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Present and future distribution modeling of *Pinus sylvestris* and *Betula pubescens* within the reindeer pastures of the Gabna sameby (Sweden)

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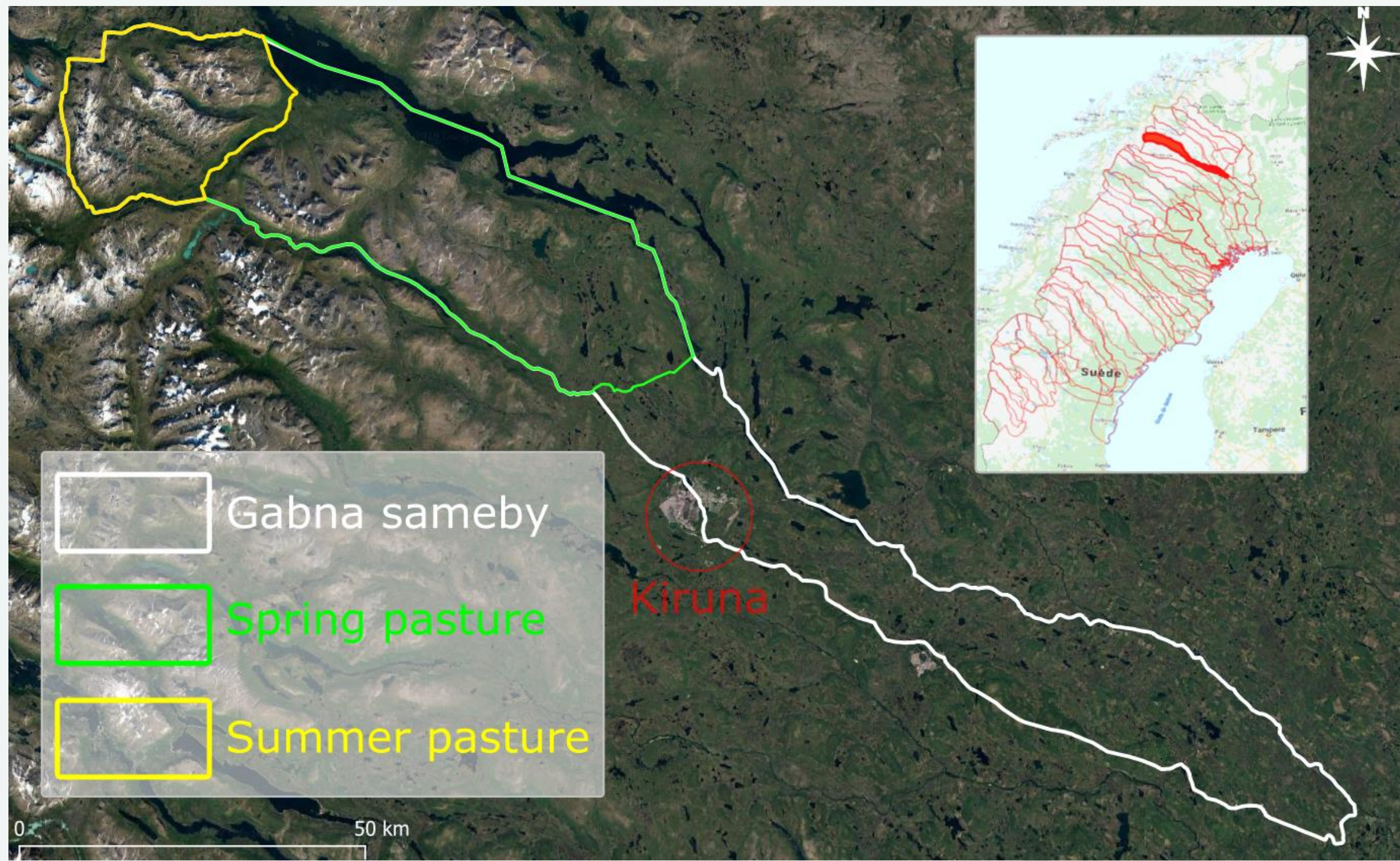
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Material and method:

1



Material

- Gabna reindeer herders summer/spring pastures (RenGIS 2.0, Sametinget)
- Interpolated and simulated TMIN/TMAX (CHELSA-CLIMATE 1979-2013; RCP 8.5; 2061-2018)
- Corine Land Cover 2012 (EEA)
- Floristic surveys (Courault, 2018)

2



Preprocessing

- Clipping climatic datasets on summer/spring pastures
- Re-projecting outputs (WGS 84 - UTM 34N)

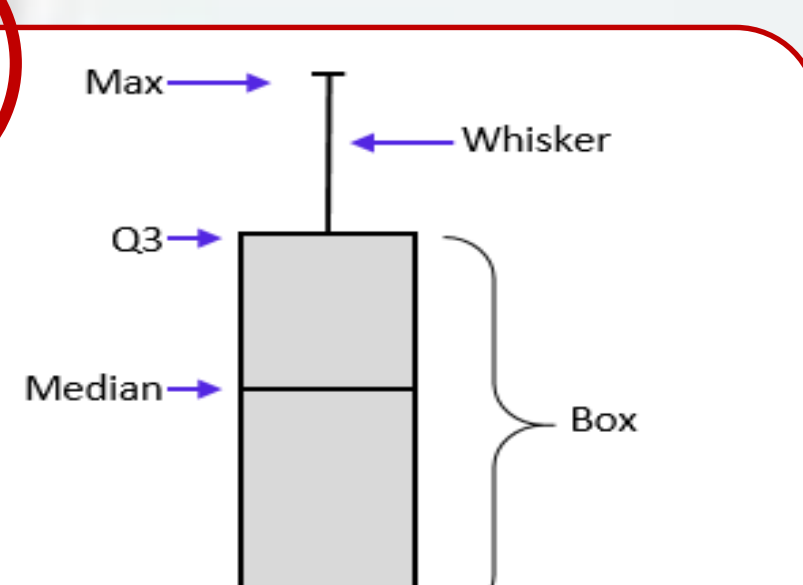
Introduction:

The increasing bioclimatological variability in northern Sweden questions the resilience of pastoral landscapes belonging to the Gabna reindeer herding (Lundqvist, 2008 ; Riseth, Tømmervik et al., 2011).

Driven by the increase of temperatures, the spread of woody species (Scot pine and Montane birch) along the taiga-tundra ecotone might be one more difficulty for reindeer grazing in spring and summer, due to competition with graminoids and terricolous lichens (~ 75% in species diversity of the reindeer' annual diet, Lefrère, 2003)

Strictly based on summer temperatures, we want here to map the potential distribution of *Pinus sylvestris* (Scot pine) and *Betula pubescens* (Montane birch), confront it with their observed distribution for the present, and then mapping their future extent according to pessimistic future projections (CMIP5, RCP 8.5).

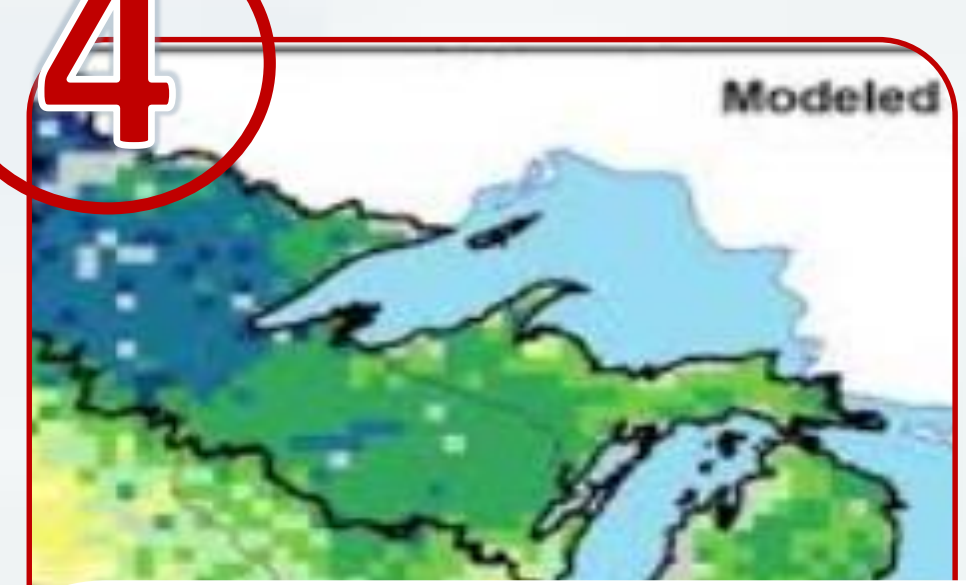
3



Selecting future projection of T°C

- Extraction of TMIN/TMAX by location of floristic surveys
- Selection of the median of the CMIP5 scenario (e.g. CMCC-CM)

4

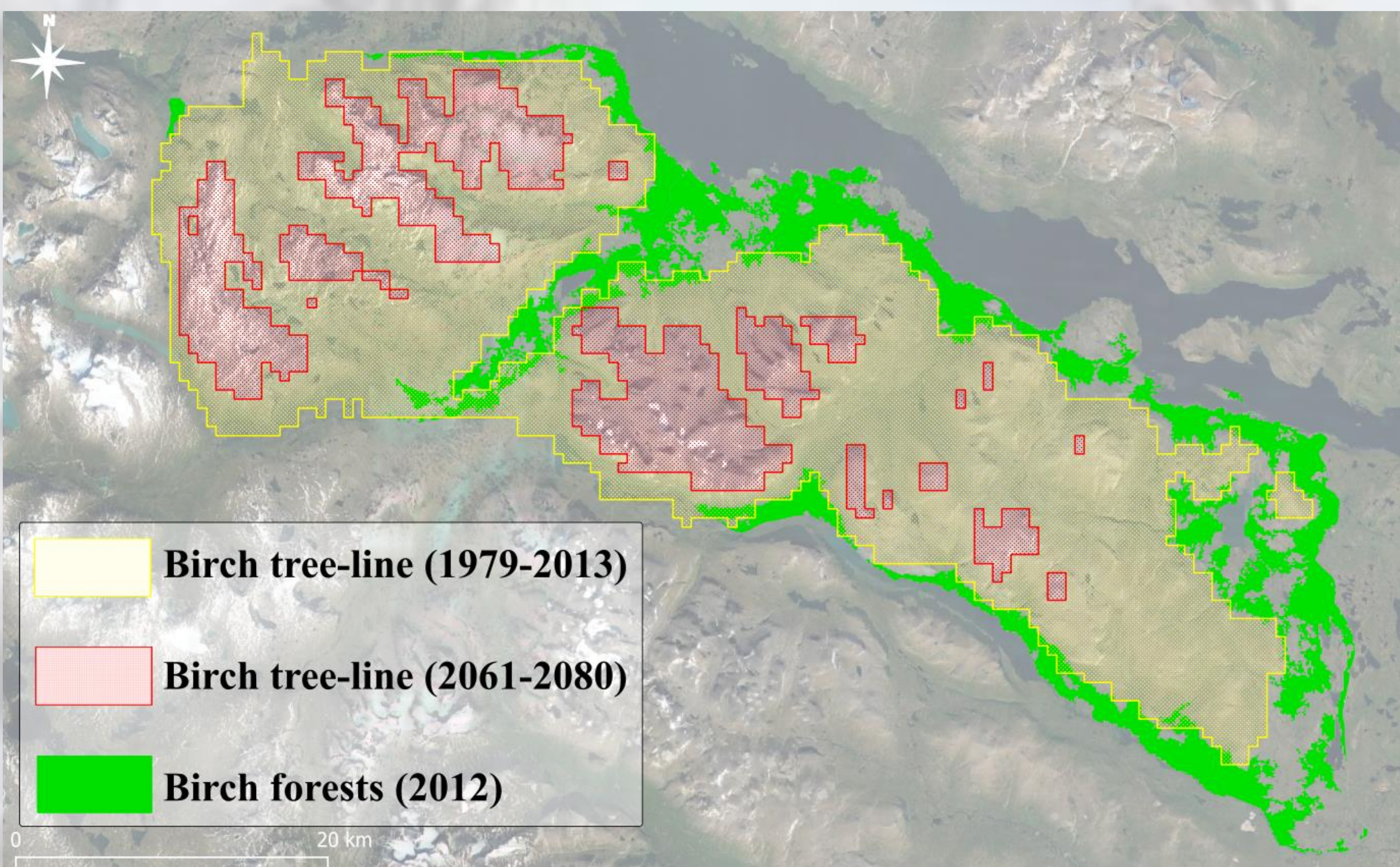


Specie thermic threshold selection and post-processing

- Reclassifying according to Mountain birch and Scots Pine thermic limiting factor (e.g. 15.8°C TMAX of July; 10°C TMIN of July)
- Quantifying areas of potential presence/absence and maps

Results (1)

Results (2)



Observed broad-leaved forests surface area (Corine 2012)	Modeled present mountain birch surface area (1979-2013)	Modeled future mountain birch surface area (2060-2081)	Observed coniferous forests surface areas (Corine 2012)	Modeled present scots pine surface area (1979-2013)	Modeled future scots pine surface area (2060-2081)
431 km ²	896 km ²	1909 km ²	8 km ²	1521 km ²	2180 km ²
19 %	40 %	85 %	0,4 %	68 %	98 %
Total area: 2231,8 km ²					

References: Lundqvist, 2008, Reindeer husbandry in a climate change, SLU; Riseth, Tømmervik et al., 2011, Sámi traditional ecological knowledge as a guide to science: snow, ice and reindeer pasture facing climate change. Polar Record, 47(3), pp.202-217; Lefrère 2003, Variations saisonnières des activités diurnes et interactions sociales des rennes semi-domestiques Rangifer tarandus L en Laponie finlandaise: méthodes de gestion traditionnelle et moderne de l'élevage. Thèse de doctorat, Uni Paris V; Courault, 2018 Les paysages culturels de l'élevage de rennes en Scandinavie face au changement global, une approche multi-scalaire (Laponie suédoise, sud norvégien), Thèse de doctorat, Uni Paris IV

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