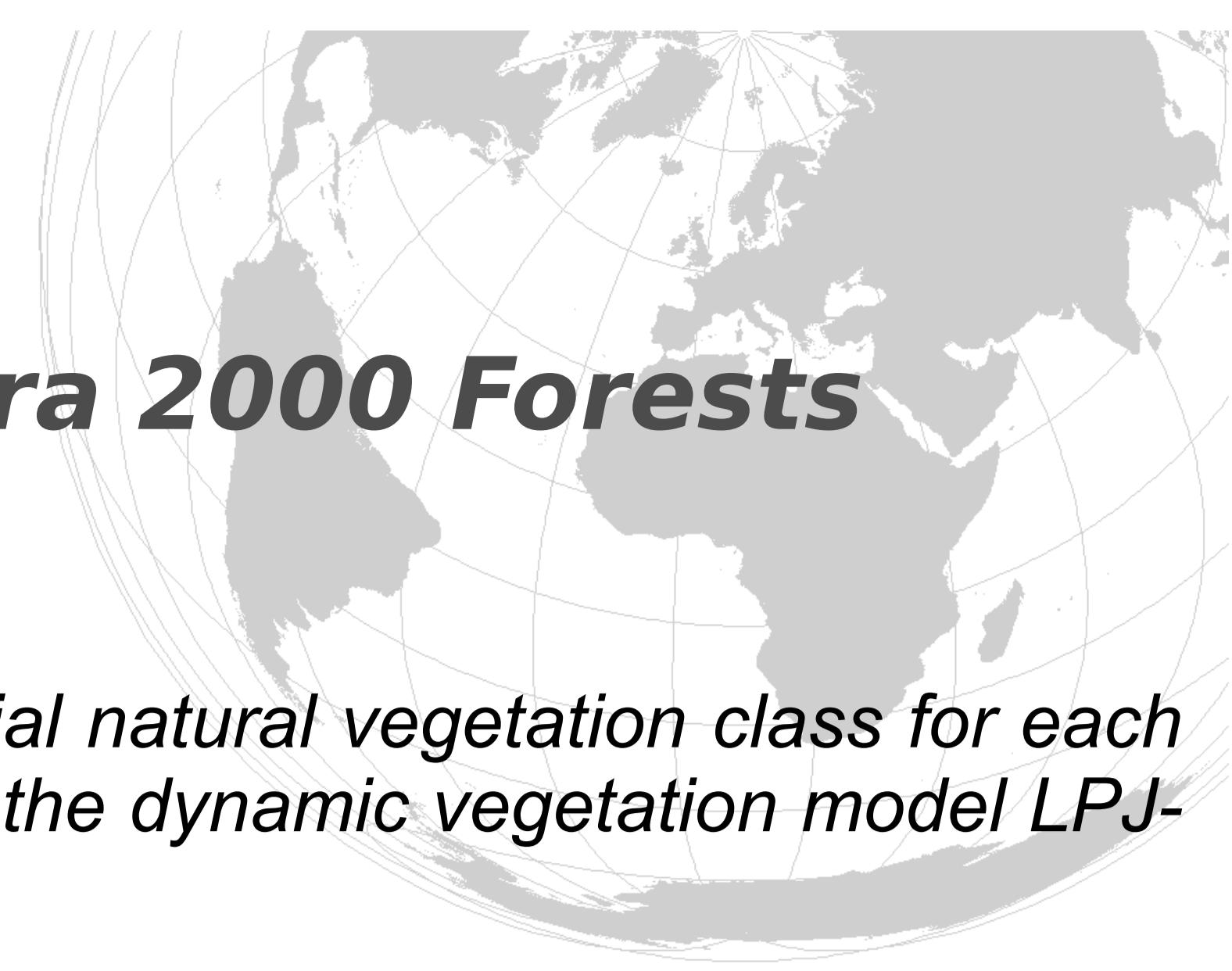


LPJ-GUESS

Mapping Hot Spots of Natural Vegetation Change in Natura 2000 Forests

Authors : Luis Costa ^a, Katrin Vohland ^a Thomas Hickler ^b



Abstract: Impacts of climate on vegetation are often summarized in biome maps, representing the potential natural vegetation class for each grid cell under current and changed climate. Using GIS, the extent and type of biome change predicted by the dynamic vegetation model LPJ-GUESS was calculated for the forest sites of the Natura 2000 areas.

Motivation

Biodiversity loss is inextricably linked to the degradation of ecosystems. Humans are both dependent on services provided by ecosystems, such as forests, and responsible for administrative decisions on which ecosystems to protect.

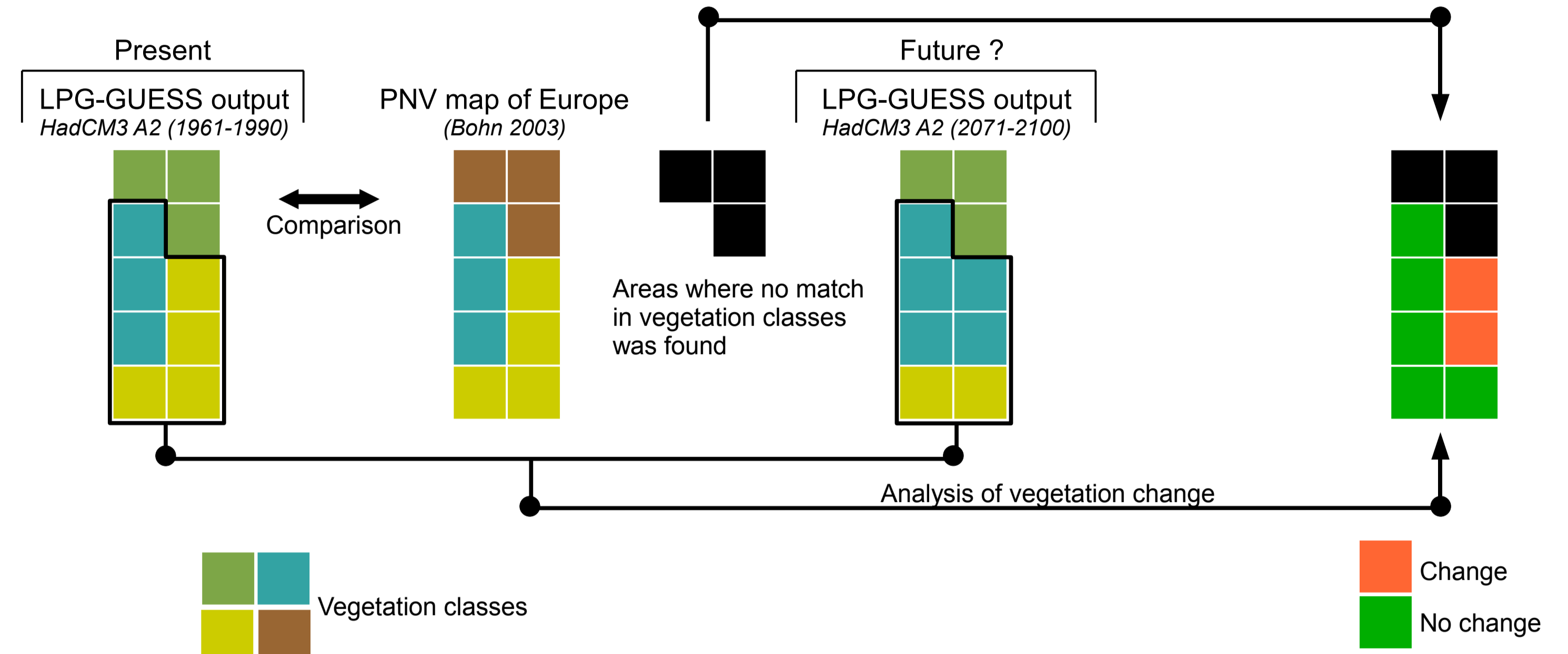
Can future climate change lead to shifts in vegetation patterns on the same habitats we choose to protect? If so, where might we need to re-think our conservation goals?

Results

The model generally reproduces the overall potential vegetation across Europe (Fig.1). Major differences between the modelled vegetation and the PNV map occur at the transition between Hemiboreal and Boreal forest in southern Finland. The model also underestimates the extent of Steppe vegetation at the Hungarian Plains and the areas of Temperate deciduous forests in northern part of the Iberian Peninsula.

Methods

The process-based model of vegetation dynamics LPJ-GUESS was used to calculate the potential natural vegetation (PNV) across Europe under current and future climatic conditions.



For regions where current LPJ-GUESS output was in line with the Bohn 2003 map of PNV, the amount of Natura 2000 forests predicted to undergo on future vegetation change was calculated.

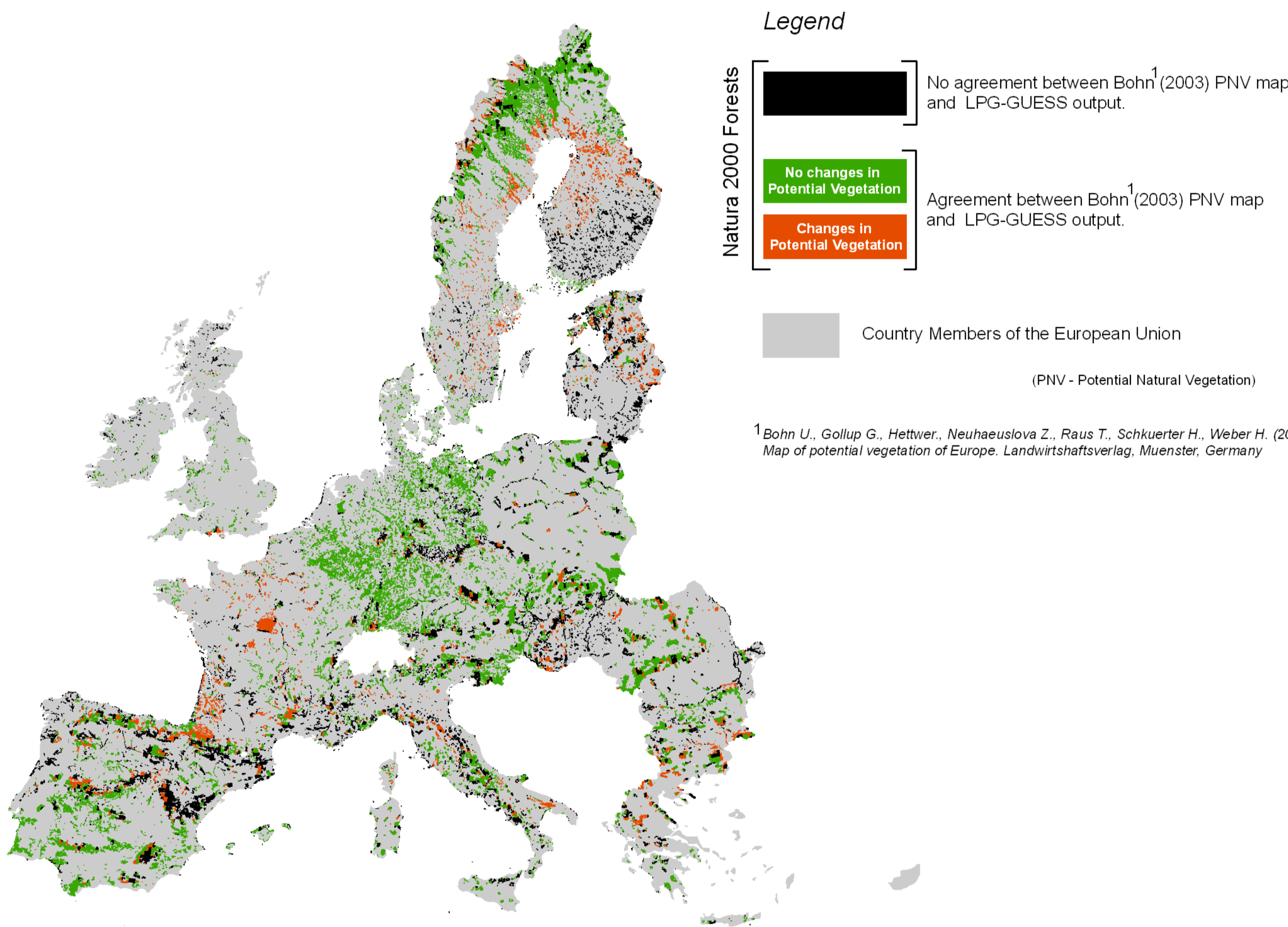


Fig. 1 – Changes in potential vegetation in the Natura 2000 forests

No changes in potential vegetation in Natura 2000 forests are expected to occur in Central Europe. Large shifts in vegetation were noted in the Baltic region, central Finland and France.

In a management perspective, it's not only useful to know where changes in potential vegetation are likely to take place, but also what type of change is predicted and to what extent.

A country based analysis (Fig.2) displays the type and extent of the vegetation shifts, serving a possible base of discussion about conservation policies within country members of the European Union.

Conclusion

Conservation goals have to account for climate change as a major driver of rapidly changing vegetation patterns across Europe.

Trees largely influence the availability and quality of habitats for other organism groups. The effects of a shift in vegetation will therefore have an impact on habitat dependent species.

Conservation strategies and management practices should be re-considered in areas where substantial changes in vegetation are most likely to occur.

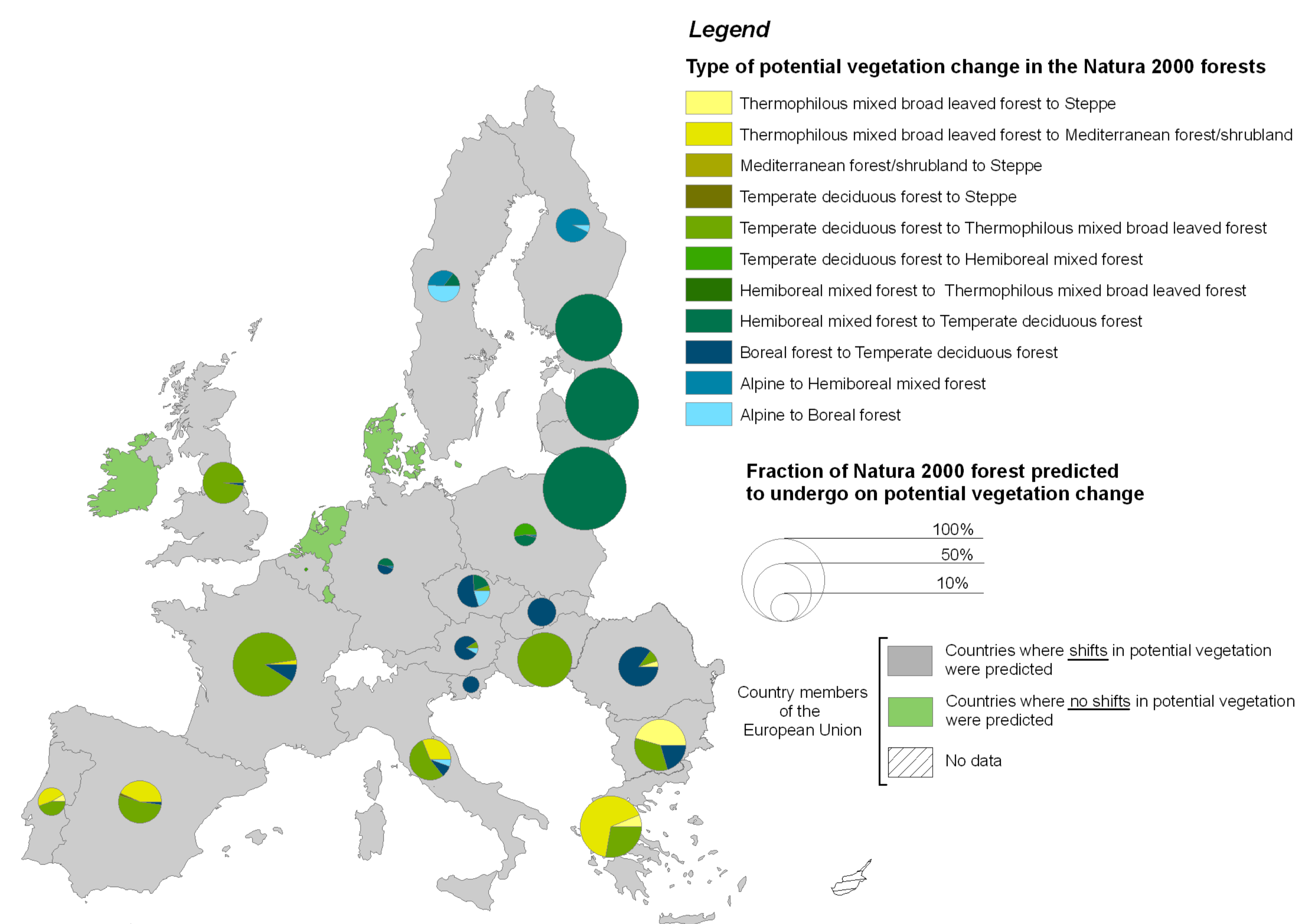


Fig. 2 – Type and extension of of potential vegetation in Natura 2000 forests by country

^a Potsdam Institute for Climate Impact Research, Telegraphenberg A 62, D-14473 Potsdam, Germany

^b Department of Physical Geography and Ecosystems Analysis, Geobiosphere Science Centre, Lund University, Sölvegatan 12, S-223 62 Lund, Sweden