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# Multi-decadal satellite monitoring of vegetation cover (MOD44B) in Fennoscandia: application to Saami' reindeer husbandry landscapes



## husbandry landscapes



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## INTRODUCTION

- i. In subarctic & montane areas, large-scale surveys of vegetal cover are important to assess consequences of the increase in temperature & intensification of human activities
- ii. In Lapland for saami reindeer' herders, pastoral systems are unprecedentedly affected by global change, having regional to local consequences (be it biological, ecological, economical or cultural): herds' metabolism, pasture quality & availability, insect harassment, predators etc.
- iii. We propose a monitoring of the Gabna & Gällivare reindeer husbandry territories-landscapes- using MODIS 44B Vegetation continuous fields time series. Gabna' reindeer husbandry system is considered by Swedish and Saami authorities as a montane system, whereas Gällivare has forest features

## MATERIAL & METHODS

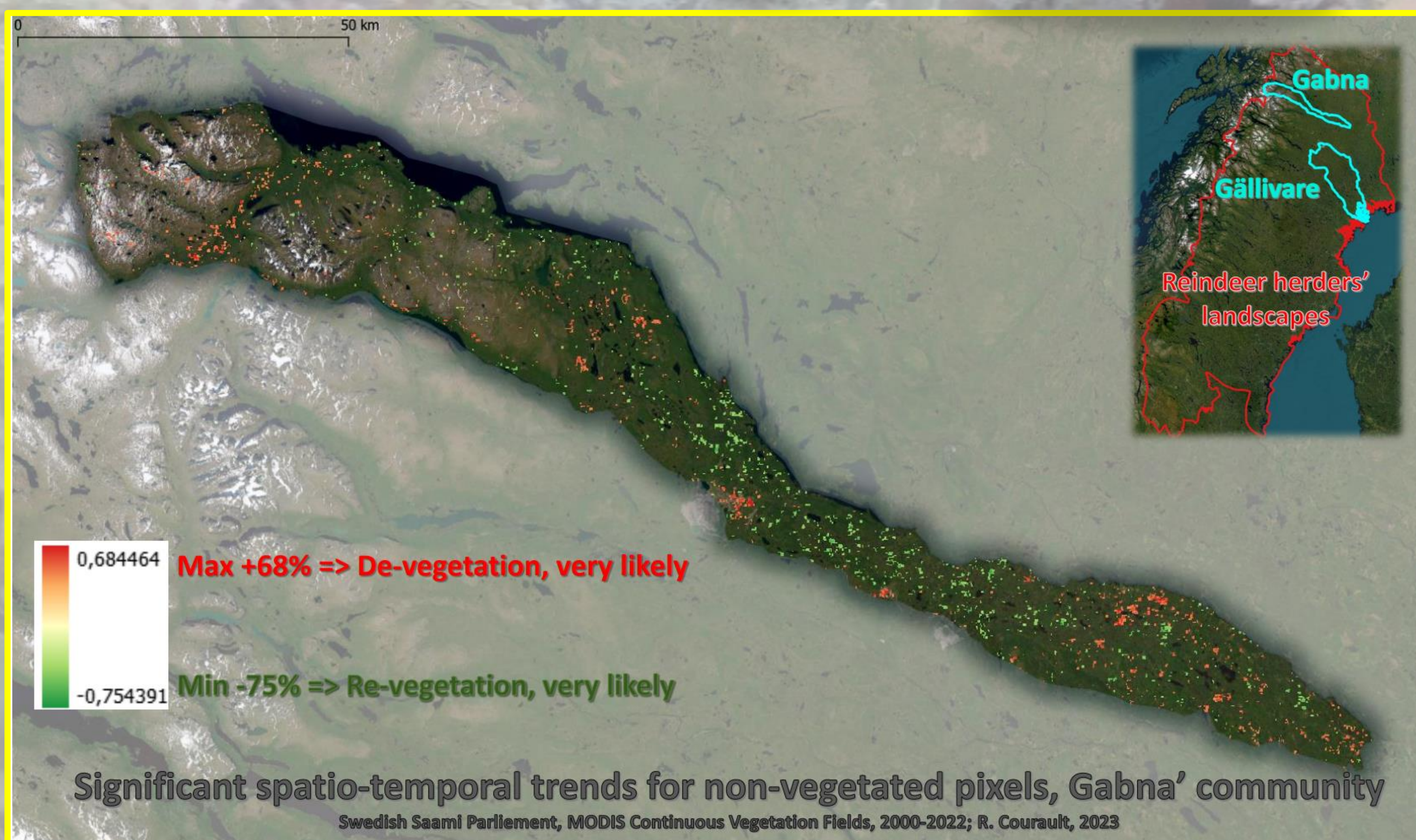
- a) Vegetation cover time series (MOD44B Yearly Vegetation Cover Fields, 2000-2022; NASA-USGS)
- b) Declared territories of reindeer husbandry (Rengis 2.0)
- c) Computing spatiotemporal trend tests of Mann-Kendall (MK): Revegetation ? Devegetation? How much areas of territories are affected by such processes? Drivers?
- d) Clipping and selecting significant trend tests (p-value < 0.05; MK > +0.4 & MK < -0.4)



## HIGHLIGHTS & DISCUSSION

**Forest cover** : 26% of Gabna is significantly affected by forest changes, mostly de-vegetation (average  $\bar{x}$  of MK = -0.45). For Gällivare: 84%,  $\bar{x} = -0.3$ . Forestry is the main driver, clear-cuttings & pine recruitments, besides images' preprocessing refinements in detection of trees (coniferous & broadleaved)

**Non-forest**: For this layer, 22 and 19% of Gabna and Gällivare surface areas are revegetating ( $\bar{x} = +0.47$  &  $+0.44$ , respectively). Tundra' shrubification/extension of montane shrubs (Gabna) + pine' recruitment in stands for forested areas (Gabna & Gällivare)



**Non-vegetated**: Differences between Gabna (montane reindeer herding, see map above) and Gällivare (forest): for the latter most of significant pixels shows a temporal increase of non-vegetated pixels ( $\bar{x} = +0.4$ ). Urban and mining areas are extending. Meanwhile, evolution of non-vegetated areas within Gabna shows heterogeneous processes, mentioned previously.

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