

# Synthesis on ecosystem services in the Carpathians (Central-Eastern Europe)

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## AIM

The aim of the research is to emphasize and present the importance and irreplaceable role of the Carpathians within the Europe by an assessment of **provisioning, regulatory and cultural ecosystem services**, to express their ecological and cultural value, as well as to highlight their important role in the mitigation of effects of the climate change and to draw attention to the need to protect them.



Slovak part of Carpathians  
Tatra Mountains

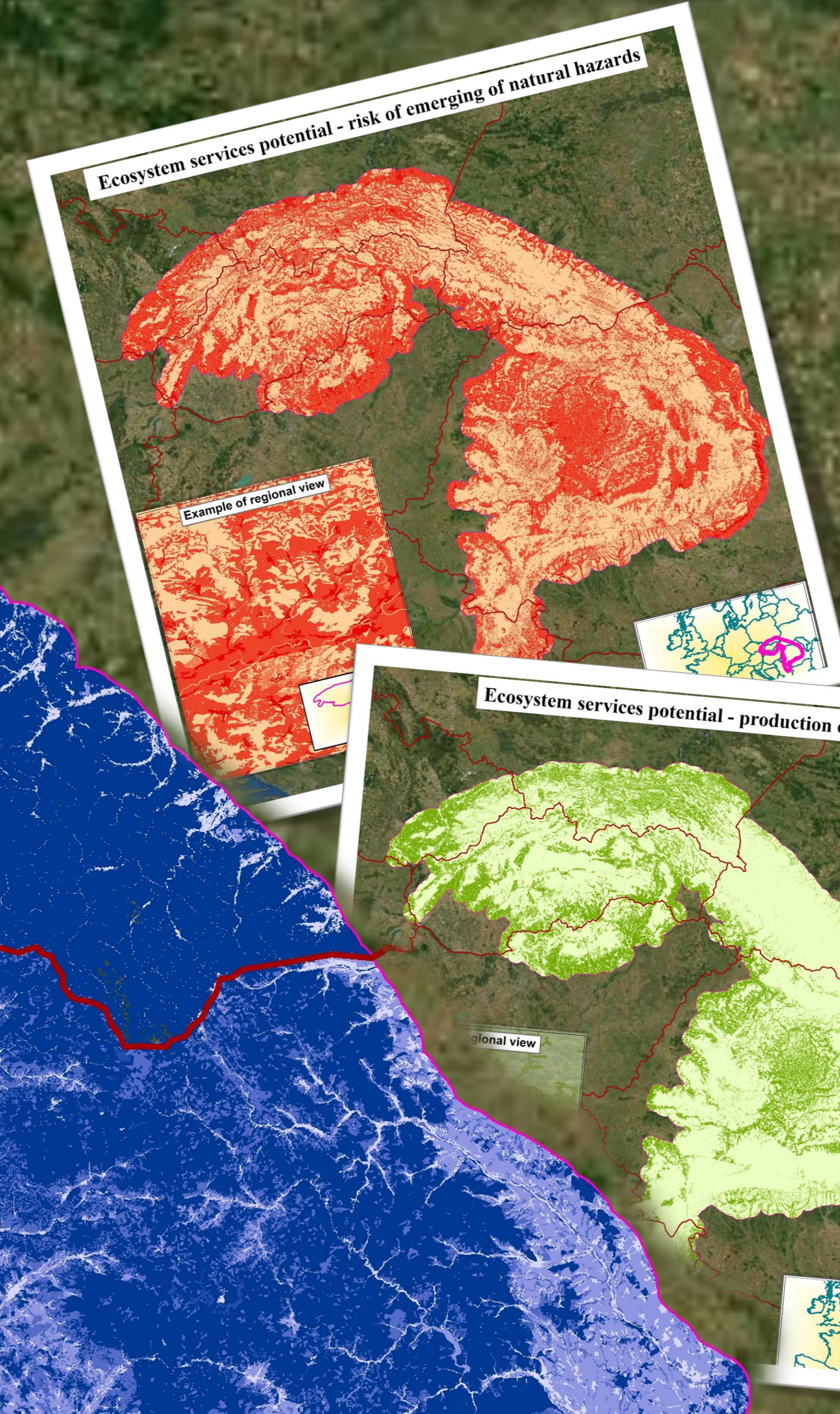
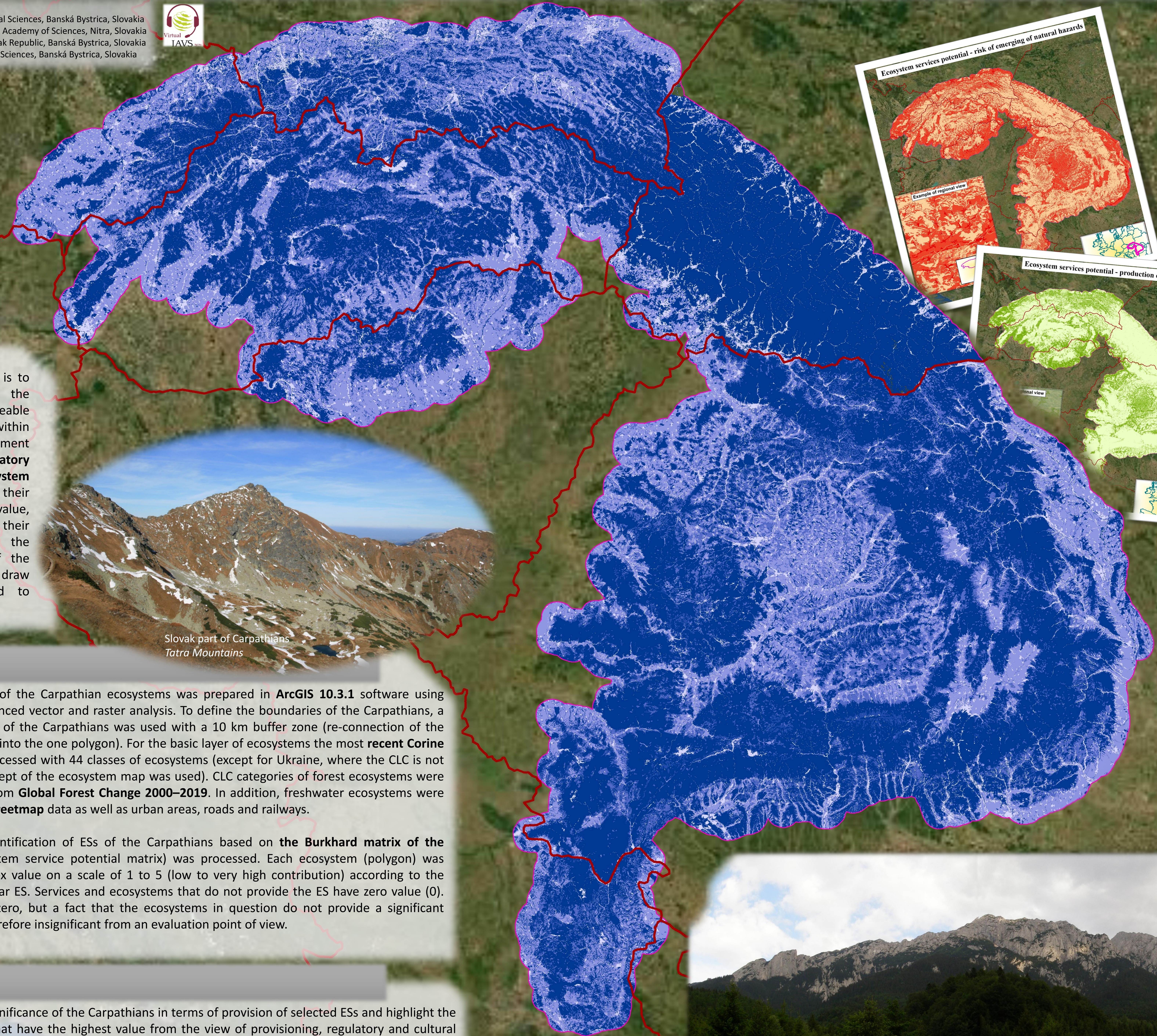
## METHODS

In the first step, a map of the Carpathian ecosystems was prepared in **ArcGIS 10.3.1** software using standard, as well as advanced vector and raster analysis. To define the boundaries of the Carpathians, a layer of **orographic units** of the Carpathians was used with a 10 km buffer zone (re-connection of the small boundary polygons into the one polygon). For the basic layer of ecosystems the most **recent Corine land cover** data were processed with 44 classes of ecosystems (except for Ukraine, where the CLC is not available and thus a concept of the ecosystem map was used). CLC categories of forest ecosystems were supplemented by data from **Global Forest Change 2000–2019**. In addition, freshwater ecosystems were refined using the **OpenStreetmap** data as well as urban areas, roads and railways.

The second step, an identification of ESs of the Carpathians based on the **Burkhard matrix of the potential** of ESs (ecosystem service potential matrix) was processed. Each ecosystem (polygon) was assigned a potential index value on a scale of 1 to 5 (low to very high contribution) according to the contribution of a particular ES. Services and ecosystems that do not provide the ES have zero value (0). This is not an absolute zero, but a fact that the ecosystems in question do not provide a significant amount of ES and are therefore insignificant from an evaluation point of view.

## RESULTS

- The evaluation of the significance of the Carpathians in terms of provision of selected ESs and highlight the most important areas that have the highest value from the view of provisioning, regulatory and cultural ESs.
- Individual maps of potential provision of selected ESs (e. g. global climate regulation in the middle).
- Index values of potential provision of selected ESs divided according to the ecosystem categories.

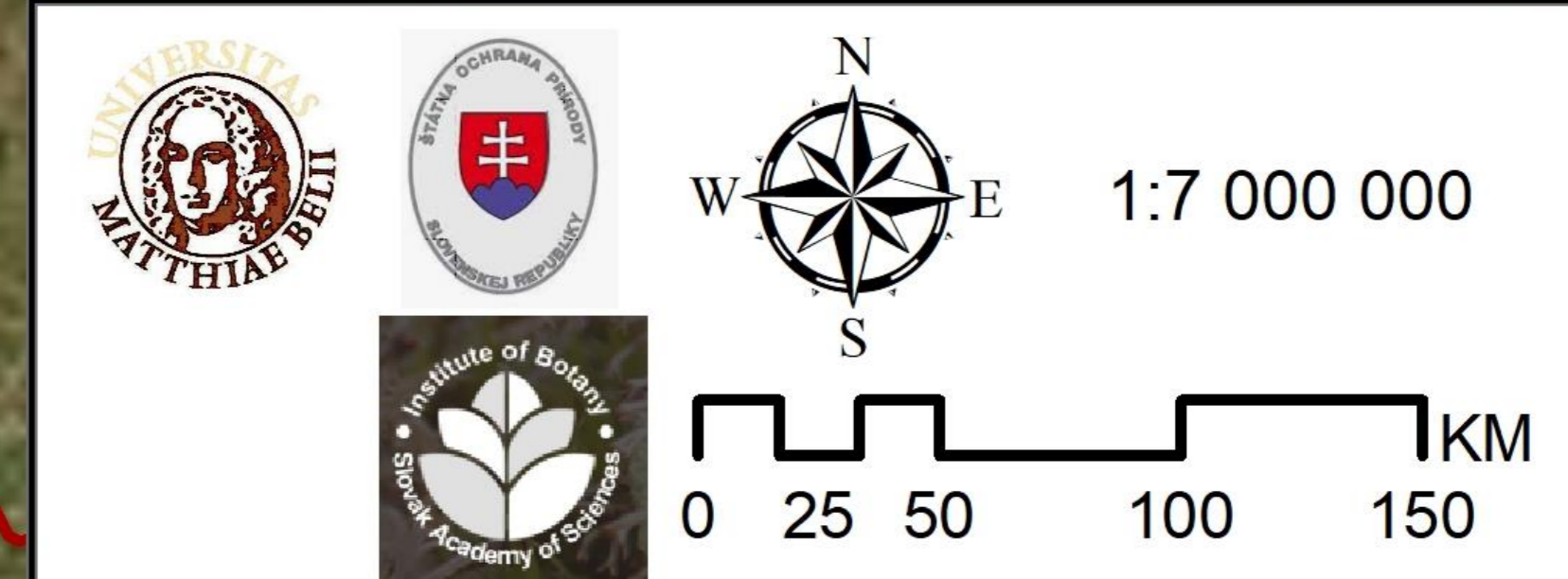


## Legend

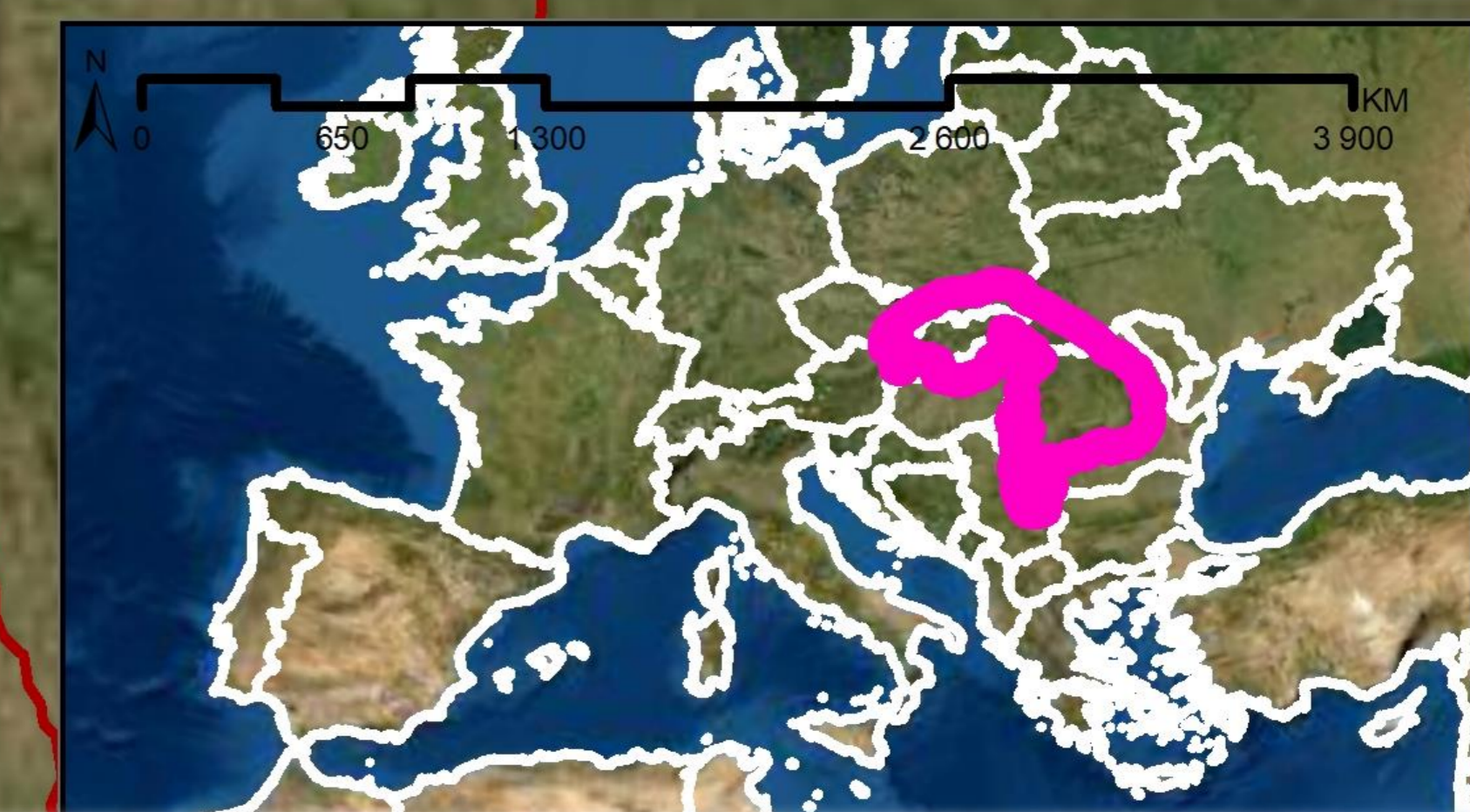
- State borders
- Carpathians

## Carpathians ecosystem services Global climate regulation

- 0 - no potential
- 1 - low relevant potential
- 2 - relevant potential
- 3 - medium relevant potential
- 5 - very high relevant potential



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Traditional settlements  
- Romanian Carpathians

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Romanian Carpathians