



Developing Climate Information for Arctic reindeer herding communities



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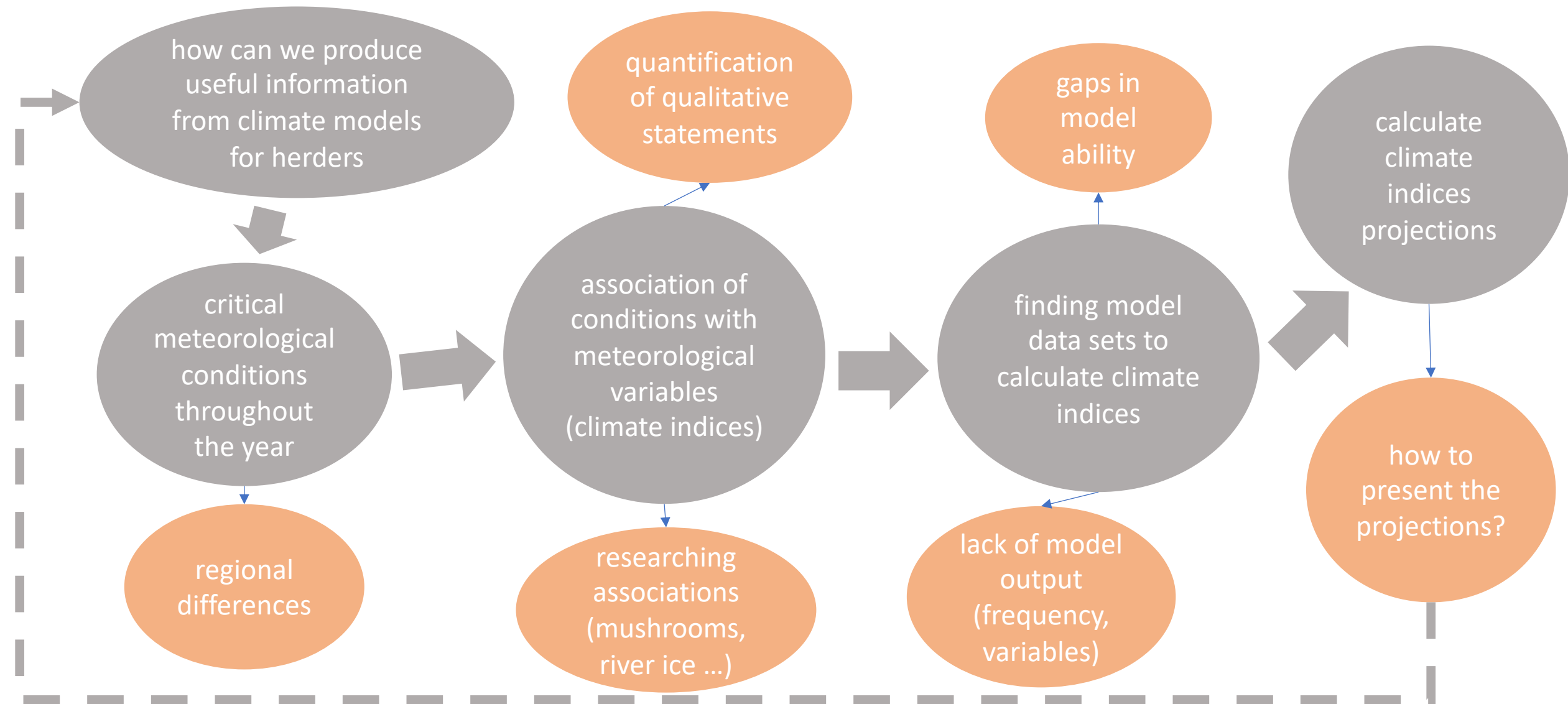
CHARTER: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity ...

... and their relevance for Climate Change Adaption of traditional livelihoods in the Arctic

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

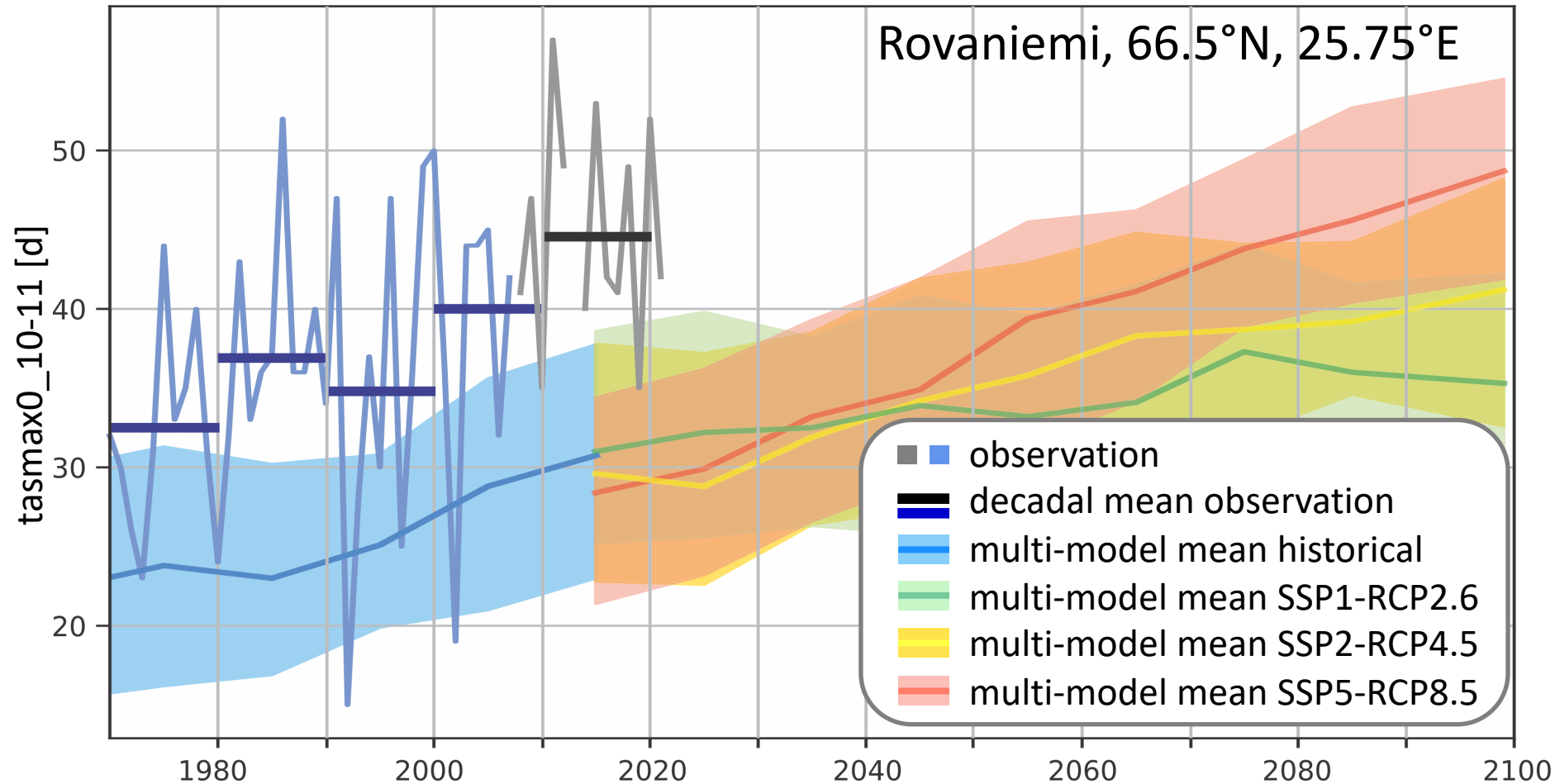
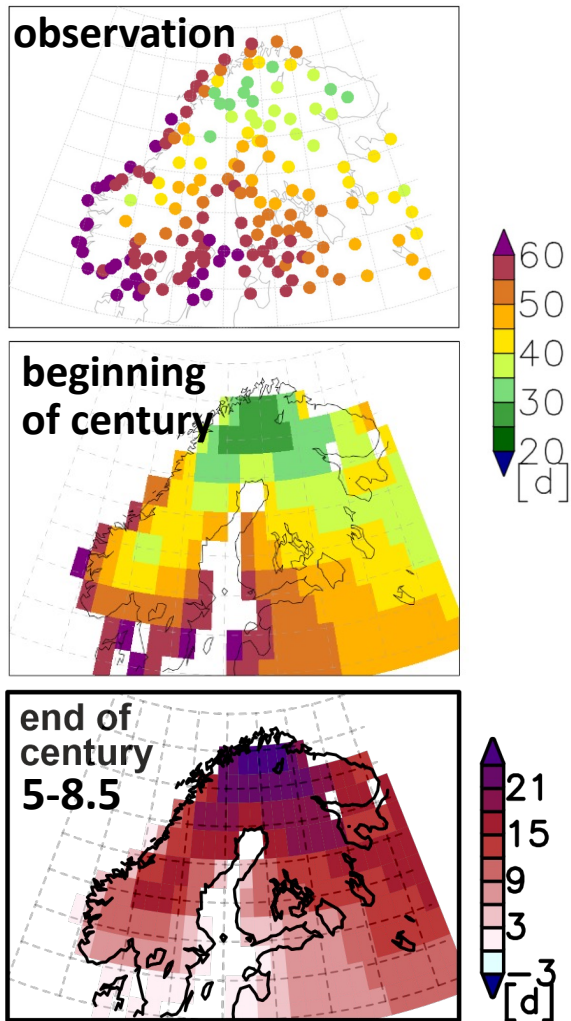
questions we started with:

- 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?



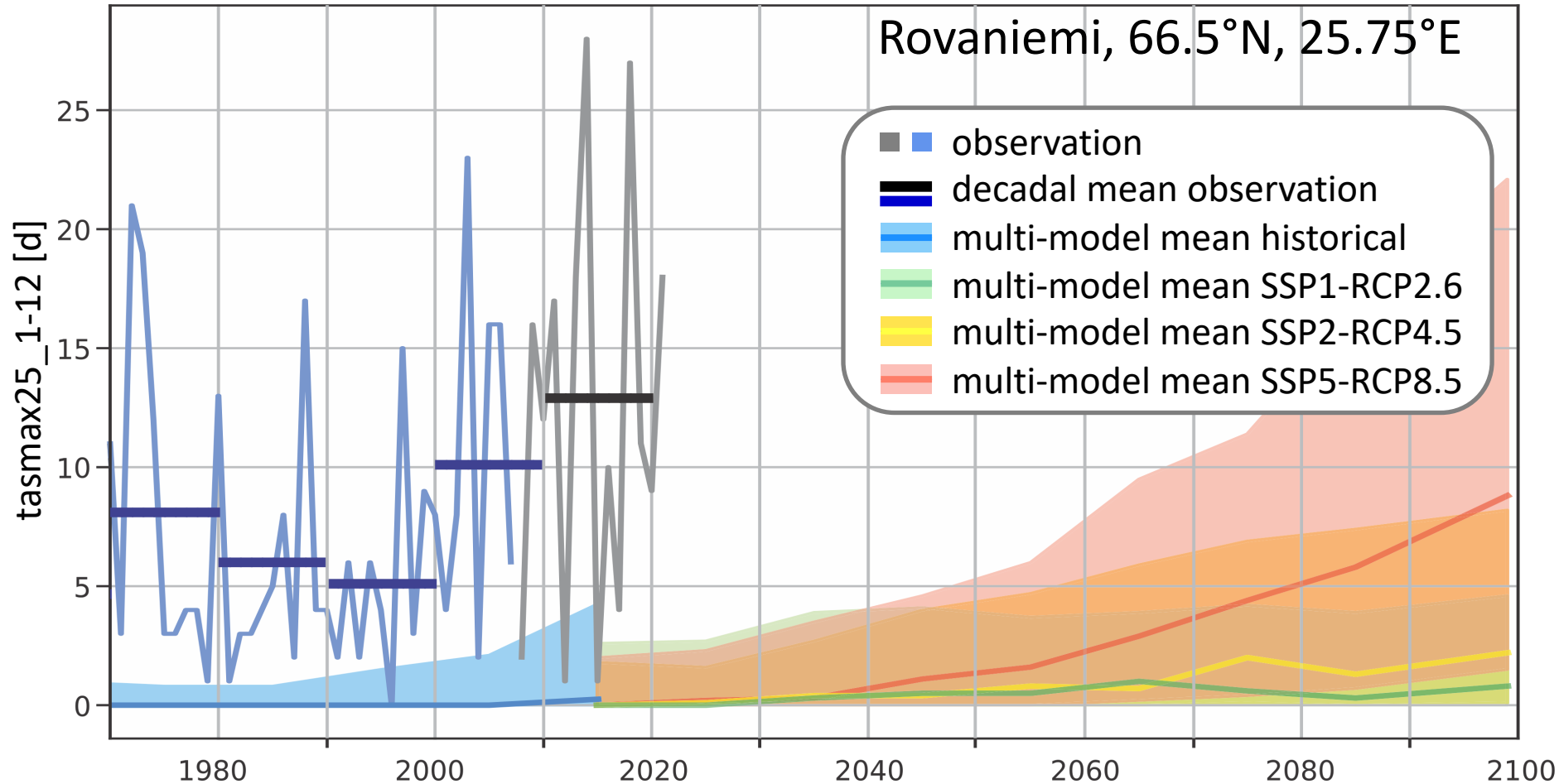
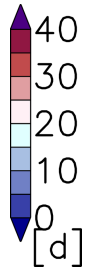
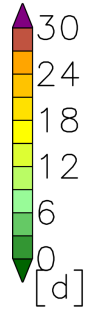
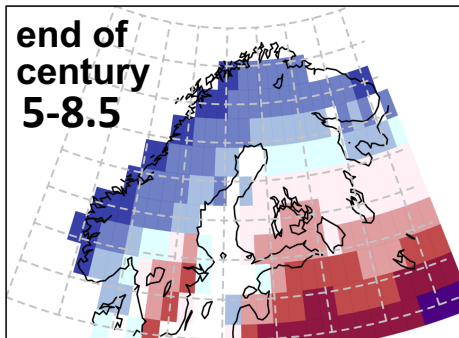
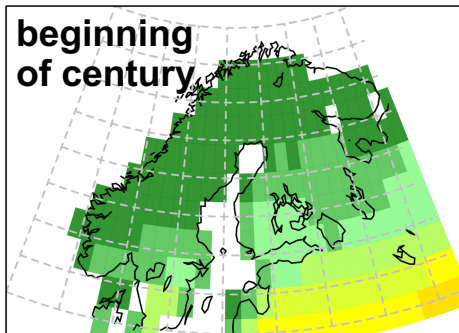
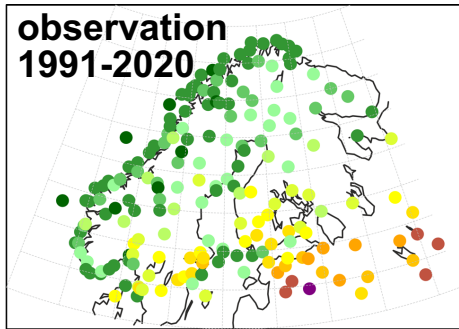
examples of climate indices – tasmx0_10-11 from CMIP6

winter index: number of days with tasmx above 0°C in October and November

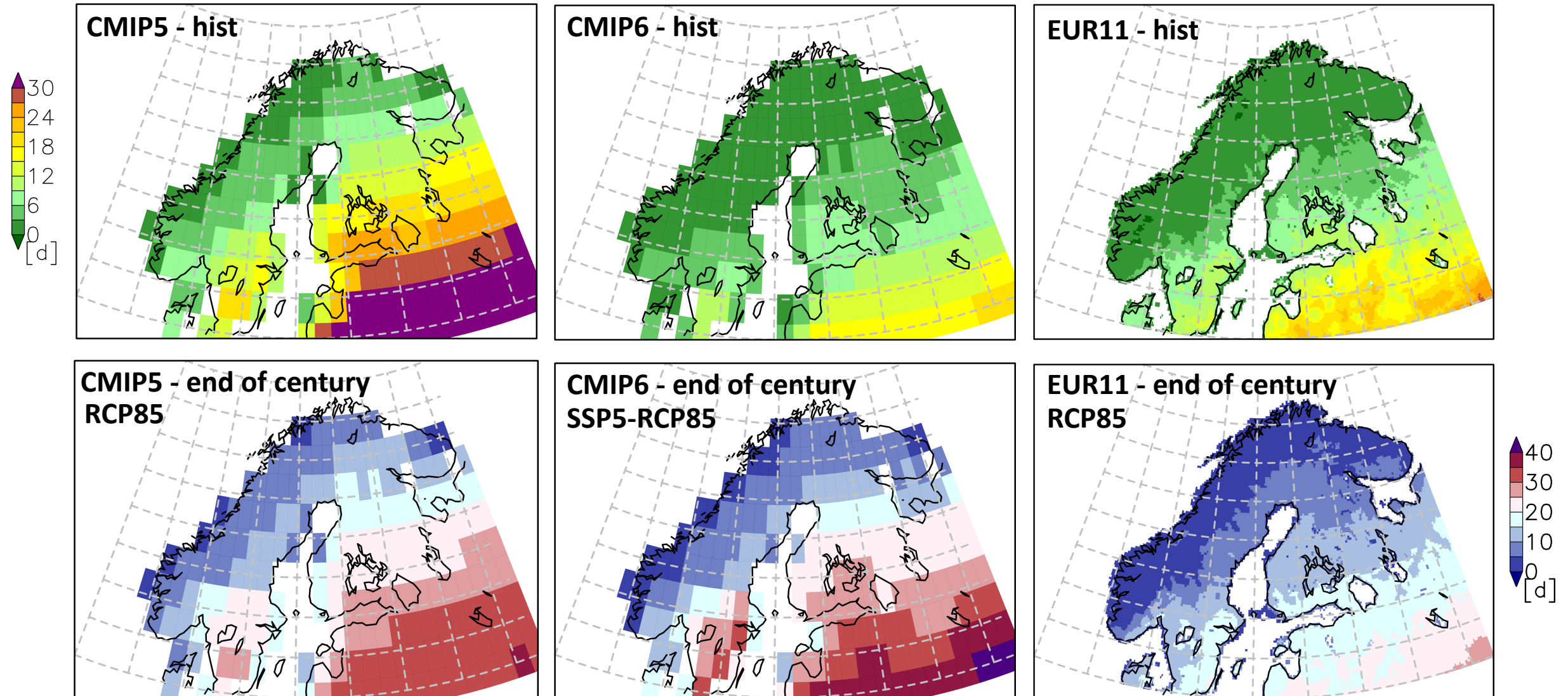


examples of climate indices – tasmx25_1-12 from CMIP6

summer index: number of days with tasmx above 25°C



tasmax25_1-12 from other sources



PolarRES: Polar Regions in the Earth System

- studies the interactions between the atmosphere, oceans, and sea ice in the Arctic and Antarctic
- Core Ambition: To improve regional climate information for impact assessments in the Arctic and Antarctic

high resolution polar climate model simulations

storylines approach
for determining
global forcing



regional model
hindcast
simulations for
evaluation

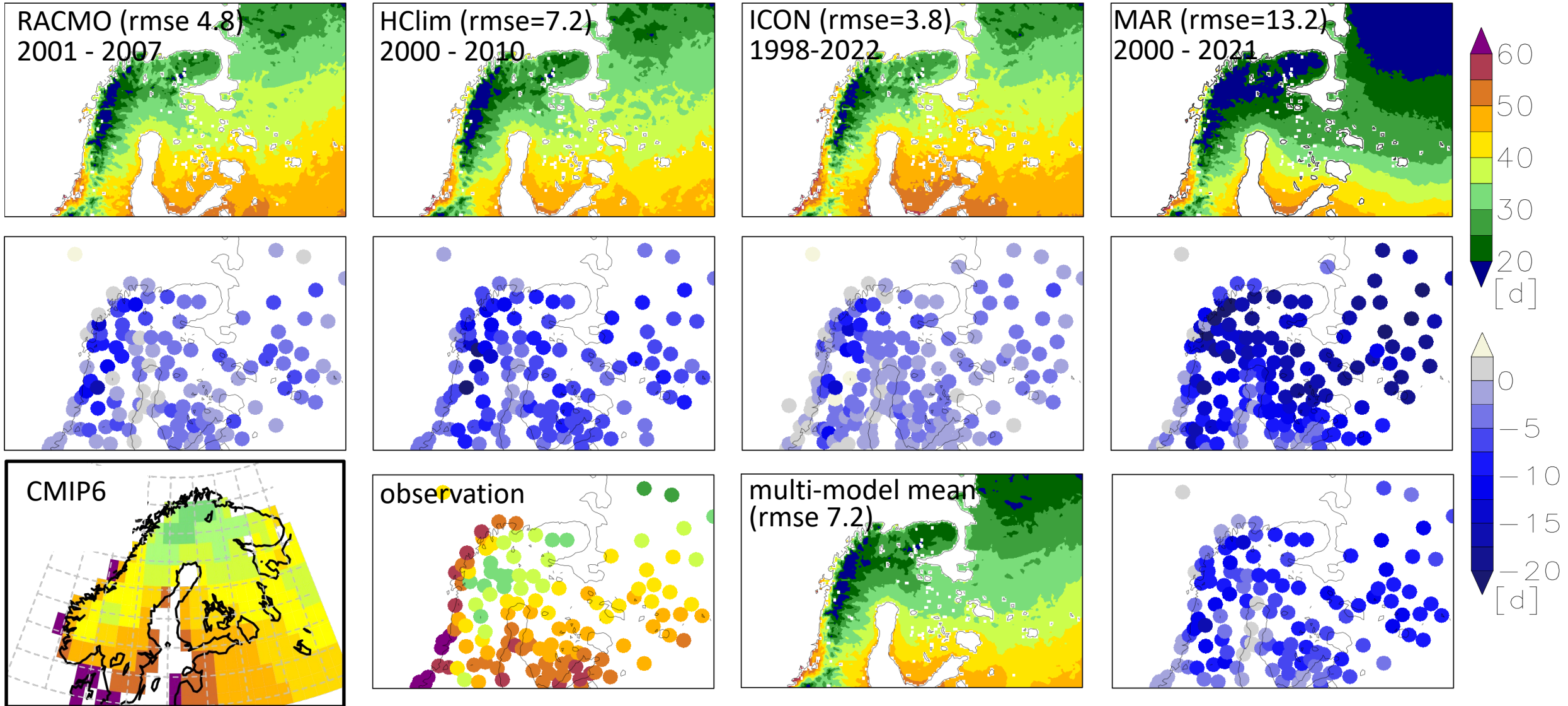


models Arctic

ICON LAM, AWI ✓
MAR, U Liege ✓
WRF, NORCE ✓
HCLIM, DMI ✓
MetUM, BAS ✓
RACMO, U Utrecht ✓

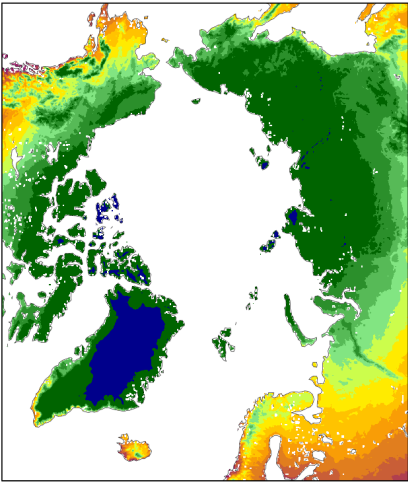
calculation of
climate indices for
herders from the
future projections

PolarRES tasmax0_10-11, Scandinavia

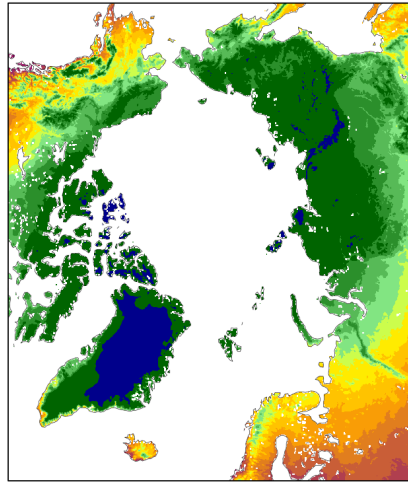


PolarRES tasmax0_10-11, Arctic

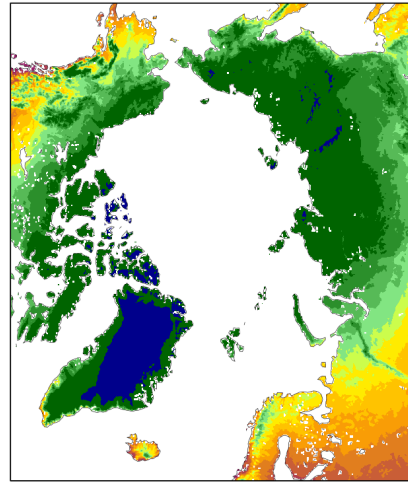
multi-model mean
(rmse=7.6)



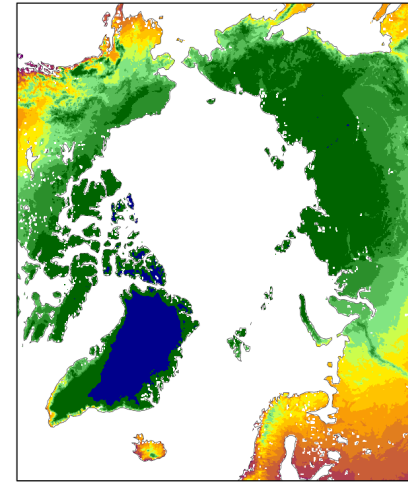
RACMO (rmse=6.4)
2001 - 2007



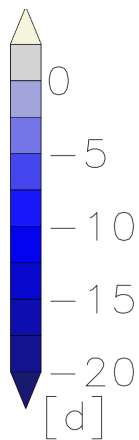
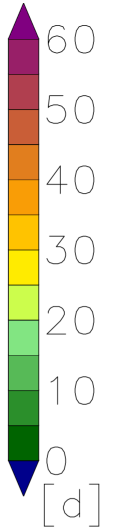
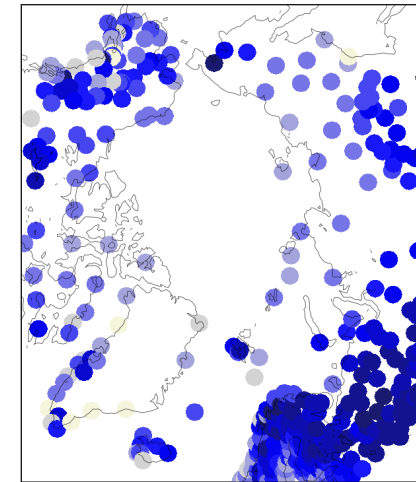
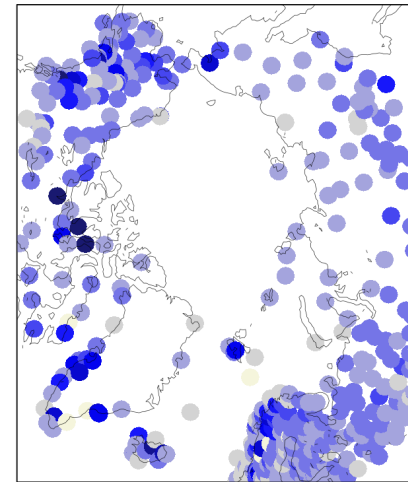
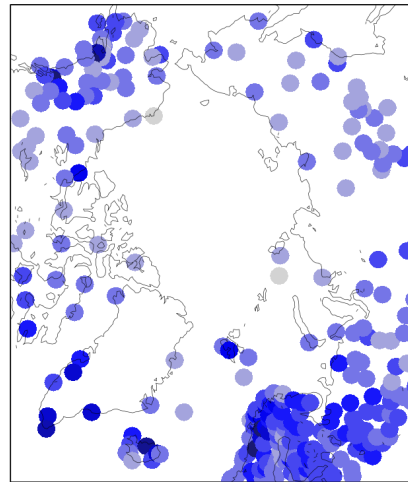
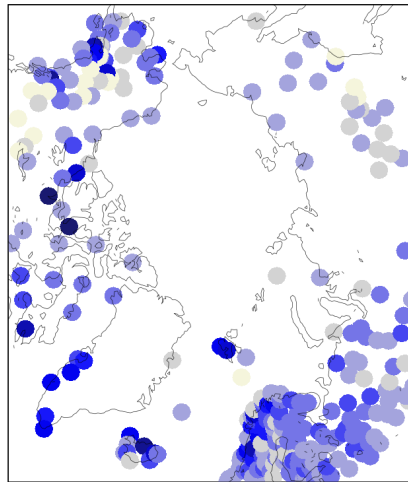
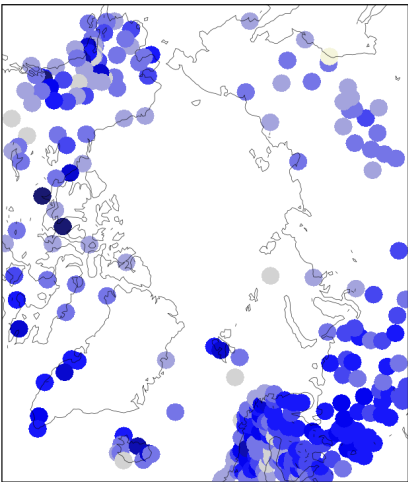
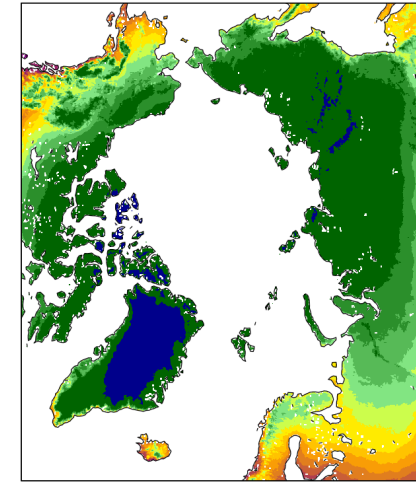
HClim (rmse=6.5)
2000 - 2010



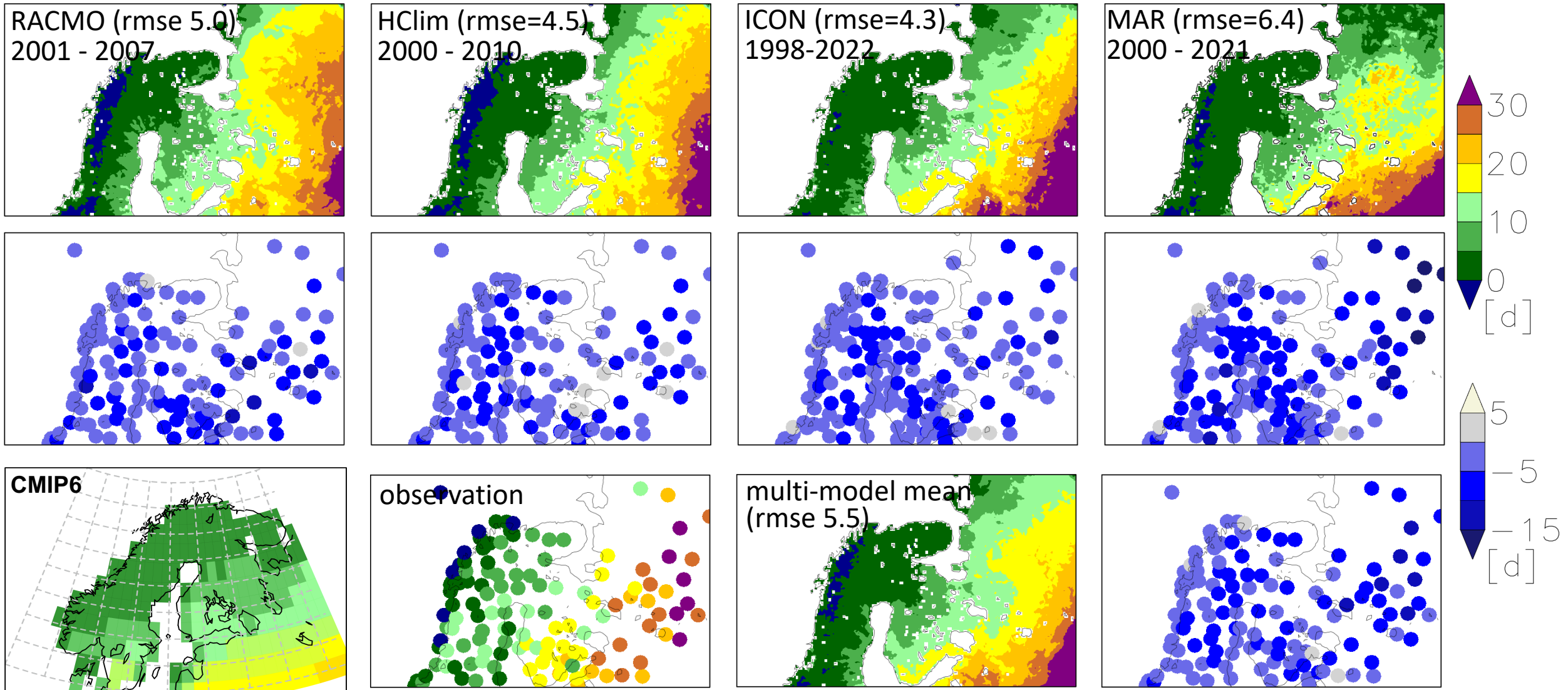
ICON (rmse=4.8)
1998-2022



MAR (rmse=11.2)
2000 - 2021



PolarRES tasmax25_1-12, Scandinavia



PolarRES tasmax25_1-12, Arctic

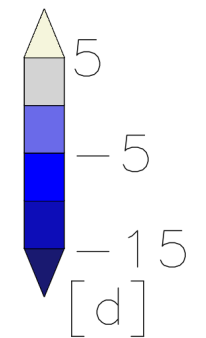
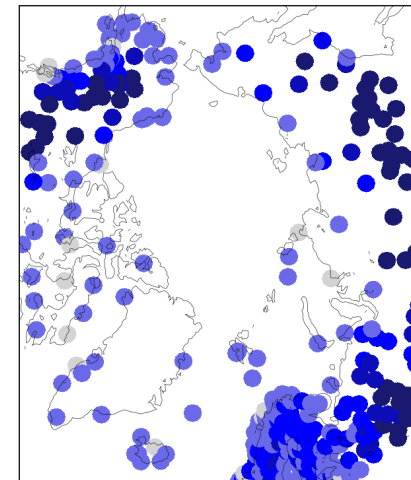
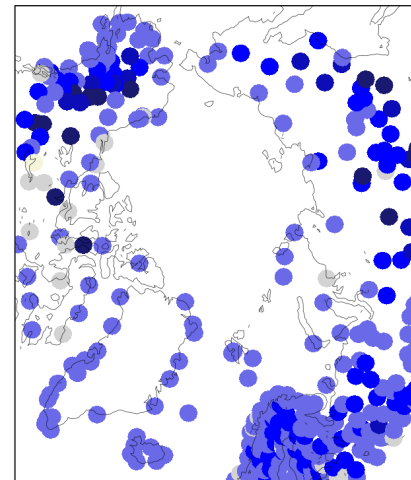
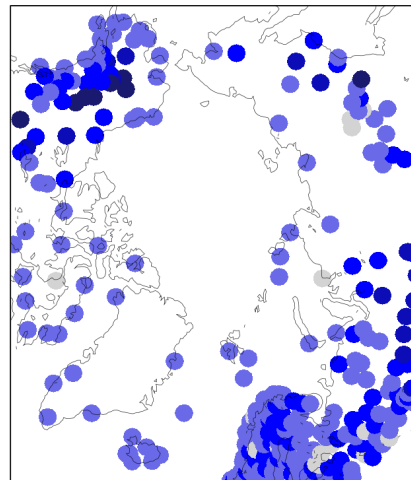
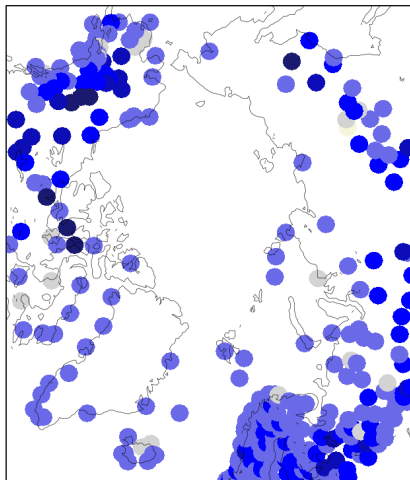
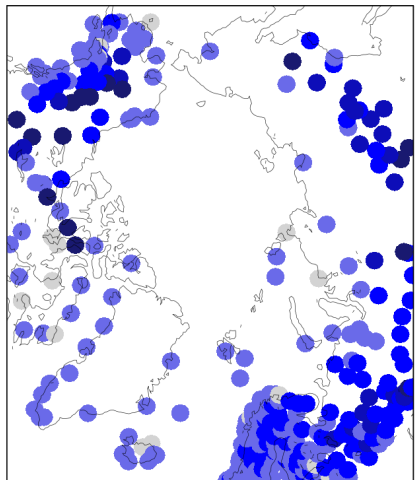
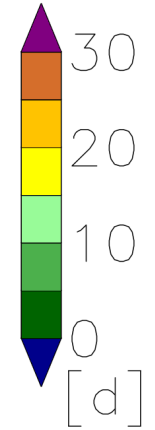
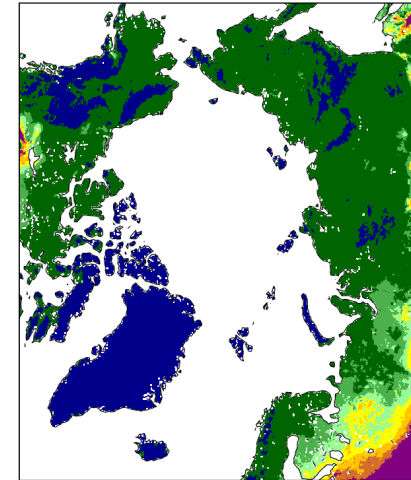
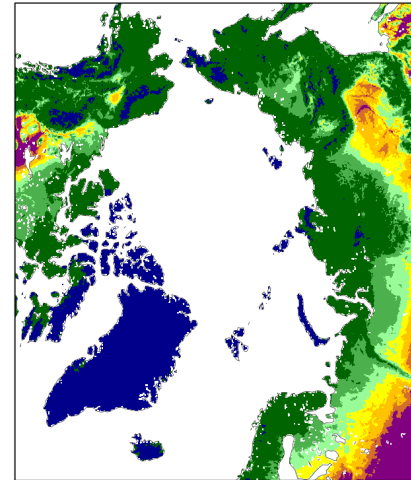
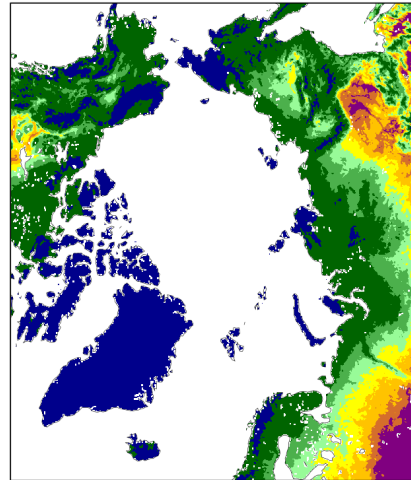
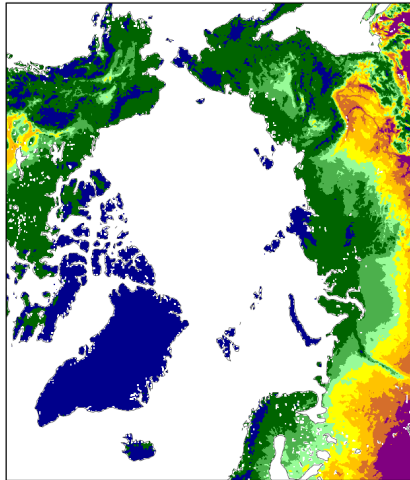
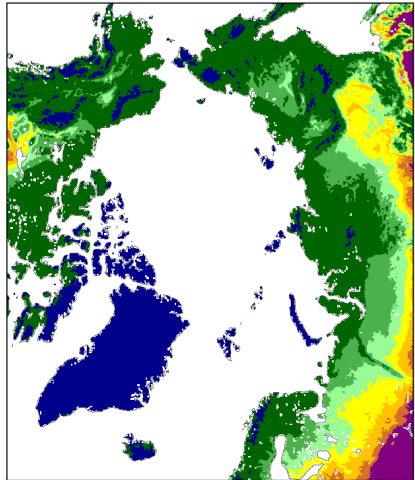
multi-model mean
(rmse=9.3)

RACMO (rmse=8.4)
2001 - 2007

HClim (rmse=5.9)
2000 - 2010

ICON (rmse=7.0)
1998-2022

MAR (rmse=12.4)
2000 - 2021



stakeholder requests can be hard to meet!

- fixed threshold indices like we presented them here are hard to capture for global and regional models
- however, we cannot define the freezing point relative to model temperature distributions, so representing fixed thresholds correctly matters!

what you downscale matters!

- RCM downscaled projections used for these indices should be forced by a subset of available GCMs targeted to the variables relevant for the indices
- providing information on a broad range of different climate indices would still requires big RCM/GCM matrices

questions?

