

# **PROGRAM FOR MAPPING CHEMICAL SOIL PROPERTIES:**

**tested on grassland and arable land  
in South Tyrol, Northern Italy**



**eurac**  
research

# PROGRAM FOR MAPPING CHEMICAL SOIL PROPERTIES:

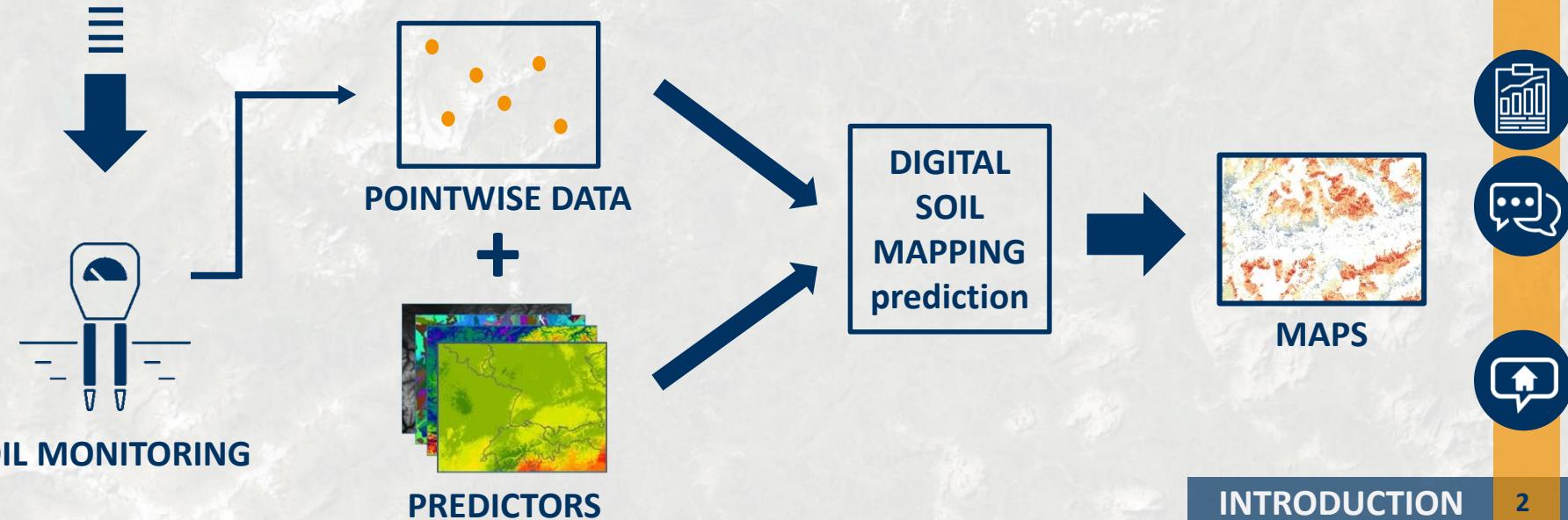
tested on grassland and arable land  
in South Tyrol, Northern Italy



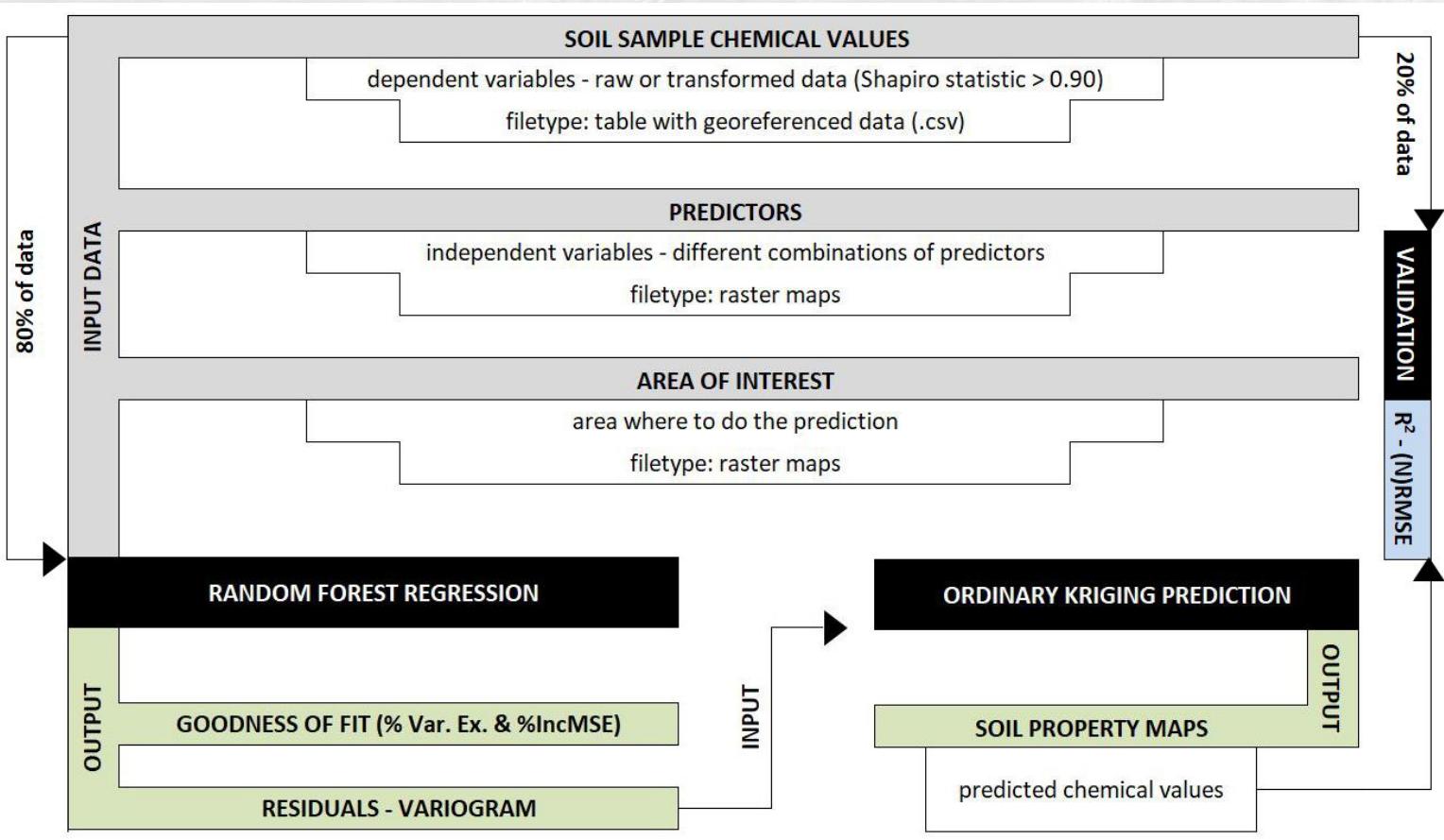
# AIM OF THE STUDY



Image source: zeroemission.eu (<https://cutt.ly/7vFR4OB> - last visited on 21.04.2021)



# RESEARCH DESIGN

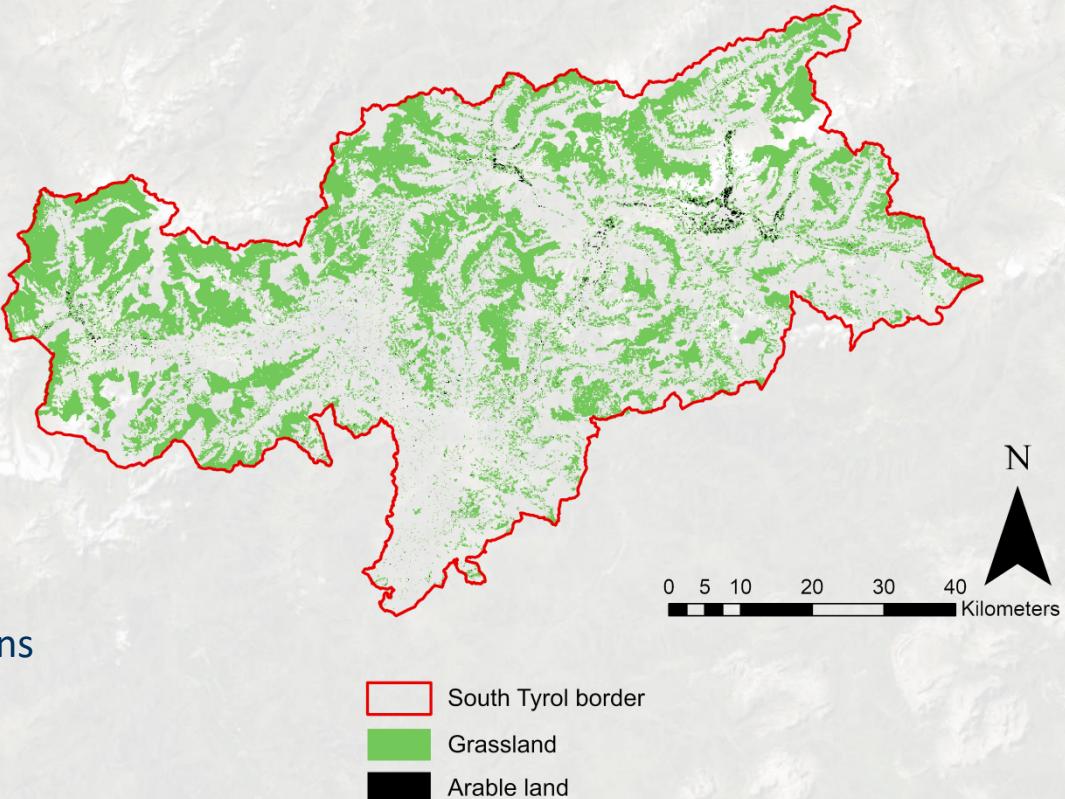


# MAPS

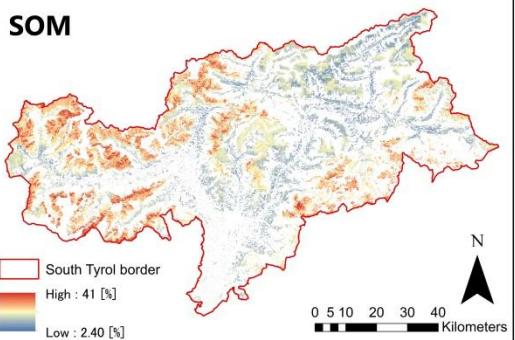
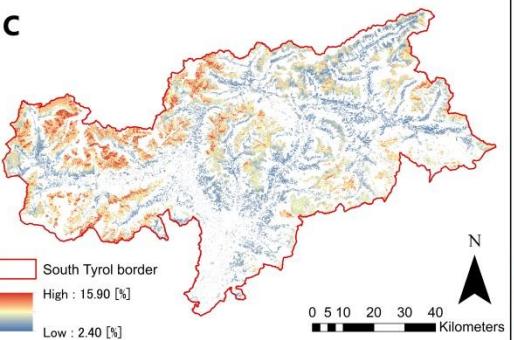
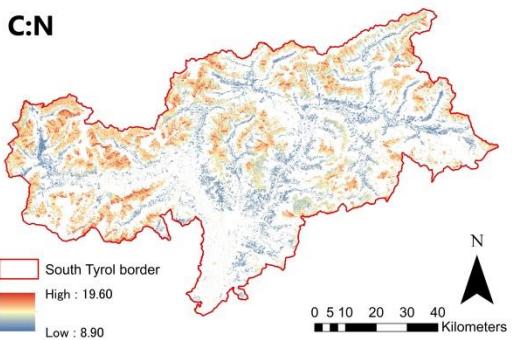
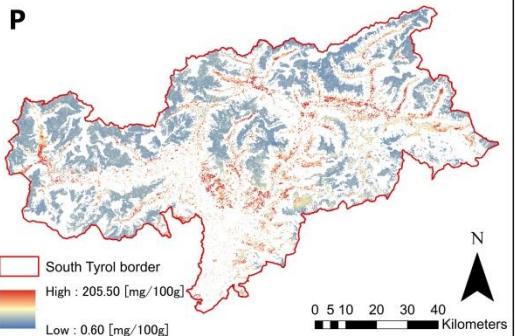
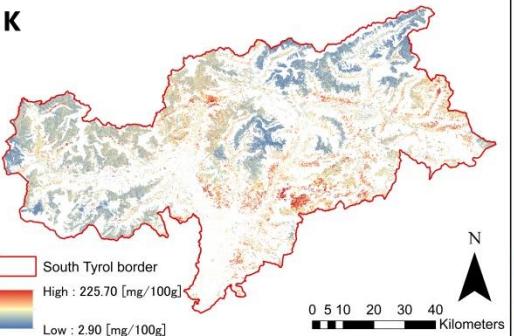
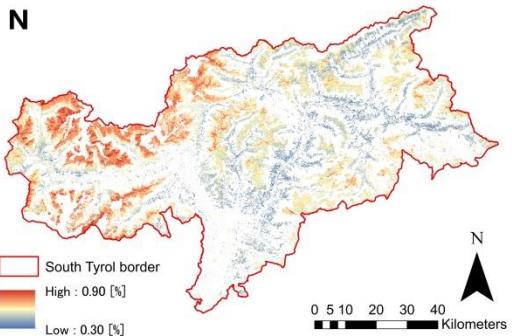
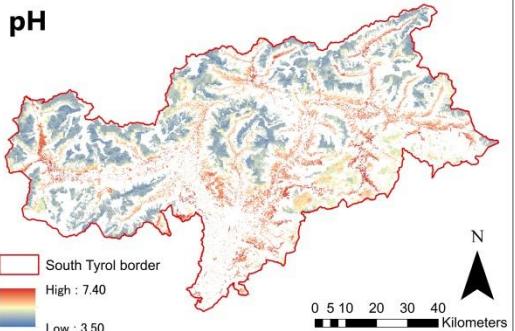
## AREAS OF INTEREST

1. grassland
2. grassland + arable land

→ similar patterns

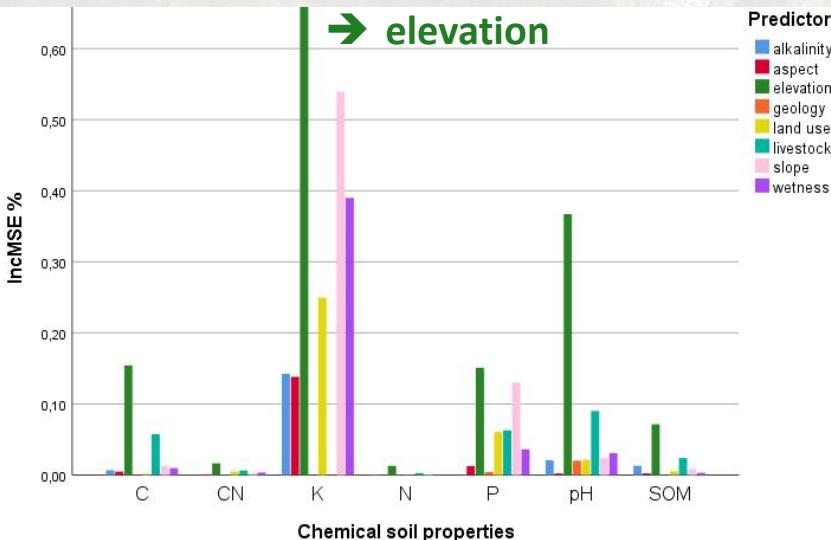
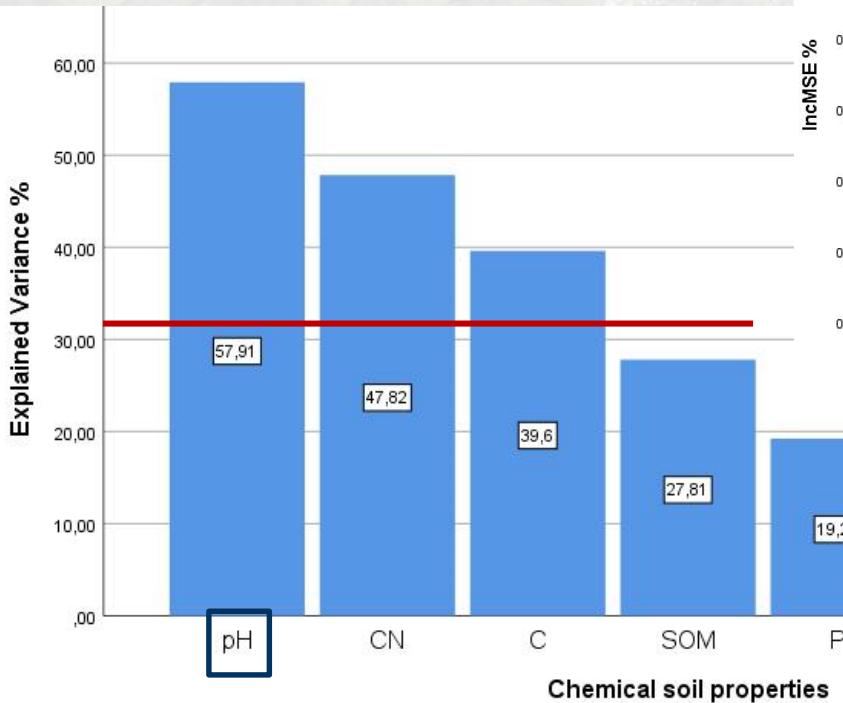


## RESULTS & DISCUSSION

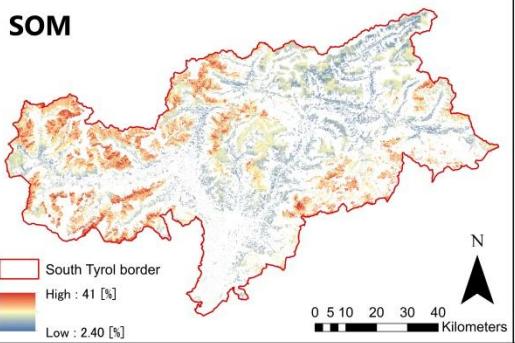
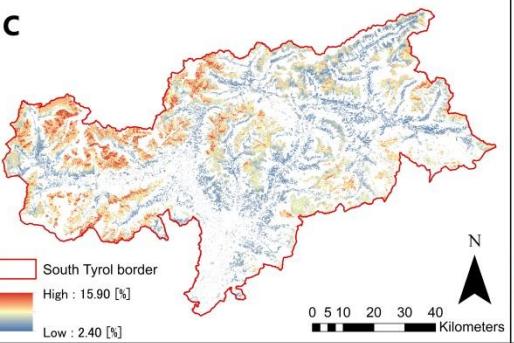
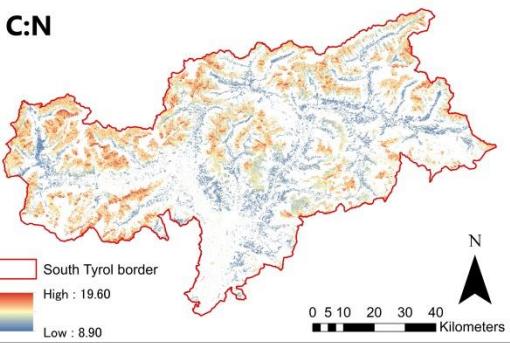
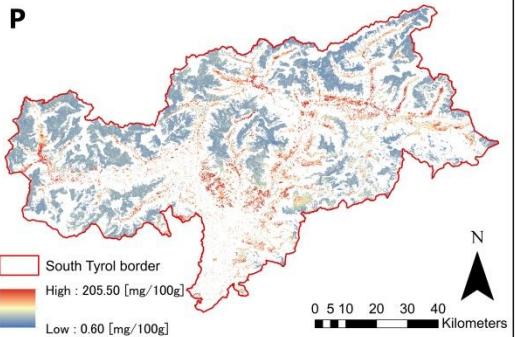
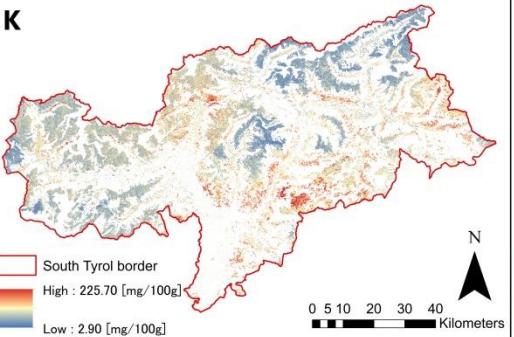
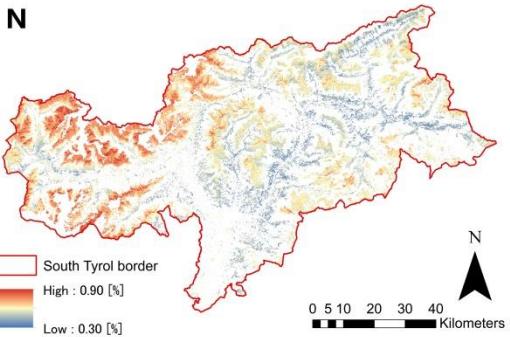
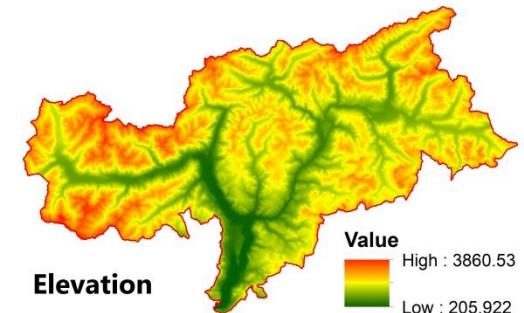
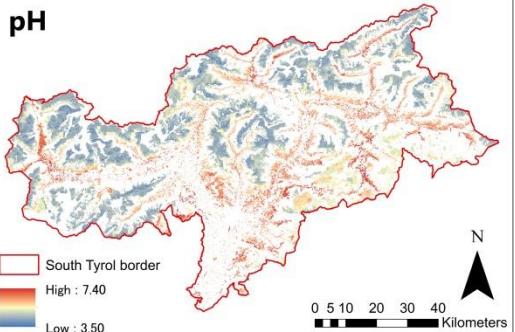
**SOM****C****C:N****P****K****N****pH****RESULTS**

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# INFLUENCE OF THE PREDICTORS



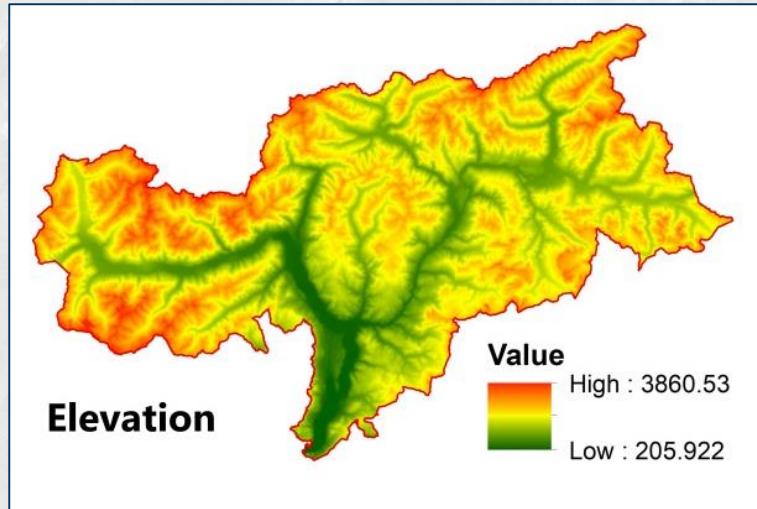
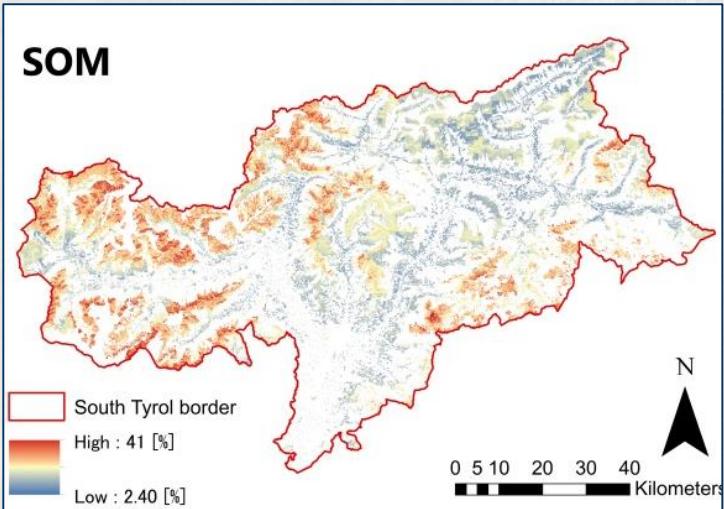
→ mean of explained variance: 31.1%

**SOM****C****C:N****P****K****N****pH**

→ elevation influences  
temperature and  
precipitation  
regimes

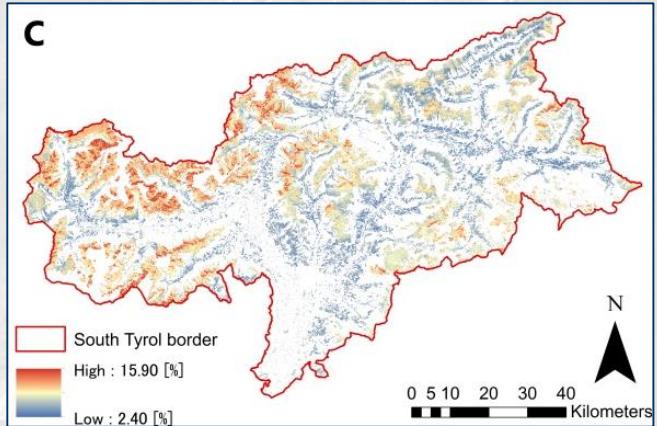
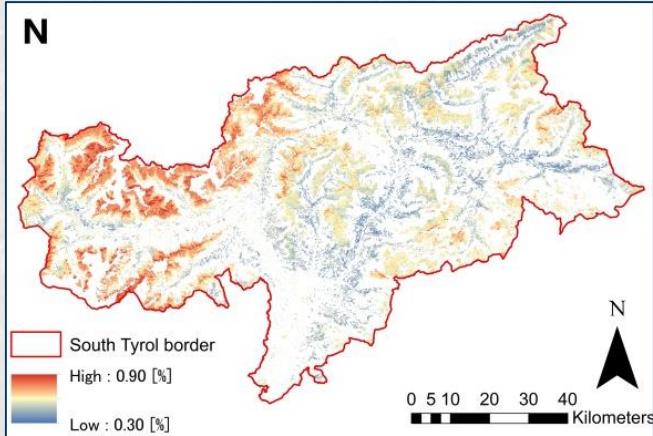
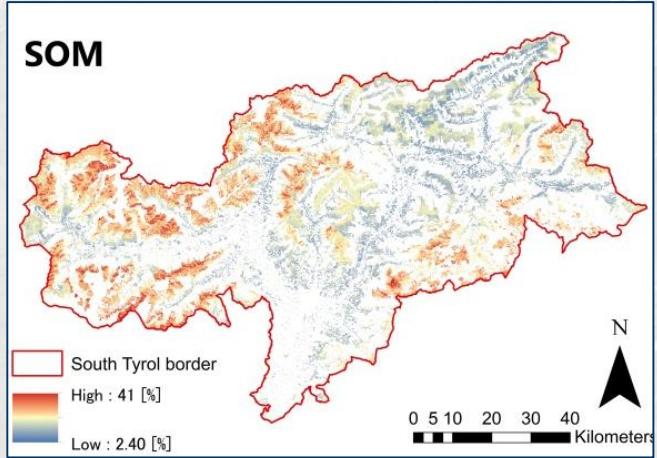
**RESULTS**

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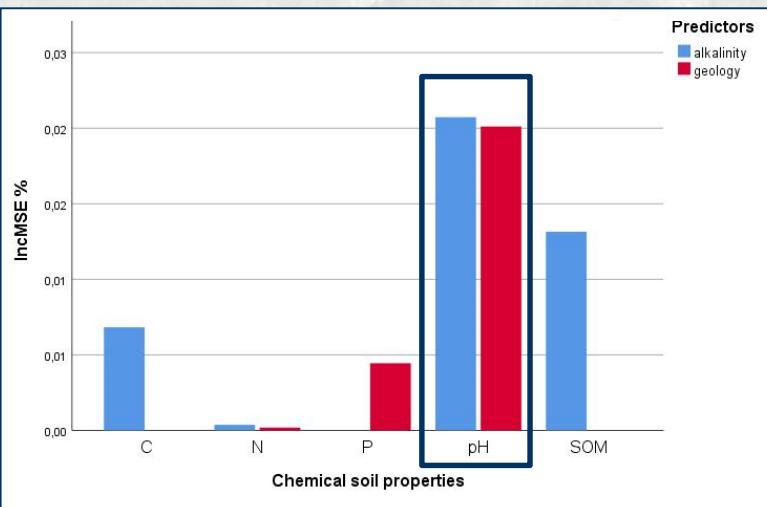
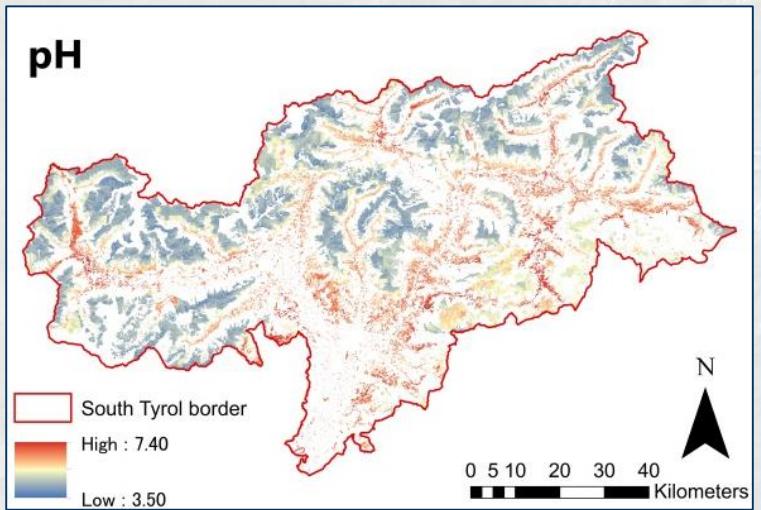
→ SOM increases with increasing elevation





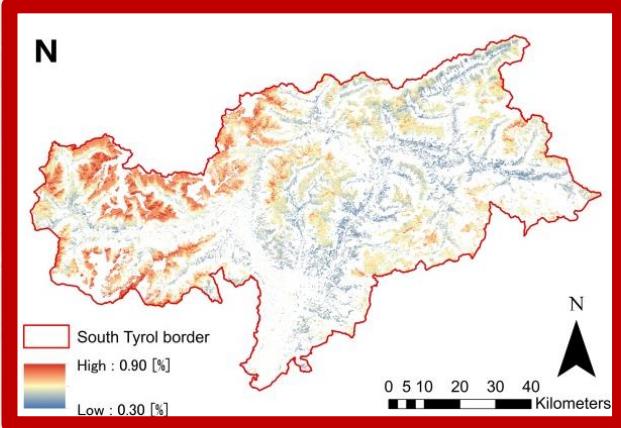
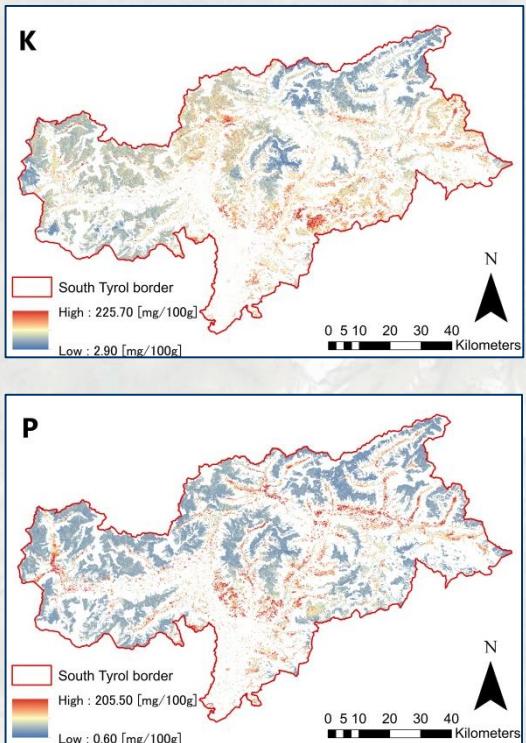
- west-east gradient:  
climate-induced soil leaching
- Spatial match of high SOM  
and high C:  
SOM as carbon reservoir





→ pH was predicted lower at higher altitudes

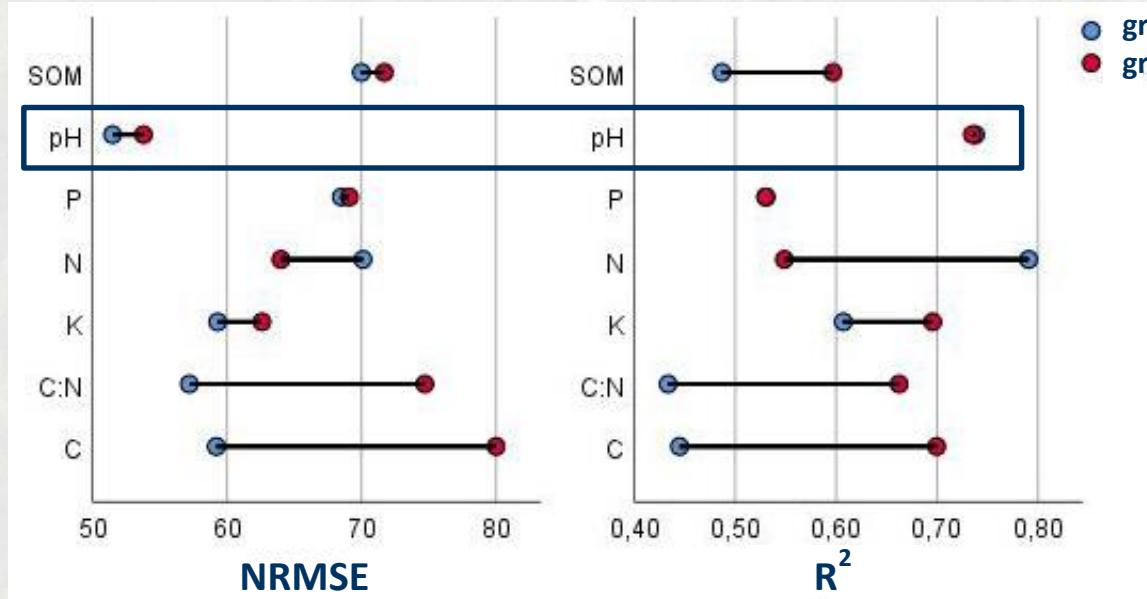
→ lower pH in the Dolomites, Wipptal and upper Vinschgau:  
high carbonate contents of the bedrock



- N was predicted higher at higher altitudes
- Most used fertilizers: K, P and N  
- mainly used at lower altitudes
- Possible explanation: past arable land use



## VALIDATION



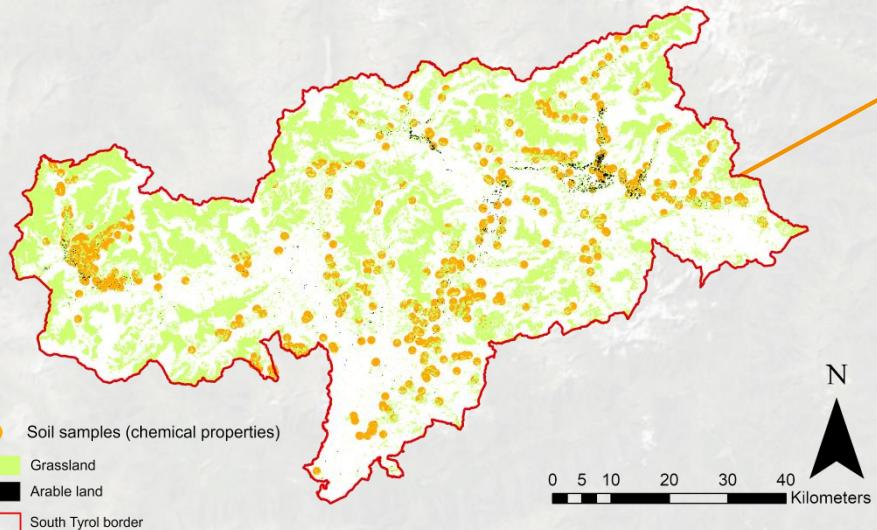
● grassland  
● grassland and arable land

→  $R^2$   
mean: 0.60

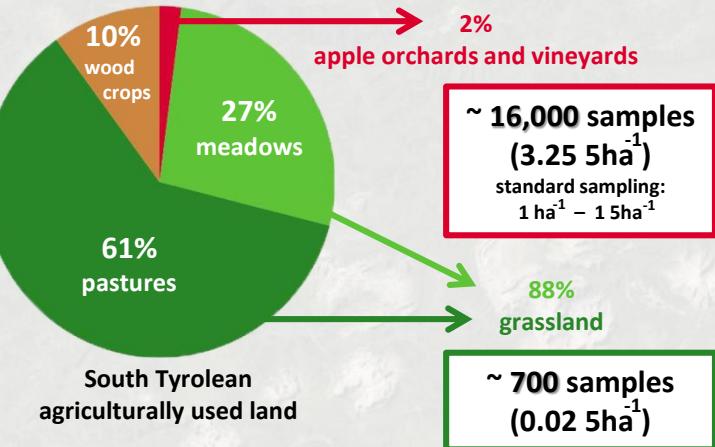
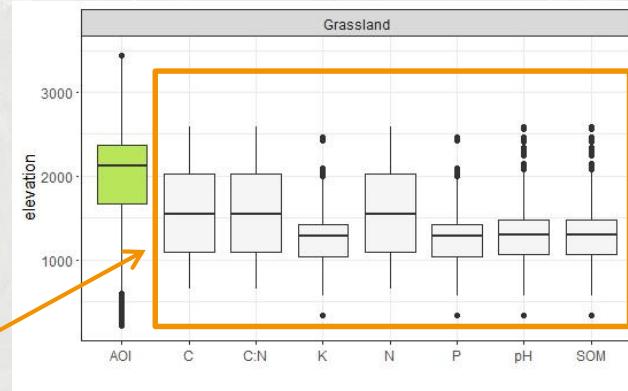
→ NRMSE  
mean: 65.1

## FUTURE WORK

→ improve the amount and distribution of the source data



→ integration of other predictors





This study fills knowledge gaps of spatially distributed information of chemical soil properties in South Tyrolean grassland and arable land



The developed program turns any pointwise chemical soil surveys into continuous maps through robust regression and interpolation digital soil mapping methods



The results should allow conciliating intensive agriculture production with profitability and environmental sustainability



## ACKNOWLEDGMENTS



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Centro di Sperimentazione  
Research Centre  
NATURE & SCIENCE: HAND IN HAND



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Software and documentation are available online:

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