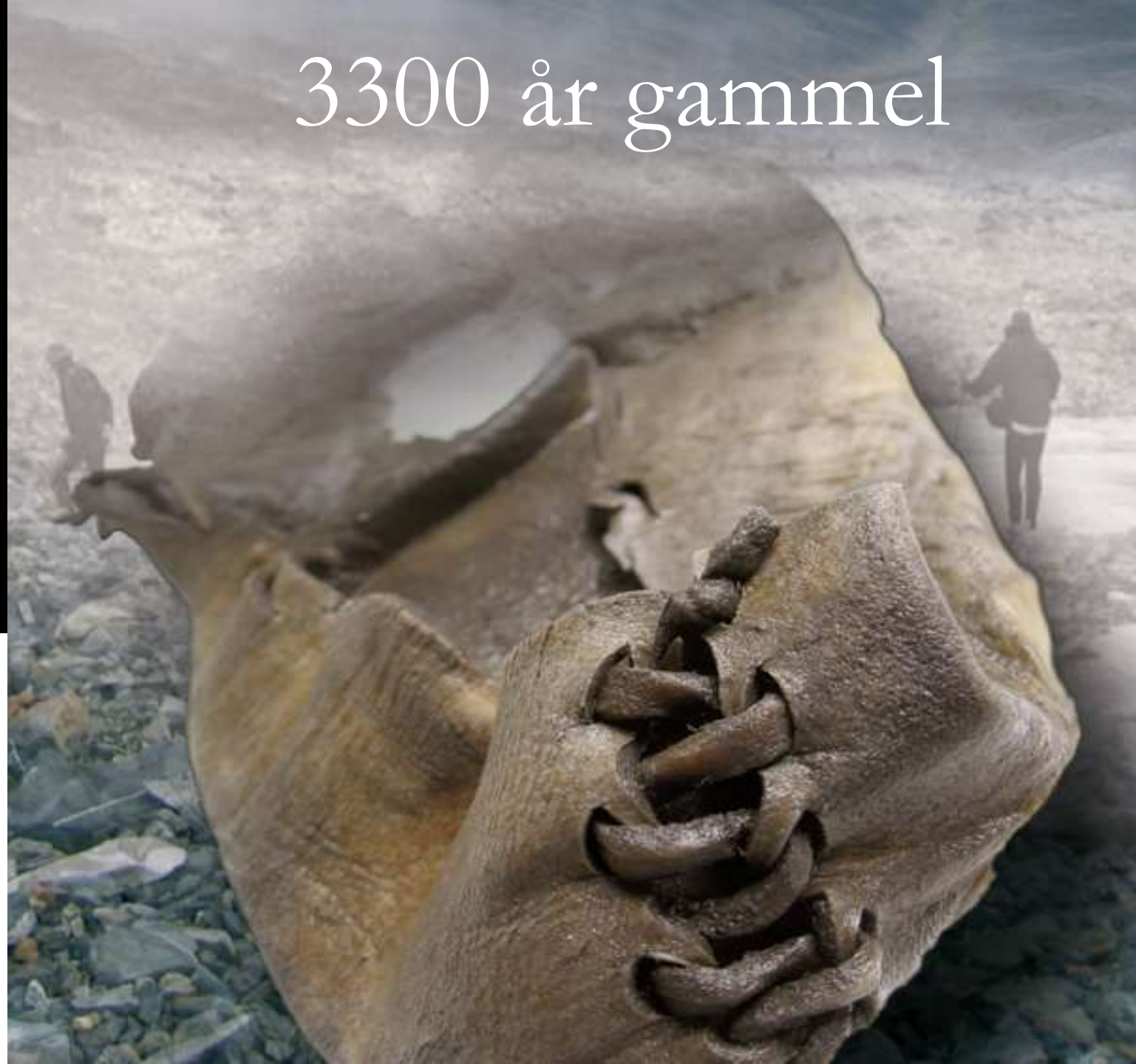
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Espen Finstad



Innlandet
fylkeskommune

3300 år gammel



Etter 20 år med brearkeologi:

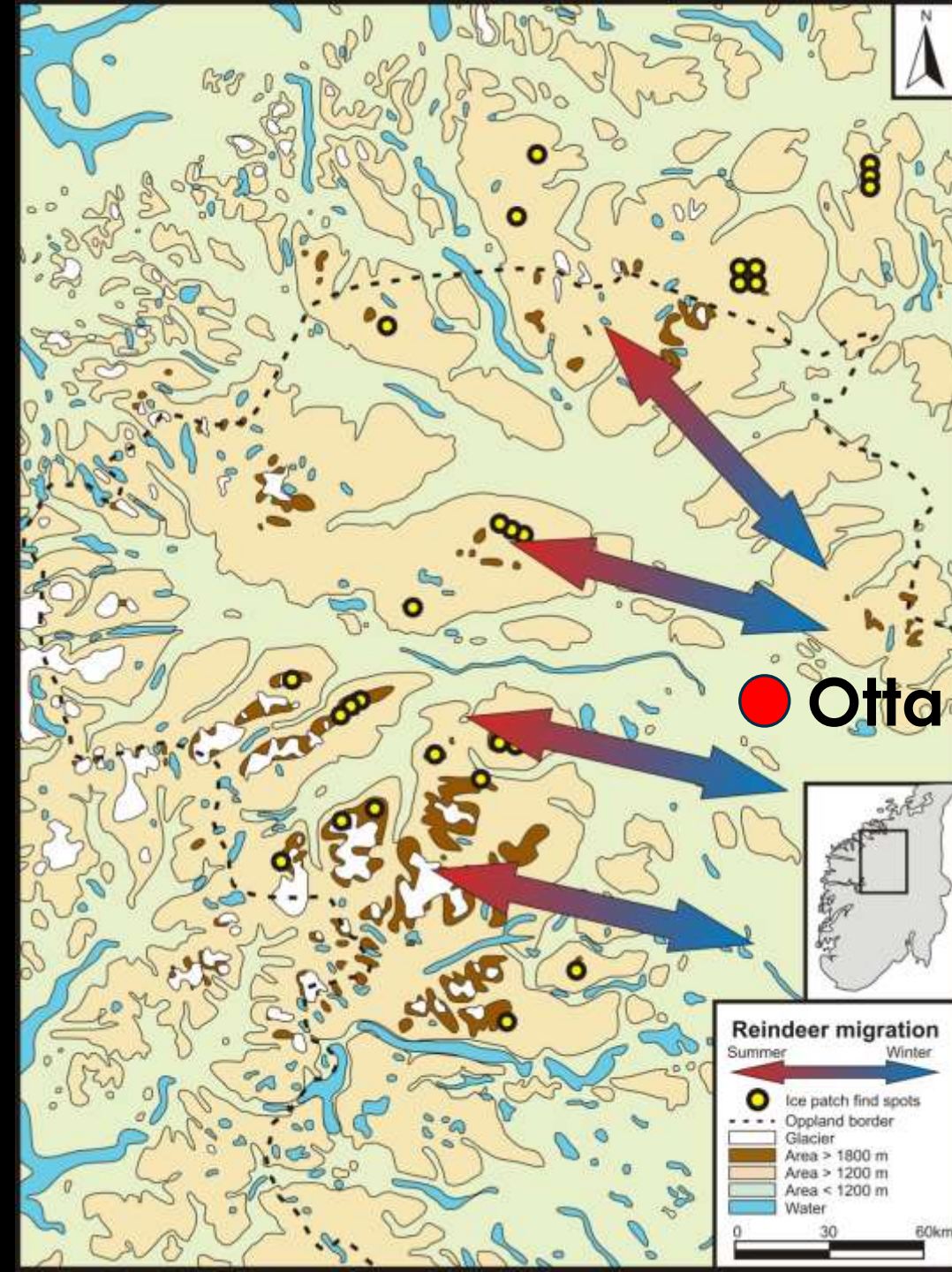
Hvor står vi?

Veien videre?



Sommerbeite i vest

Vinterbeite i øst





Sommerfangst på rein



Buestilling





An aerial photograph of a glacier system. The glacier is divided into two main sections. The left section, labeled 'BRE', shows a more uniform, light-colored surface with some longitudinal ridges. The right section, labeled 'IS/SNØFONN', shows a more complex, darker surface with numerous transverse ridges and a more irregular shape. The background is a dark, forested area.

BRE

Bevegelse

IS/SNØFONN

Ikke bevegelse

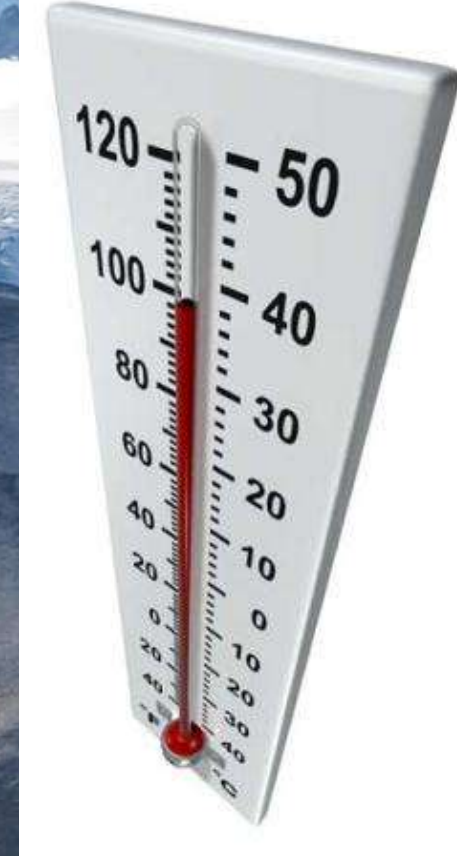
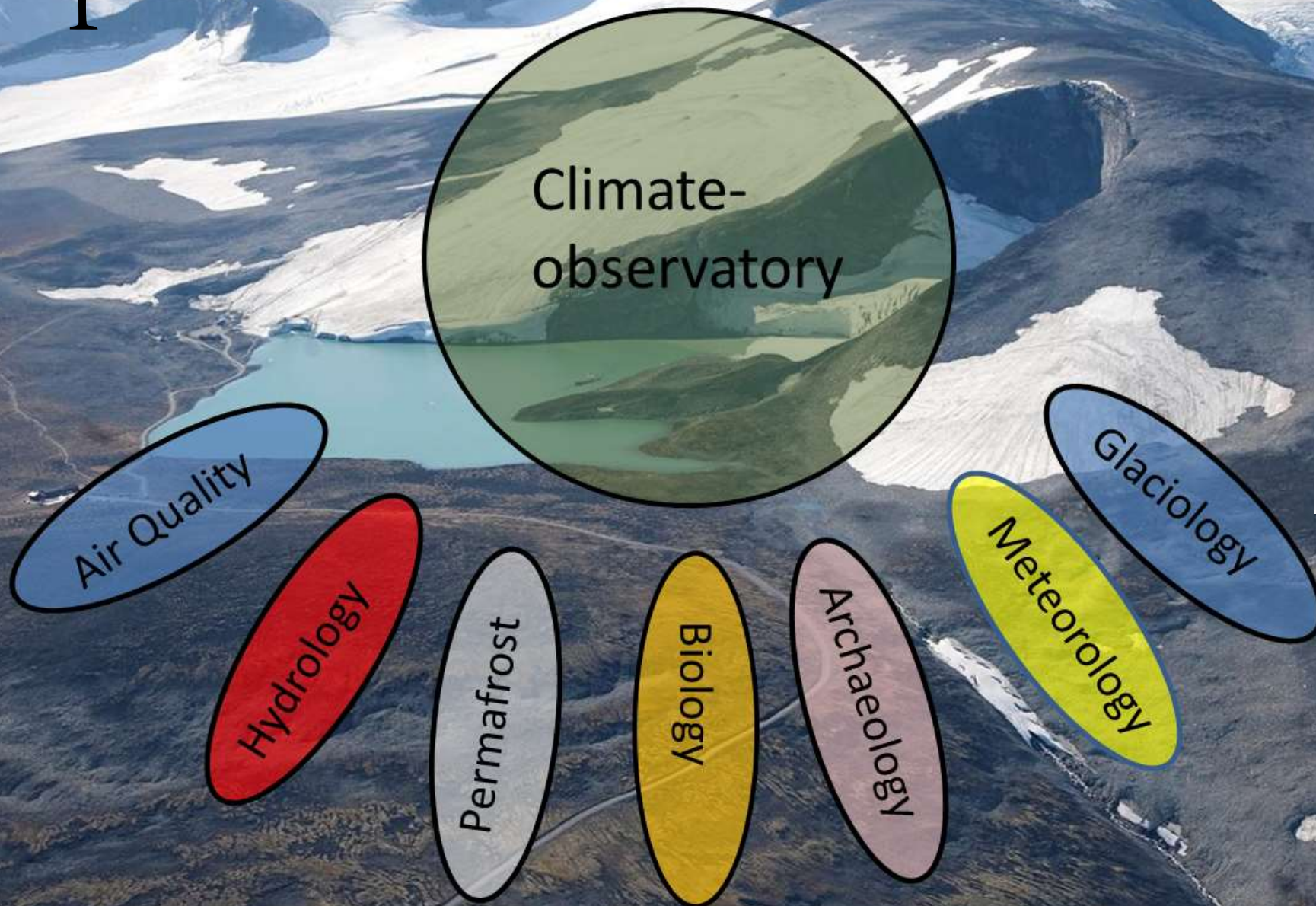


Jotunheimen 2006

Galdhøpiggen



Klimapark 2469



Informasjon Information

- 1 Startpunkt Starting Point
- 2 Permafrost Permafrost
- 3 Fauna Fauna
- 4 Vegetasjon Vegetation
- 5 Lav Lichens
- 6 Reinsdyrfangst Reindeer hunting
- 7 Vær og klima Weather and climate
- 8 Geologi Geology



Daglege omvisingar 10.30 og 14.00, frå medio juni til slutten av august, elles etter bestilling. Turen startar frå Juvasshytta. Guided tours are held daily at 10:30 and 14:00 from mid-June to end of August, and start at Juvasshytta.

KJØP BILLETT PÅ BUY TICKET AT:

- Juvasshytta
- Norsk Fjellmuseum i Lom
- www.mimisbrunnr.no



MÍMISBRUNNR
KLIMAPARK 2488

— Gangbane (universelt tilrettelagt) Walkway (universally accessible) ... Sti Trail

A Juvasshytta Juvasshytta lodge

B Istunnel Ice-tunnel

C Utsiktspunkt mot Kjelbreen Viewpoints against Kjelbreen

Det brearkeologiske sikringsprogrammet i Innlandet (secetsoftheice.com)

- Et samarbeid omkring innsamling og sikring av de brearkeologiske funnene i Innlandet

Avtale mellom:



Innlandet
fylkeskommune



UiO : Kulturhistorisk museum

Det brearkeologiske sikringsprogrammet i Innlandet (secetsoftheice.com)

- Et samarbeid omkring innsamling og sikring av de brearkeologiske funnene i Innlandet
- Helhetstenking omkring forvalting, forskning og formidling

Avtale mellom:



Innlandet
fylkeskommune



UiO : **Kulturhistorisk museum**

Et utvidet samarbeid om brearkeologien og klima

- Favne bredere
- Utstillinger av funn på Norsk Fjellsenter Lom
- Tydeligere kobling til klima
- Ta posisjoner
- Utnytte hverandres fortrinn

Avtale mellom:



Klimapark 2469

Norsk Fjellmuseum



Innlandet
fylkeskommune



UiO : **Kulturhistorisk museum**

Feltarbeidet



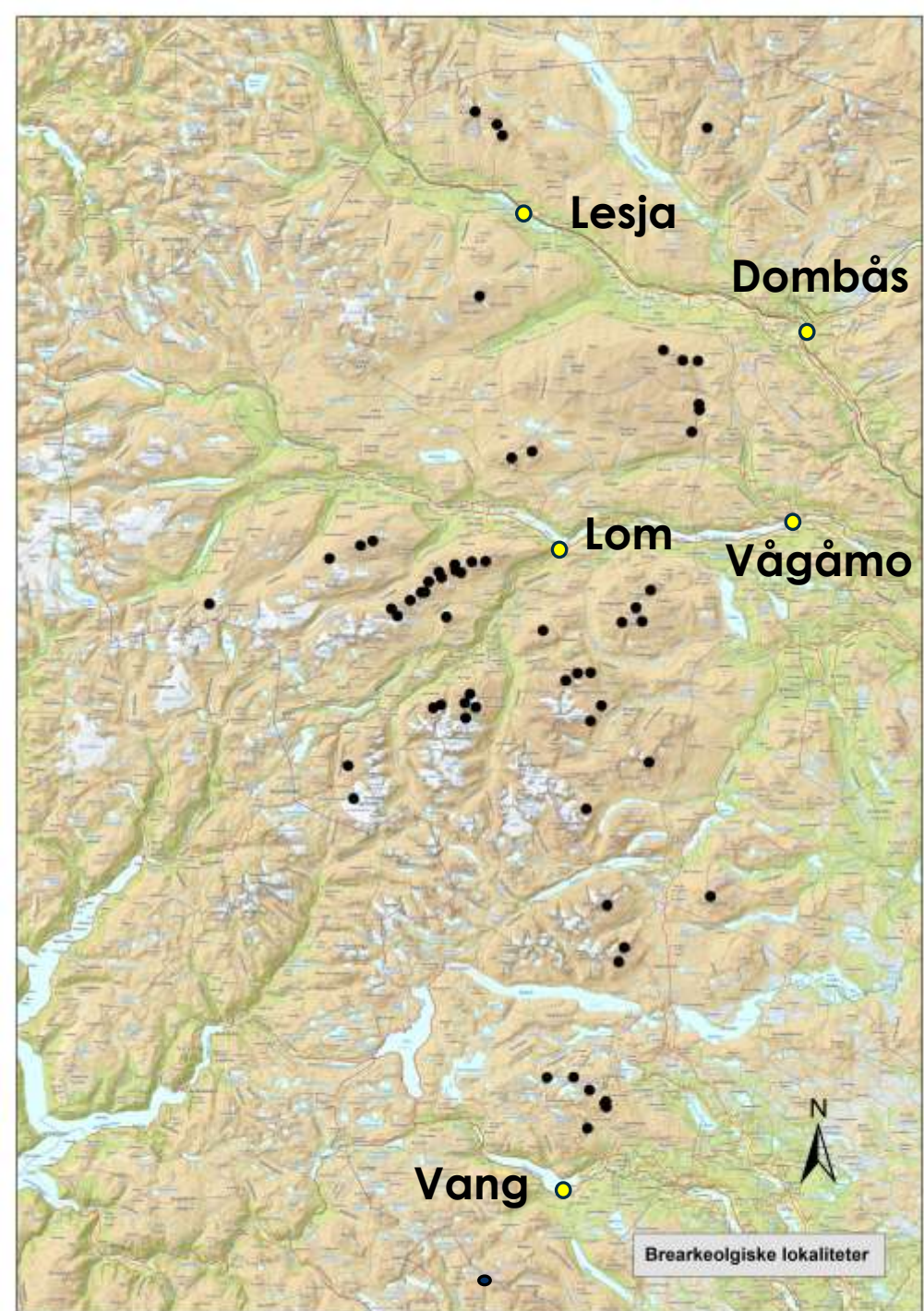


Systematisk registrering og innsamling



STATUS

- 66 lokaliteter
- 3800 funn
- Eldste funn 6000 år



1500 år gammel Pil



Med styrefjor bevart





Pil fra steinalder - 4000 år gammel



Skremmepinne - 1500 år





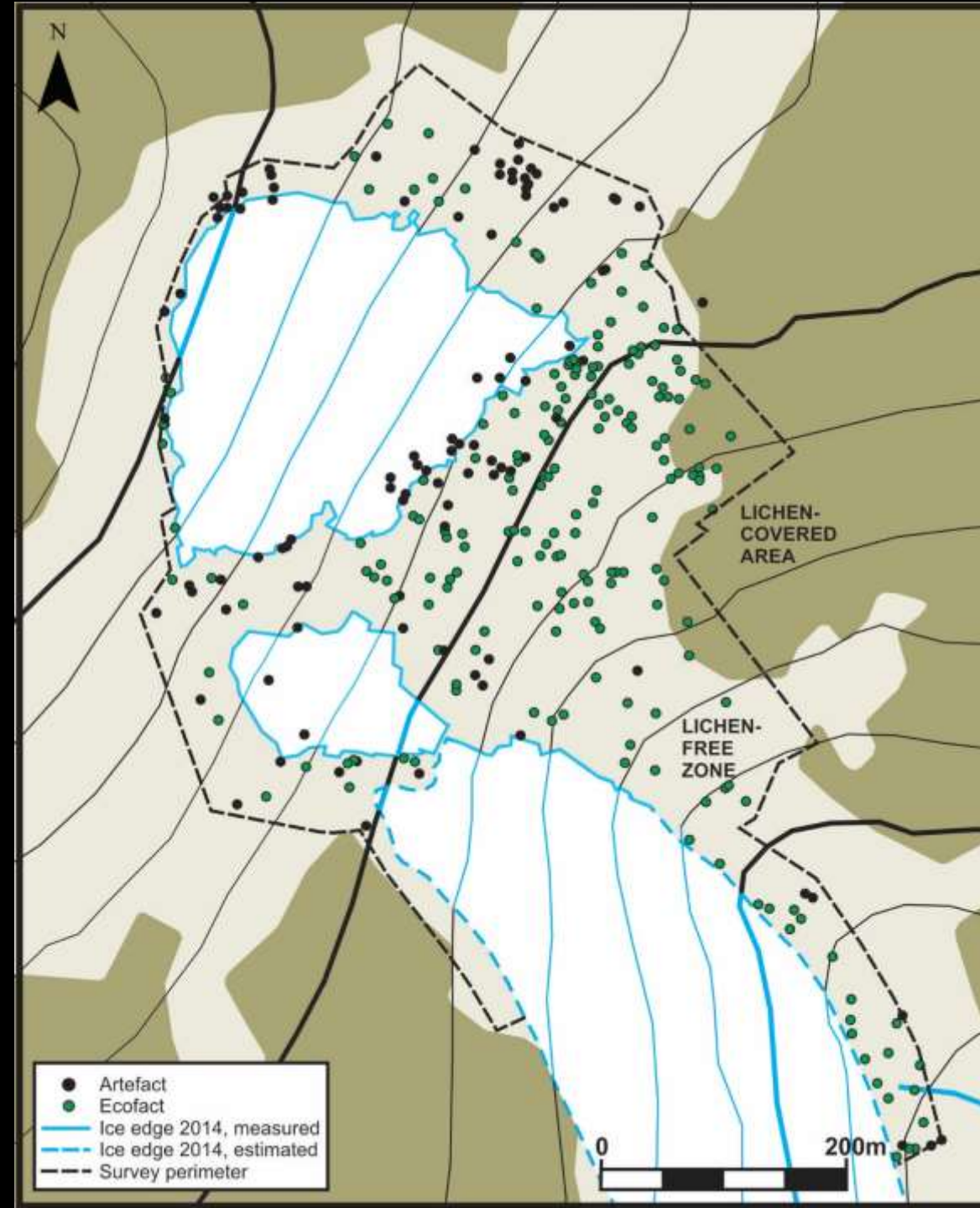
**Norges eldste bue
4000 år gammel**

Langfonne

- 69 Pilskaft og spisser
- Skremmepinner
- Tekstil
- Skinnsko
- Bein og gevir



180 000 m² registrert





Vardet rute

Lendbreen,
September
2014

1000 år gammel hestemøkk (vikingtid)





Hestetrug
1800 år gammel





Kjortel – 1700 år gammel

Norges eldste klesplagg

1700 år gammel sko
Romersk mote



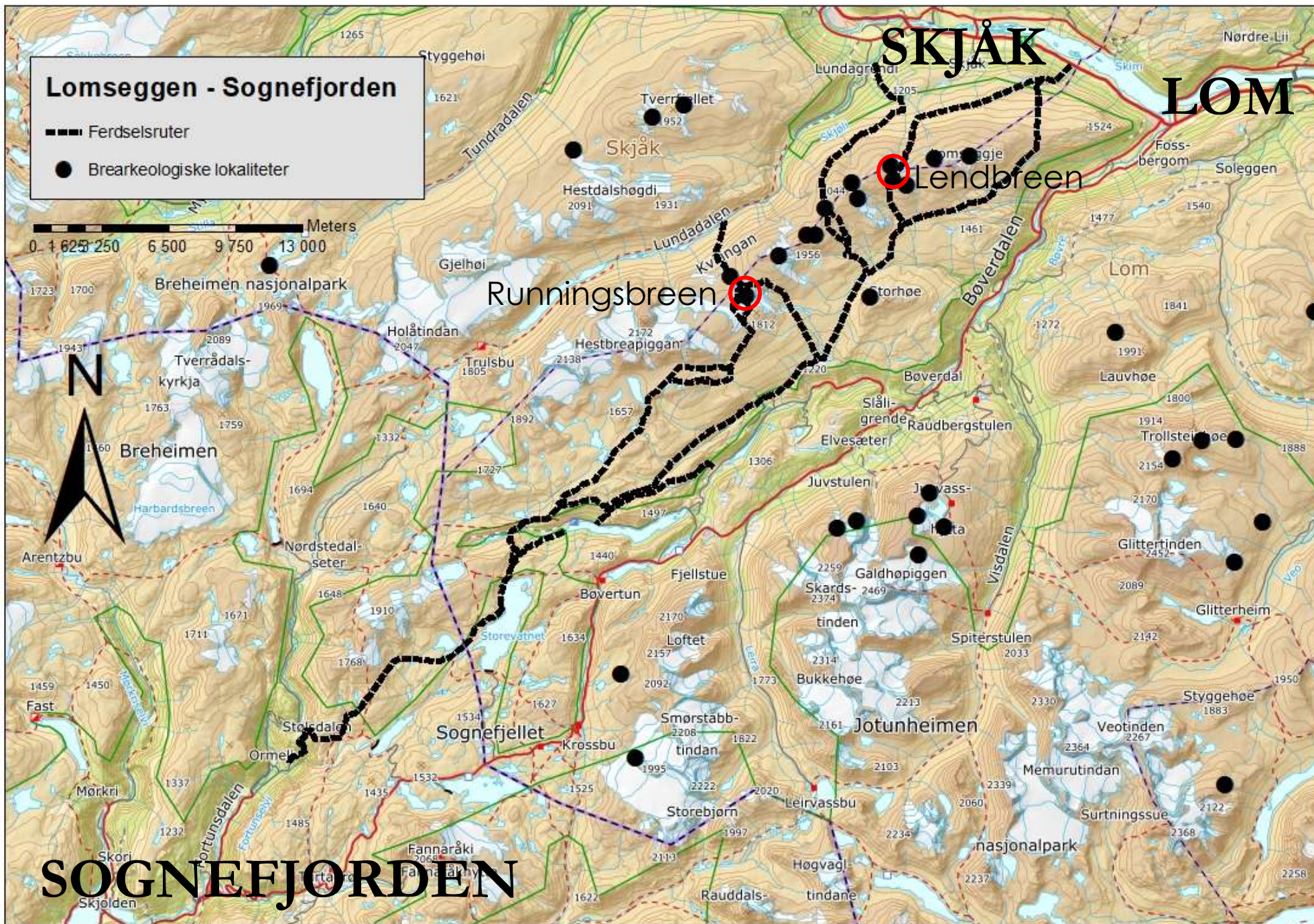
Lomseggen - Sognefjorden

—●— Færdselsruter

● Brearkeologiske lokaliteter

0 1 625 250 6 500 9 750 13 000 Meters

N



Ski

1300 år gammel



2014



Verdens best bevarte skipar fra forhistorien

2021



1m

Prehistoric and Medieval Skis from Glaciers and Ice Patches in Norway

Espen Finstad¹, Julian Martinsen², Runar Hole³ and Lars Pilo¹

1. Oppland County Council; 2. Museum of Cultural History, University of Oslo; 3. Tarandus AS.

Lars.Holger.Pilo@oppland.org

Traditionally, ski history has relied on preserved skis from bogs, on rock carvings depicting skiers and on written sources. The on-going melting of mountain ice has led to the discovery of ancient skis from a new context. In this paper, we present ski finds from glacial ice in Norway, dated from the first millennium BCE to the Medieval Period. The finds of skis from glacial ice shed new light on the ski history of North-Western Europe—the development, the context of use in a high-alpine landscape and the skiing technique. One of the finds provides the earliest date yet for the use of fur on the underside of skis.

Introduction

Research Paper

Interpreting archaeological site-formation processes at a mountain ice patch: A case study from Langfonne, Norway

Lars Holger Pilo,¹ James H Barrett,^{2,3} Trond Eiken,⁴ Espen Finstad,¹ Sunniva Grønning,¹ Julian R Post-Melbye,⁴ Atle Nesje,¹ Jørgen Rosvold,⁷ Brit Solli⁸ and Rune S Ødegård⁸

Abstract

In the context of global warming, ice patches are increasingly important foci of high-elevation archaeology. Langfonne in Jostedal, central southern Norway, is uniquely suited to provide a window onto site formation processes and taphonomy in this novel archaeological setting. Here the site record from systematic survey includes the largest number of arrows, bones and antlers from a single ice patch worldwide. Combining data from these finds with the results of glaciological investigations provides an opportunity to interpret the influence of archaeological site-formation processes and taphonomy on chronological and spatial patterning. It is inferred that the spatial patterning of artefacts at Langfonne is partly a result of displacement by ice movement, meltwater and other natural processes. Nevertheless, the finds yield information regarding past hunting practices and the extent of ice at different times. An early cluster of finds from c. 6000 cal yr BP may result from ice deformation which has brought early objects to the surface. The number of arrows increases from c. 1700 cal yr BP onwards, peaking around c. 1200 cal yr BP. Artefacts from this period show a wide spatial distribution indicating both the preferential survival of more recent finds and that they were lost when the ice patch was large. Based on comparison with the chronology of natural bone and antler samples from the site, the greater number of finds of this date may also reflect a period of increased hunting.

Keywords

archaeology, glaciology, ice patch, Jostedal, Norway, reindeer, site formation processes, taphonomy

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ROYAL SOCIETY OPEN SCIENCE

rsos.royalsocietypublishing.org

Research



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Received: 26 October 2017
Accepted: 13 December 2017

Subject Category:
Biology (whole organism)

Subject Areas:
environmental science

The chronology of reindeer hunting on Norway's highest ice patches

Lars Pilo¹, Espen Finstad¹, Christopher Bronk Ramsey², Julian Robert Post Martinsen³, Atle Nesje⁴, Brit Solli³, Vivian Wangen³, Martin Callanan⁵ and James H. Barrett⁶

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⁶McDonald Institute for Archaeological Research, University of Cambridge, Downing Street, Cambridge CB2 3ER, UK

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The melting of perennial ice patches globally is uncovering a fragile record of alpine activity, especially hunting and the use of mountain passes. When rescued by systematic fieldwork

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<https://doi.org/10.15184/aqy.2020.2>

Research Article

Crossing the ice: an Iron Age to medieval mountain pass at Lendbreen, Norway

Lars Pilo¹, Espen Finstad¹ & James H. Barrett^{2,3,*}

¹ Department of Cultural Heritage, Innlandet County Council, Norway

² Department of Archaeology, University of Cambridge, UK

³ Department of Archaeology and Cultural History, NTNU University Museum, Norway

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Mountain passes have played a key role in past mobility, facilitating transhumance, intra-regional travel and long-distance exchange. Current global warming has revealed an example of such a pass at Lendbreen, Norway. Artefacts exposed by the melting ice indicate usage from c. AD 300–1500, with a peak in activity c. AD 1000 during the Viking Age—a time of increased mobility, political centralisation and growing trade and urbanisation in Northern Europe. Lendbreen provides new information concerning the socio-economic factors that influenced high-elevation travel, and increases our understanding of the role of mountain passes in inter- and intra-regional communication and exchange.

The Holocene
OnlineFirst
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<https://doi.org/10.1177/09596836221126133>

Research Review

Ötzi, 30 years on: A reappraisal of the depositional and post-depositional history of the find

Lars Pilo¹, Thomas Reitmaier², Andrea Fischer³, James H Barrett⁴, and Atle Nesje⁵

Abstract

When Ötzi, the Iceman, was found in a gully in the Tisenjoch pass in the Tyrolean Alps in 1991, he was a huge surprise for the archaeological community. The lead initial investigator of the find argued that it was unique, preserved by serendipitous circumstances. It was hypothesised that the mummy with associated artefacts had been quickly covered by glacier ice and stayed buried until the melt-out in 1991. It is now more than 30 years since Ötzi appeared. In this paper, we take a closer look at how the find can be understood today, benefitting from increased knowledge gained from more than two decades of investigations of other glacial archaeological sites, and from previous palaeo-biological investigations of the find assemblage. In the light of radiocarbon dates from the gully and new glaciological evidence regarding mass balance, it is likely that Ötzi was not permanently buried in ice immediately after his death, but that the gully where he lay was repeatedly exposed over the next 1500 years. We discuss the nature of the ice covering the site, which is commonly described as a basally sliding glacier. Based on the available evidence, this ice is better understood as a non-moving, cold of snow and ice, frozen to the bedrock. The damaged artefacts found with Ötzi were

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2022, Vol. 47, No. 3, 149–162
<https://doi.org/10.1080/00940309.2021.2012301>

Routledge
Taylor & Francis Group

OPEN ACCESS

On a Mountain High: Finding and Documenting Glacial Archaeological Sites During the Anthropocene

Lars Pilo¹, Espen Finstad¹, Elling Utvik Wammer², Julian R. Post-Melbye³, Axel Hee Rømer⁴, Øystein Renning Andersen⁴, and James H. Barrett^{5,6,*}

¹Department of Cultural Heritage, Innlandet County Council, Norway; ²Museum of Cultural History, University of Oslo, Norway; ³University of Cambridge, UK; ⁴Department of Archaeology and Cultural History, NTNU University Museum, Trondheim, Norway

ABSTRACT

Glacial archaeology is a developing field, brought on by climate change. High mountain ice is melting, which has led to the exposure of artifacts in North America, Mongolia, the Alps, and Scandinavia. The highest number of finds and sites in the world are reported from Innlandet County, Norway. We present our methods of finding and documenting glacial archaeological sites in Innlandet based on 15 years of experience. Sites are found using a combination of local information on the ground and remote sensing. Fieldwork takes place in three steps: an exploratory survey for assessment, systematic surveys for documentation, and monitoring in case of further ice retreat. The harsh environment makes the logistics very different from regular archaeology at lower elevations. Fieldwork methods are described in detail. The continuing retreat of mountain ice worldwide makes the Innlandet experience increasingly pertinent to the practice of field archaeology.

KEYWORDS

ice patch archaeology; glacier; fieldwork methods; survey; hunting sites; mountain passes; remote sensing; climate change

Introduction

Glacial archaeology is a developing field brought on by climate change (Andrews and MacKay 2012; Reckin 2013; Dixon et al. 2014). Glaciers and ice patches are melting in the high mountains around the world, and human influence on the climate is very likely the main driver of this melt (IPCC 2021). As the ice retreats, artifacts and faunal materials are melting out in North America, the Alps, Scandinavia, and Mongolia. Glacial archaeologists in these regions are uncovering some of the oldest human remains to date.

explain how our fieldwork is conducted, especially the surveying and find documentation. We also discuss the challenging logistics of glacial archaeology and how they can be overcome. Our practices and methods are of present and increasing relevance to world archaeology, given that global warming is now exposing artifacts and faunal material from melting ice masses in several places internationally. Glacial archaeology is a field which is bound to expand in scope and importance. It is also one where remote sites will only be found with a targeted effort. Where pertinent, we compare

Latest news



Ötzi – a new understanding of the holy grail of glacial archaeology

Lars Pilo Posted on November 7, 2022



Finding and Documenting Glacial Archaeological Sites

Lars Pilo Posted on December 15, 2021



The Best-Preserved Pair of Skis from Prehistory

Lars Pilo
Posted on October 5, 2021



The Lost Viking Settlement

Lars Pilo
Posted on June 9, 2021



Prehistoric Arrow Bonanza at Langfonne

Lars Pilo
Posted on November 25, 2020



The Hunt for the Lost Mountain Pass

Lars Pilo
Posted on April 16, 2020

Tweets from @brearkeologi

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Secrets Of The ... @brearkeol... · Apr 21

Replying to @brearkeologi
A radiocarbon date from the shaft tells us that the arrow is around 1200 years old, from the Early Viking Age. We only have two arrows with forked arrowheads from the ice. A great find ❤️



5 1,260



Secrets Of The ... @brearkeol... · Apr 21

We found this beautiful arrow only two meters from the melting ice. It is incredibly well preserved - the sinew at the front is intact, the wooden birch shaft is in one piece and there are even three fletches.





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Rediger profil



234 innlegg

11,5k følgere

Følger 243

Secrets Of The Ice

The Glacier Archaeology Program in Innlandet County, Norway
secretsoftheice.com



INNLEGG

REELS

LAGRET

TAGGET



Secrets Of The Ice

12. august 2022 · 🌐

In 2019, we found the skeleton of a dog with collar and leash in the Lendbreen permafrost. The skeleton is radiocarbon-dated to the 16th century AD. The bones tell us that it is an adult male, about 40 cm tall, with wear marks starting to show on the bones. One of his ribs had broken and healed again. A selection of small bones collected at the same spot appear to be the skeleton of a cat. They show that our dog ate fish for his last meal. DNA analysis of one of the dog's teeth is on... See more



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Frem innlegg

👍❤️👍 6,3 k

493 kommentarer · 3,1 k delinger

Liker

Kommenter

Del



Secrets Of The Ice

2,754 Tweets



Edit profile

Secrets Of The Ice

@breaarkeologi

The archaeology of glaciers and ice patches. Our work has been covered by National Geographic, Science, CNN, BBC, der Spiegel et al. @Glacialarchaeo1 tweeting

📍 Lillehammer, Norway 🌐 secretsoftheice.com 📅 Joined July 2016

2,954 Following · 28.4K Followers

Tweets

Tweets & replies

Media

Likes

📌 Pinned Tweet



Secrets Of The Ice @breaarkeologi · Aug 18, 2022

This is why we ❤️ glacial archaeology! See how happy we are when we get to hold an arrow, which has been lost in the ice for 1500 years



🗨 142

🔄 1,427

❤ 16.4K

📷

📌

Show this thread

NATIONAL GEOGRAPHIC



Archaeologist holding a c. 1400-year-old arrow, lost reindeer hunting in the high mountains of Oppland, Norway, during the Late Antique Little Ice Age.

PHOTOGRAPH BY JULIAN MARTINSEN, SECRETS OF THE ICE OPPLAND COUNTY COUNCIL

Melting Glaciers Could Reveal How Our Ancestors Dealt With Changing Climates

While some archaeologists dig with trowels and shovels, others use a warming planet to their advantage.

BY ELAINA ZACHOS

3 MINUTE READ



Internasjonale medier som har dekket
brearkeologien i Innlandet (utvalg)



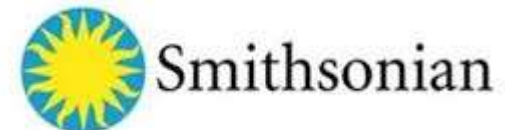
DER SPIEGEL

Newsweek

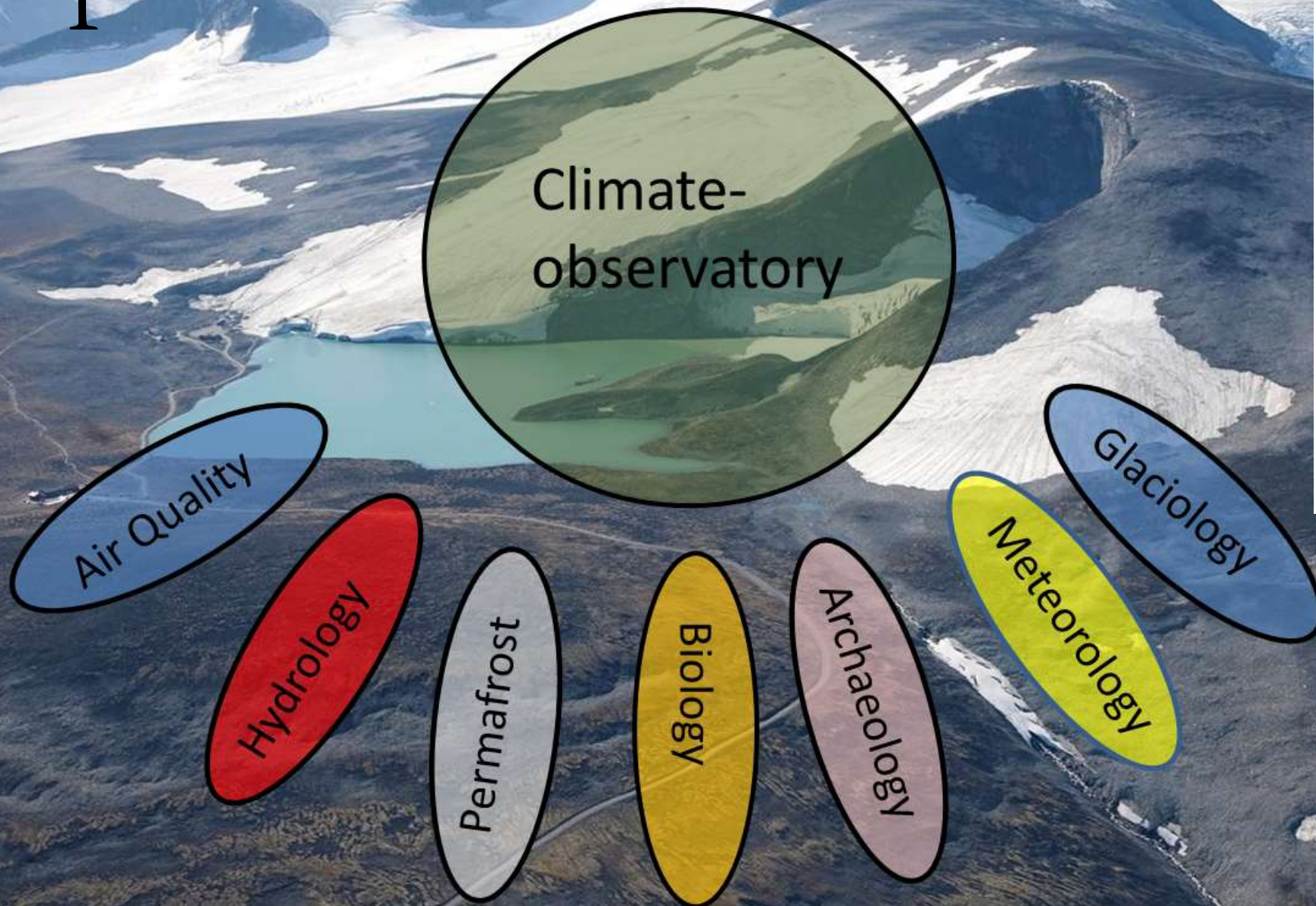
Science
AAAS

**The
Guardian**

 **ARCHAEOLOGY**



Klimapark 2469



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MÍMISBRUNNR
KLIMAPARK 2488

— Gangbane (universelt tilrettelagt) Walkway (universally accessible) ... Sti Trail

A Juvasshytta Juvasshytta lodge

B Istunnel Ice-tunnel

C Utsiktspunkt mot Kjelbreen Viewpoints against Kjelbreen







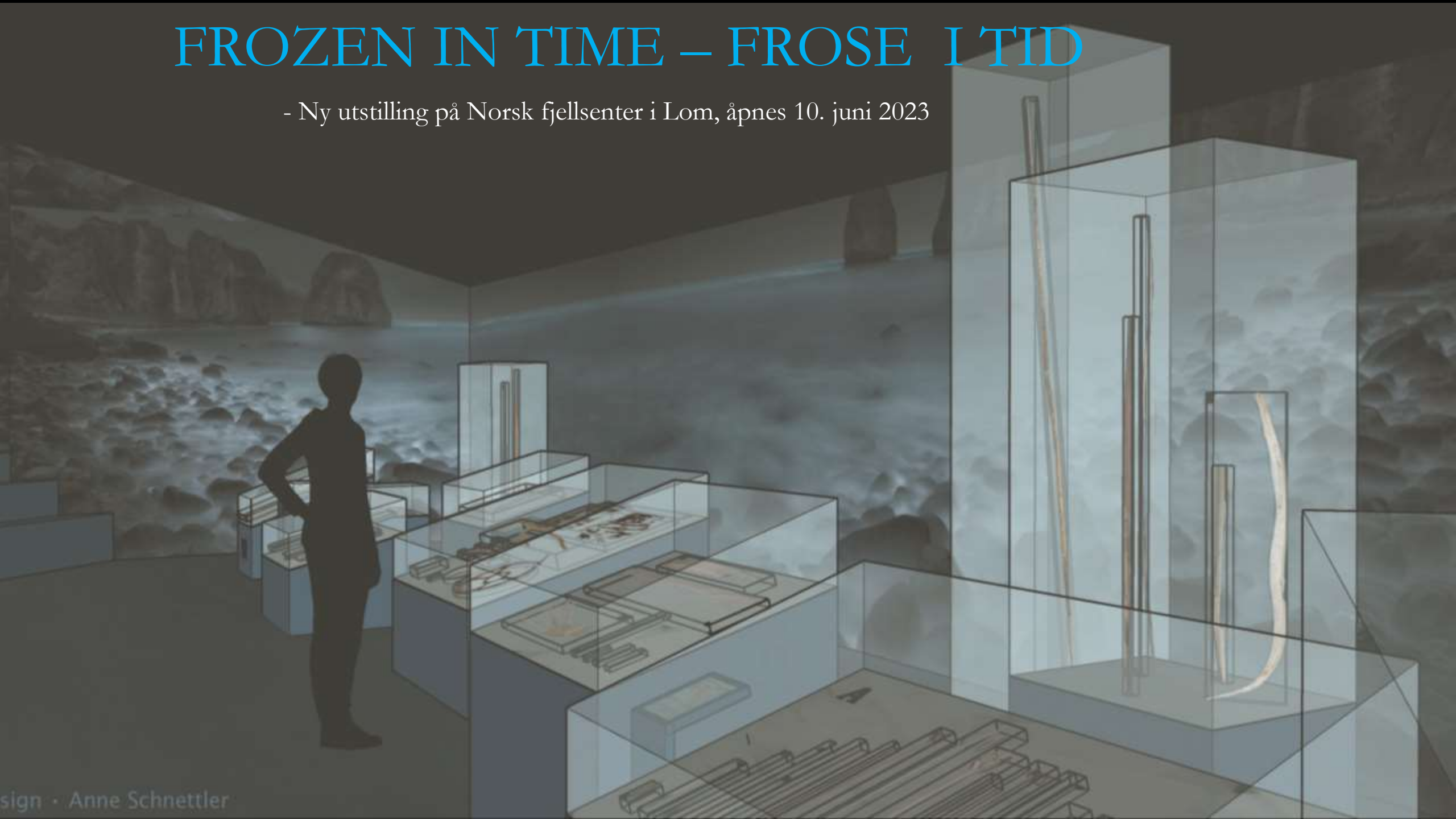


Istunnelen – 7700 år gammel is



FROZEN IN TIME – FROSE I TID

- Ny utstilling på Norsk fjellsenter i Lom, åpnes 10. juni 2023



Brearkeologi

Secrets of the Ice



secretsoftheice.com

Klimapark 2469



klimapark2469.no

Norsk Fjellsenter i Lom



Norskfjellsenter.no

Økonomi så langt:

IFK:

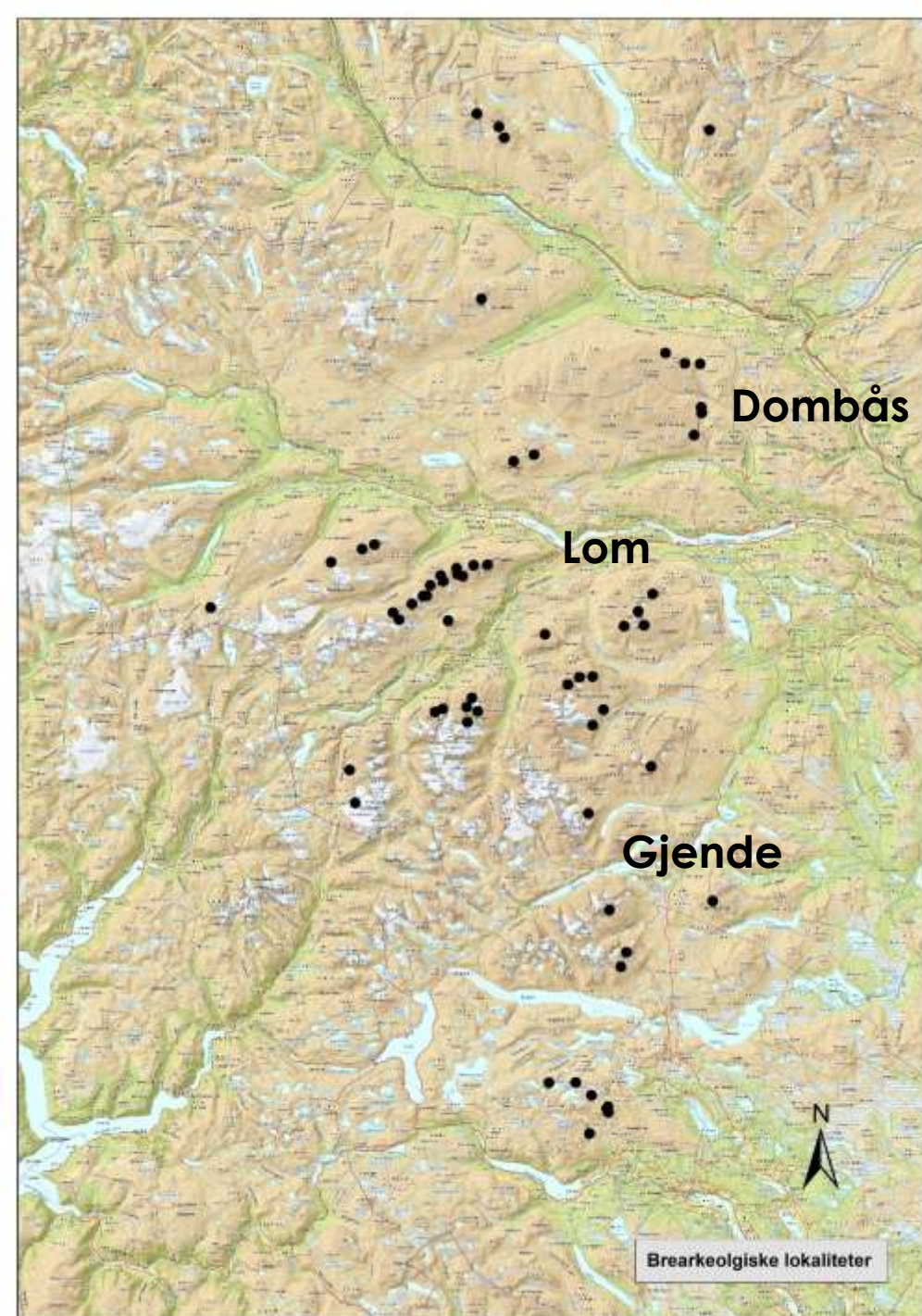
- 1,5 årsverk brearkeologer (faste stillinger)
- Kr. 200.000 (feltarbeid, analyser, utstyr)

STATEN:

- Kr. 500.000 (feltarbeid og funn)

KHM:

- 50.000,- feltarbeid + mye egeninnsats



Jotunheimen 2006

Galdhøpiggen



Jotunheimen år 2100

Galdhøpiggen

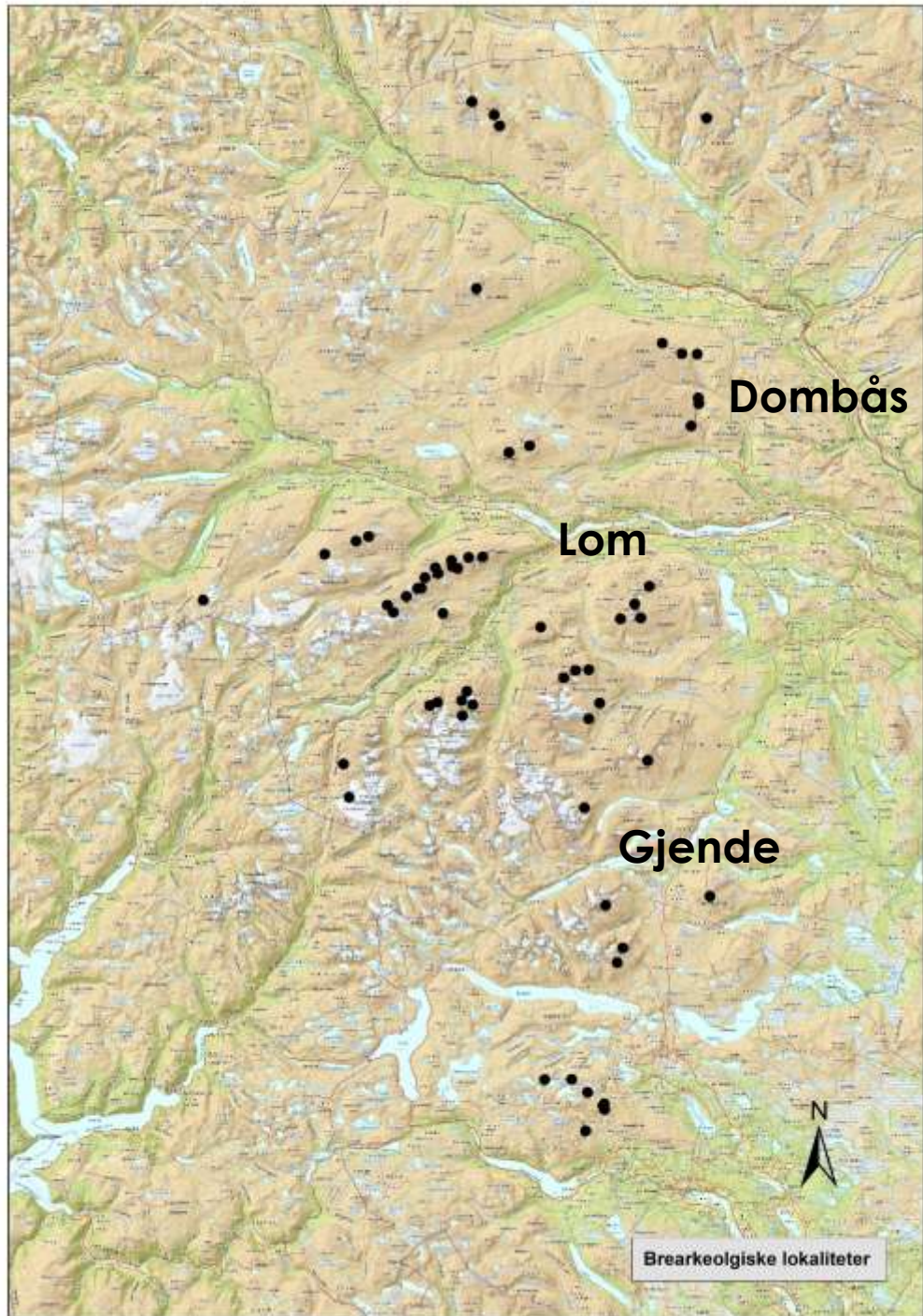


Lendbreen 2006



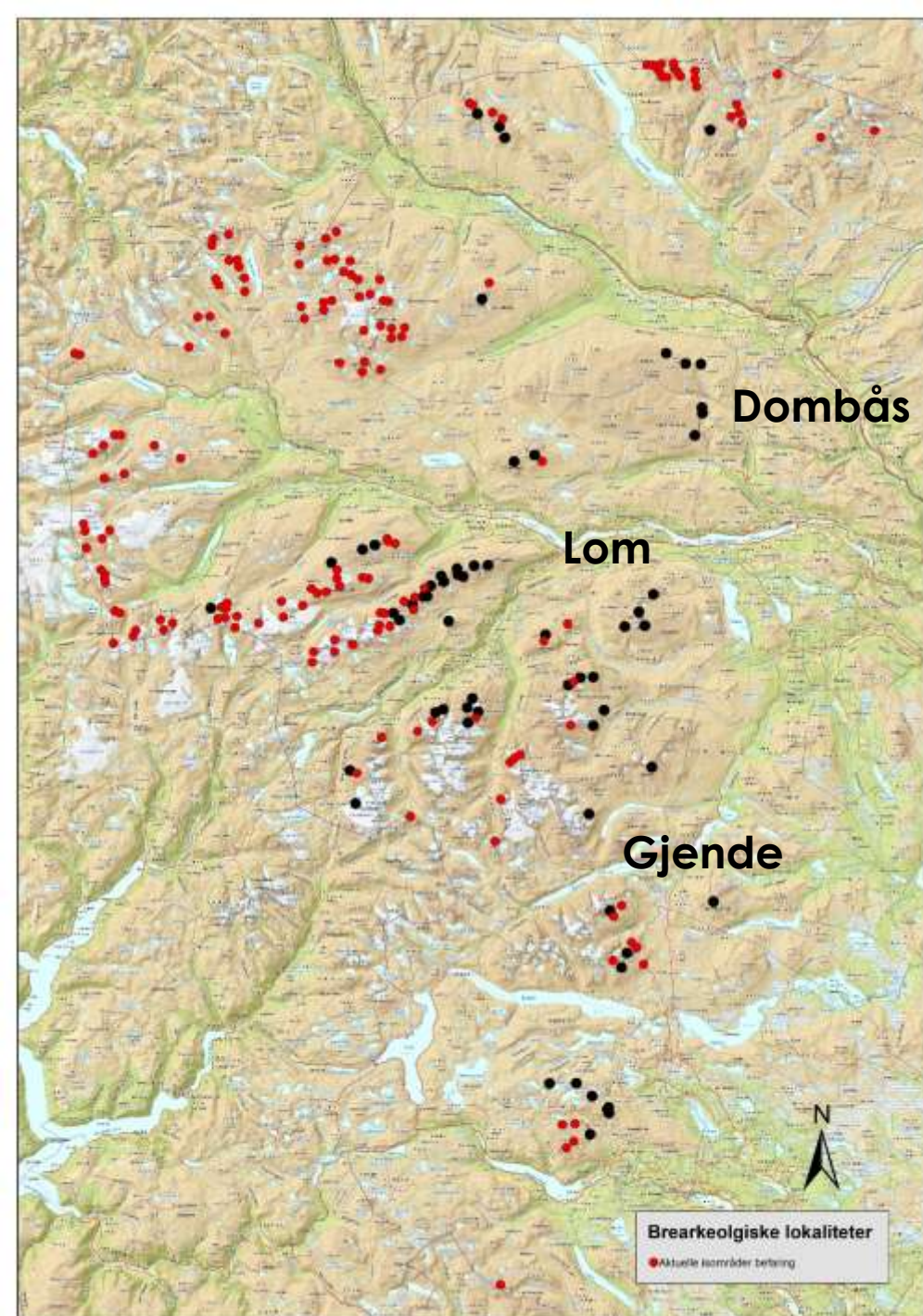
Lendbreen 2018





FREMOVER

- Flere lokaliteter
- Flere eldre funn
- Flere 10 år med arbeid



Det brearkeologiske sikringsprogrammet i Innlandet

Vedtak i Fylkestinget i april 2023

- Fylkestinget mener at Innlandets naturgitte forutsetninger, med de høyeste fjell- og breområdene i Norge og Nord-Europa, gir Innlandssamfunnet både ansvar og muligheter.
- Innlandet fylkeskommune har tatt en nasjonal og internasjonal posisjon innen brearkeologi og koblingen til klimaendringer i høyfjellet. Fylkestinget vil videreutvikle Innlandets posisjon gjennom det brearkeologiske sikringsprogrammet (Secrets of The Ice), kunnskapsproduksjon og formidling.
- Fylkestinget støtter inngått samarbeidsavtale mellom Innlandet fylkeskommune, Kulturhistorisk Museum (Universitetet i Oslo); Norsk Fjellmuseum og Klimapark 2469 AS, om en helhetlig tilnærming til arbeidet med de arkeologiske funnene i isen i Innlandet, hvor forvaltning, forskning, og formidling sees i sammenheng.
- Fylkestinget ser den store betydningen av robuste kunnskaps- og formidlingsaktører i Innlandet og støtter opp om utvikling av Klimapark2469 AS og utstillinger med originale brefunn på Norsk Fjellsenter i Lom. Dette gir nasjonal og internasjonal attraksjonskraft, og er viktig for kunnskapsformidling, verdiskaping og merkevarebygging for regionen og Innlandet.
- Fylkestinget ber fylkesordfører gå i dialog med politisk ledelse i KMD om økt statlig finansiering til det brearkeologiske sikringsprogrammet i Innlandet. Eventuell styrking av fylkeskommunens innsats på feltet vil vurderes i forbindelse med fylkesbudsjettet for 2024.

«Our planet is losing its ice»

David Attenborough

