photo by Minna Turunen

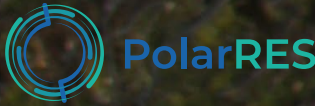Sharing not permitted

Using climate model projections to provide relevant climate information to Arctic reindeer herding communities

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

aims to simulate the future effects of social-ecological changes for indigenous and local communities and traditional livelihoods in the Arctic

questions we started with:

- What kind of information from climate model projections of the future would be relevant for reindeer herders?
- What would help them in the development of adaptation strategies in connection to climate change?

questions that were used in communication with reindeer herders (interviews, literature):

- What weather conditions are good/bad for the important events of the reindeer herding year?
- What makes a reindeer herding year good/bad?

critical seasonal conditions in reindeer herding

spring (calving)
- snow free patches
- snow storms
- ice crusts
- river and lake ice

early spring
- snow melt
- rain on snow
- ice crusts

early summer (calf marking, migration)
- high water levels in rivers
- strong currents

summer
- ~~insect harassment (insect numbers)~~
- insect harassment (insect attacks)
- hot summers
- wet/dry summers
- permafrost degradation
- ~~shifts in occurrence of predators/plants~~
- snow bed degradation

winter
- rain on snow
- mild temperatures (from -5°C to +3°C)

daily snow height, snow cover fraction	daily precipitation (liquid, solid)	daily dew point temperature
daily air temperature (mean, minimum, maximum)	daily soil temperature and moisture	daily wind speed (mean, maximum)
river and lake ice	river discharge	clouds

early winter (migration)
- rain on snow
- hoarfrost; frozen water on plants/lichen
- ice crust on bare ground (ground ice or frost)

late autumn (rutting , round ups)
- wet/dry soil at the moment of first snow
- frozen/unfrozen soil at the moment of first snow

early autumn
- ~~mushroom growth~~
- warm conditions during rutting
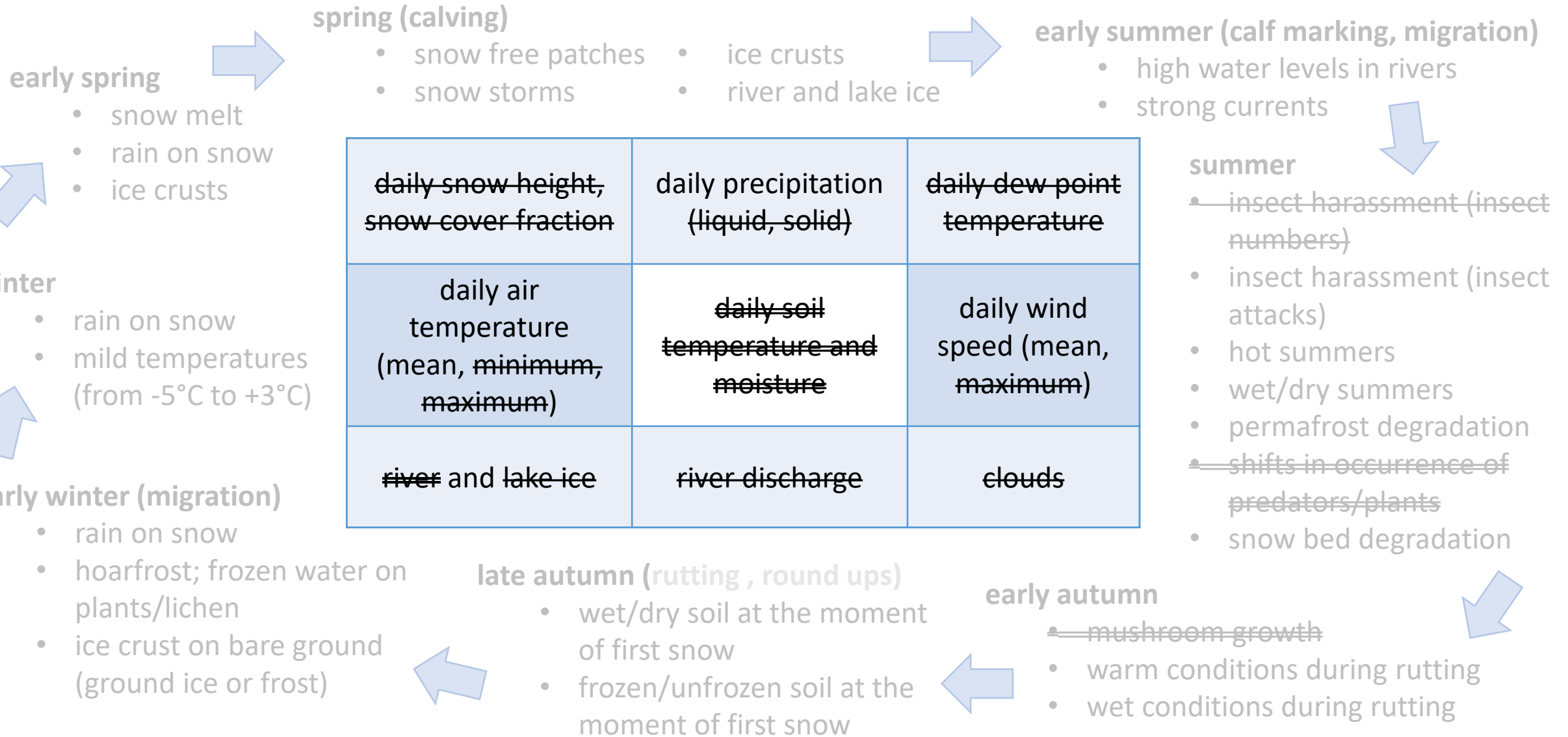- wet conditions during rutting

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critical seasonal conditions – availability of variables

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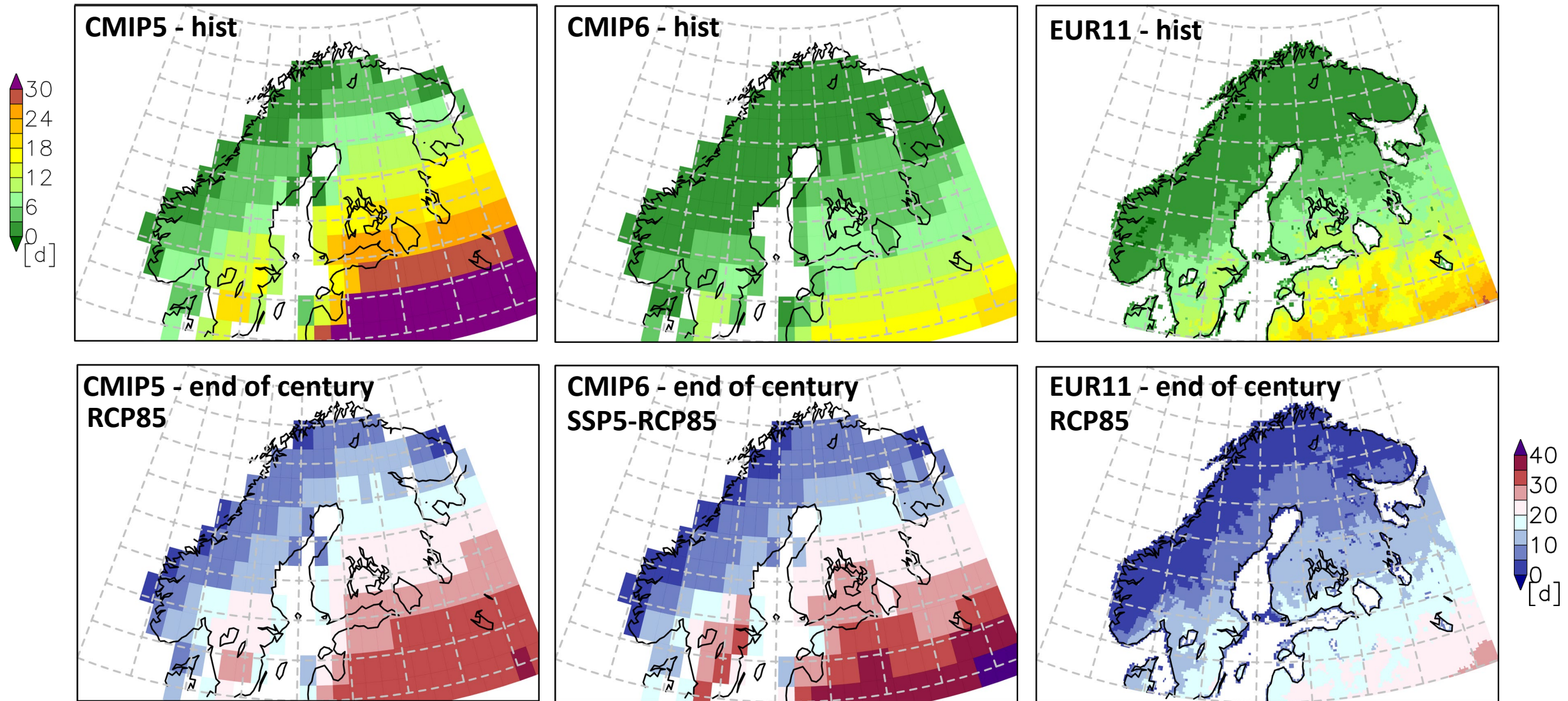- warm conditions during rutting
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hot summers – days with tasmax > 25°C from CMIP6

conclusions

Resolution is everything!

- at least daily temporal resolution of variables is necessary to compute the indices relevant for herders

- high spatial resolution is necessary for adaption of adaptation strategies

questions?

You can never output too many variables!

- specific target groups of climate model projections have specific needs in variables

- providing information on different possible futures with adequate uncertainty estimates requires these variables from big intercomparison projects