

At the interface between scientists and local practitioners - presenting climate index projections to reindeer herders



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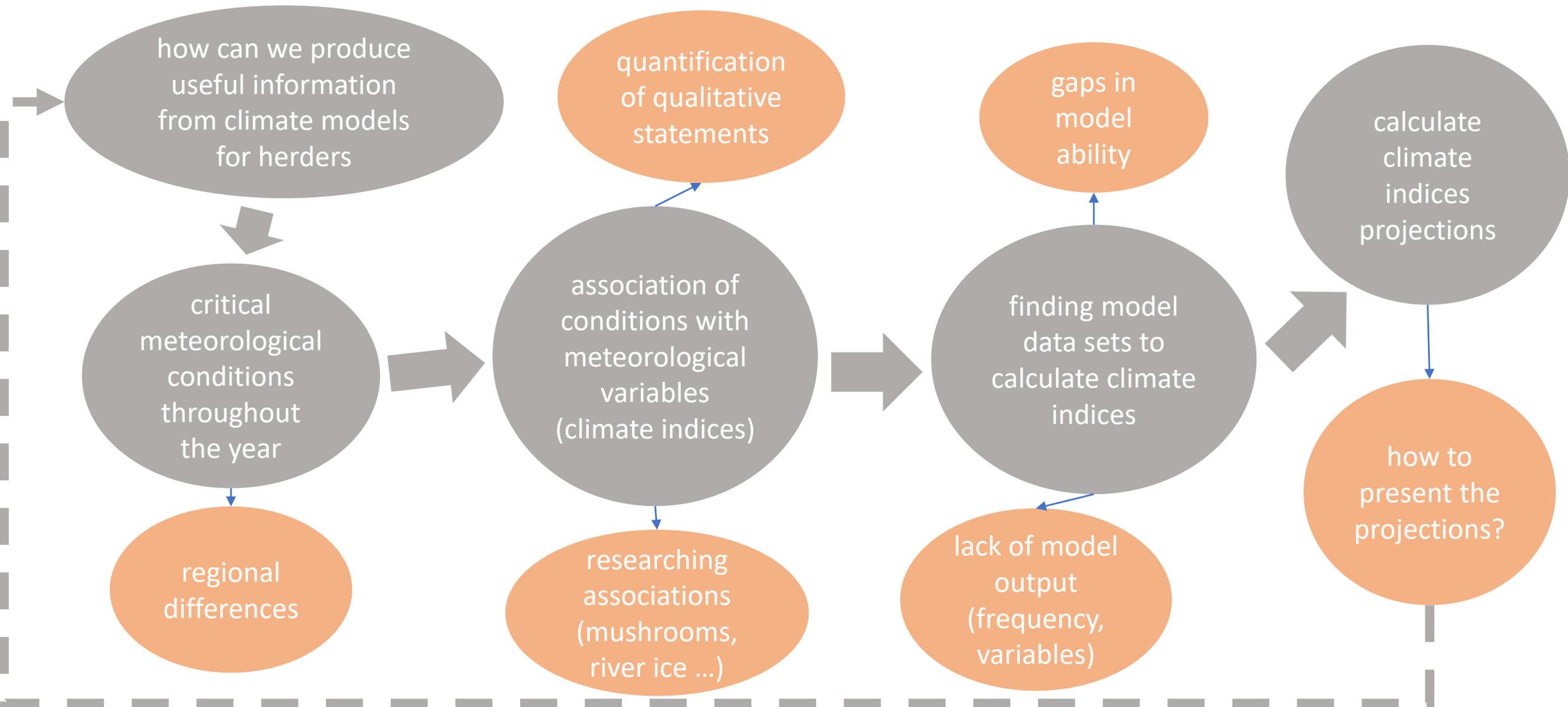
CHARTER: Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity ...

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

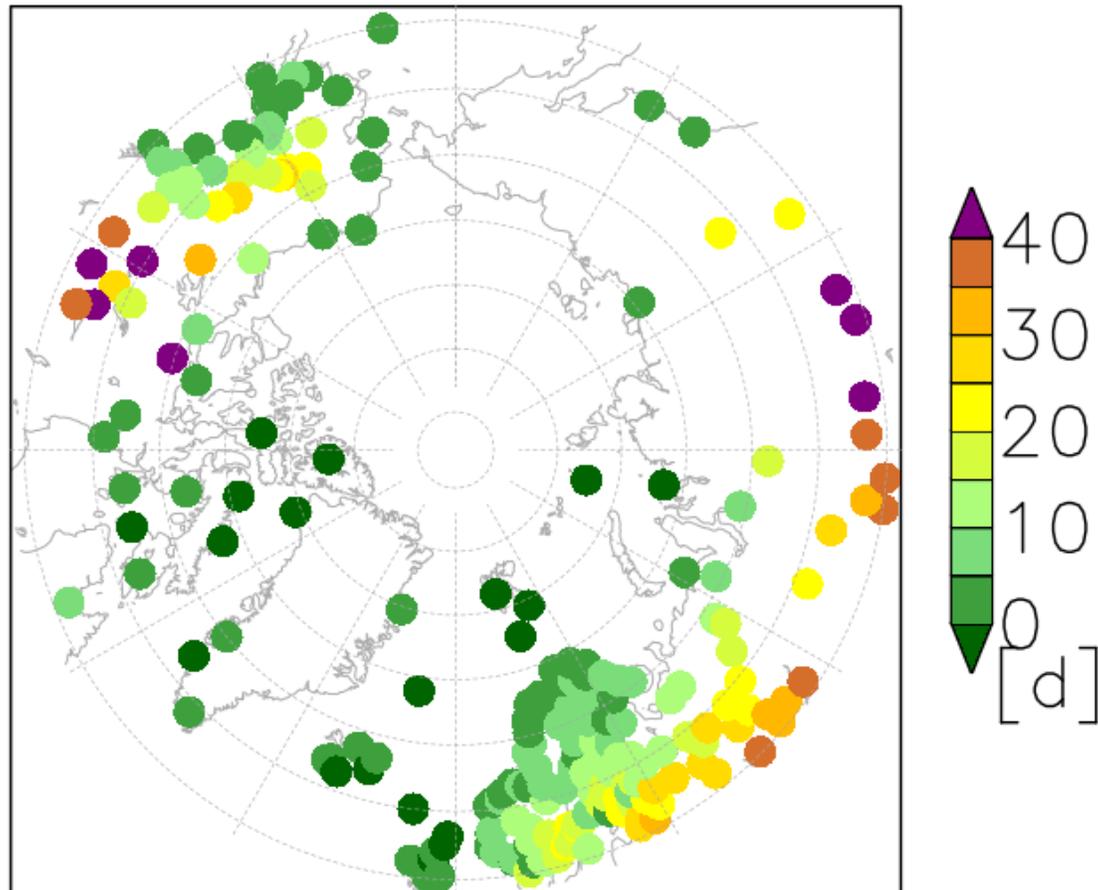
- aims to simulate the future effects of social-ecological changes for indigenous and local communities and traditional livelihoods in the Arctic

questions we started with:

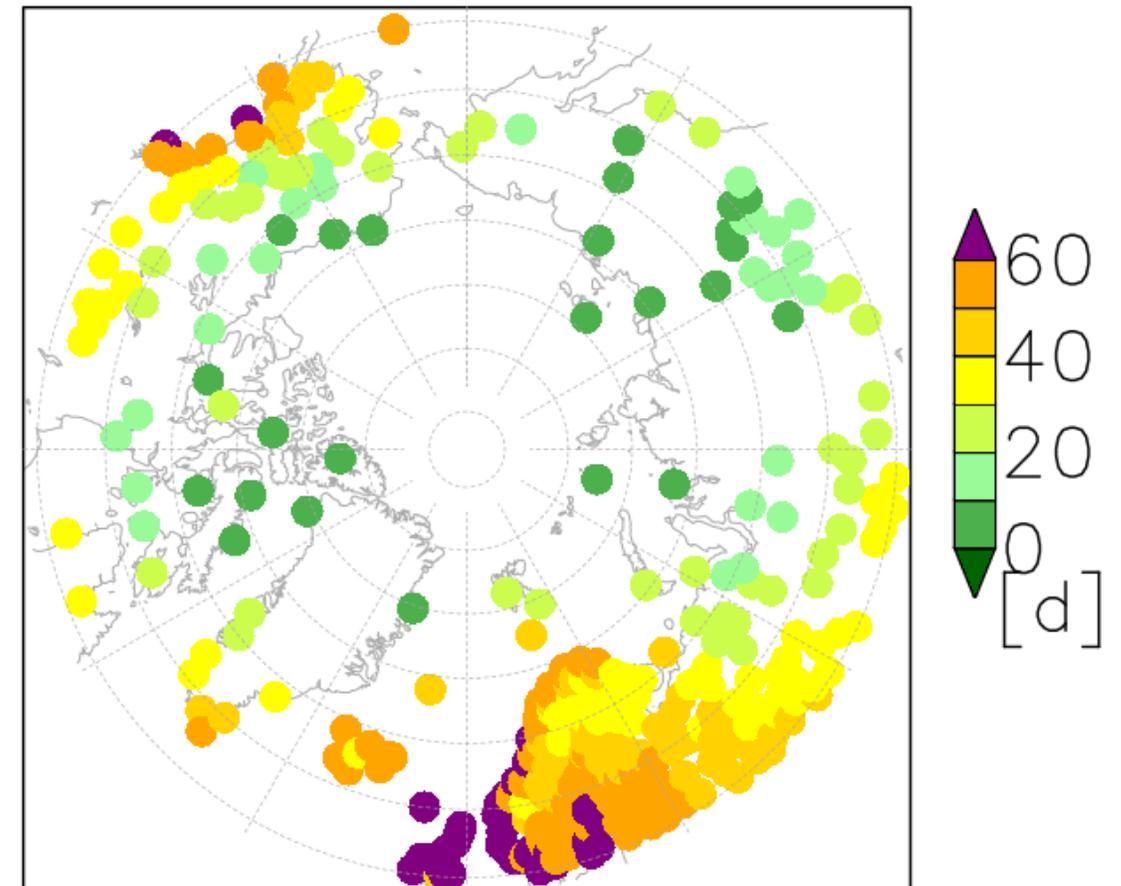
- What kind of information from climate model projections of the future would be relevant for reindeer herders?
- What would help them in the development of adaptation strategies in connection to climate change?



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

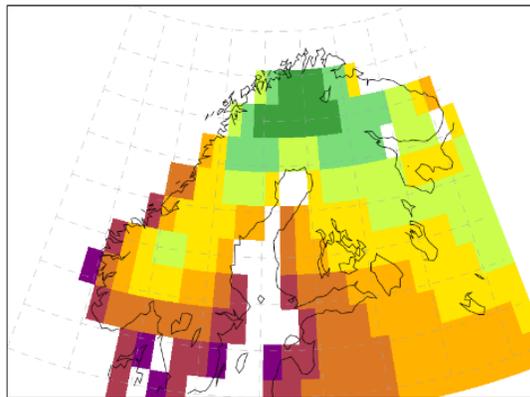
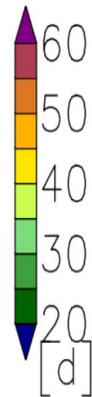
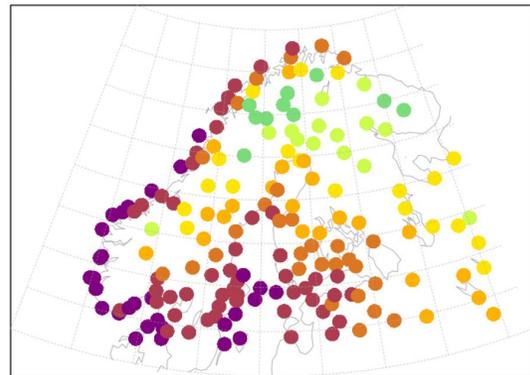


winter index: number of days with tasmax above 0°C in October and November

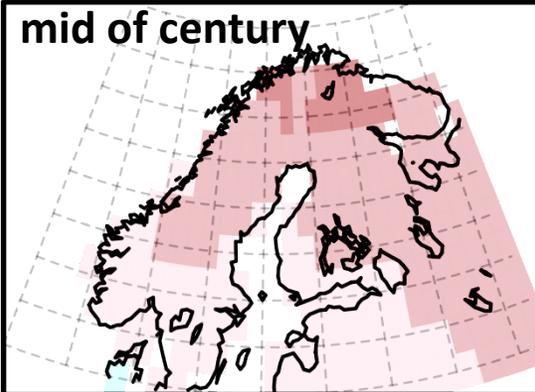


winter index: number of days with tasmx above 0°C in October and November

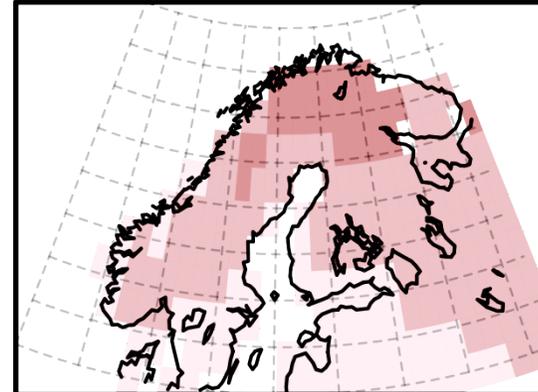
observation



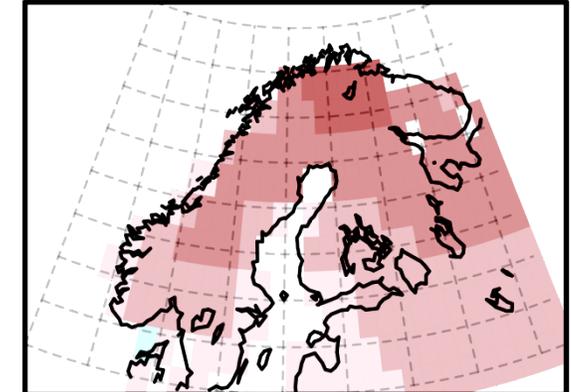
SSP2-RCP4.5



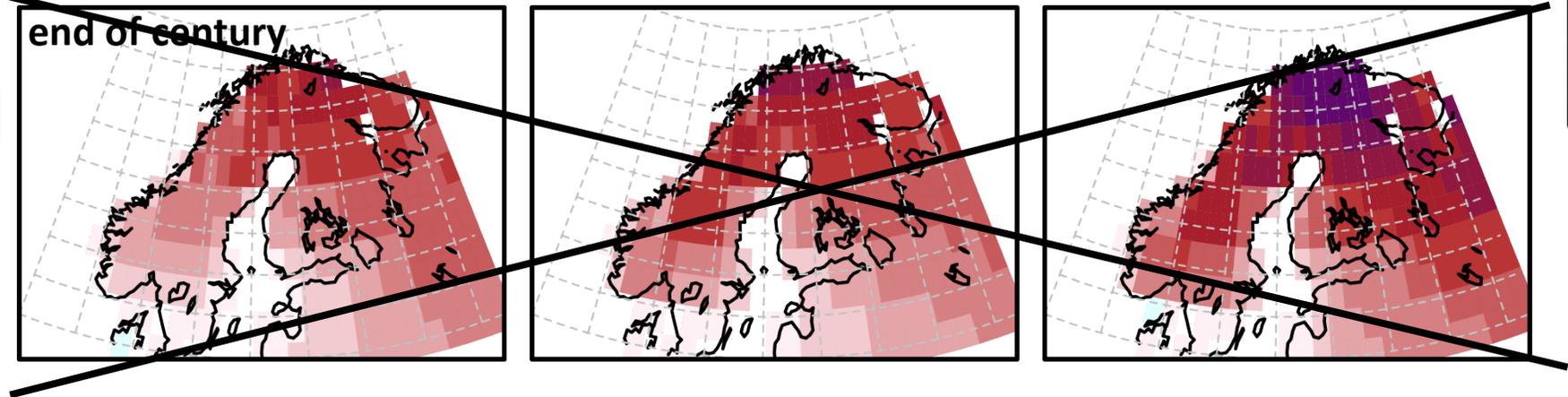
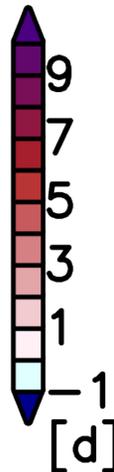
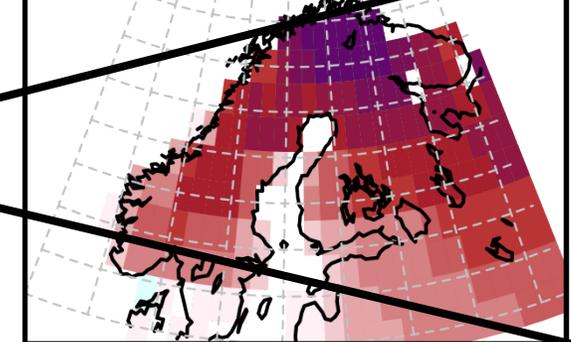
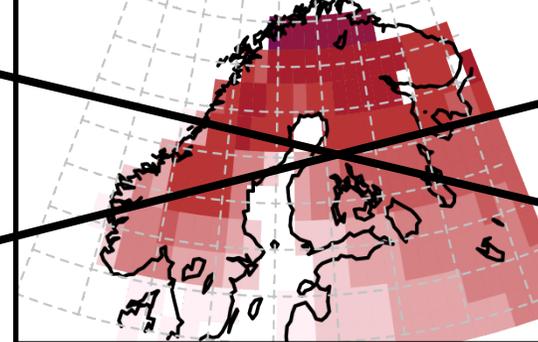
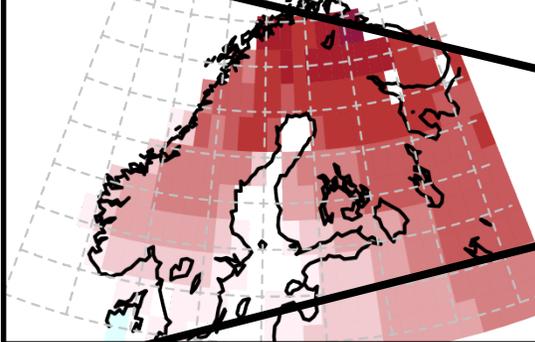
SSP3-RCP7.0



SSP5-RCP8.5



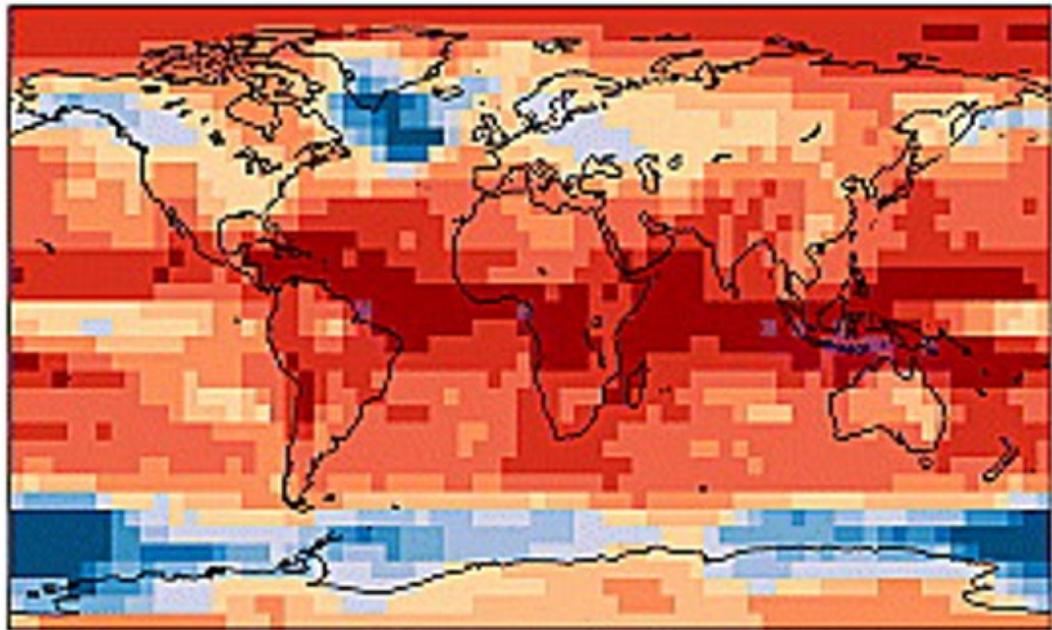
end of century



maps – time travel maps

time of emergence concept
(Hawkins & Sutton, 2012)

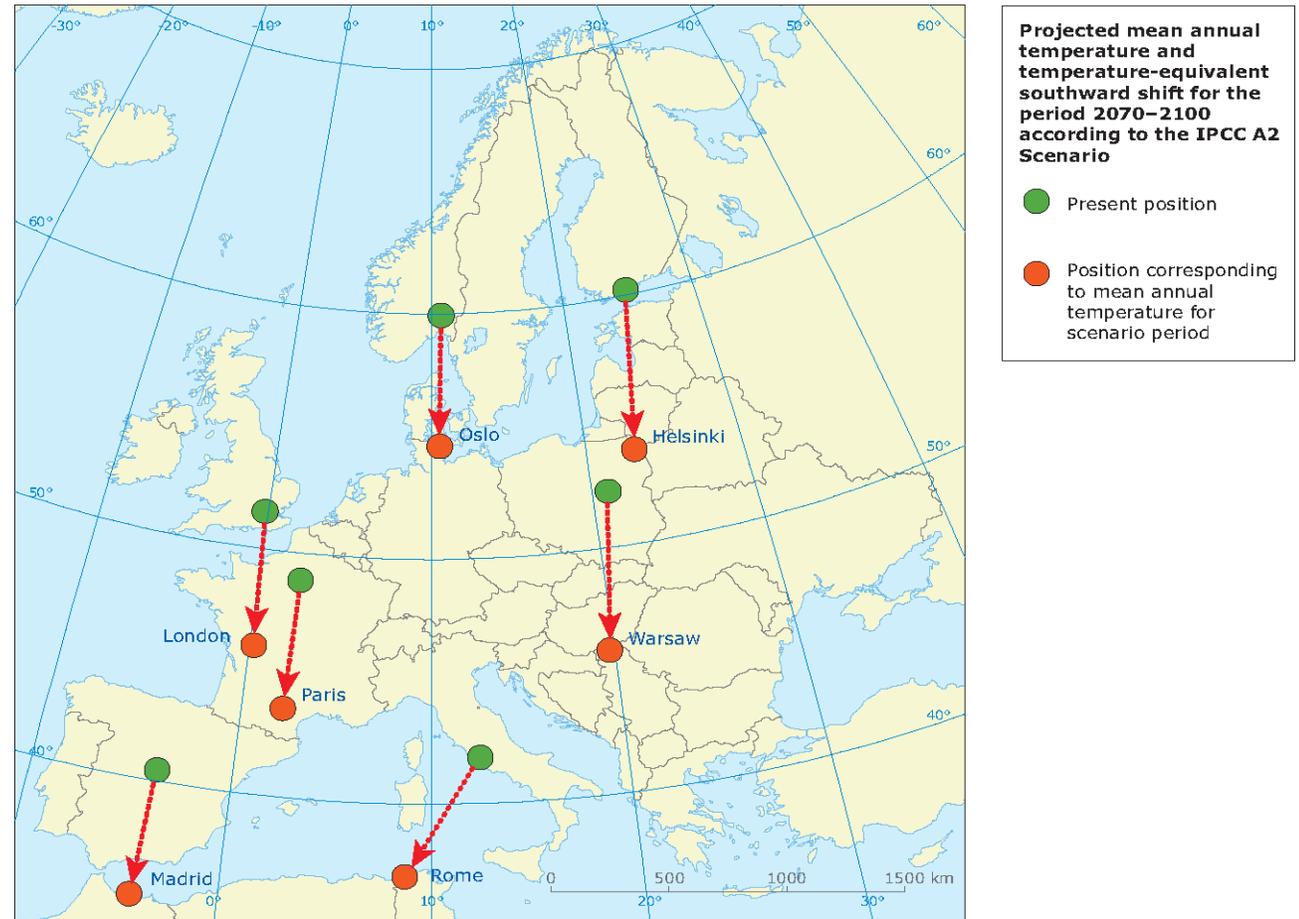
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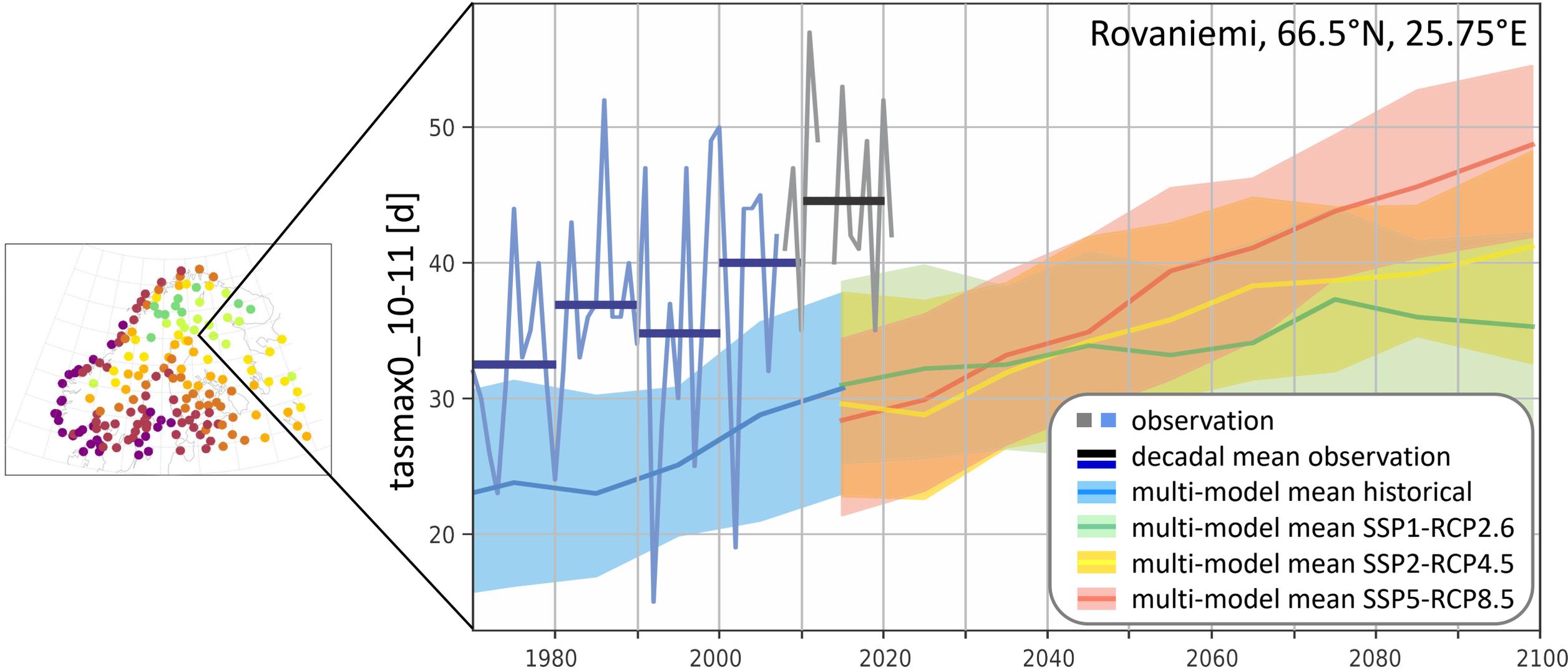
2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065

<https://doi.org/10.1029/2011GL050087>

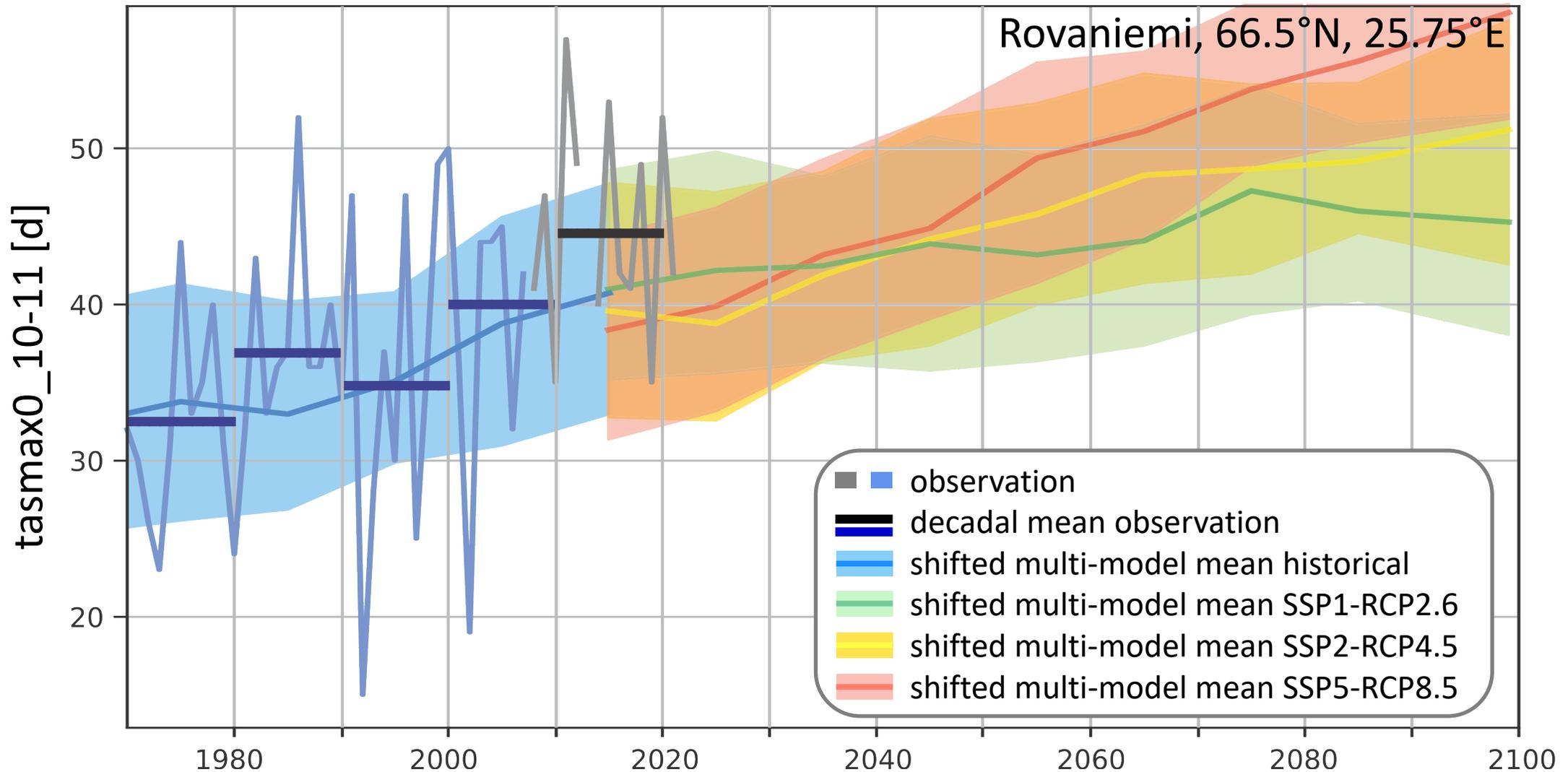
shifting cities concept (Hiederer & Lavalle, 2009)



Hiederer & Lavalle, 2009. Geographic Position of Europe for End-of-Century Temperature Equivalent. Special Publication JRC Pubsy N. 50603, European Communities.



time series – delta change approach



Exposure multiplication factors (EMFs): How often will my children be faced with heat waves in comparison to myself or my parents?

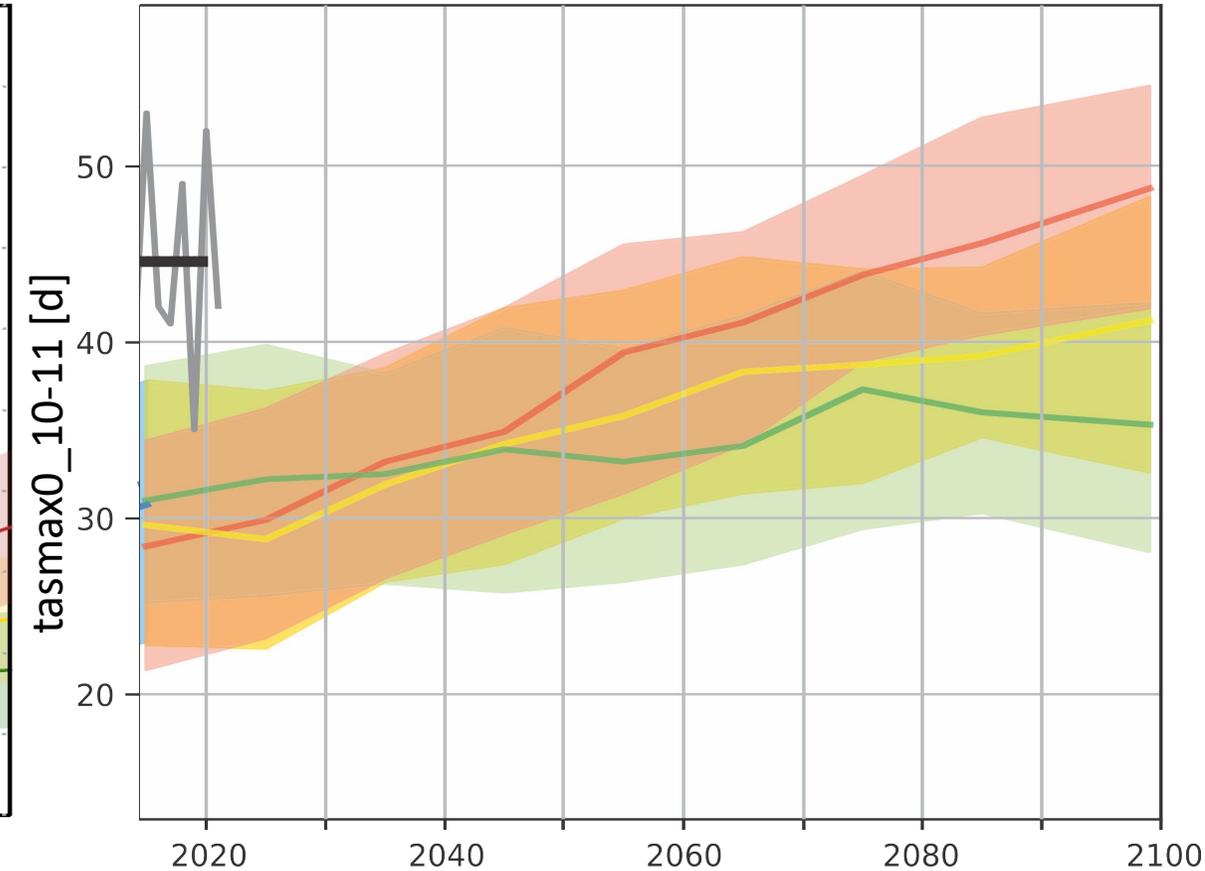
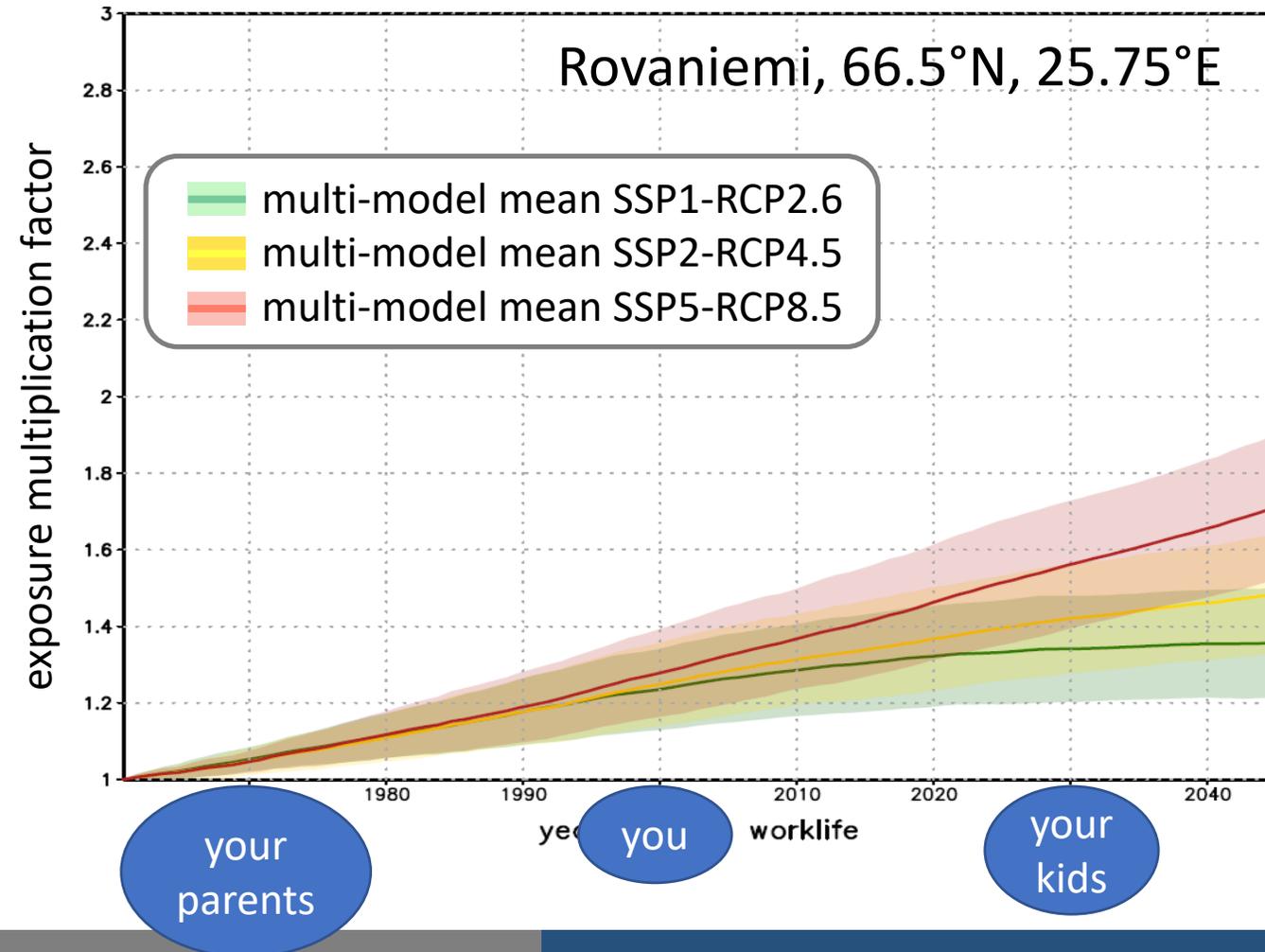
exposure definition:

- exposure is the number of events of a specific kind (eg a heat wave) that a person is exposed to during their work life (lifetime)
 - depends on:
 1. the number of years a person works (lives), eg 55 years
 2. the year a person starts their work life (was born)example: we sum up the number of days with daily mean temperature above 25°C from 1960 to 2014
 - this approach creates a time series with an exposure value for each year, which represents the number of heat waves a person starting their work life in this year will experience in their work life

exposure multiplication factor (EMF)

- in order to compare different exposures over time, we define a base exposure, eg a person who started their work life (was born) in 1960
- the exposure for all years is then given as a multiplier of the base exposure, allowing us to say a person starting their professional life (born) in 2020 will have a x times higher exposure to a specific event compared to a person starting their work life (born) in 1960

Exposure multiplication factors (EMFs): How often will my children be faced with thawing days in late autumn in comparison to myself or my parents?



Exposure Multiplication Factors:

Your children will face twice as many Octobers without freezing days then you have.

Time series in combination with reference to generations:

Your children will face winters coming one month later than we are experiencing now.

Time travel maps:

In 2040, temperatures in Rovaniemi will be like they are in Helsinki today.

How do we visualize climate change impacts?

- what type of graphs are useful and understandable?
- how do we communicate uncertainty?
- how do we communicate biases?
- how do we tailor our results to different types of audiences?

suggestions?

