

NEW SCIENCE, NEW TEACHING, NEW ARCTIC:

BUILDING TRANSDISCIPLINARY UNDERSTANDING FOR A CHANGING NORTH

“Interdisciplinary knowledge is therefore both urgently needed and frustratingly elusive in the Arctic. An interdisciplinary approach is required to foster understanding of a region that in so many ways defies singular stories of its past, categorical understandings of its present, or predictive models for its future.”

Urgently needed & frustratingly elusive

1. Urgently needed
2. Frustratingly elusive
3. Working across disciplines
4. The Arctic as research opportunity

1. URGENTLY
NEEDED





Cross disciplinary perspectives

- Animal husbandry
- Anthropology
- Biology
- Climatology
- Geography
- History
- Law
- Politics / International Relations

Question conceptual divisions

- Is a border something that defines units (nations, economies, etc.), is it place for performing politics, or is it a piece of bureaucratic infrastructure?

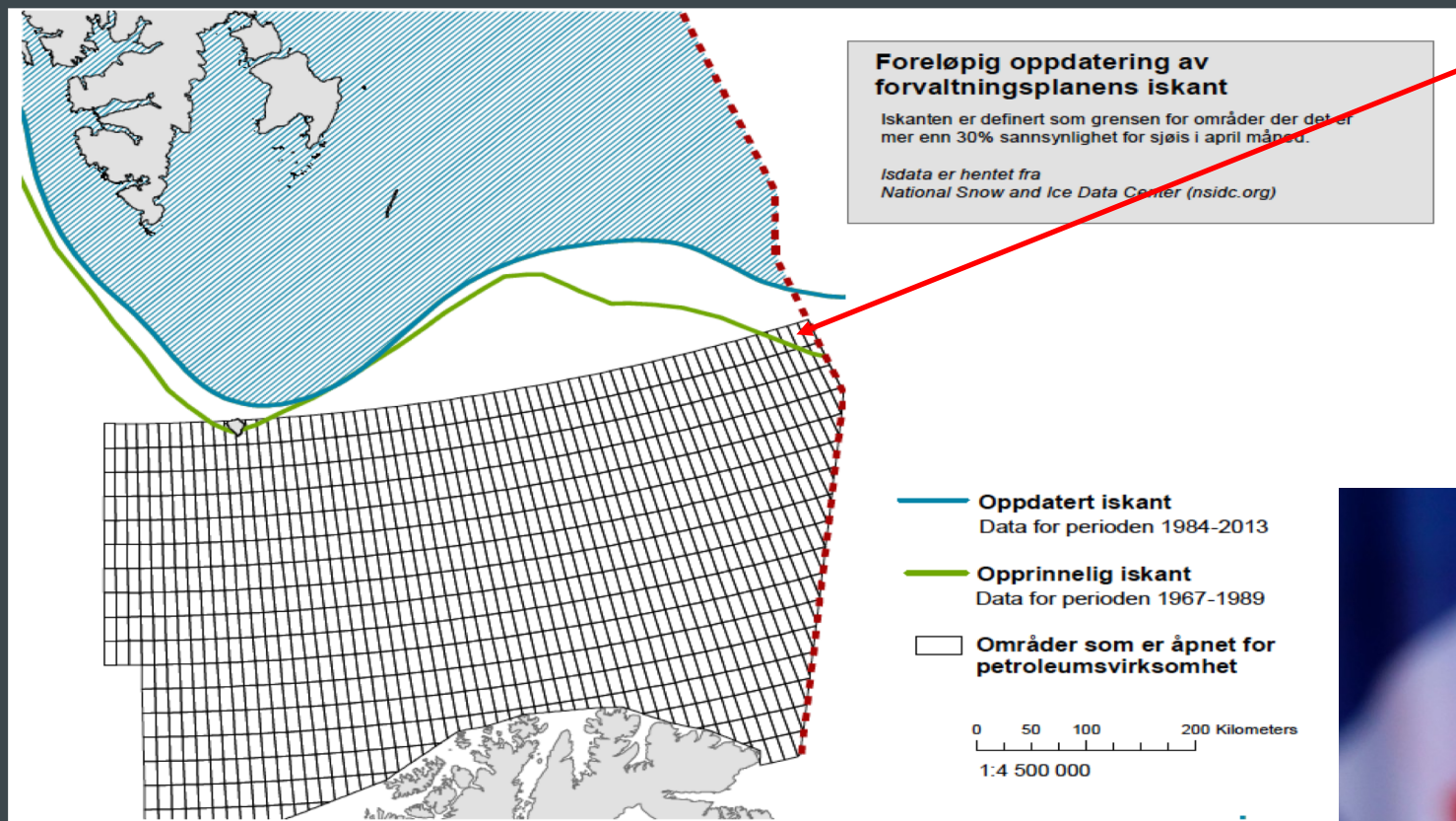
Multiple scales

- From individual herder (or reindeer), to global climate system, to EU conference rooms



Lofoten Islands / Barents Sea Management Plan:

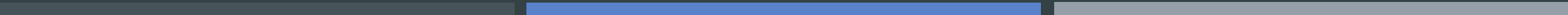
- No petroleum activities in the marginal ice zone
- But how do you account for:
 - Multiple spectra used to define icy pixels
 - Threshold for determining ice extent
 - Threshold for determining ice frequency
 - Short-term variance
 - Seasonal variance
 - Annual variance
 - Long-term change



New limits of marginal ice zone (“the ice edge”) were defined on same day that new leasing round was announced

“We are not moving the ice edge. It is actually nature that is currently moving the ice edge.”
– Erna Solberg, 20 January 2015






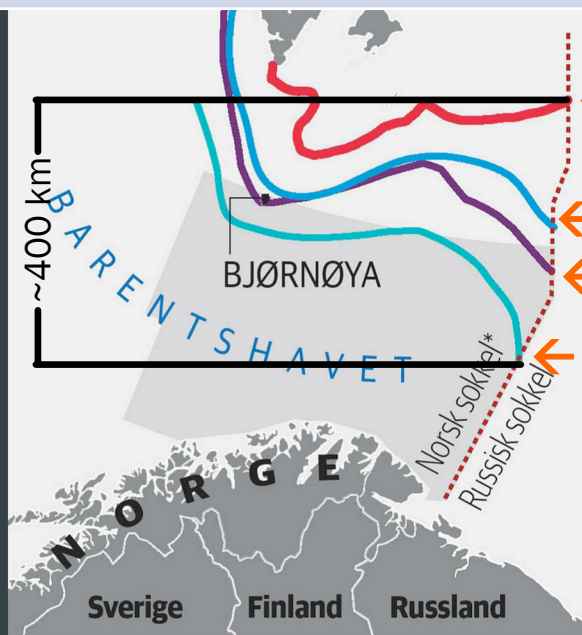


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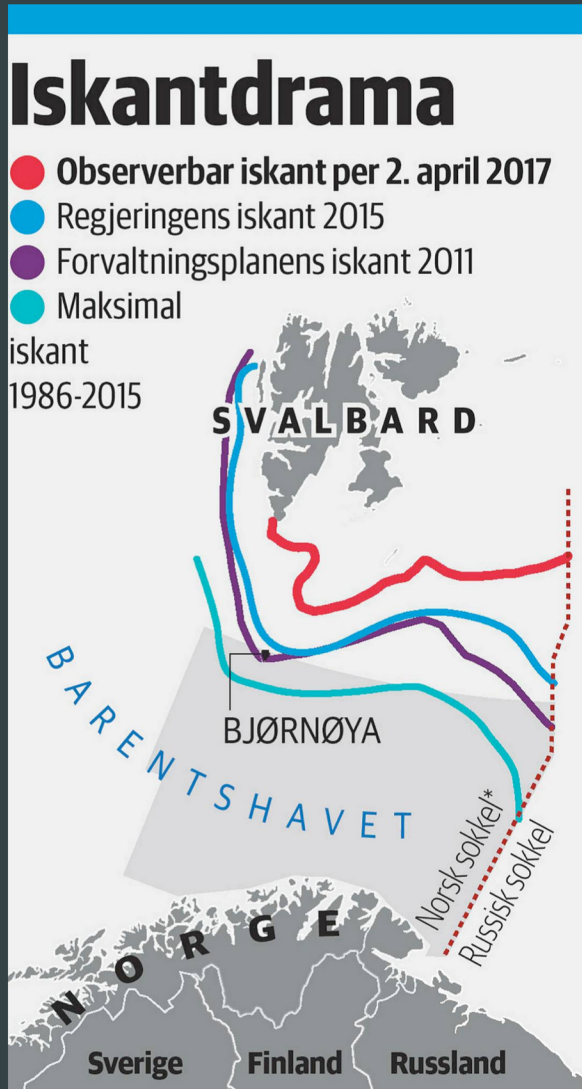
Where is the ice edge on 2 April 2017?

← Oil Ministry definition: 'Actual/Observed' ice edge (2 April 2017)

← New Environment Ministry definition (30% likelihood in April, 1984-2013)

← Old Environment Ministry definition (30% likelihood in April, 1964-1989)

← NPI definition (maximum record in April, 1986-2015)



Research (and practice of ice edge delimitation) is wrapped up with key questions of practice science and communicate it into policy:

- Risk
- Temporal dynamism (at multiple scales)
- Interconnectedness of marine (and other) environments
- Data aggregation and estimation
- Knowable and unknowable variability
- Expert knowledge

Requires knowledge of:

- Remote sensing
- Marine biology
- Oceanography
- Risk assessment
- Petroleum economics
- Public policy formation
- Politics of welfare state
- (Post-) Cold War international relations

Dagens Næringsliv, 9 May 2017

United Nations Convention on the Law of the Sea (UNCLOS) Article 234

“Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence.”

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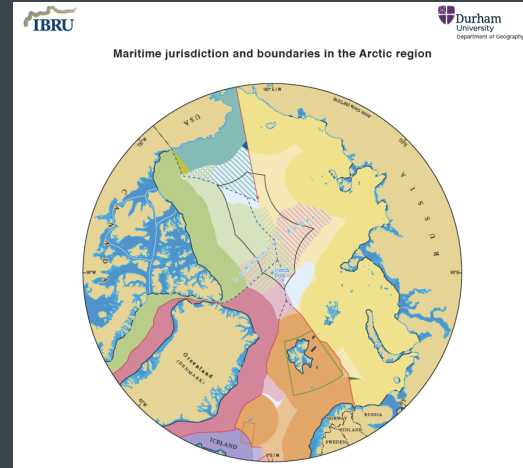
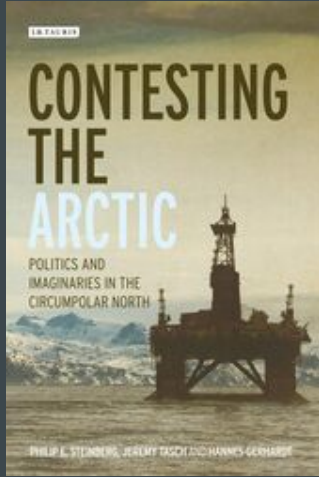
Practical question:

- What would a law of sea ice look like that actually accounted for sea ice's multiple states, uses, etc (Or, what if UNCLOS took sea ice seriously)?

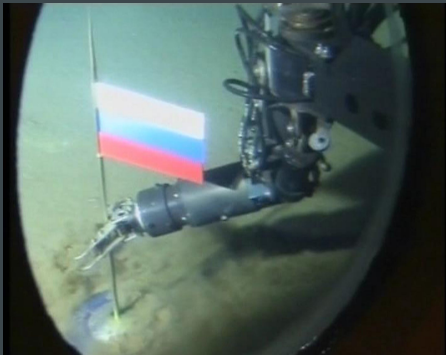
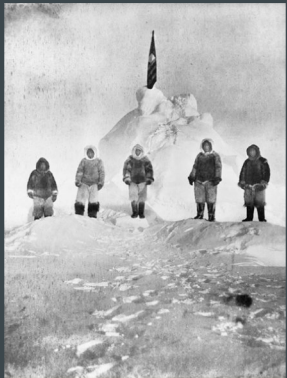
Conceptual question:

- Once frozen ocean is incorporated into our understanding of the world, how does that challenge assumed geophysical and geopolitical binaries (and their linkage) that underpin our ordering of the world?





- The power of myths in the Arctic
 - Space of geopolitical conflict
 - Space of happy cooperation
 - Space of wealth / resources / opportunity
 - Space of poverty / backwardness / underdevelopment
 - Space of purity / emptiness / sublime beauty
- Interdisciplinarity builds awareness
- Power of myth + lack of knowledge is used to perform power → more reason for interdisciplinary wide view



2. FRUSTRATINGLY ELUSIVE

- Laboratory vs local
 - Arctic is not *just* laboratory for exploring concepts/processes
 - Arctic is not *just* place to implement practical applications
 - And local involvement is not *just* as data source or beneficiary
- Arguing about how to argue
- Misunderstanding the “other”

Natural scientists on how social scientists can be “useful”

- They can get us the data that we need to do our analysis (archival, stakeholder input, coordinate citizen science, etc.)
- They can communicate our findings (translate to policy makers, general public, etc.)
- They can take bits of our findings and use them to spin theories that we don't understand (or really care about)

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Social scientists on how natural scientists can be “useful”

- They can get us the data that we need to do our analysis (background on physical change and processes)
- They can communicate our findings (makes our findings appear rigorous, objective, and robust)
- They can take bits of our findings and use them to spin theories that we don't understand (or really care about)

← Tweet



Noella Gray
@NoellaJGray

How NOT to do [#interdisciplinary](#) research.



J. Arbuckle @Jfullstop · Oct 3

Oh no, the dreaded "now that we got the grant how do we do the social science?" email!!

Amirite #AcademicTwitter that the time for this question is at the beginning of the grant-writing process? Not post-award?

Integrating social and biophysical models for urban and urban-adjacent food-energy-water (F-E-W) systems to analyze current conditions and make future predictions focusing on local food production in urban and near-urban areas.

As some of my colleagues were reviewing the literature your papers came up prominently in your work in gathering data from producers and in the agricultural domains. One of our first tasks is to develop surveys and conduct focus groups with producers and farmers. It looks like you have a lot of experience in conducting focus groups. For a lot of us on the team this is something that we are not that experienced in. I run a lot of human-in-the-loop experiments, but not focus groups.

At some point would you be willing to meet with our sub-team to just

5:37 PM · Oct 5, 2019 · [Twitter for iPhone](#)

2 Retweets 10 Likes



- Respect each other as scientists and *researchers*. We're not consultants (unless we are)

← Tweet

Search Twitter

Hello! It's been a while.

Your name came up today in a meeting on a new NSF project we are starting up this year. IN this project, we plan on gathering data and integrating social and biophysical models for urban and urban-adjacent food-energy-water (F-E-W) systems to analyze current conditions and make future predictions focusing on local food production in urban and near-urban areas.

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At some point would you be willing to meet with our sub-team to just talk through some of the lessons learned you have gained from your experiences. I feel that would be really helpful in getting us started. We

16

19

120





3. WORKING ACROSS DISCIPLINES

- Respect each other as scientists and *researchers*. We're not consultants (unless we are)
- Spice up a team with non-specialists
 - Brings in diverse perspectives
 - Bringing them up to speed is team building and brings commonality to surface
- Develop interdisciplinary education
 - Again, lowers the temperature; forces recognition of commonalities; seeds research collaborations
 - Maximizes impact
- If you can't find a common research objective, don't despair; there are other models

4. THE ARCTIC AS RESEARCH OPPORTUNITY



Acknowledgments

The discussion of climate change and Sámi reindeer herding mobilities draws on the work of DurhamARCTIC Ph.D. Students Ilona Kater (Biosciences/Anthropology) and Jan Mikael Lundmark (Law/Geography). Their studies, in turn, are made possible by a grant from the Leverhulme Trust.

The discussion of Norwegian ice edge delimitation is drawn from:

- P. Steinberg, B. Kristoffersen, & K. Shake, “Edges and flows: Exploring legal materialities and biophysical politics at the sea ice edge.” In: *Blue Legalities* (I. Braverman & E. Johnson, eds.), Duke University Press, 2020.
- P. Steinberg & B. Kristoffersen, “‘The ice edge is lost....nature moved it’: Mapping ice as state practice in the Canadian and Norwegian North,” *Transactions of the Institute of British Geographers* 42(4): 624-641 (2017).

The discussion of Arctic mythologies is drawn from:

- P. Steinberg, J. Tasch, & H. Gerhardt, *Contesting the Arctic: Politics and Imaginaries in the Circumpolar North*. I.B. Tauris/Bloomsbury, 2015.