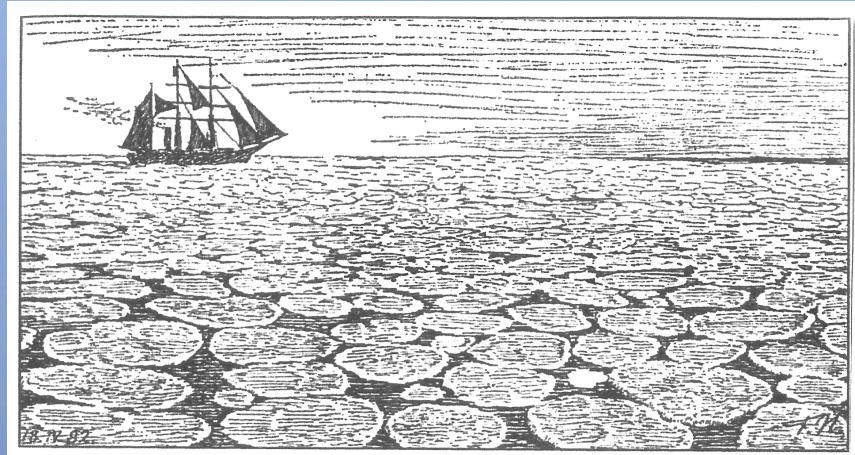


# Syntheses of Sea-Ice, Climate and Human Systems in the Arctic and Subarctic (SYNICE)

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**Sketch by Fridtjof Nansen, 1882**



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Foundation (USA) in 2006**

# **SYNICE AIMS**

- To elucidate and clarify linkages, interactions and feedbacks among Arctic sea-ice, climate, and human systems.
- To synthesize a number of climate and sea-ice data sets together with data drawn from the social sciences and from traditional ecological knowledge (TEK).
- To document and understand the systems governing the variability of the ice-edge location in the North Atlantic, associated changes in the production of North Atlantic deep water and the thermohaline circulation.
- To evaluate impacts of changes in sea-ice cover on human systems in the Arctic and Subarctic, specifically in the regions of Iceland and Labrador/Nunatsiavut.

# SEA ICE RECORDS FROM ICELAND

- BASED ON A WIDE VARIETY OF HISTORICAL RECORDS
- Medieval Annals
- Certain Sagas
- Geographical Treatises
- Later Annals
- Travellers' Accounts
- Diaries
- Official Reports and Letters
- Early Newspapers



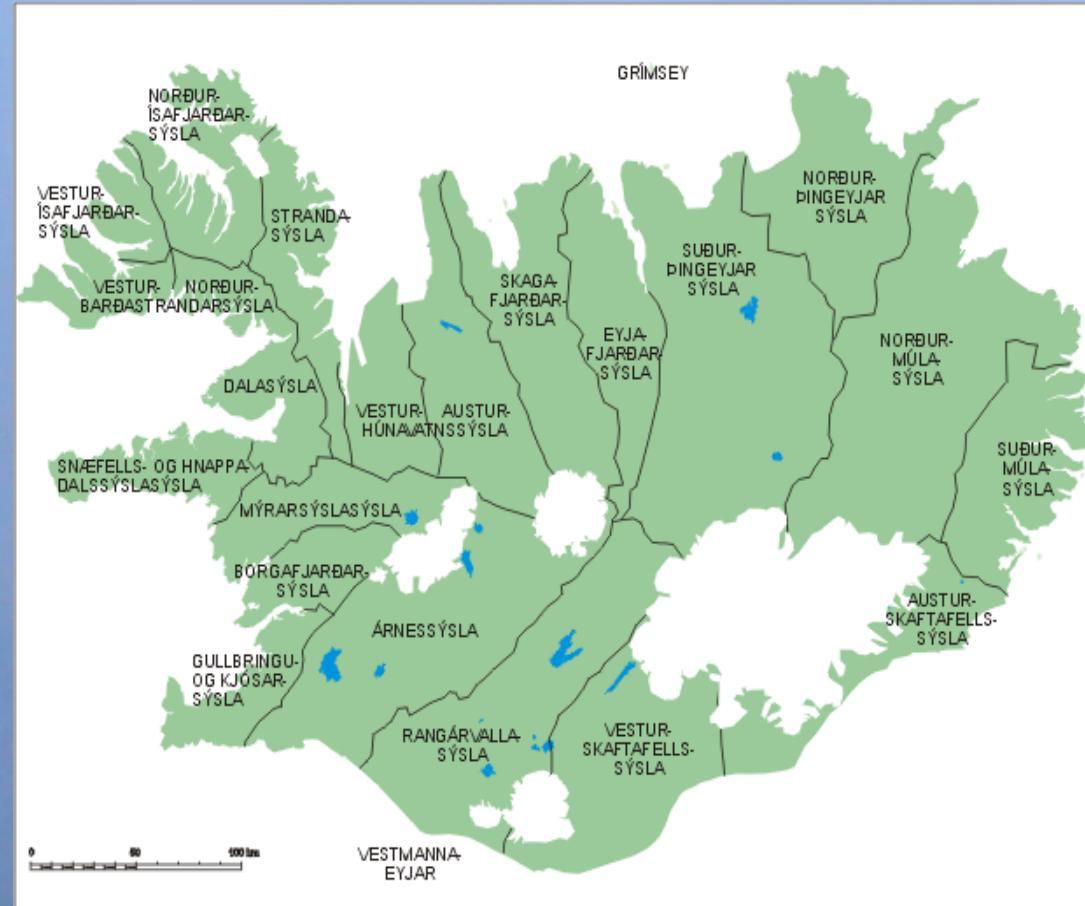
# OFFICIAL REPORTS

## c. 1700-1900

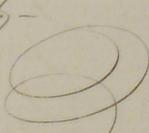
Reports in the form of letters were written from all the 23 districts of Iceland by officials called Sheriffs.

These were sent annually or more frequently to the Danish government.

They contain information on climate, weather, hay harvest, fisheries etc. as well as on SEA-ICE conditions.



Beretning  
angaaende Vest- Omtets almindelige Sitstand fra 1<sup>st</sup> Jan. til 31<sup>st</sup> Aug. 1866;

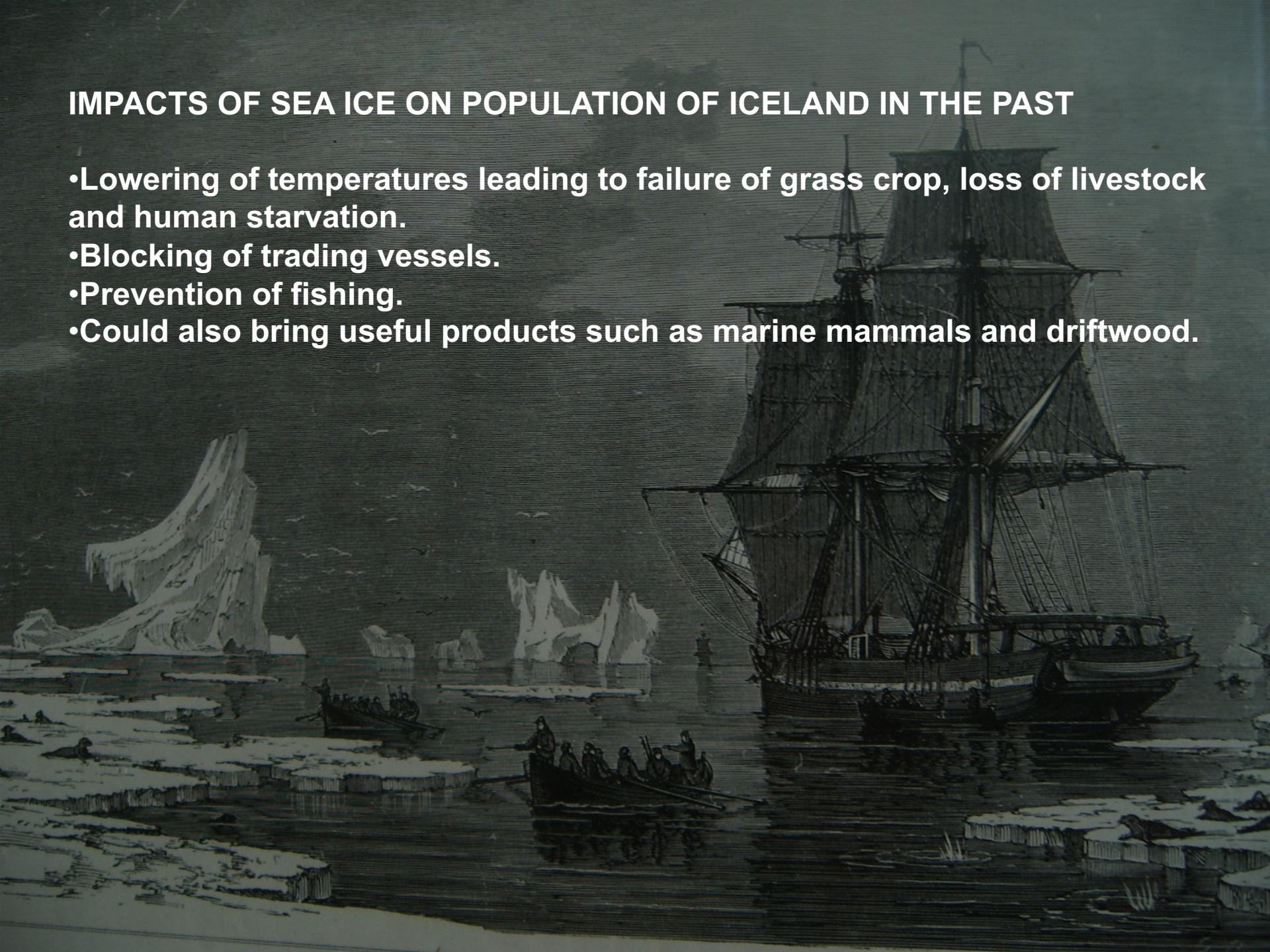
Vestliget.	Skeaturoholdeet.	Hærcuptræningen.	Fiskerierne.	Hansetelen.	Sundhedsstiftsland.	Møgneselboldet.	Anmærk.
<p>Skat efter Nyttæren blev det vistnæ og øre- bænde Vestlig, der havde hverken i de 2 sidste Mandender af formige År, afsløft af en kemiætlig Vest Fisk, hældede et sæget af betydelige men- lige og vortværdige Strom- og Skært Skeefald. Oette Vestlig Ordinande er alene at Mandende Hælding men @celles endnu i de værtværdige og vort- værdige Fiskerier og Mørk- værdige at se de ikkede værdes, Hil skjendt Vælden vel ekellet Gangen lød om i Østlig etter ejerstægt sit- ting, saa vardest old dog Sædefeltet og Oale- Spreden har Sundheds- Gangen, inden den ejede bleste fra Den vest forstør- ret Øst, og skjendt dette Bænkens vandlæs i Be- skrivinger fra Bænta- strandbyrådet, eller der vardest i den vest</p>	<p>Kreaturernes Sæleføring i den store Kæder hvilket næ- som opfældt til Følg, at der varmed Førvarer paa den Ærste opfældt Manget paa det formede Fader, da nu Førvarer tillige var meget kolst, saa krypde den hæld og var et Ma- tehældt Ærste Faar, dog saadest Dint vider opfæde Læse. I Brækningerne fra Bæntastrandsbyrådet be- merkes, at en Bænk i Bæntastrandsbyrådet har Mørk, Fritræs og Mørk, værdie, g. 30 læs, dermed værdie at se de ikkede værdes, blivende Det er ordnæagtig at Hælden er ordnæagtig ekellet Gangen lød om i folks Brækningerne fra Ring, saa vardest old dog Sædefeltet og Oale- Spreden har Sundheds- Gangen, inden den ejede bleste fra Den vest forstør- ret Øst, og skjendt dette Bænkens vandlæs i Be- skrivinger fra Bænta- strandbyrådet, eller der vardest i den vest</p>	<p>Rea Græst af det kolte Førvarer nænde Færb til Hærvæltor forst Gæstlag go i Førvarer lange efter den døvældige Tid og vardest waas desfor autrig et Røbysttet af Blæs dyrlæringen iaaer over alt i Østledet ent blive Perst ringe. —</p>	<p>Den ældste bemærkt er Brækningerne fra Brækningerne, hvor vært noget dyrene med det betydelige Fiskeri her i Østledet eller hæve endnu ikke indkommen, og hæles ikke Brækningerne fra Strandbyrådet. Ent iandledet Østledet be- kjendt at Fiskerierne i Østledet Spredt mis- lykkedes i den ældste Fiskeri, hvorimod den i Forsommeuen paa mange Pæs var et særdeles godt Fiskefiskeri. I Strand- byrådet opdæn den i Førvarer et betydeligt Østledet Mørk, og det er den betydelige Fis- ket, som ved tøggeerne kan hælf, der antages at have foregåget en stort br- øffigt Mørkengang. Blæ- kæde fiskeri i begyndelse vardest Spreden har i alt Fis- ket meget ubetydeligt. I folks Brækningerne fra</p>	<p>Injekt, de intakte Væro, int' Hærvæltor, iaaer have vært noget dyrene med det betydelige Fiskeri her i Østledet eller hæve endnu ikke indkommen, og hæles ikke Brækningerne fra Strandbyrådet. Ent iandledet Østledet be- kjendt at Fiskerierne i Østledet Spredt mis- lykkedes i den ældste Fiskeri, hvorimod den i Forsommeuen paa mange Pæs var et særdeles godt Fiskefiskeri. I Strand- byrådet opdæn den i Førvarer et betydeligt Østledet Mørk, og det er den betydelige Fis- ket, som ved tøggeerne kan hælf, der antages at have foregåget en stort br- øffigt Mørkengang. Blæ- kæde fiskeri i begyndelse vardest Spreden har i alt Fis- ket meget ubetydeligt. I folks Brækningerne fra</p>	<p>I den næste Hældet af Mandenderne blev Brækningerne overalt angivet af en ondastet Forkjældelsesvæg, der da angives des ikke at vore for et betydeligt Østledet Menestæder hadde hæve til Følg, dales forhindring vardest iandledet fore- saavel tildeles ion tildeles Fiskerier, og daavridt hvor ellers betydeligheden har vært Hældet vel vides ikke (med Hældet mæste). Menestæder hæve den har, over- alt ent betydelig. Følg der paa Brækningerne fra Bænkens idet for ydelse paa Østledet har hælden i idet hældende Før- varer vistnæ vider Kæmpeledet bortværet fra paa Blæs, hvormed ikke 3 til 4 pæs af Besøkta ringen, og i Nyra og Blækædeledet saakal Oale- Spreden har Fiskeriet, int' hælf, der antages at have foregåget en stort br- øffigt Mørkengang. Blæ- kæde fiskeri i begyndelse vardest Spreden har i alt Fis- ket meget ubetydeligt. I folks Brækningerne fra</p>	<p>I den næste Hældet af Mandenderne blev Brækningerne overalt angivet af en ondastet Forkjældelsesvæg, der da angives des ikke at vore for et betydeligt Østledet Menestæder hadde hæve til Følg, dales forhindring vardest iandledet fore- saavel tildeles ion tildeles Fiskerier, og daavridt hvor ellers betydeligheden har vært Hældet vel vides ikke (med Hældet mæste). Menestæder hæve den har, over- alt ent betydelig. Følg der paa Brækningerne fra Bænkens idet for ydelse paa Østledet har hælden i idet hældende Før- varer vistnæ vider Kæmpeledet bortværet fra paa Blæs, hvormed ikke 3 til 4 pæs af Besøkta ringen, og i Nyra og Blækædeledet saakal Oale- Spreden har Fiskeriet, int' hælf, der antages at have foregåget en stort br- øffigt Mørkengang. Blæ- kæde fiskeri i begyndelse vardest Spreden har i alt Fis- ket meget ubetydeligt. I folks Brækningerne fra</p>	 

Letter from District Governor, Bergur Ólafsson Thorberg,  
dated 31 August 1866, Stykkishólmur, Snæfellsnessýsla

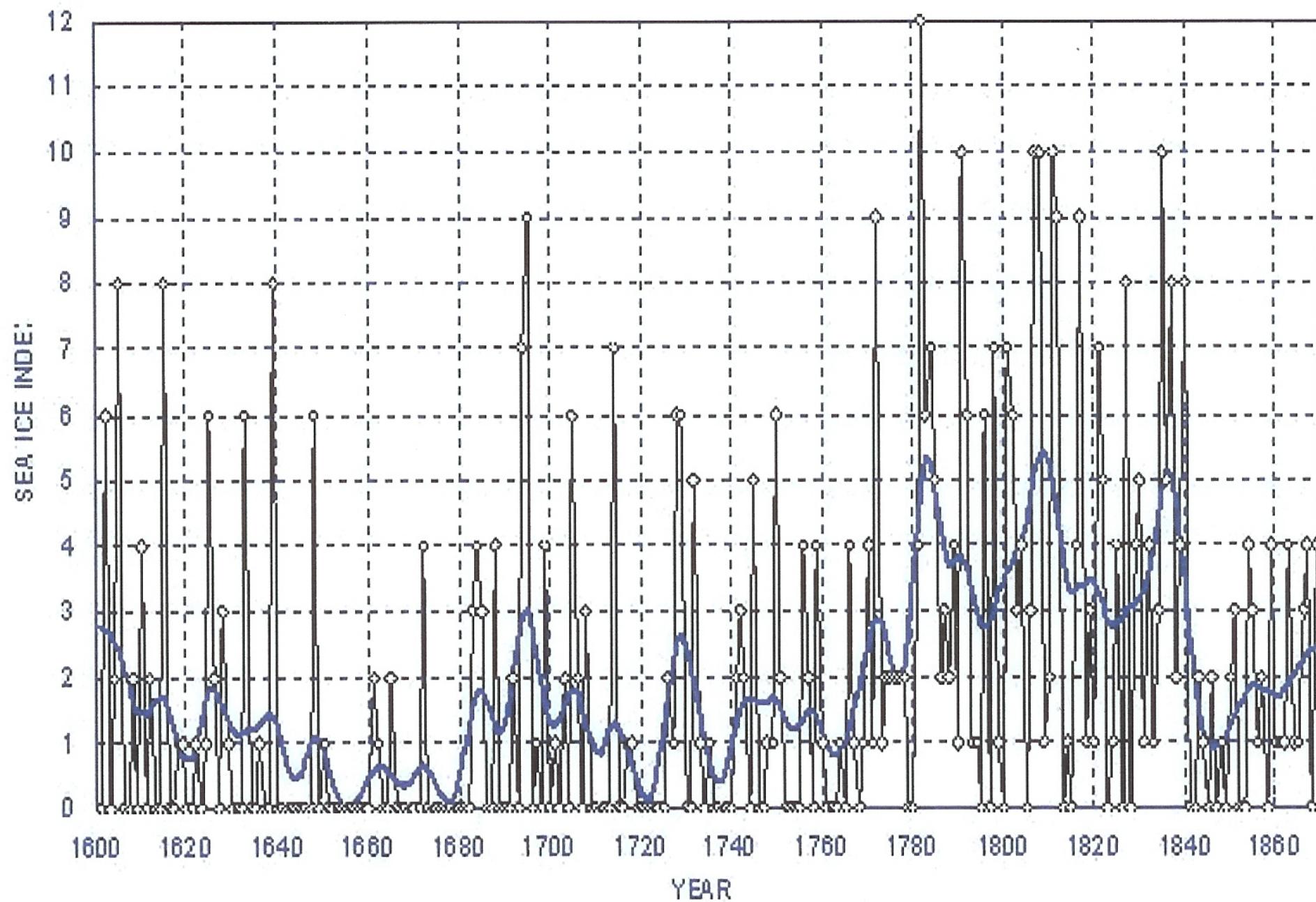
- Immediately after New Year, the inconstant and changeable weather which had prevailed for the last 2 months of the previous year was supplanted by a quite severe frost, partly caused by strong northeasterly storms and heavy snowfalls. This weather lasted, not just to the end of the month (January) but continued almost unchanged for the next 2 months, February and March. Although the wind occasionally changed to a southerly or southwesterly direction, this did not last for more than 1 to 2 days at a time before it began to blow again from the north with increased strength. Both the frost and the snow were much more severe than they usually are, even at this time of year. However, it was the snow that was much more than usual as in most places the ground was covered by such amounts of snow that all transport by horse was impossible and even people on foot had difficulty. Communication by sea also ceased completely on account of the ice which filled up all bays and fjords. As a consequence, for all this time, all livestock needed to be kept in and given fodder, as not even horses were able to seek their food outside.

## IMPACTS OF SEA ICE ON POPULATION OF ICELAND IN THE PAST

- Lowering of temperatures leading to failure of grass crop, loss of livestock and human starvation.
- Blocking of trading vessels.
- Prevention of fishing.
- Could also bring useful products such as marine mammals and driftwood.



## ICELANDIC SEA ICE



# SEA-ICE RECORD FROM THE BARENTS SEA

## Compiled by Torgny Vinje

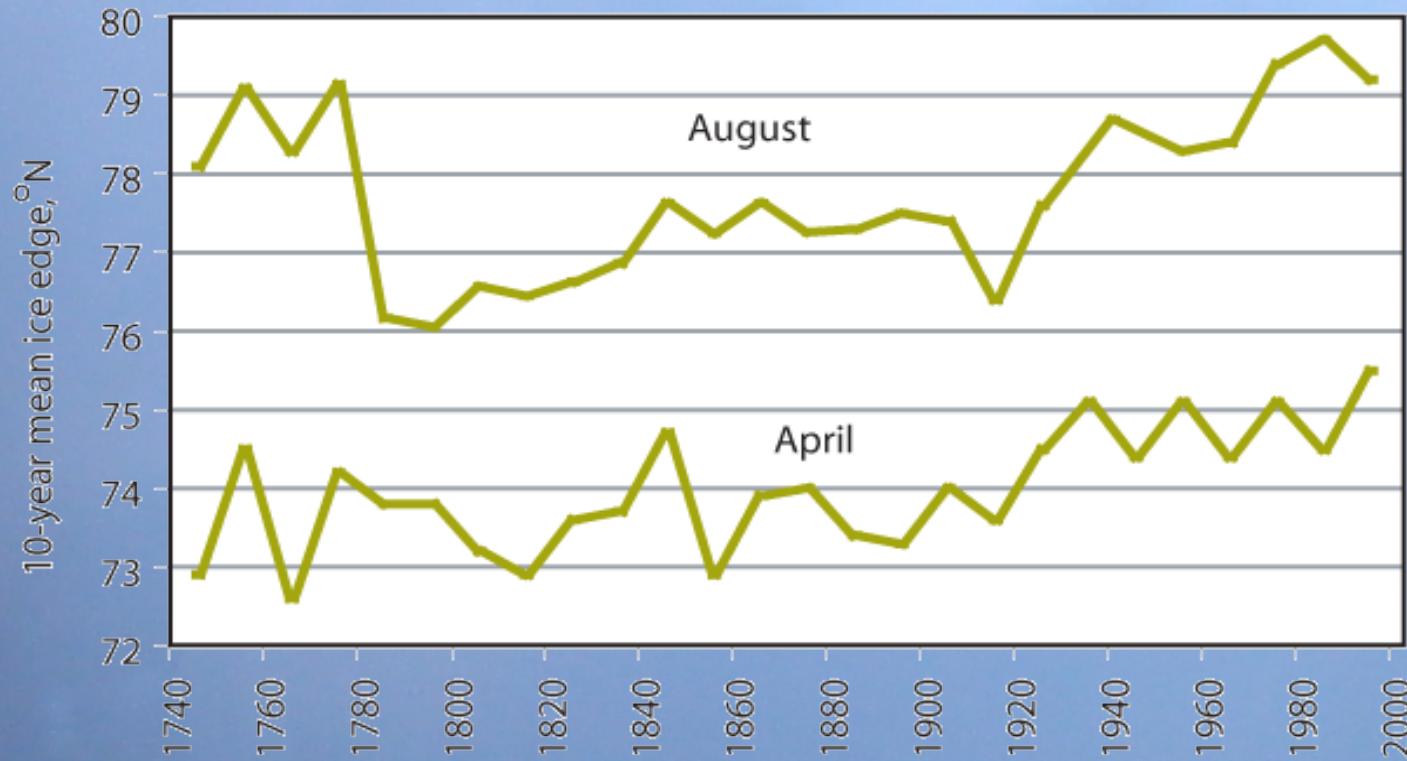


# BARENTS SEA RECORD

Vessels sailing to the Arctic to explore or to hunt whales and seals made early sea-ice observations. Over the centuries, technological advances and commercial opportunities in the Arctic led to more frequent and regular sea-ice observations, with associated increasing accuracy. The ACSYS Historical Ice Chart Archive presents historical sea-ice observations in the Arctic region between 30°W and 70°E in the form of digitized maps, stored as shape files. The earliest chart dates from 1553, and the most recent from December 2002.

# SEA-ICE RECORD FROM THE BARENTS SEA

**Changes in the  
ice edge for April  
and August in the  
Western Barents  
Sea.**



# NEWFOUNDLAND and LABRADOR

- The coast of Labrador and the east coast of the island of Newfoundland are exposed to the cold Labrador Current. This distributes sea ice and icebergs across the Grand Banks of Newfoundland and into the North Atlantic Ocean. Ice appears through local formation and drift from further north off the Labrador coast in late autumn.

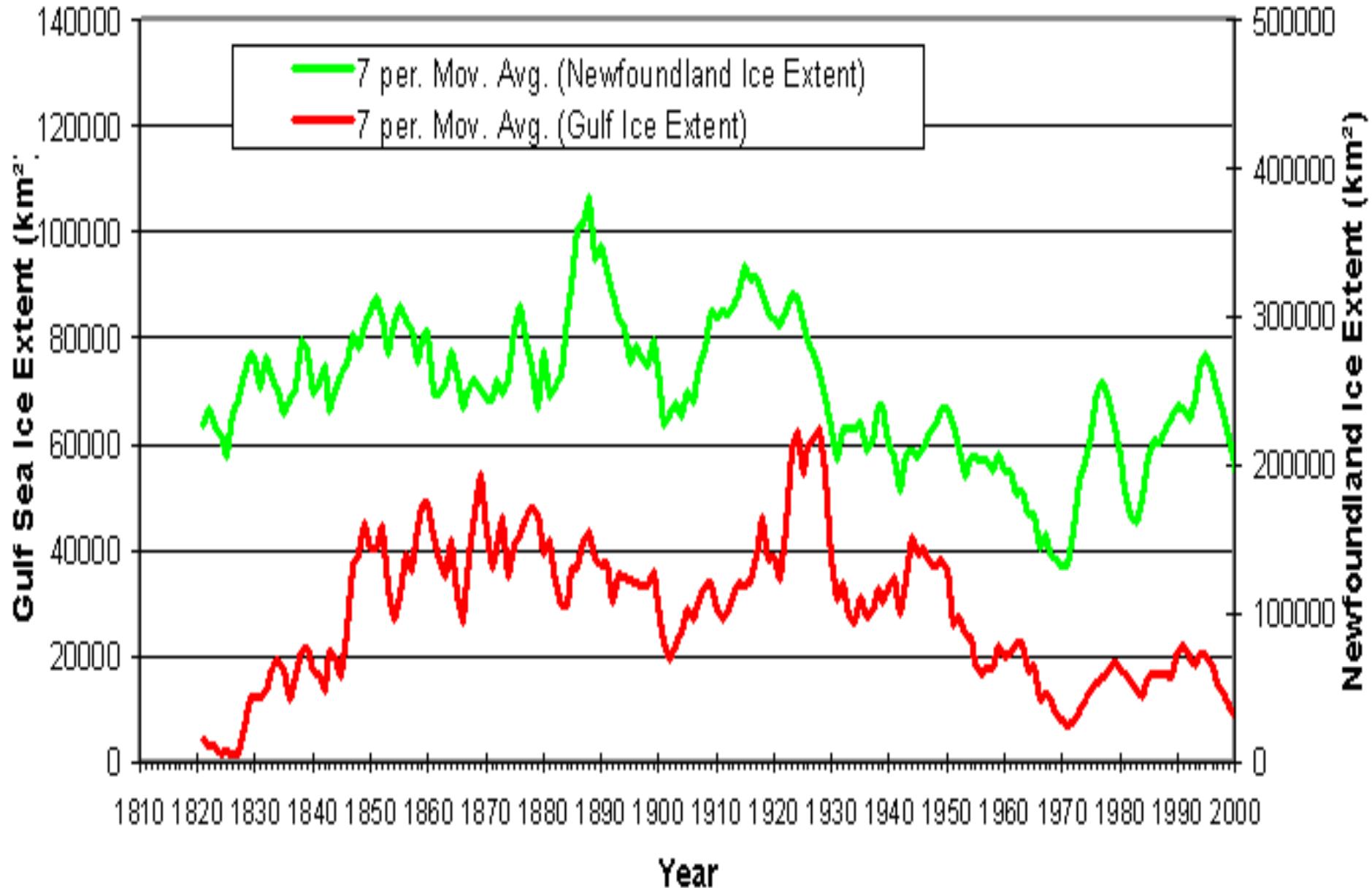


# **LABRADOR and NEWFOUNDLAND SEA-ICE RECORD**

## **compiled by Brian Hill**

- The data set for the period 1810–1958 was compiled by Brian Hill for sea-ice extent during January–April. For early years the Hill data set was compiled from ice sightings reported in shipping journals, gazettes and newspapers, and later, by the International Ice Patrol which commenced activity in 1914.

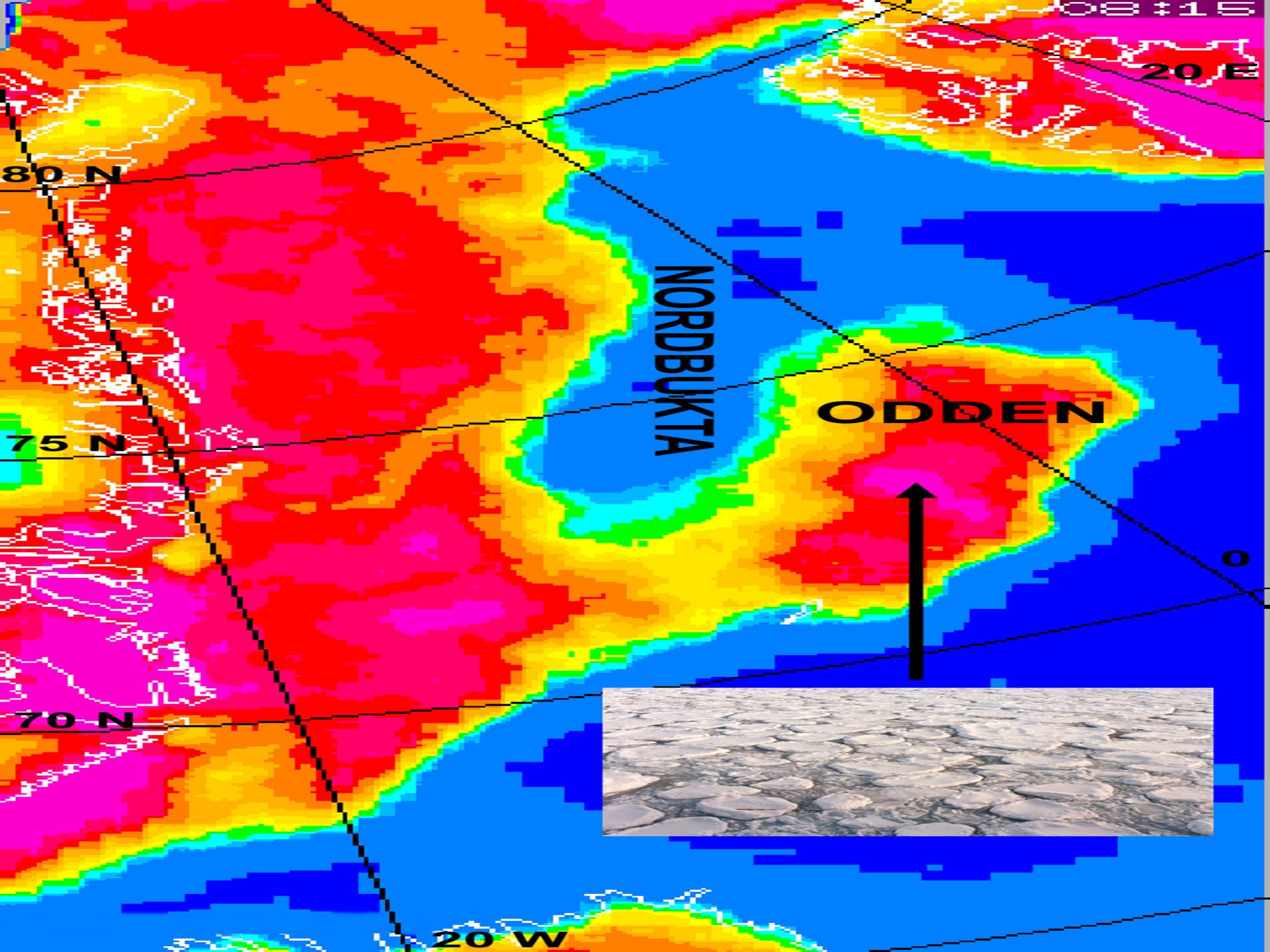
## GULF and NEWFOUNDLAND ICE EXTENTS



# THE ODDEN AREA

- A long sea-ice record has not yet been produced for the Odden region.
- Records exist, primarily sealer's accounts, which would make it possible to compile such a record.





# ODDEN SEA-ICE RECORD

## Peter Wadhams and Maxine Von Eye

- From the early seventeenth century, information on sea ice began to be periodically collected in connection with the hunting of bowhead whales, *Balaena mysticetus*, and continued in the eighteenth century when another “fishery” was initiated in the Greenland Sea. This involved the Greenland or harp seal *Phoca groenlandica*.

# ODDEN SEA-ICE RECORD

## Peter Wadhams and Maxine Von Eye

- The seals gathered to whelp on the sea ice in immense numbers at nearly the same time each winter in a relatively small area known as the “west ice” or Odden. The present project will acquire additional data from sealers’ logbooks held in the National Maritime Museum, London, and the Norwegian Polar Institute, Tromsø.

# PRESENT-DAY IMPACTS OF DIMINISHING SEA ICE IN THE LABRADOR REGION



# THE MORAVIAN MISSIONARIES AT THE LABRADOR COASTS

- The recording of meteorological data, comprising both instrumental and qualitative meteorological observations, began in August 1771, when the *Unitas Fratrum* or Unity of the Brethren, established its first mission among the Inuit on the Labrador coast.

Research on these data is being done by Gaston Demarée,  
Royal Meteorological Office, Belgium

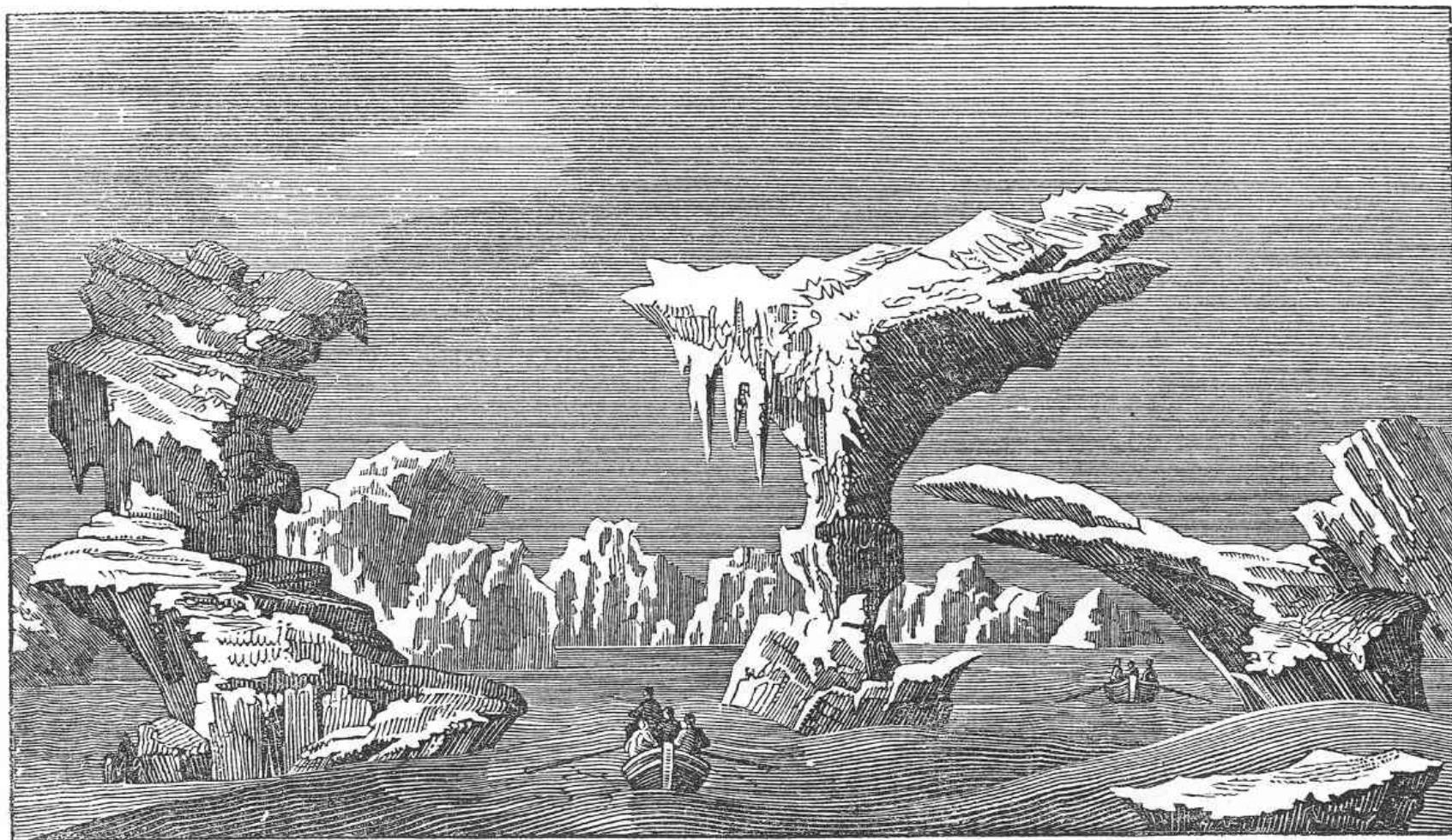
# Calwer Missions-Blatt.

Nro. 25.

3. Dezember

1842.

Botschaft aus dem kalten Norden.



# SUMMARY

- The sea-ice record from Iceland is near completion.
- The sea-ice record from the Barents Sea area is completed and published.
- The record of historical ice conditions around Newfoundland and on the Grand Banks, and in the Gulf of St. Lawrence and the Scotian Shelf, both from AD 1810 to the present is completed and published.
- Research on the Odden region of the central Greenland Sea has begun but needs further data acquisition and analysis.
- A climate and sea-ice record based on Moravian missionary accounts from Labrador has begun but needs further data acquisition and analysis.
- *The completion of the records will fill a knowledge gap and enable a more complete synthesis of climate and sea-ice data for the North Atlantic/Arctic.*

# ACKNOWLEDGEMENTS

A photograph of a sunset over a body of water, likely a fjord or large lake, with mountains visible in the distance. The sky is filled with warm orange and yellow hues from the setting sun, which is partially obscured by clouds. The water in the foreground has small ripples and reflects the warm colors of the sunset.

- National Science Foundation (USA)
- European Science Foundation
- RANNÍS (Icelandic Centre for Research)
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- Trausti Jónsson
- Torgny Vinje
- Þor E. Jakobsson
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- Lisa Barlow