

Supporting the adaptation of reindeer husbandry to climate change in Finland

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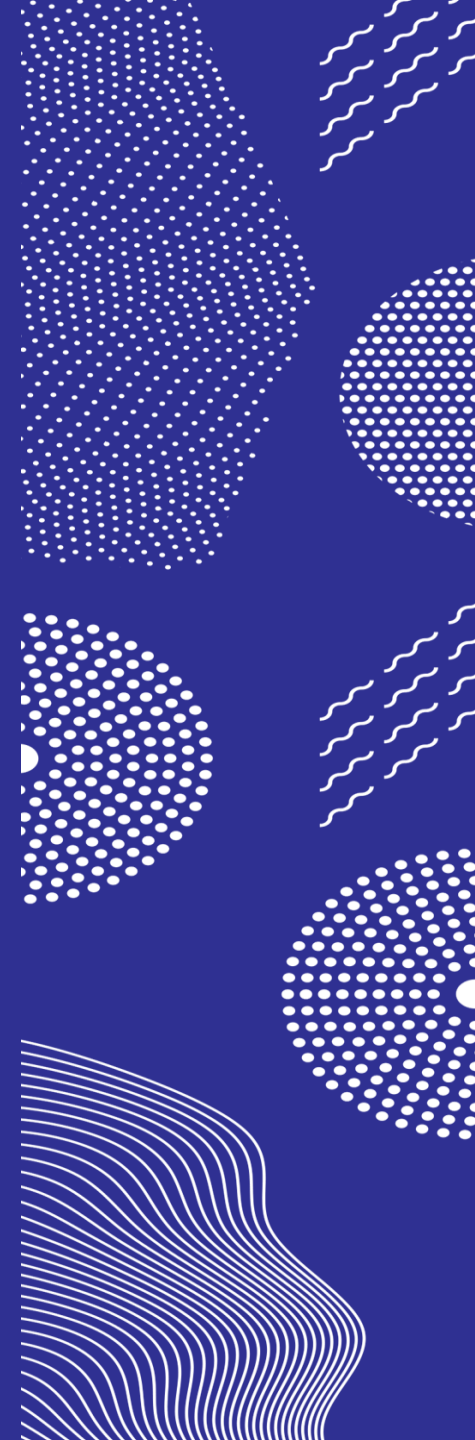
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CLIMINI

Adaptation of reindeer management to climate change – how to minimize the adverse effects of climate change?

The aim of the CLIMINI project is to

1. produce a synthesis based on available knowledge about the impacts of climate change on reindeer husbandry of Finland, as well as its adaptation to climate change
2. produce recommendations for measures for reindeer husbandry to minimize the adverse effects of climate change and utilize its potential benefits, and
3. root operational models for adaptation (“best practices”) into the practical herding work, for example through education and guidance of the livelihood

The project is led by the Arctic Centre, University of Lapland, and funded by the European Regional Development Fund.

Weather is a key factor in the working environment of reindeer herders

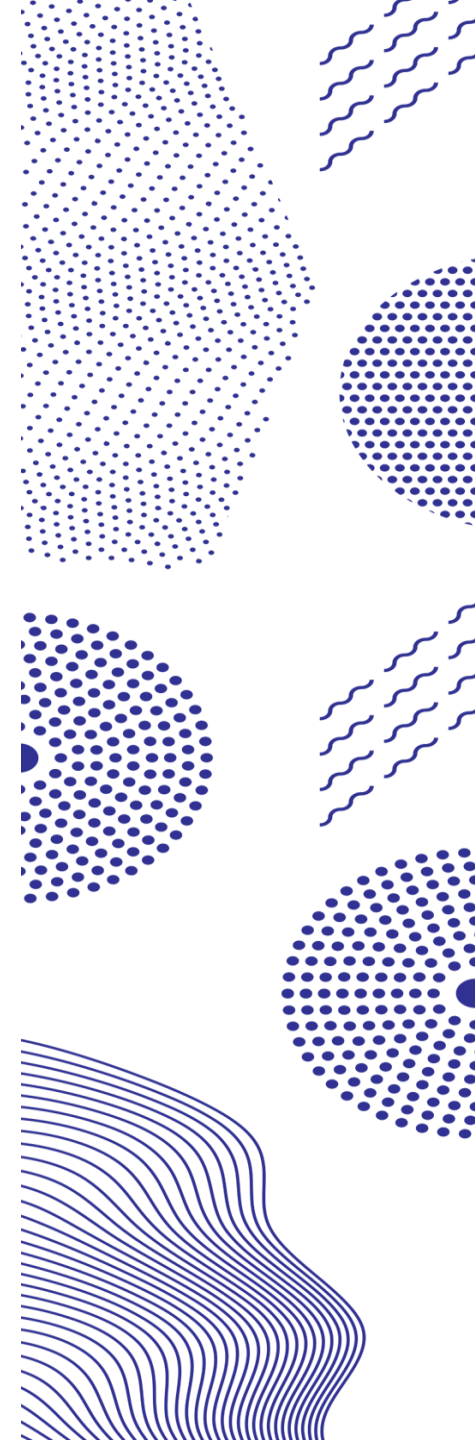


”The weather is a determining factor present at all the time in reindeer husbandry”

”Round-ups have been shifted by a month. When I was younger, snow was on the ground already in October. Nowadays we’ll have to wait it until late November.”

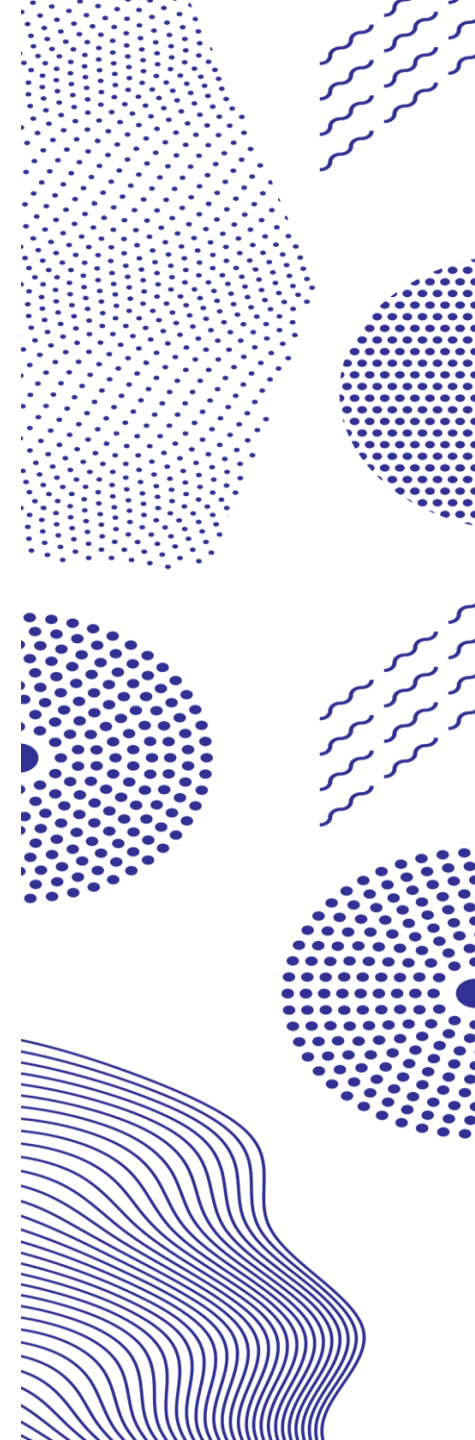
“Everything in reindeer husbandry is somehow related to the climate. It is a bad or good year for calving, and a bad or good year for forage.”

- The citations are from the interviews of reindeer herders performed during the CLIMINI project.



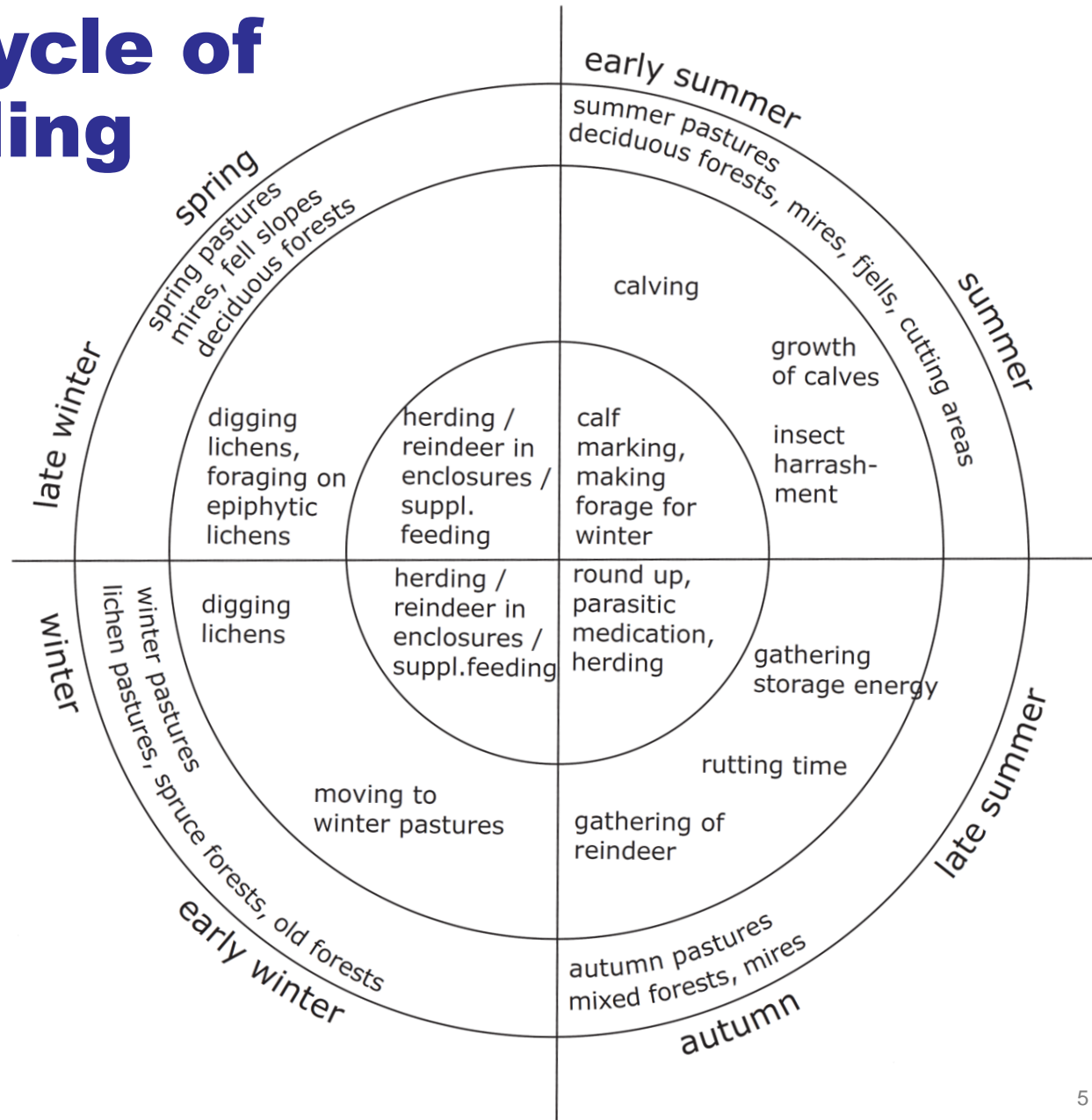
Adaptation to climate change among the reindeer herders

- According to the interviews with reindeer herders and their associations, adaptation is usually reactive. The herders adapt to prevailing conditions, e.g., by taking reindeers to better pasture areas or with supplementary feeding.
- Proactive adaptation is difficult, although mushroom season, for example, predicts the fitness of reindeers during the following winter.
- Seasonal weather has become more difficult to predict → traditional knowledge has become somewhat outdated.
- On the long-term, adaptation is seen above all as a land-use and resource issue.
- Adaptation is easier the larger are the pasture areas.
- Multi-industry as a buffer in the livelihood.



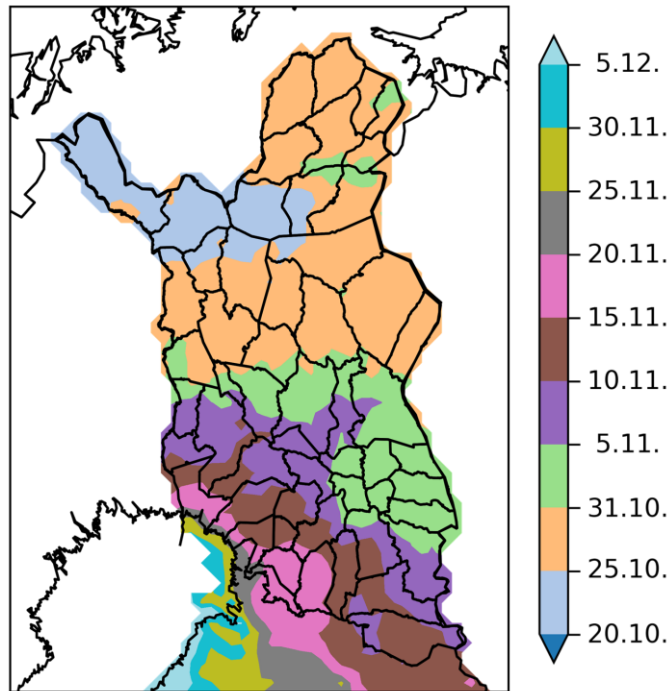
The annual cycle of reindeer herding

The annual cycle of reindeer herding is characterized by different seasonal weather-related risks which require strategic responses from the herders. Maps and time series constitute an easy starting point for discussions about climatic changes with local practitioners.

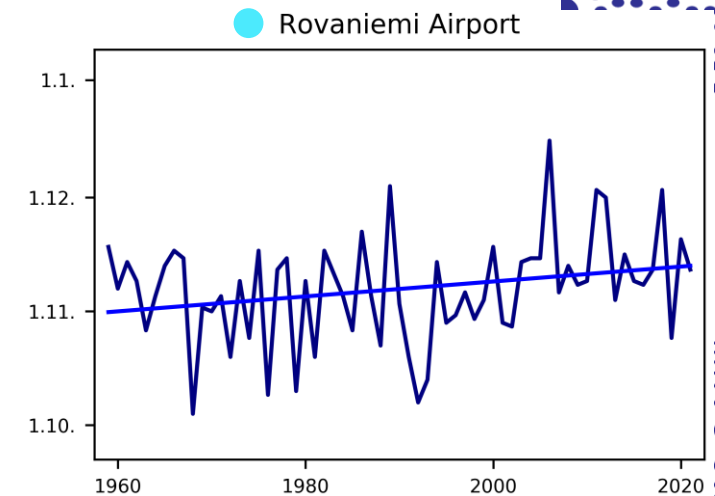
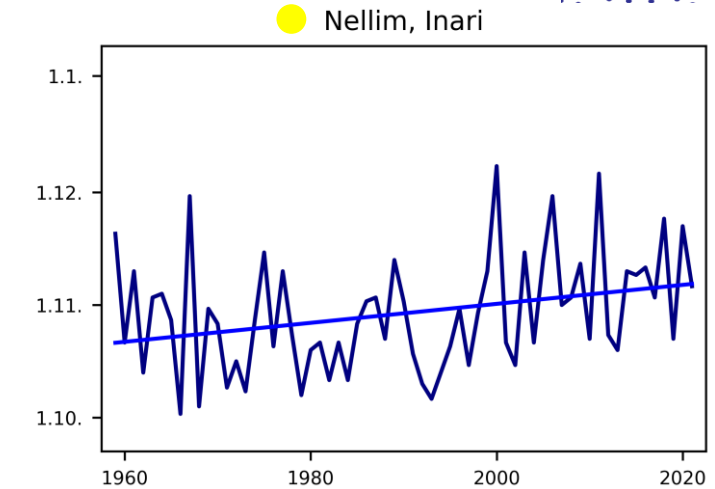
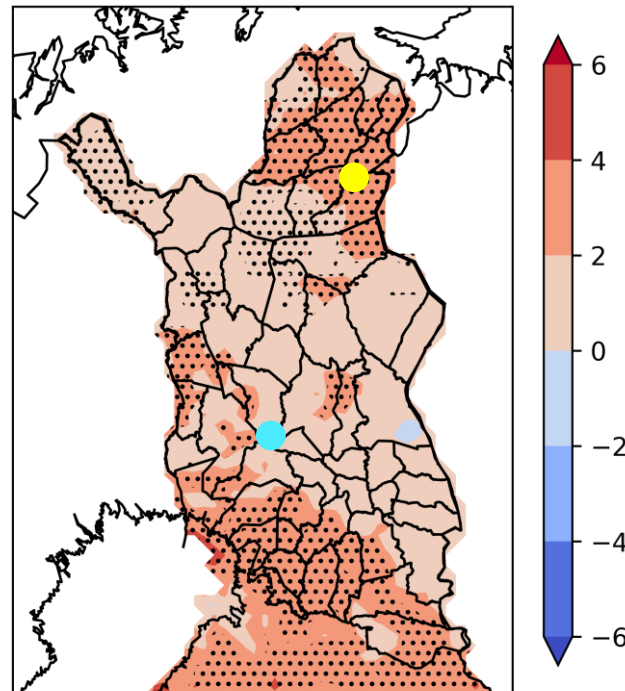


Snow comes later

Average formation date of permanent snow cover 1991-2020



Trend in the formation date of snow cover 1961-2020 (days/10 yr.)

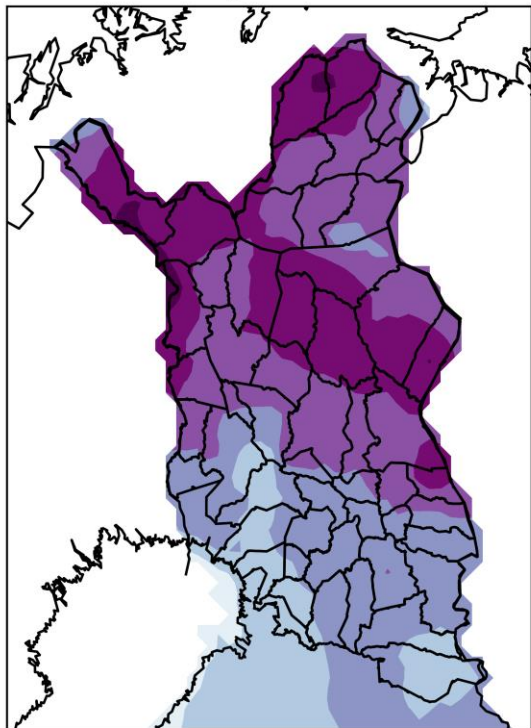


The formation of permanent snow cover has shifted one to two weeks later during the past 60 years.

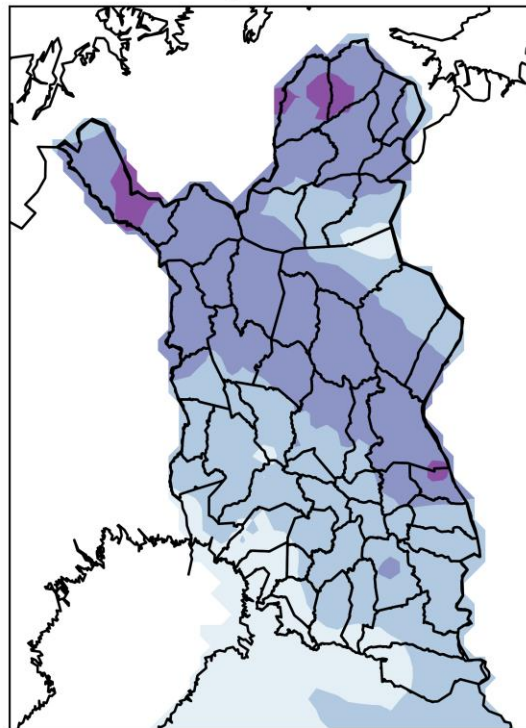
Stippling indicates statistically significant trend at the 5% risk level.

Less cold days in winter

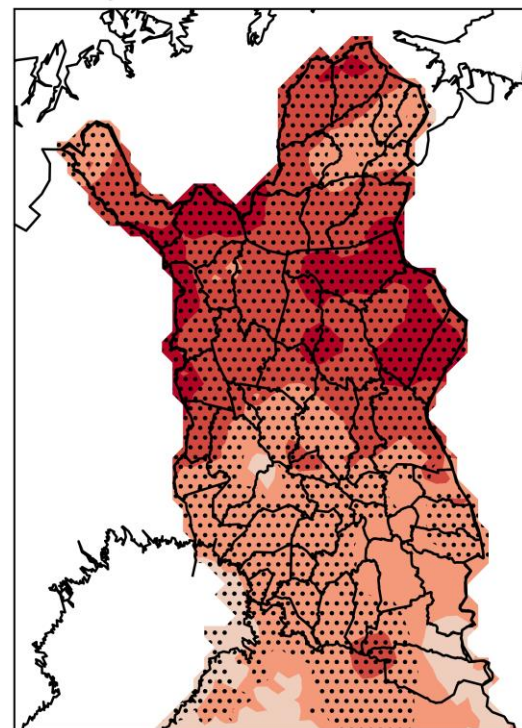
Average annual number of cold days 1961-1990



Average annual number of cold days 1991-2020



Change in the number of cold days 1961-1990 -> 1991-2020

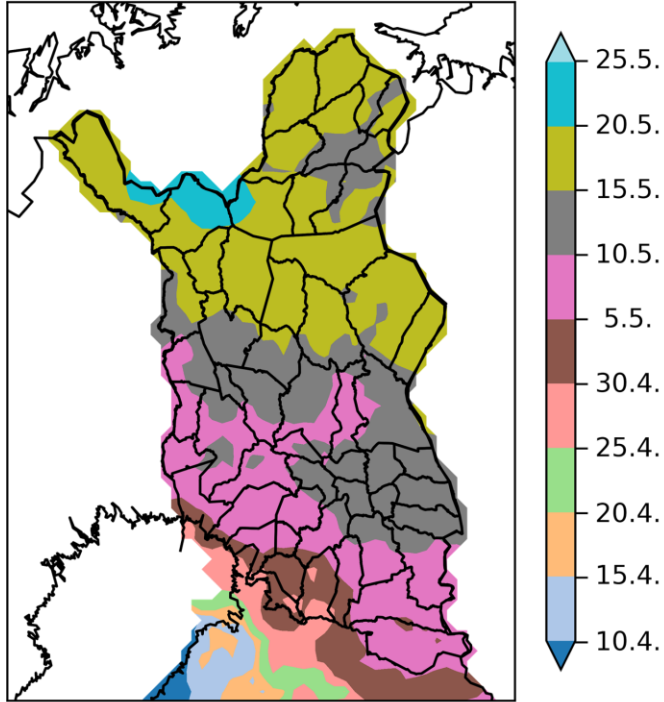


The number of cold days with daily mean temperature below $-25\text{ }^{\circ}\text{C}$ has decreased significantly throughout the reindeer management area.

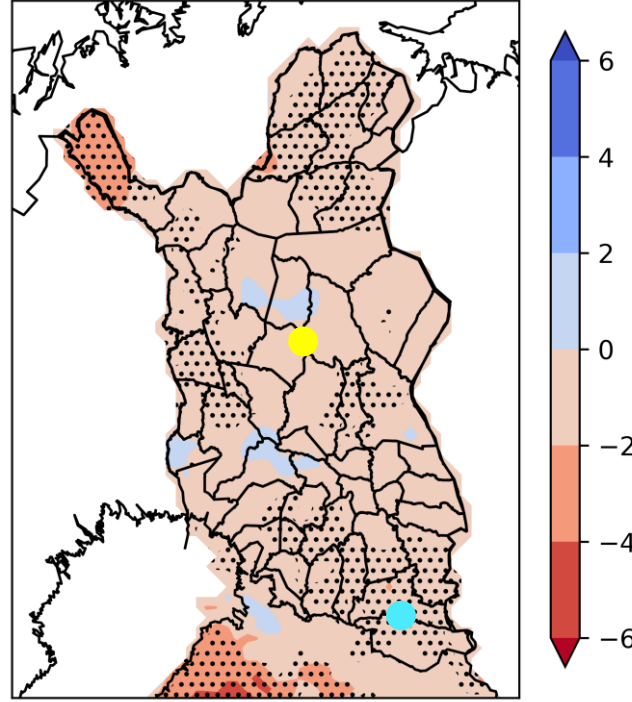


Little change in the timing of snow melt

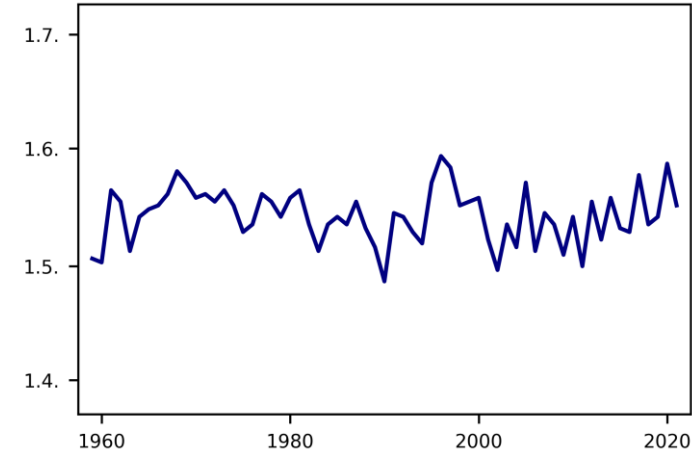
Average cessation date of permanent snow cover 1991-2020



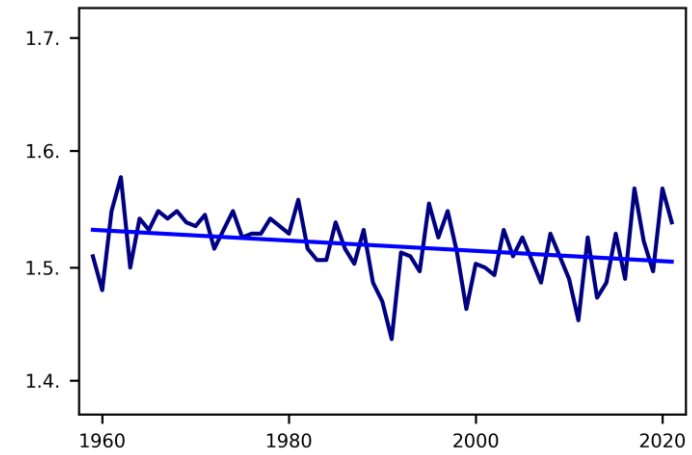
Trend in the cessation date of snow cover 1961-2020 (days/10 yr.)



● Tähtelä, Sodankylä

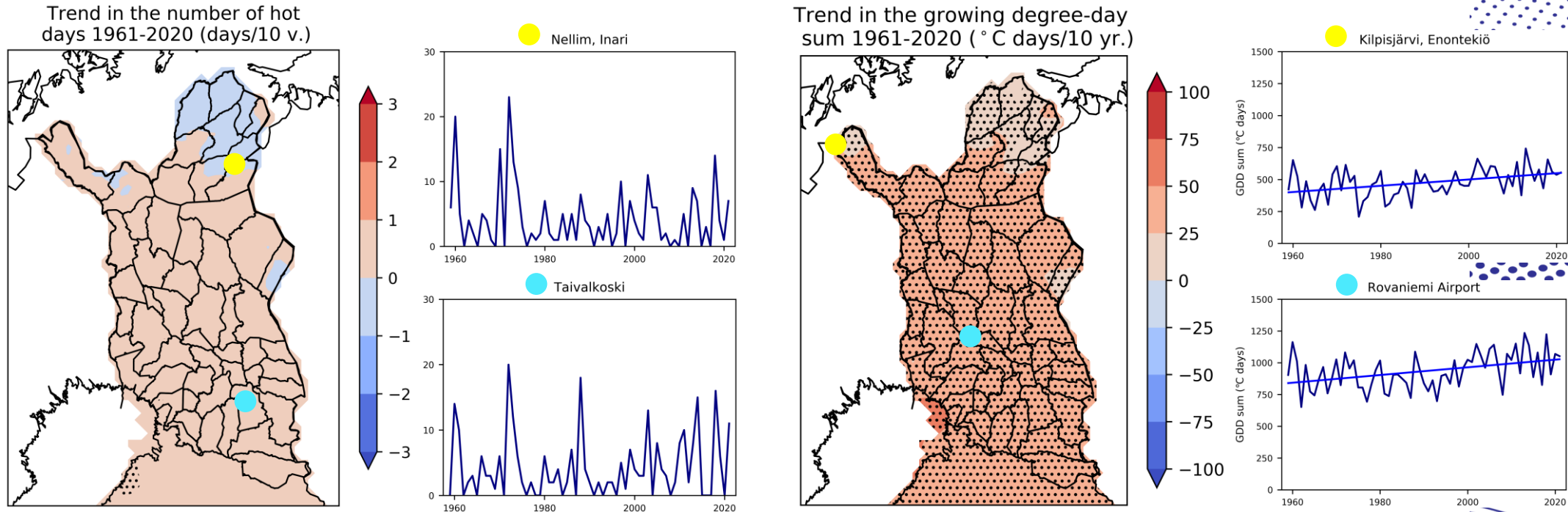


● Suomussalmi



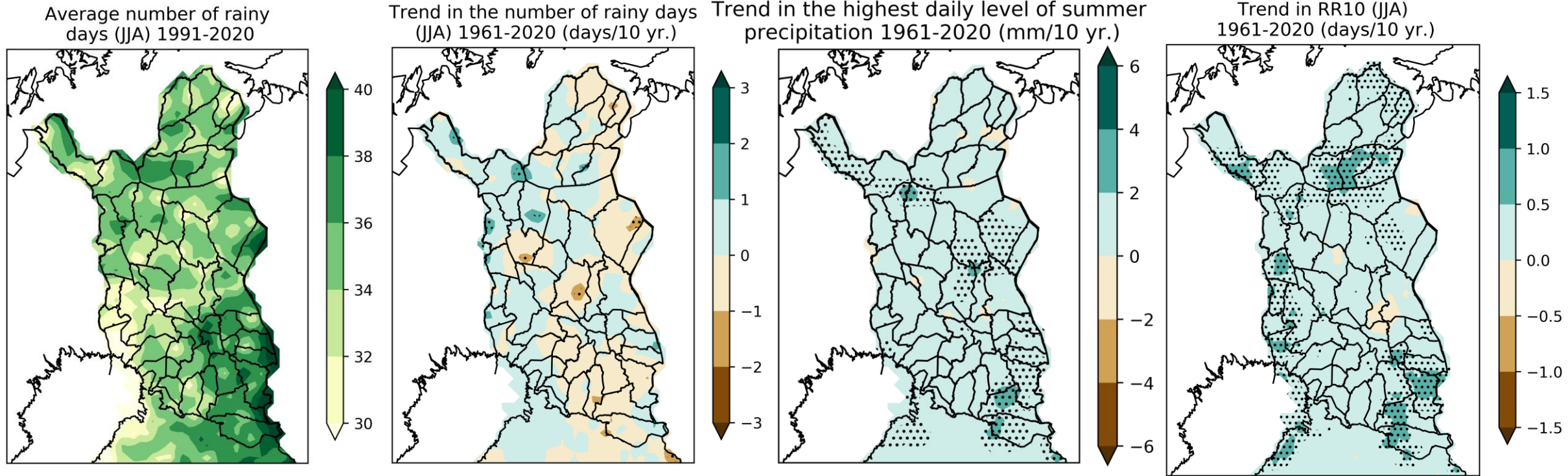
The average cessation date of permanent snow cover has become only a little earlier.

Varying number of hot days, increasing growing degree-day sums



The number of hot days with daily maximum temperature above 20 °C varies substantially from year to year. The growing degree-day sum, on the other hand, has increased steadily.

Varying summer rainfall



Most rainy days in the east, least in the southwest.

Heavy precipitation indices depict slightly increasing trends over part of the reindeer management area.



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Thank you for your attention!

