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# Social Impacts of Permafrost Thaw in Coastal Northern Siberia

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# Plan

- I. Nunataryuk
- II. Research Questions
- III. Case Studies
- IV. Preliminary Results



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# I. Nunataryuk



# I. – Nunataryuk project

- Determine the impacts of thawing land, coast and subsea permafrost on the global climate and on humans in the Arctic and to develop targeted and co-designed adaptation and mitigation strategies.
- Duration: 5 years (2017-2022)
- Funding: Horizon 2020 (European Commission)
- 26 partners from 11 countries
- CEARC:
  - WP7 – analysis of socio economic impacts of permafrost thaw in Siberia



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## II. Research questions

1. Impacts on Cultural Dimensions (Doloisio, N.)
2. Impacts on Human Security (Vullierme, M.)
3. Impacts on the Economic System (**Cordier, M.**, Shadrin, V., Yantsen, A.)



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## II. 1 – Impacts on Cultural Dimension Doloisio, N.



## II. 1a – Cultural Dimension at Risk

- Current research on climate change focused on...:
  - Quantifying the impacts of climatic variation
  - Impacts on ecosystems or infrastructure
- ... while ignoring social aspects, which:
  - Are equally vulnerable and closely related to the territory
  - Relates to identity, emotional ties and implications of potential forced displacements



# II. 1b – Importance of Cultural Analysis

- Why is it important ?
  - Arctic communities developed a particular understanding and sense of place
  - Essential to understand the causes and meanings of human responses :
    - Societies with shared values and beliefs produce their view of the natural environment, which influences how they interpret and respond to risk (Douglas and Wildavsky, 1982)
    - The legitimacy, acceptability and effectiveness of adaptations can only be understood within a particular social context, and adaptation has the potential to undermine resilience where cultural values are overlooked (Ford et al, 2015)
- How can we study it ?
  - Using qualitative methods (Ethnography and participant observation)
    - Data do not suit comfortably with quantitative approaches: cultural aspects tend not to be well integrated into climate change analyses and policies (Adger et al, 2013)



## II. 1c – Questions and Research Goals

- Changes of climate and permafrost:
  - New interacting processes and stressors => creating new risk patterns for Arctic communities
- Increased knowledge of the risks:
  - Starting point for understanding the opportunities for, and implications of, possible solutions
- Better understanding of new risk patterns through the recompilation of narratives of personal experiences
  - What are the risks perceived by inhabitants?
  - Which sectors are most impacted?
  - Adaptive strategies implemented or desired to be implemented?
  - Signs of agency?
  - Similarities and differences between Tiksi and Bykovsky



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## II. 2 – Impacts on Human Security Vullierme, M.

## II. 2a – Human Security: definition

- Human Security
  - Copenhagen School, 1990s
  - Linked to the security of individuals or group of individuals
  - Protection of individual(s) against violent or non-violent, physical or non-physical threats – *i.e.* threats to development, well-being, dignity, values, health or the environment
- Object of Security
  - Individual
- *Human Development Report 1994 (ONU) :*
  - Seven dimensions linked to a broad definition of human security : community, economic, environmental, food, health, personal, political

## II. 2b – Human Security: dimensions

Type of Security	Protected by	Examples of risks
<b>Community</b>	Social group procuring a cultural identity, values and support	Tensions between communities (competition, limited access to opportunities and resources), oppressive practices of some traditional communities (serfdom, excision)
<b>Economic</b>	Access to a minimum income (employment or public protection system)	Incomes insecurity (unemployment, poverty), loss of home
<b>Environmental</b>	Access to a healthy environment, survival of local resources and ecosystems	Pollution, desertification, degradation or inaccessibility of resources, salinisation
<b>Food</b>	Easy and daily access to a basic and healthy alimentation	Hunger or deficiencies
<b>Health</b>	Access to medical care and good sanitary conditions	Injuries, infectious and parasitic of cardiovascular diseases, deficiencies, unsanitary environment
<b>Personal</b>	Access to independence and protection against physical violence	Torture, war, ethnic tensions, crime, rape, domestic violence, child abuse, suicide
<b>Political</b>	Access to a society respectful of fundamental rights and freedoms	Arbitrary and political repression, torture, ill-treatment and disappearances, political prisoners, control of ideas and information

## II. 2c – Questions and Research Goals

- How permafrost thaw impacts human security in the Arctic?
- Primary goals : Apprehension of risks perceptions by inhabitants
- Research Steps
  1. Identification of risks
    - What are the risks identified by research?
    - What are the risks perceived by inhabitants?
  2. Classification of risks
    - Are those potential risks related to one of the seven dimensions of Human Security?
    - Can we classify those potential risks by order of importance?



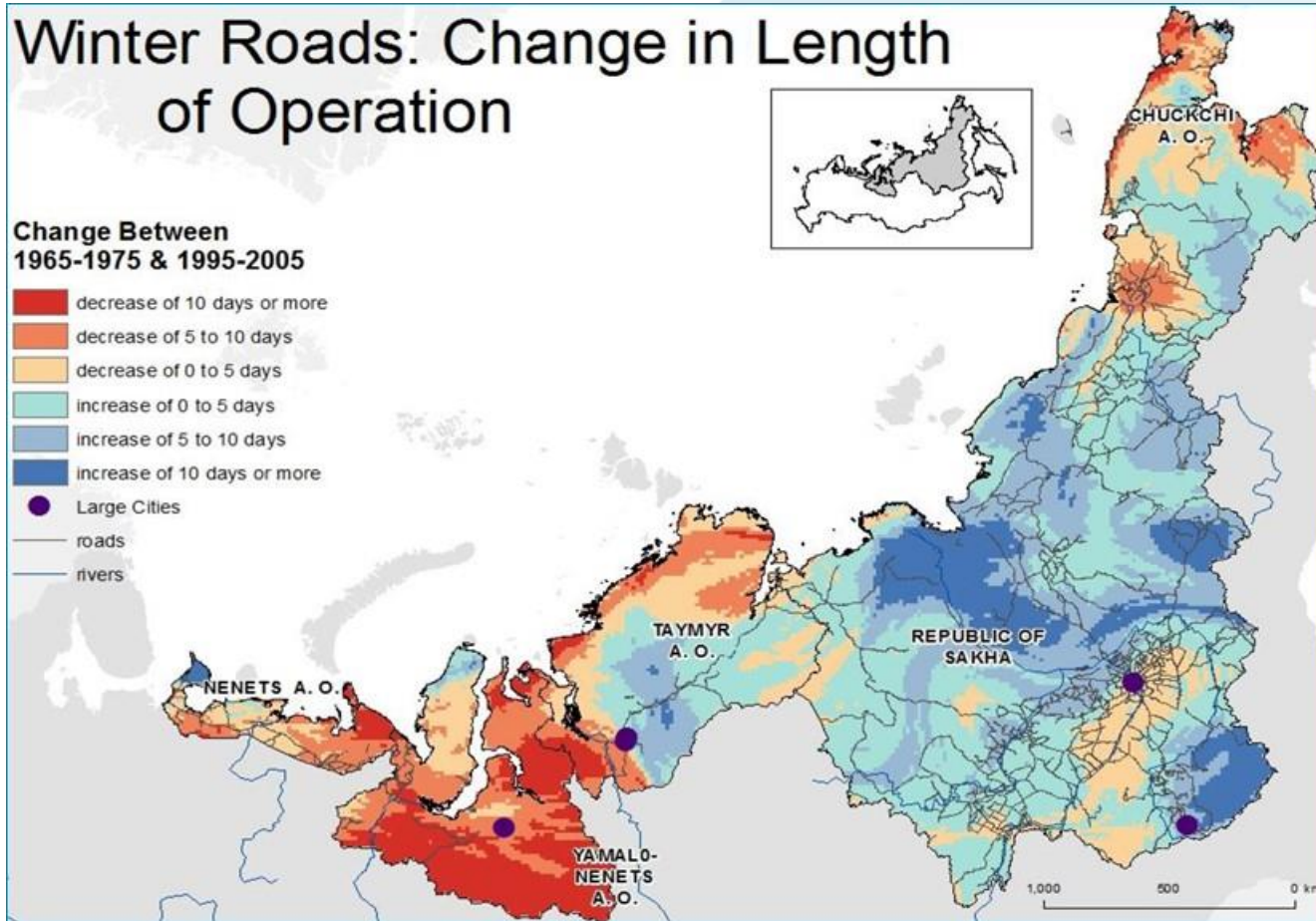
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## II. 3 – Impacts on the Economic System

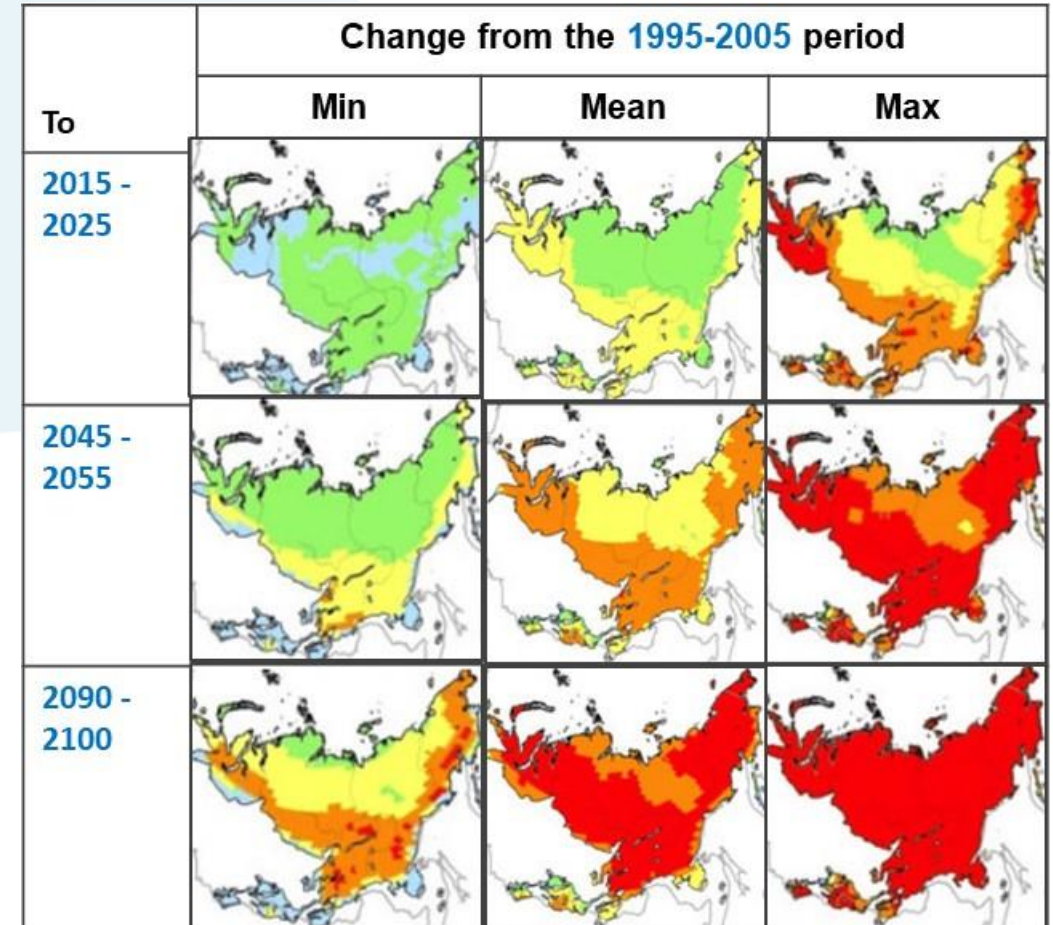
Cordier, M., Nikulkina, I., Shadrin, V., Yantsen, A.



# II. 3a – Economics and permafrost in North Siberia (Russia)



Changes in the duration of the winter road operational period between **1970s** and **2000s** (Anisimov and Streletskiy, 2015)



Statistics of relative changes in bearing capacity (Shiklomanov et al., 2017)

## II. 3b – Economic context in North Siberia (Russia)

- Market economy/self-subsistence economy
  - In some villages, self-subsistence hunting, fishing and harvesting multiplies by 2 household income
  - There is a wide exchange networks of meat, fish and harvested food from villages to cities between relatives and friends
  - In some villages, working life is shared between a professional activity (monetary income) and self-subsistence activities (income in kind)



## II. 3c – Questions and Research Goals

- How permafrost thaw measurements translate into economic impacts for local populations?
- Which **human activities** are directly impacted by permafrost thaw?
- Will permafrost thaw generate human migrations from Bykovskiy and Tiksi?
  - Cultural, social, and economic consequences?
- Is permafrost thaw perceived as a problem by local inhabitants?
  - Why and how?
  - How to use that information to provide recommendations on mitigation and adaptation strategies?



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## III. Case Studies

1. Fieldwork in Siberia
2. Two Coastal Case Studies

Field work organised by the CEARC (Vanderlinden, J-P. (Dir), Cordier, M. Doloisio, N., & Vullierme, M.) and NEFU (Nikulkina, I. (Dir.), Shadrin, V., Grigorieva L., & Garasyuta, P.).



# III. 1 – Fieldwork in Siberia



- Where?

- Bulunsky Region
- Tiksi & Bykovskiy

- When?

- From July 16 to 25, 2019

- Who?

- 46 local stakeholders interviewed
  - ✓ 9 in Bykovskiy
  - ✓ 37 in Tiksi

# III. 2a – Case Study 1

## Тикси – Tiksi

- City: 4604 inhabitants in 2017
- On the mainland
- Permafrost erosion on the coast: 0-1m/year
- Human activities:
  - public services (Bulunsky district municipality office, library, teachers, museum guide)
  - accountant, lawyer
  - veterinary
  - professional fishermen, harbour employee
  - horse breeder



# III. 2a – Case Study 2

## Быковский – Vykovskiy

- Village: 526 inhabitants in 2019
- Peninsula
- Permafrost erosion on the coast: 1.1-2.1m/year
- Human activities:
  - self-subsistence fishing and hunting
  - professional fishing
  - public services (Bulunsky district municipality office, kindergarden, teachers)
  - technicians (electric station, heating system)
  - etc.





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# IV. Preliminary Results



# IV. Preliminary Results

## In Tiksi

- Most people do not identify any risks linked to permafrost since Tiksi is built on rocky ground
- People assert that infrastructure damages are linked to a lack of funding for maintenance and repair
- Outmigration of young people prevent Tiksi development

## In Bykovskiy

- People observe marine fish catch have been declining for the last 7 years
  - Several explanations: industrial nets, oil exploration, increased discharge in Lena river linked to permafrost thaw
- People observe coastal erosion due to permafrost thaw but not the first concern

## In Tiksi and Bykovskiy

- People observe new species and changes in seasonal temperatures
- Young people plan to migrate for personal reasons
- People feel attached to their place of living



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