Third Arctic Science ministerial Webinar Series

Co-hosted by Iceland and Japan

This webinar series is a cooperation between the ASM3 Organizers in Iceland and Japan and the European Polar Board.

3rd ARCTIC SCIENCE MINISTERIAL

European Polar Board

Third Arctic Science Ministerial Webinar Series

Theme 2: Understand

Enhance understanding and prediction capability on Arctic environmental and social systems and its global impact

17 February 2021
13: 00 - 14: 00 UTC

Program here! ▶ https://asm3.org

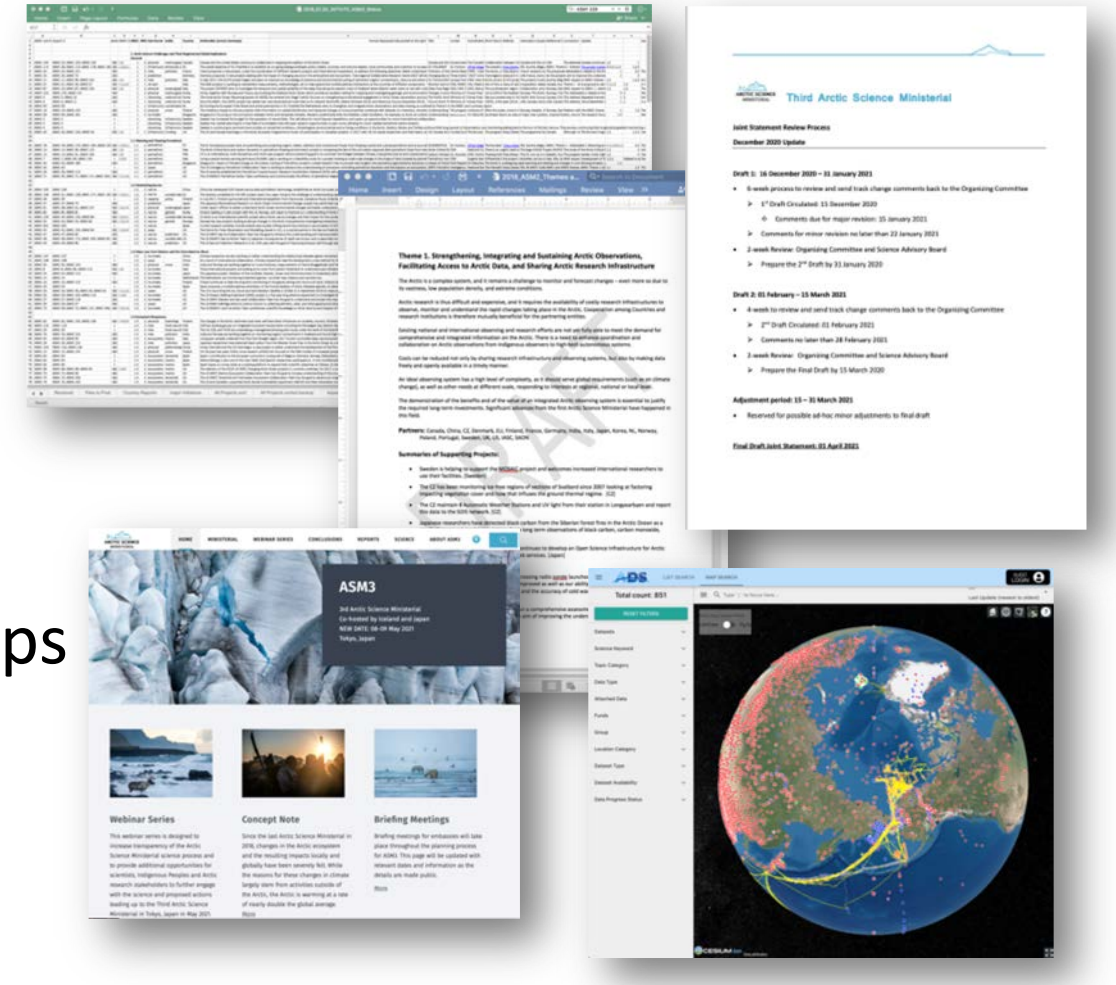
Welcome and Update on ASM3 Process

Lindsay Arthur

ASM3 Organizing Committee

Arctic Research Information

- Country / Organization Participants
  - Arctic Research Overviews
  - ASM2 Project Updates
  - New Projects in Support of ASM3
  - Collaboration and Cooperation Survey
- Online Feedback Forms
- ASM3 Research Community Workshops (IASC/IASSA/APECS), ISAR-6, AOS



On the Horizon

- **Joint Statement**
- **ASM3 Report**
- **Online Resources**
  - Webinar Recordings
    https://asm3.org/webinar-series/ https://tinyurl.com/asm3-webinar-videos
  - International Opportunities Resources
  - Arctic Research Overviews
  - Project Database Beta
- **3rd Arctic Science Ministerial**
  - 8-9 May 2020, Tokyo, Japan

Theme 2: Understand

Overview of Theme 2: Understand – Progress since ASM2 and Upcoming Projects

- Mia Bennett, ASM3 Science Advisory Board Member

Highlights from Theme 2: Understand

- PROjecTing sEa-level rise: from iCe sheets to local implicaTions – PROTECT
  - *Gaël Durand, CNRS – IGE, Project Lead*
- ARCPATH: Arctic Climate Predictions: Pathways to Resilient, Sustainable Societies
  - *Prof. Brynhildur Davíðsdóttir, University of Iceland*
- Linkage between Arctic, climate change, and marine debris
  - *Suchana Apple Chavanich, Chulalongkorn University*
- NUNATARYUK: co-designed adaptation and mitigation strategies for thawing permafrost and coastal erosion in Northern Canada
  - *Prof. Dr. Hugues Lantuit, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Project Lead*
- CHARTER: GLobal effort (CHina, Russia, Canada, Iceland, etc.) to understand how climate and biodiversity changes will impact arctic communities and their adaptive capacity
  - *Bruce Forbes, Arctic Centre, University of Lapland, Project Lead*

Recommended Actions to enhance Arctic understanding and prediction capability

- ASM3 Science Advisory Board Member

Question and Answer Session

Overview of Theme 2: Understand

Enhance understanding and prediction capability on Arctic environmental and social systems and its global impact

Mia Bennett

ASM3 Science Advisory Board Member

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

- What progress have we made in enhancing our understanding and predictive capabilities?
  - Our understanding of Arctic ecosystems increasingly focuses on where **different ecosystems intersect**, which are some of the region's most productive and biodiverse areas

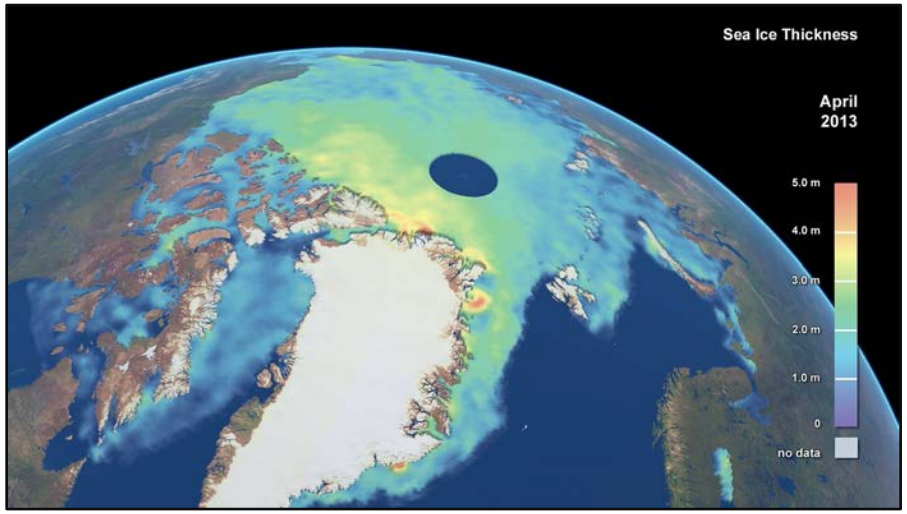
Land-sea interface

Sea-ice interface

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

- What progress have we made in enhancing our understanding and predictive capabilities?
  - Urgent research is ongoing into **ecosystems** that are **disappearing** and **emerging**



Planetary Visions/CPOM/UCL/ESA
https://www.esa.int/ESA_Multimedia/Images/2013/09/Arctic_sea-ice_thickness

Disappearing: Areas of thick multi-year sea ice

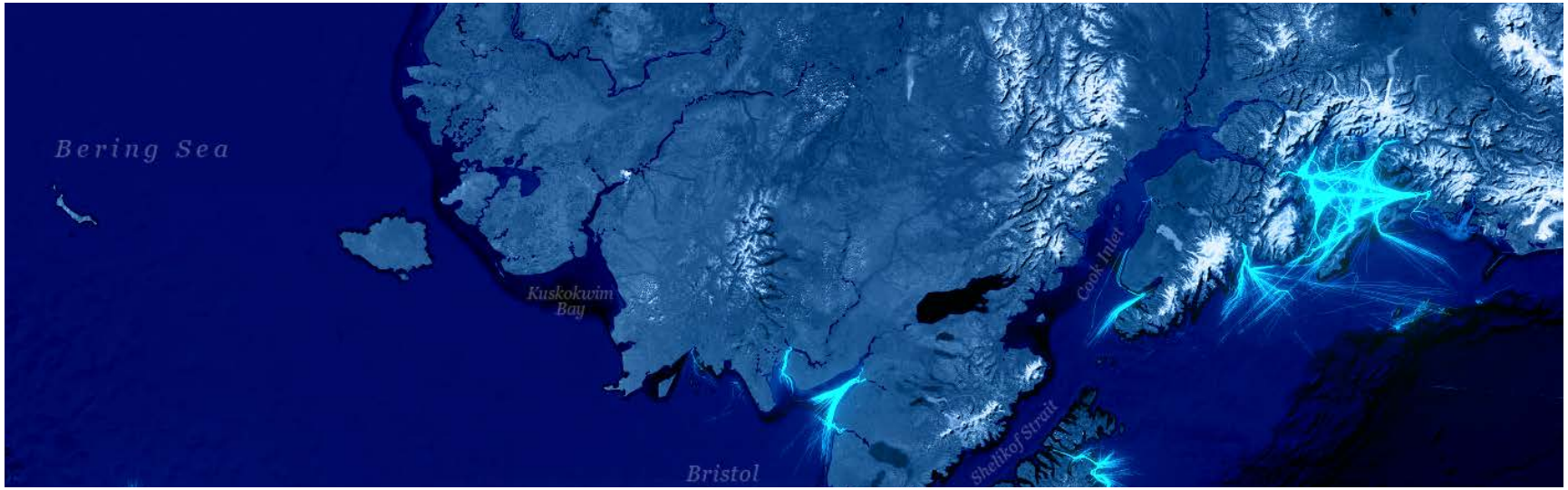
https://www.fisheries.noaa.gov/event/fifth-meeting-scientific-experts-fish-stocks-central-arctic-ocean

Emerging: Central Arctic Ocean

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

- What progress have we made in enhancing our understanding and predictive capabilities?
  - Interest in **emerging ecosystems** often dovetails with research into **societal, commercial, and geopolitical impacts**
  - Growing importance of research into **coupled human-environment systems**



https://livingatlas.arcgis.com/

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

- What progress have we made in enhancing our understanding and predictive capabilities?
  - Significant amount of research into the **atmospheric circulation of pollutants** and **climate forcers**

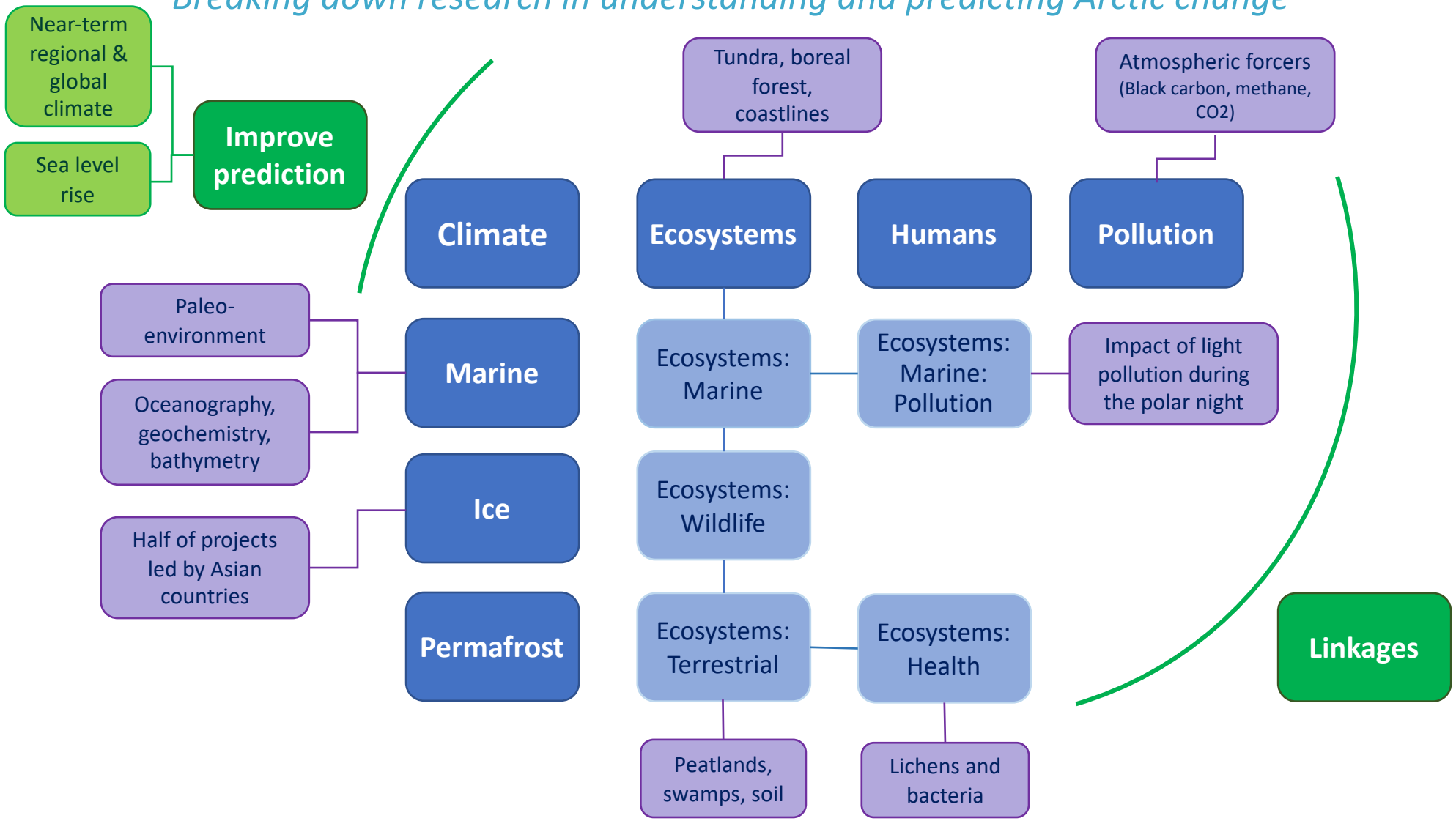
https://www.nipr.ac.jp/arcs/e/project/collaborated/03.html

Arctic Challenge for Sustainability

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

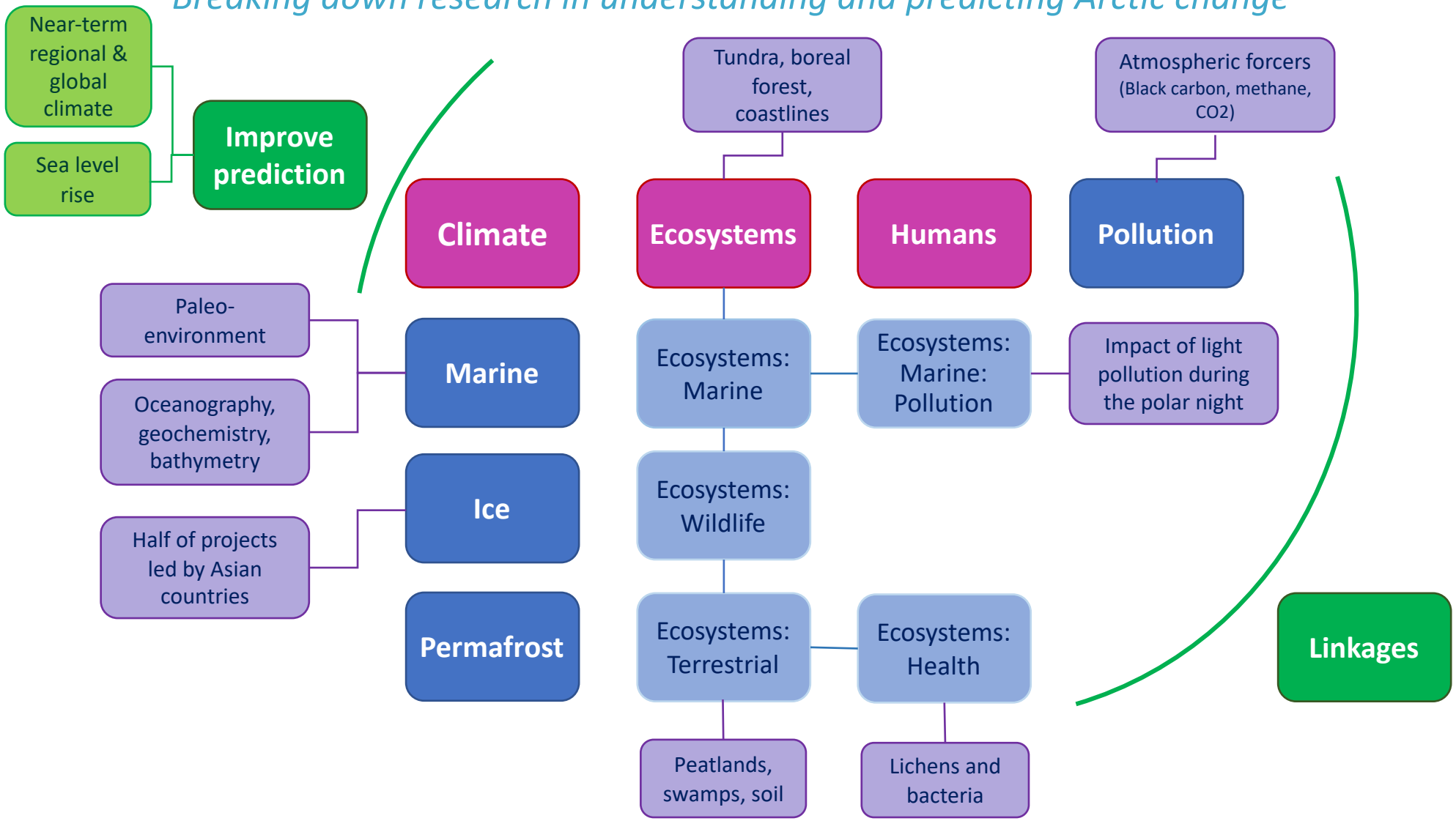
Breaking down research in understanding and predicting Arctic change



Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

Breaking down research in understanding and predicting Arctic change



Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

More work at a higher scale integrating understanding of different parts of the climate

Climate

- **Changing Arctic Ocean:** UK-German effort studying how atmospheric and oceanic circulation changes are affecting the large-scale ecosystem structure and biogeochemical functioning of the Arctic Ocean

More climate research integrating societal concerns

- **CHARTER:** Finnish-led effort with multiple partners (China, Russia, Canada, Iceland, etc.) examining how climate and biodiversity changes will impact Arctic communities and their adaptive capacity

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

Ecosystems

- Research on biotic conditions targets **fisheries** and **crustaceans** (i.e. snow crabs) and **insects**
- Increasing adoption of **social-ecological systems framework**
- **Collaboration between countries** in this area is increasing, but more could be done to integrate **Indigenous Knowledge** and leverage **citizen science**
  - Notable gap: A project on reindeer herding makes no mention of Indigenous Knowledge or partnership

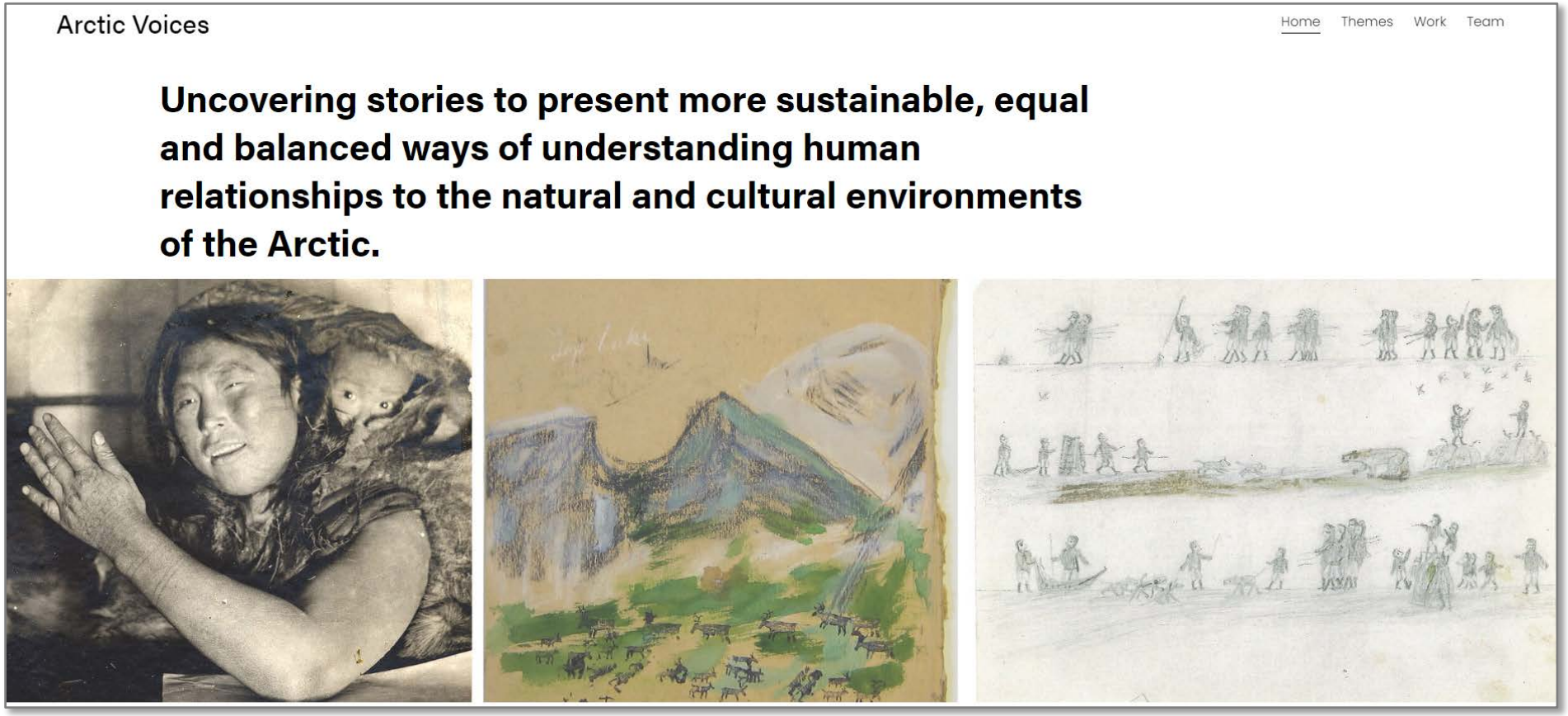
Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

More work into **gender equality** and **diversity**, largely being advanced by Norway and Iceland

- **Arctic Voices** in Art and Literature in the Long Nineteenth Century (Norway)

Humans



https://www.arcticvoices.space/

Overview of Theme 2: Understand

Progress since ASM2 and Upcoming Projects

Who is doing the research?

- **International** collaboration continues to increase, with new partners as well (e.g. Thailand, Singapore)
- **Women, Indigenous Peoples,** and **early career researchers** are increasingly integral to Arctic research
  - More efforts are being made to include members of these groups in both **designing** and **carrying out research**

Highlights from Theme 2: Understand

Moderated by Mia Bennett, ASM3 Science Advisory Board Member

- **PROjecTing sEa-level rise: from iCe sheets to local implicaTions – PROTECT**
  - *Gaël Durand, CNRS – IGE, Project Lead*
- **ARCPATH: Arctic Climate Predictions: Pathways to Resilient, Sustainable Societies**
  - *Prof. Brynhildur Davíðsdóttir, University of Iceland*
- **Linkage between Arctic, climate change, and marine debris**
  - *Suchana Apple Chavanich, Chulalongkorn University*
- **NUNATARYUK: co-designed adaptation and mitigation strategies for thawing permafrost and coastal erosion in Northern Canada**
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- **Recommended Actions to enhance Arctic understanding and prediction capability**
  - ASM3 Science Advisory Board Member
- **Question and Answer Session**

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European Polar Board

PROjecTing sEa-level rise: from iCe sheets to local implicaTions – PROTECT

Protect CRYOSPHERE & SEA LEVEL

Gaël Durand

CNRS – IGE, Project Lead

Protect
CRYOSPHERE & SEA LEVEL

PROTECT is a European research project working on the projections of sea level rise in the future due to the melting of land ice

198 000 glaciers

2 ice sheets

= 65 m of sea level

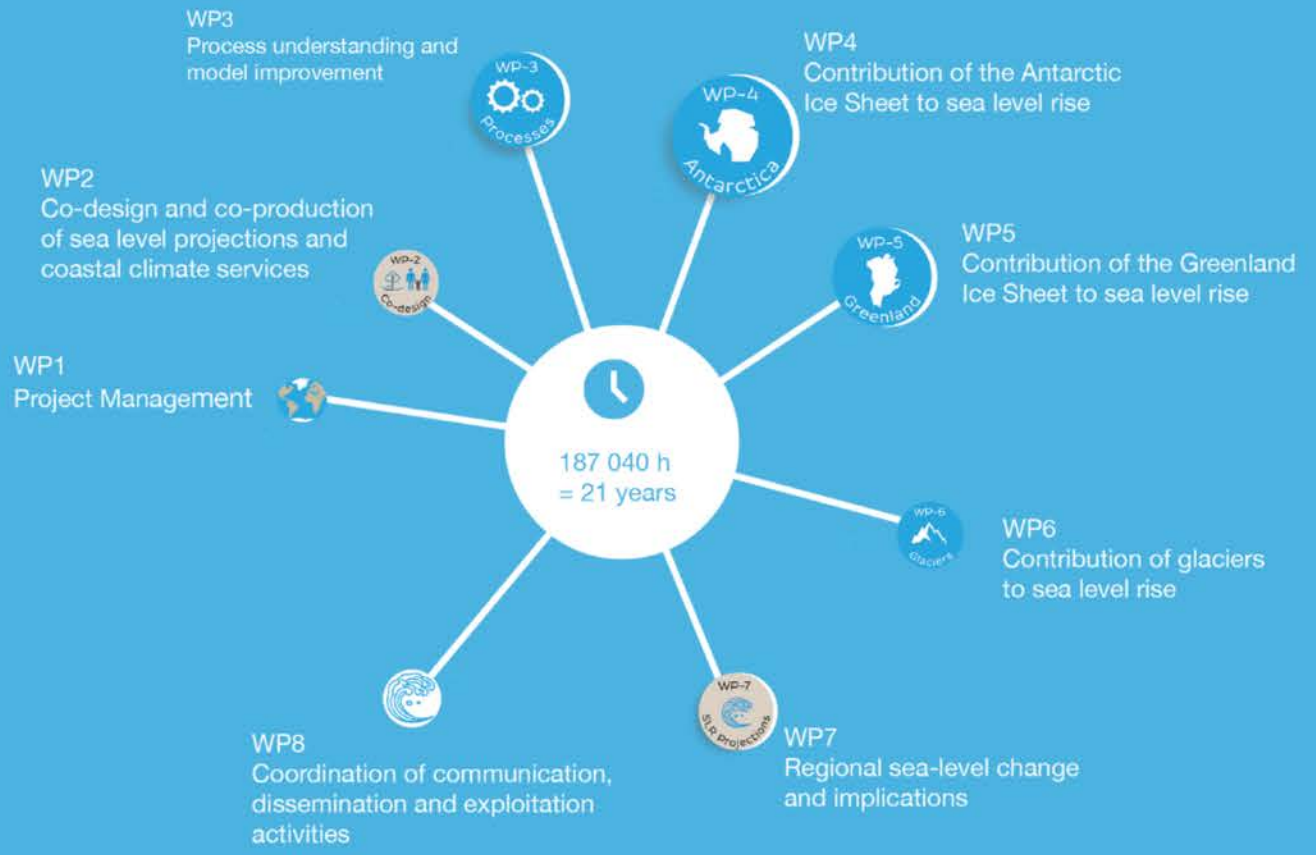
Global, regional and local projections of sea level rise on several time scales

26 partners institutions

150+ partners

10 million euros

8 countries



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869304. This material reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains.

https://protect-slr.eu
@ProtectSlr

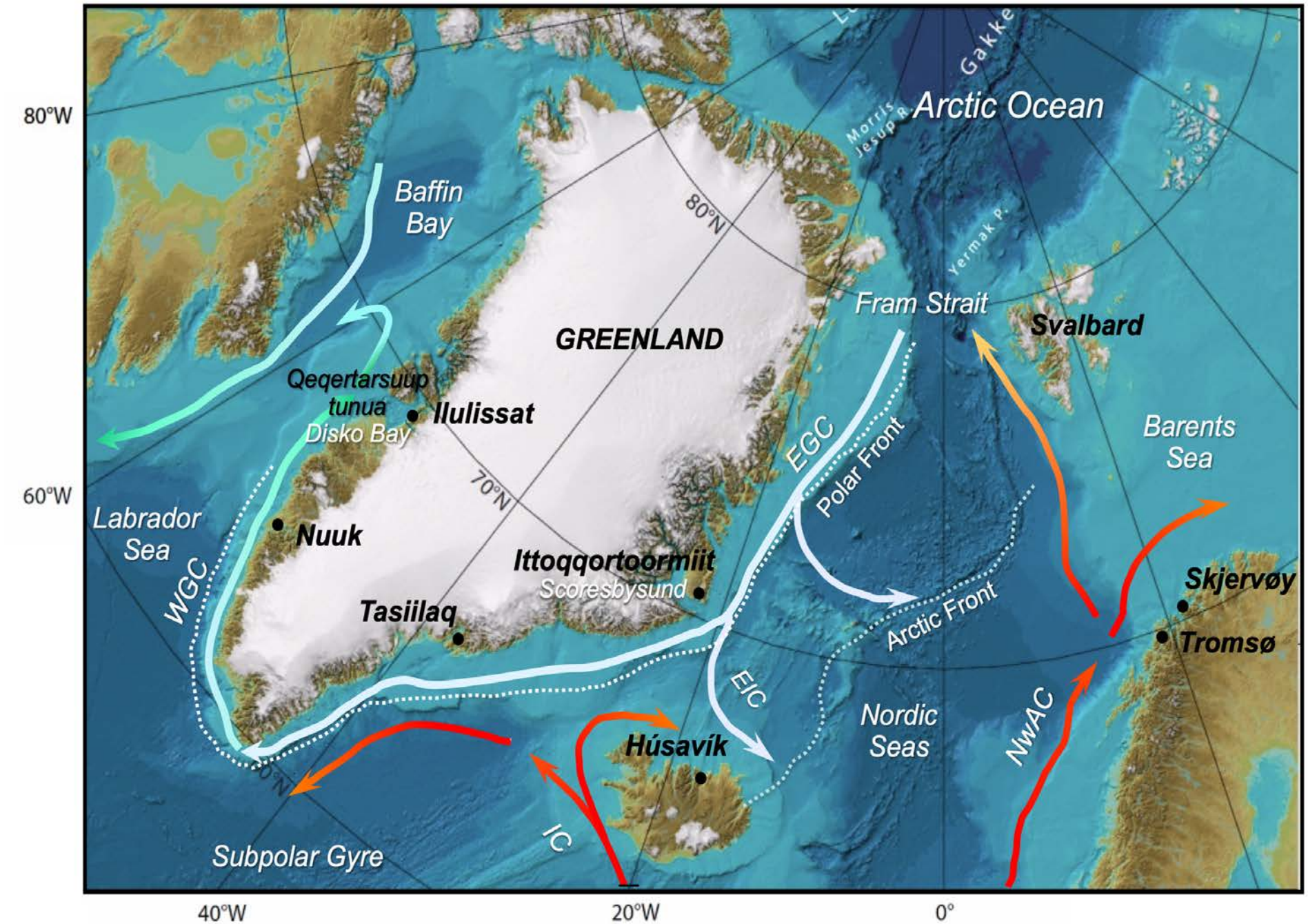
Protect
CRYOSPHERE & SEA LEVEL

ARCPATH: Arctic Climate Predictions: Pathways to Resilient, Sustainable Societies

Prof. Brynhildur Davíðsdóttir

University of Iceland

http://www.svs.is/en/projects/arcpath


80°W
60°W
40°W
20°W
0°
80°N
70°N
60°N
Arctic Ocean
Gakkel
Morris Jesup R.
Yermak P.
Baffin Bay
GREENLAND
Fram Strait
Svalbard
Barents Sea
Qeqertarsuup tunua
Disko Bay
Ilulissat
Labrador Sea
Nuuk
Ittoqqortoormiit
Scoresbysund
Tasiilaq
WGC
EGC
Polar Front
Arctic Front
EIC
IC
Húsavík
Nordic Seas
NwAC
Skjervøy
Tromsø
Subpolar Gyre

Three core objectives

(i) Improved climate predictions

(ii) Increased understanding how climate change interacts with multiple ecological and societal factors

(iii) Combining improved regional climate predictions with enhanced understanding of environmental, societal and economic interactions to supply new knowledge on potential pathways to action

Improved climate predictions

(i) Historical climatology

(ii) Global climatological modelling

(iii) Dynamic downscaling

Increased understanding how climate change interacts with multiple ecological and societal factors

i) Changes in the marine environment as a result of climate change through the prism of whales – how have they and how may they react?

ii) The societal benefits (importance) of whales

iii) The impact of climate change on the ability to sustain the societal benefits of whales

iv) The synergies between climate change and marine management systems and their impact on coastal communities

ECOSYSTEM SERVICES OF WHALES

CICES Category	Ecosystem Service
Provisioning	Food products (meat, blubber, skin and intestines) Whale bones, teeth and baleen Oil based products deriving from blubber
Regulation and maintenance	Enhanced primary production Enhanced biodiversity and evolutionary potential Nutrient cycling Climate regulation
Cultural	Tourism (whale watching) Music and arts Education Spiritual enrichment Community cohesiveness and cultural identity Aesthetics Associations linked to non-use value

Adapted from Cook et al., 2019.

SOME INSIGHTS

(i) Marine species such as blue whales are migrating Northwards, possibly due to climate change

(ii) Whales are shown to be socially important and have diverse societal benefits with cultural benefits considered the most important ones

iii) Governance of whale ES in our study region is largely through informal institutions and self governance, which may be susceptible to external pressures derived from climate change

iv) The combined impact of ITQ systems in fisheries and climate change is severely increasing the stress to coastal communities

Photo: Marianne Rasmussen

TO CONCLUDE

Understanding the diverse benefits (services) from the natural environment and revealing possible future impacts of climate change on the ability to sustain those benefits provides important insights to the resilience of coastal communities to direct and indirect pressures derived from climate change

This is important when designing pathways to action towards more resilient, sustainable societies

Photo: Marianne Rasmussen

Linkage between Arctic, climate change, and marine debris

Suchana Apple Chavanich

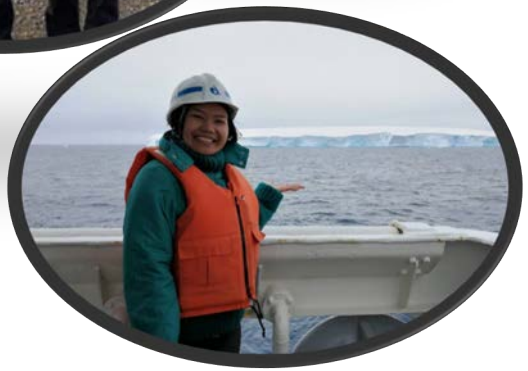
Chulalongkorn University, Thailand

and Polar Science Consortium of Thailand

Thailand and Antarctica

- HRH Princess Maha Chakri Sirindhorn graciously visited Antarctic in November 1993. She was the first Thai who made a journey to Antarctica.
- A book written by HRH "Antarctica: Chilling Summer" depicts her journey to New Zealand and Antarctica which she named this journey as "My great adventure"

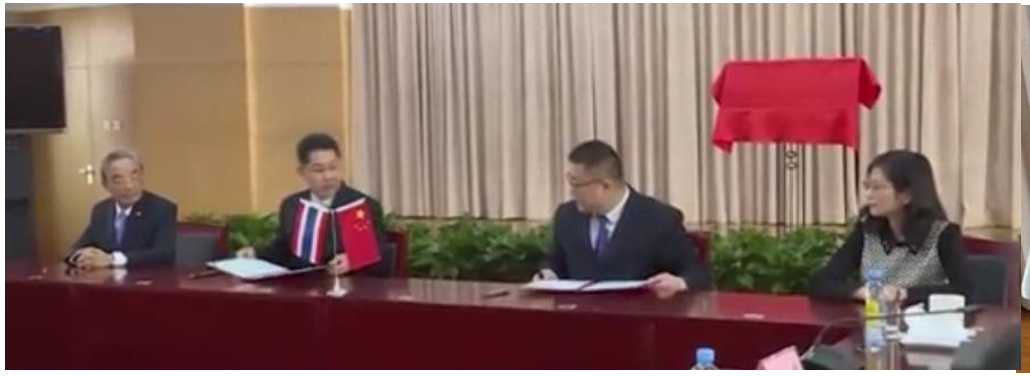
3rd ARCTIC SCIENCE MINISTERIAL

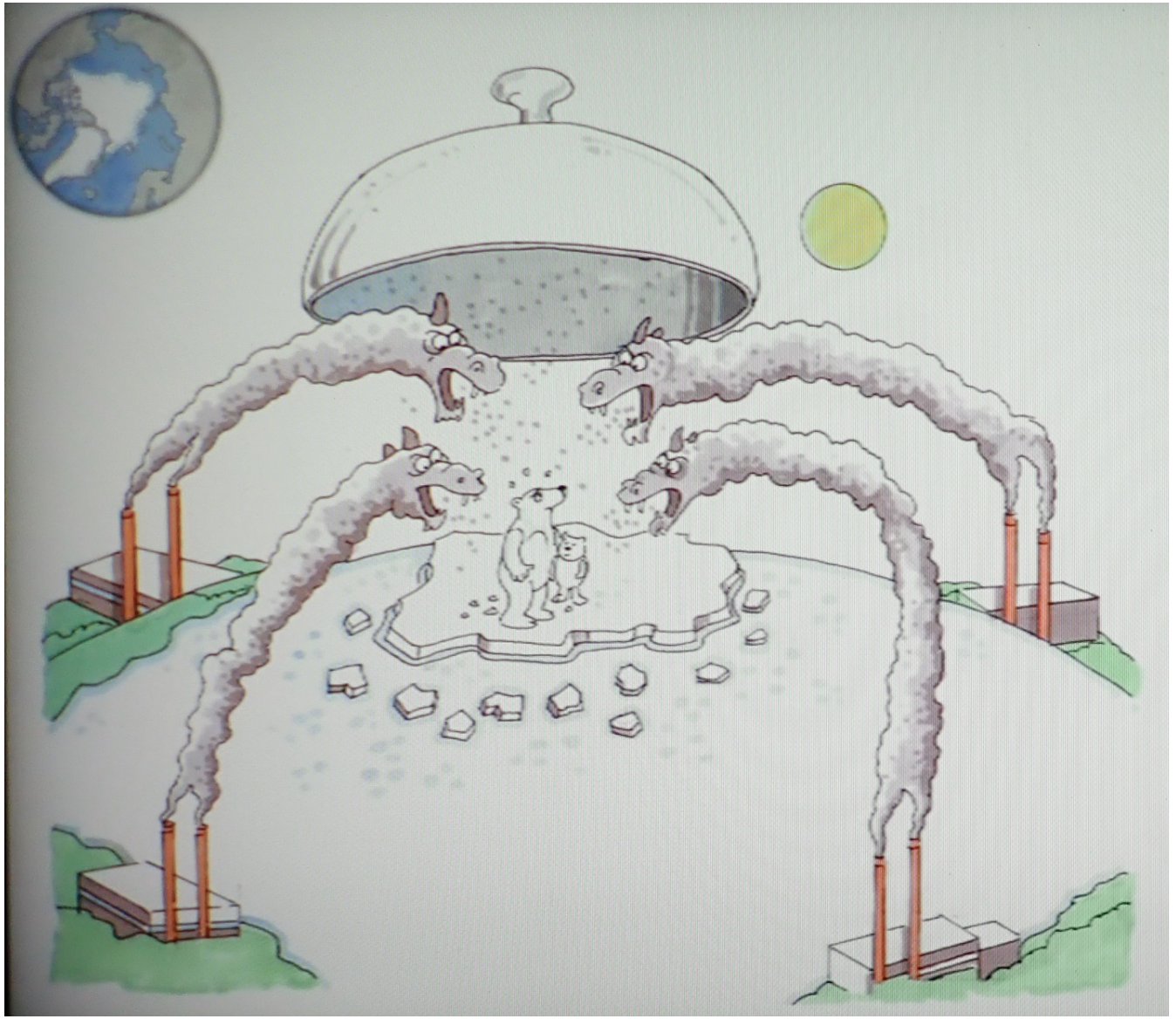


On November 13, 2015, MOU between University Centre in Svalbard (UNIS) and Chulalongkorn University was signed, and the Princess presided over the MOU ceremony

On April 6, 2016, MOU between Polar Research Institute of China and 5 Thai universities and institutes was signed, and the Princess presided over the MOU ceremony

MOU between CAA and NSTDA in 2019 and Joint Laboratory is established





Sea and air currents are conveying pollution to the Arctic

Source: NPI

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NUNATARYUK:
co-designed adaptation and mitigation strategies for thawing permafrost and coastal erosion in Northern Canada

Prof. Dr. Hugues Lantuit

Alfred Wegener Institute
Helmholtz Centre for Polar and Marine Research

3rd ARCTIC SCIENCE MINISTERIAL

NUNATARYUK

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Permafrost thaw and the changing Arctic coast, science for socioeconomic adaptation

This project is funded by the European Union

AWI HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

Anna Irrgang

Irrgang et al., 2018

4 Nunataryuk integration activities

3 Risks framework

2 Nunataryuk physical & social science activities

1 Stakeholder consultation

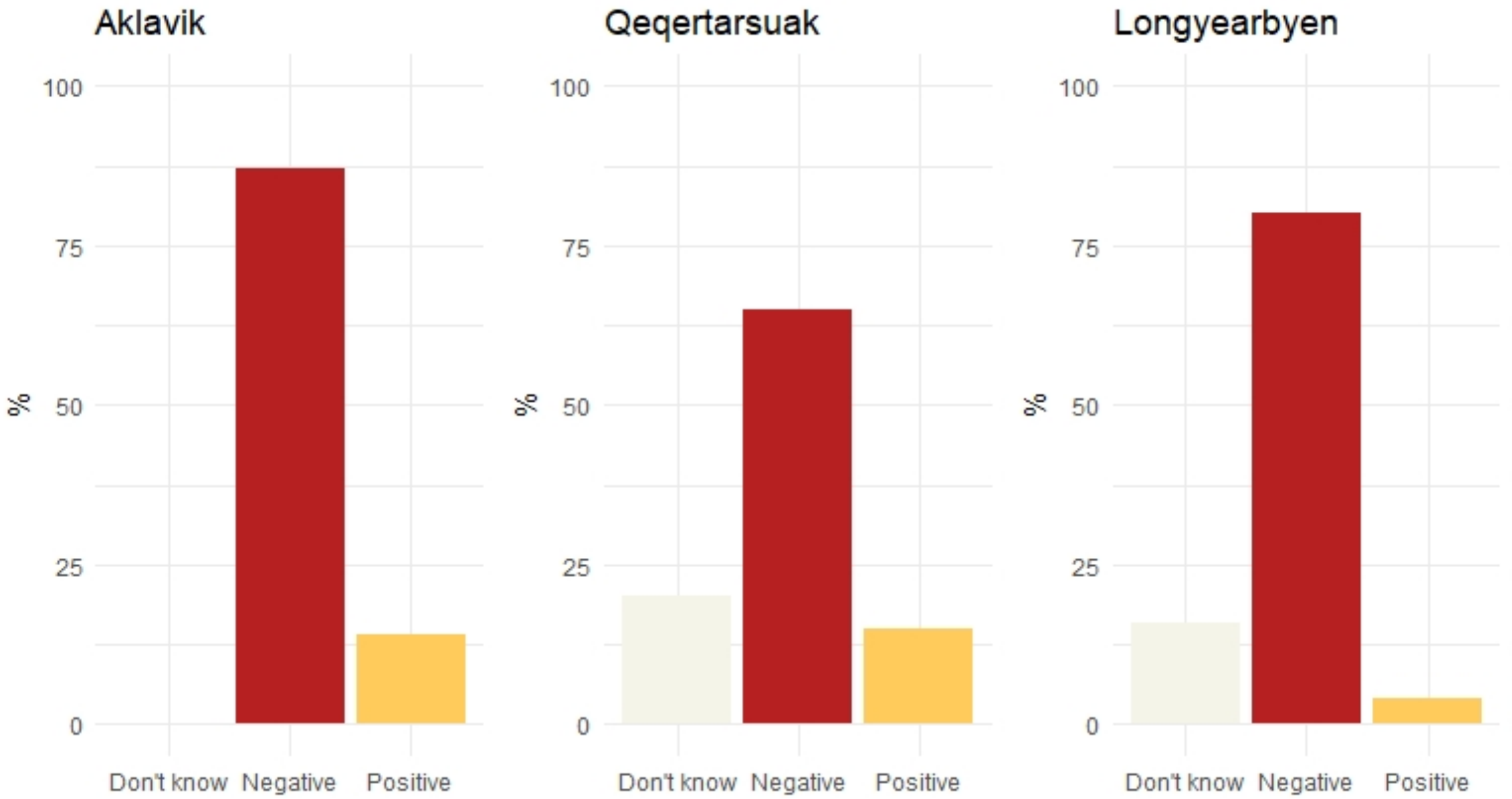
Consultations

Stakeholder survey on impacts of permafrost thaw

Over the past 10 years, would you say that the thawing of frozen ground has led to:

- positive change
- negative change
- don’t know

Stakeholder survey on impacts of permafrost thaw



Ramage & Jungsberg

NUNATARYUK
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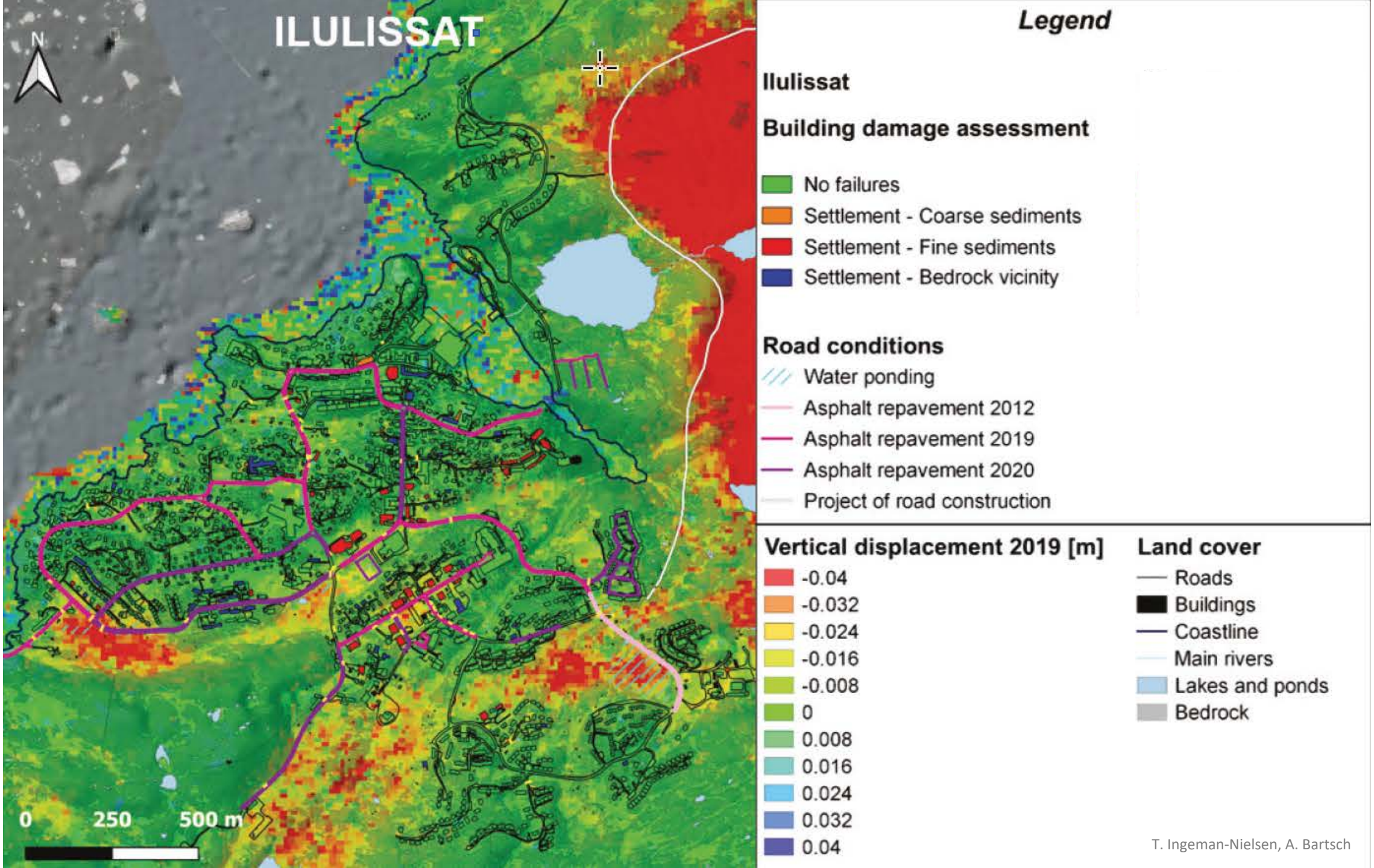
CRUISEMAPPER

Ilulissat, Greenland



T. Ingeman-Nielsen, A. Bartsch

NUNATARYUK
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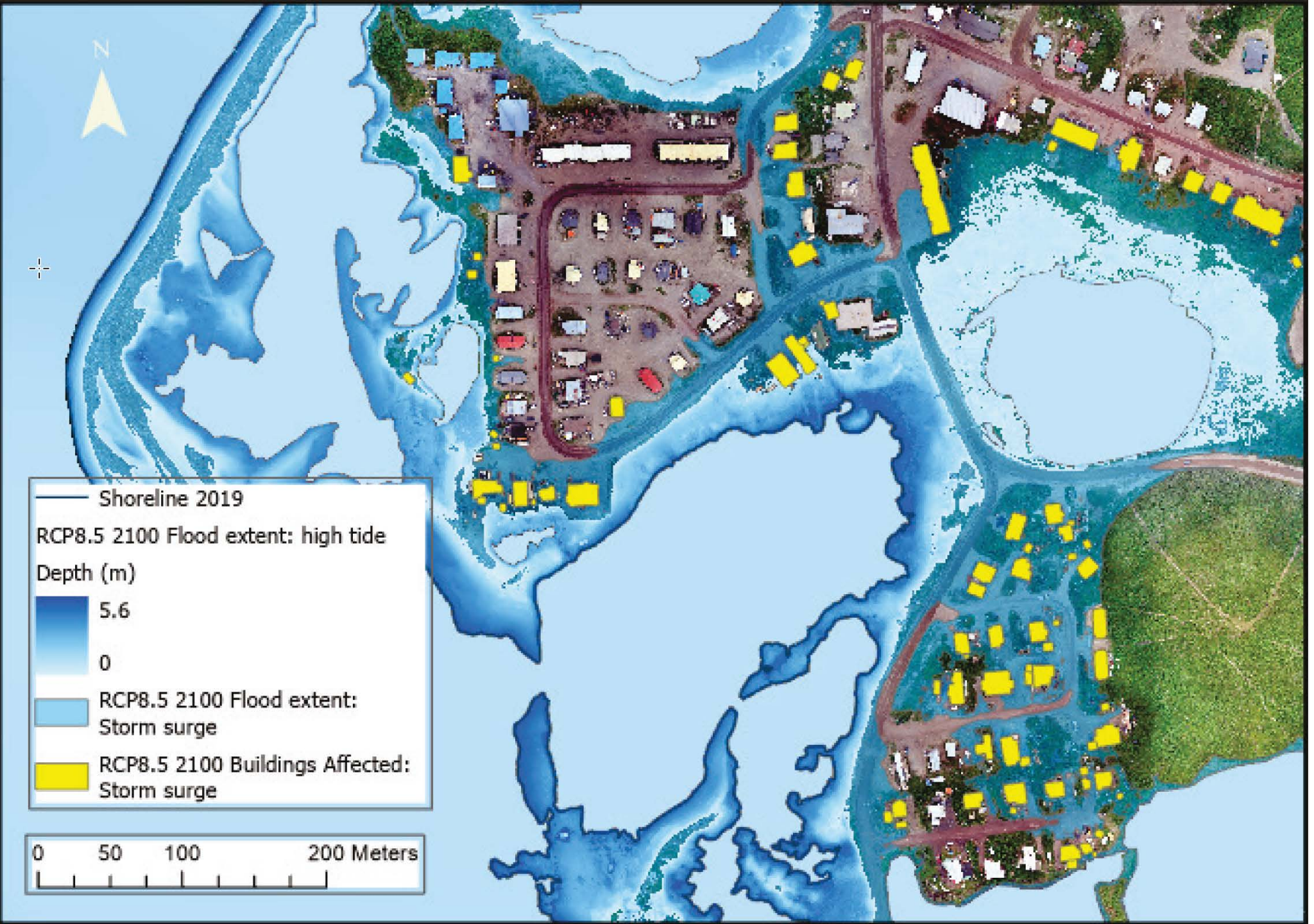
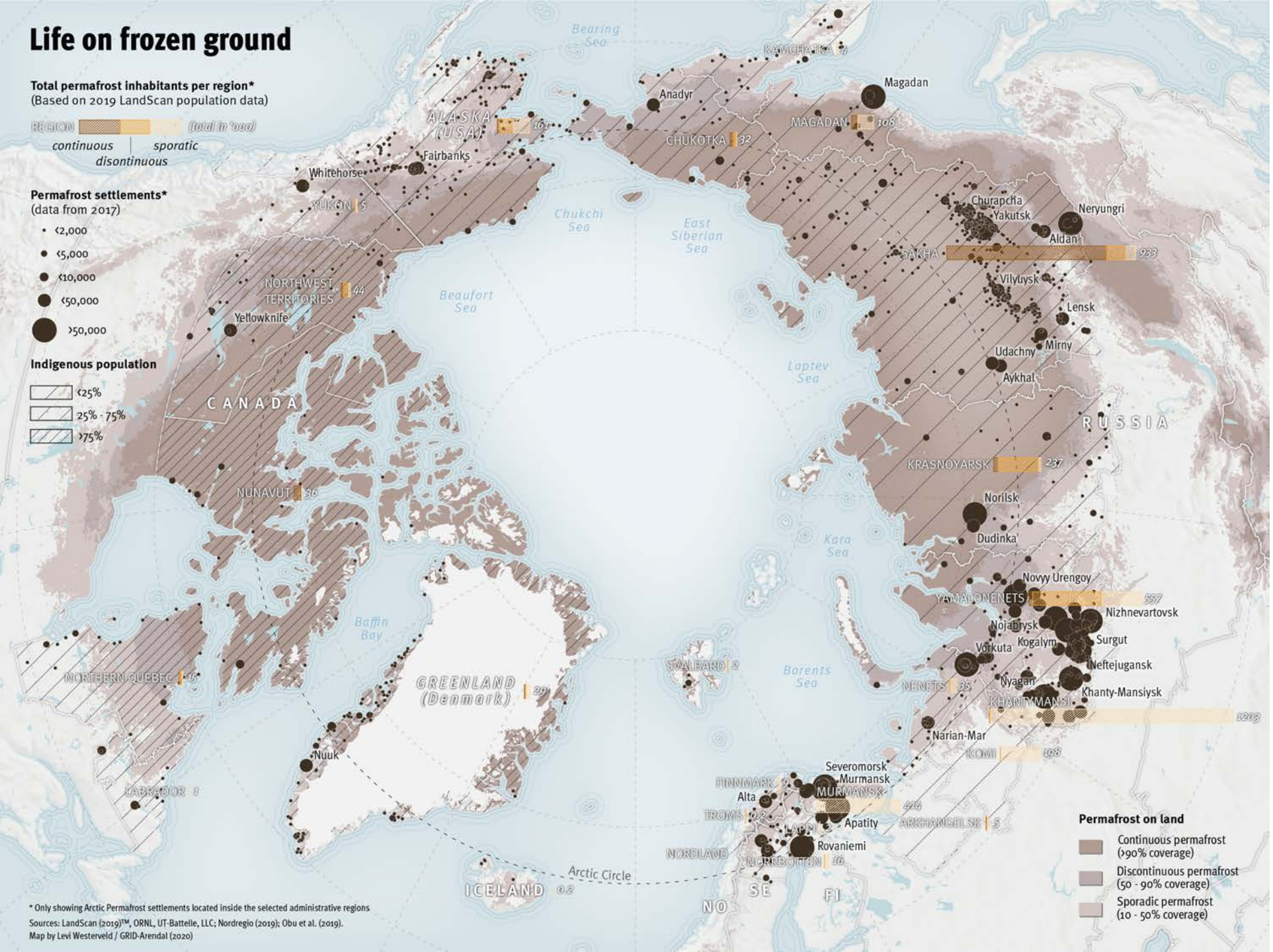
Tuktoyaktuk, Canada

HELMHOLTZ AWI



NUNATARYUK

Pinheiro, Vieira et al.



* Only showing Arctic Permafrost settlements located inside the selected administrative regions

Sources: LandScan (2019)™, ORNL, UT-Battelle, LLC; Nordregio (2019); Obu et al. (2019).
Map by Levi Westerveld / GRID-Arendal (2020)

NUNATARYUK

3rd ARCTIC SCIENCE MINISTERIAL

European Polar Board

NUNATARYUK

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Facebook: Nunataryuk

Instagram: Nunataryuk

Twitter: Nunataryuk

Web: Nunataryuk.org

This project is funded by the European Union

AWI HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity (CHARTER)

Prof. Bruce C. Forbes

Arctic Centre, University of Lapland

Tundra Nenets migration, Yamal, West Siberia. Photo: B.C. Forbes

3rd ARCTIC SCIENCE MINISTERIAL

CHARTER

CHARTER wants to advance the capacity of Arctic communities to adapt to climate and biodiversity changes. CHARTER has three main aims:

- Better understand past and ongoing responses of Arctic terrestrial social-ecological systems to changes in biodiversity, snow and ice cover across decades and centuries
- Simulate future effects of social-ecological changes for indigenous and local communities and traditional livelihoods out to 2050
- Work with Arctic communities to co-develop strategies and policy pathways for livelihoods such as reindeer herding, hunting and fishing

Consortium

9 European countries (+ Russia, China)

21 Research Institutions

7 Work Packages

Coordinator

Arctic Centre

University of Lapland

Finland

Duration

08.2020 – 07.2024

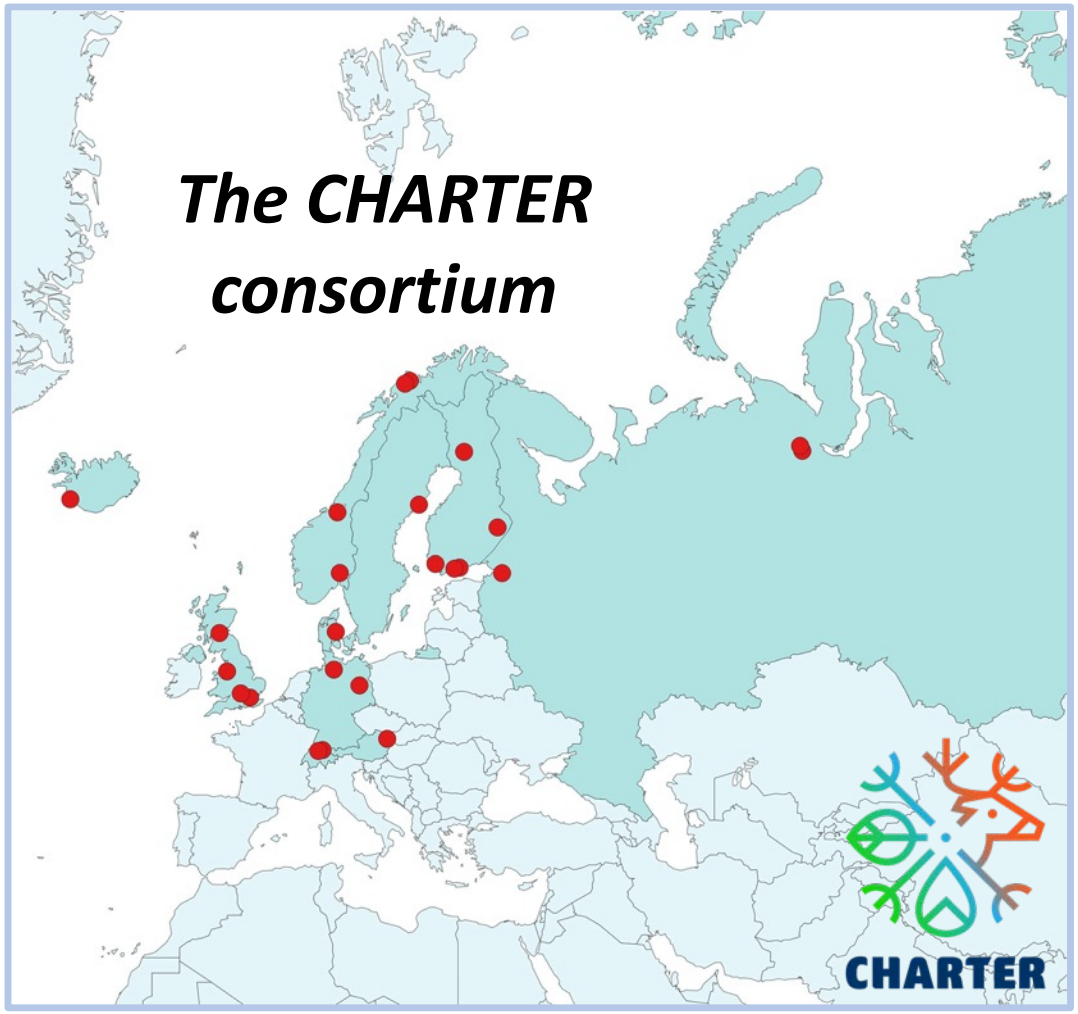
Budget

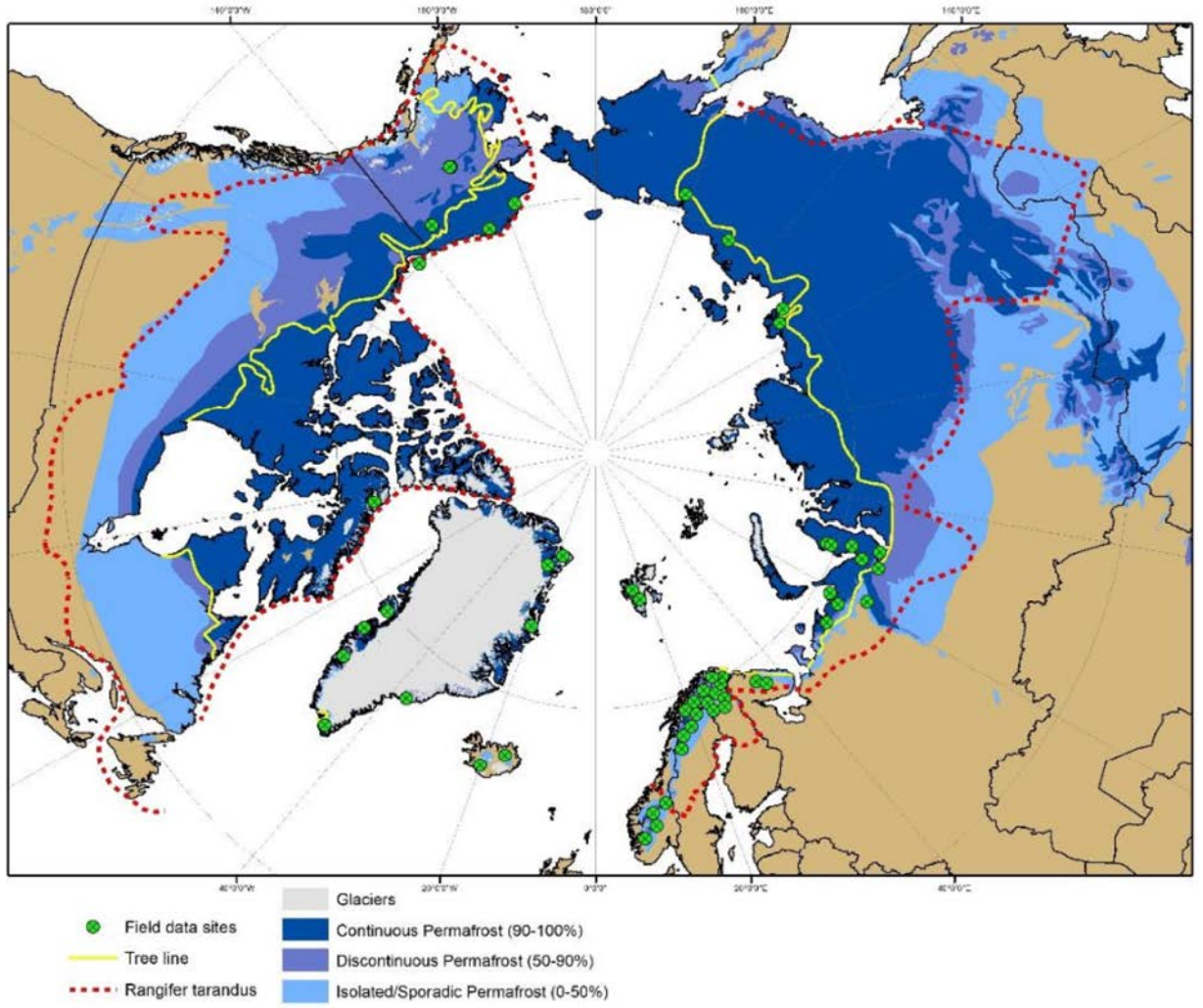
5.9 M Euro

www.charter-arctic.org

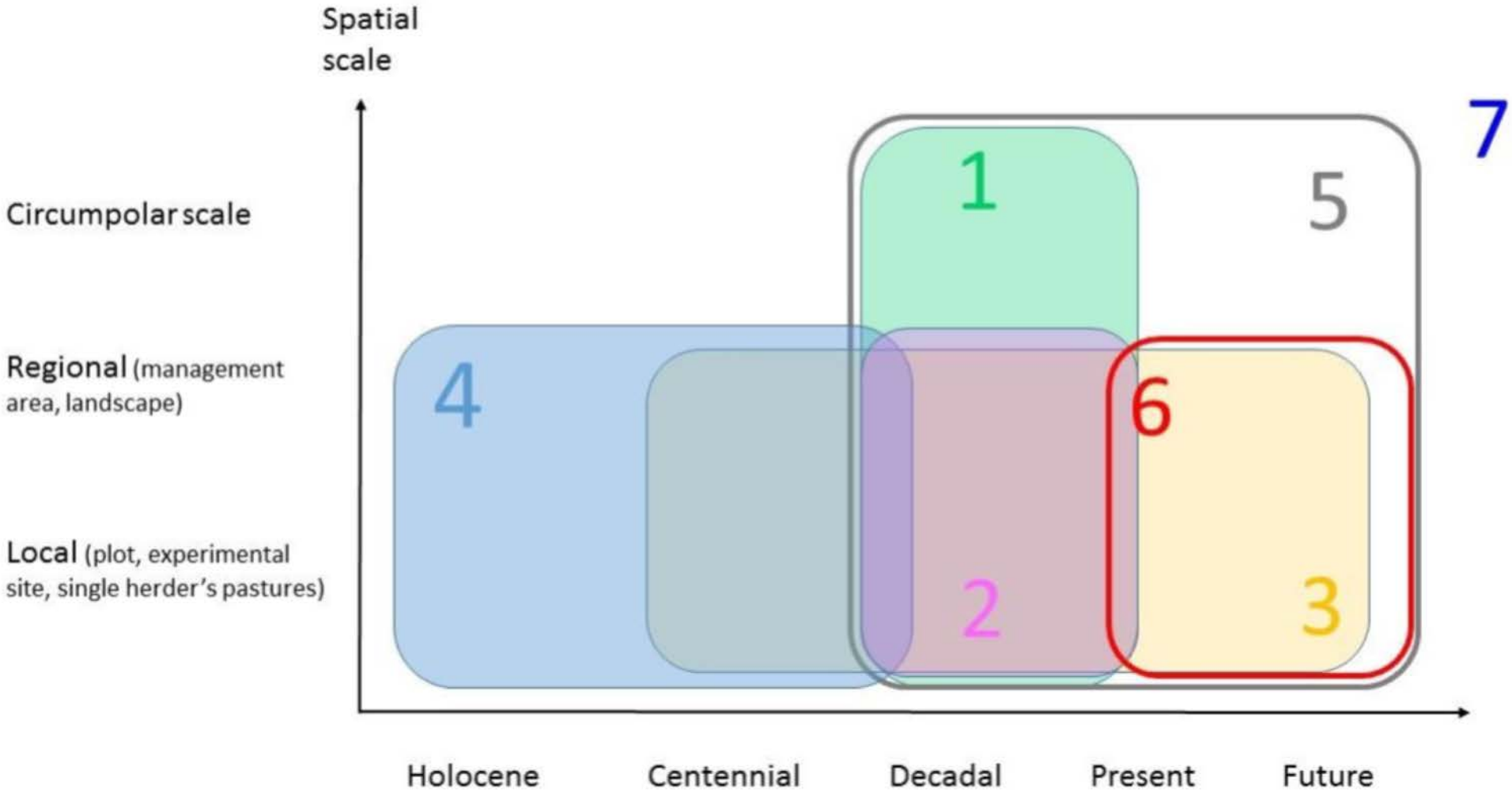
@CharterArctic

CHARTER partners, regions and datasets





CHARTER aims at integrating knowledge across multiple scales spatially (from local to circumpolar) and temporally (from the late Holocene out to ca. 2050). Numbers refer to Work Packages (WPs).



The “overgrazing” narrative in both northern Fennoscandia and Russia overrides urgently needed discussion of biodiversity, climate change and adaptation

Reindeer to be culled in Russia's far north due to anthrax outbreak

Governor of the Yamal-Nenets region confirms cull after melting permafrost awakens 'zombie infection'

theguardian

Porojen tehotuotanto on ympäristöriski

(Reindeer factory farming is an environmental risk)

PÄÄKIRJOITUS 19.9.2016 2:00 Päivitetty: 19.9.2016 6:56

KOLUMNI

Jukka Ruukki HELSINGIN SANOMAT

Kirjoittaja on HS:n tiedetoimituksen esimies.

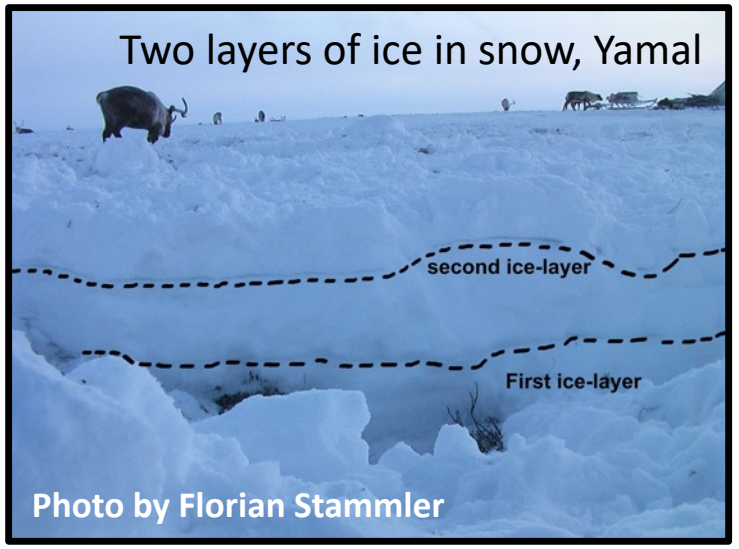
PORO ON PARASTA, kuului takavuosien slogan aidon pohjoisen luonnonlihan puolesta. Mainoksissa lapinpukuun sonnustautuneet paimentolaiset kutsuivat etelän city-ihmisiä tutustumaan puolivillin metsäneläimen ainutlaatuiseen aromiin.

HS HELSINGIN SANOMAT

Partnerships with EU and US-funded projects

AROSS
Arctic Rain on Snow Study

https://nsidc.org/rain-on-snow



CHARTER

Morning Mix

Starvation killed 80,000 reindeer after unusual Arctic rains cut off the animals' food supply

The Washington Post

By Ben Guarino November 16, 2016

Reindeer in the Russian peninsula of Yamal. (The Siberian Times)

Participatory methods and co-production of knowledge are at the core of CHARTER

- Co-documentation of different ways of knowing (focus groups, interviews, workshops…Covid-19 permitting)
- Contributing to co-development of local planning & policies
- Indigenous scholars included within the consortium
- Co-development achieved during project planning
- Synthesize existing datasets alongside new fieldwork

3rd ARCTIC SCIENCE MINISTERIAL

EU Polar Cluster

http://www.charter-arctic.org

European Polar Board

Thank you!

CHARTER

AROSS
Arctic Rain on Snow Study

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869471

ARCTIC CENTRE
University of Lapland

Recommended Actions

to Enhance Understanding and Prediction Capabilities on Arctic environmental and Social Systems and Its Global Impact

Henry Burgess

NERC Arctic Office, UK

ASM3 Science Advisory Board Member

Theme 2: Understand

- Critical section of ASM3, moving us from observations, to understanding what this knowledge ‘means’; and then bridging to how to respond.
- It is where non-Arctic states and others have so much to offer – in leading work and in framing the global importance of understanding Arctic change.
- There have been great strides in ambition and engagement, and an increasing diversity of voices, experience and knowledge to be celebrated and encouraged.
- Now is the time to redouble our collective efforts.

Theme 2: Understand

- Truly **understanding environmental risks**, the role of humans as drivers of change and the need to mitigate and adapt.
- A strong focus on **future global weather and climate patterns**, in particular to understand tipping points and cascading effects.
- **Cross-cutting research** to understand the detailed connections between inter-dependent environmental, social and economic systems.
- The ability to **generate predictions at pace** – at local, regional and global scale – to improve confidence and support effective decision-making.
- **Respectful and empowering partnerships** that fully include Indigenous researchers; that produce new knowledge; where challenge is fair and welcome; and that lead to new long-term research partnerships.

Theme 2: Understand

Building

- Encourage the development of new large-scale ambitious international partnerships & initiatives with effective data analysis and synthesis.

Increasing

- Supporting research that shapes the prediction and mitigation of risks and hazards associated with Arctic change. Across pollution, climate and weather, infectious diseases and fisheries, and particularly those areas that impact human health and well-being now and soon.

Prioritising

- Focus attention on projects that look at connections between various environmental components and those that enhance understanding of complex social, human and eco-systems.

Questions & Answers

Third Arctic Science Ministerial Webinar Series

Theme 2: Understand

Enhance understanding and prediction capability on Arctic environmental and social systems and its global impact

Please type any questions related to the webinar series in the Q&A box.

Any remaining questions may be sent to
ml-asm3@mext.go.jp

Third Arctic Science Ministerial Webinar Series

Theme 3: Respond

Sustainable development; Evaluation of vulnerability and resilience; Application of knowledge

17 March 2021
13:00 or 16: 00 UTC (TBC)

Program here! ▶ https://asm3.org

https://asm3.org

3rd ARCTIC SCIENCE MINISTERIAL

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ASM3

3rd Arctic Science Ministerial
Co-hosted by Iceland and Japan
NEW DATE: 08-09 May 2021
Tokyo, Japan

Webinar Series

This webinar series is designed to increase transparency of the Arctic Science Ministerial

Concept Note

Since the last Arctic Science Ministerial in 2018, changes in the Arctic ecosystem and the

Briefing Meetings

Briefing meetings for embassies will take place throughout the planning process for

3rd ARCTIC SCIENCE MINISTERIAL

European Polar Board

Thank You

ASM3 Email: ml-asm3@mext.go.jp

Government of Iceland
Ministry of Education, Science and Culture

MEXT MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN