

High resolution mapping of population change in breeding birds in Wallonia (Southern Belgium)

Thomas Coppée¹, Jean-Yves Paquet², Nicolas Titeux^{3,4,5} and Marc Dufrêne¹

Context

Since 1990, a global decline is observed in populations of common bird species in Wallonia (Fig. 1). Multiple possible causes are identified as destruction of habitats, fragmentation or change of agricultural practices.

Understanding of the dynamics of bird populations is important to identify the driving forces of changes. The use of state-of-the-art modeling allows to check the efficiency of models predicting the future change in bird populations based on change of land cover.

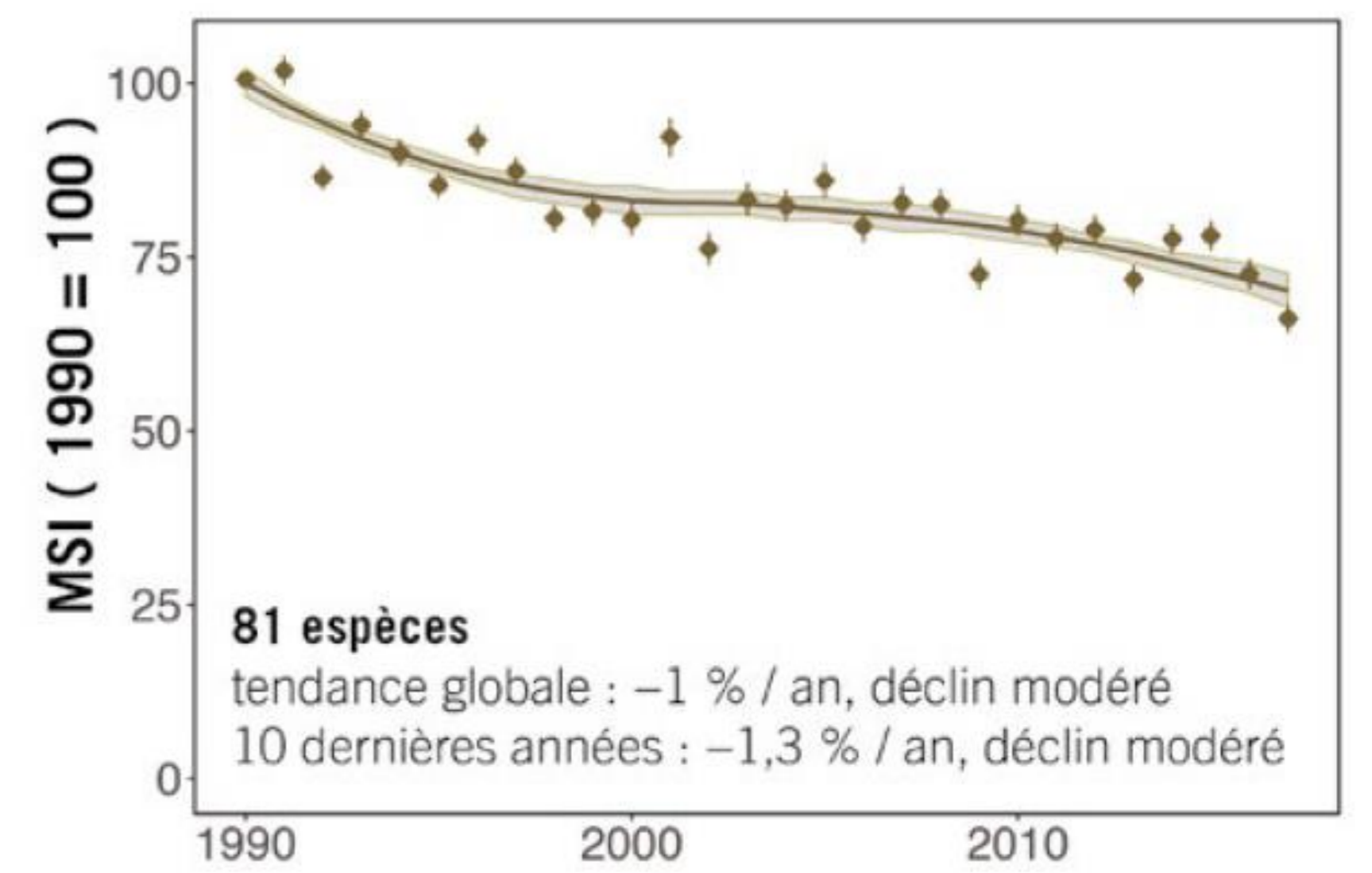


Fig. 1 Global multispecies index; changes in the overall average of 81 common species in Wallonia over the period 1990 to 2017 (Derouaux & Paquet, 2018)

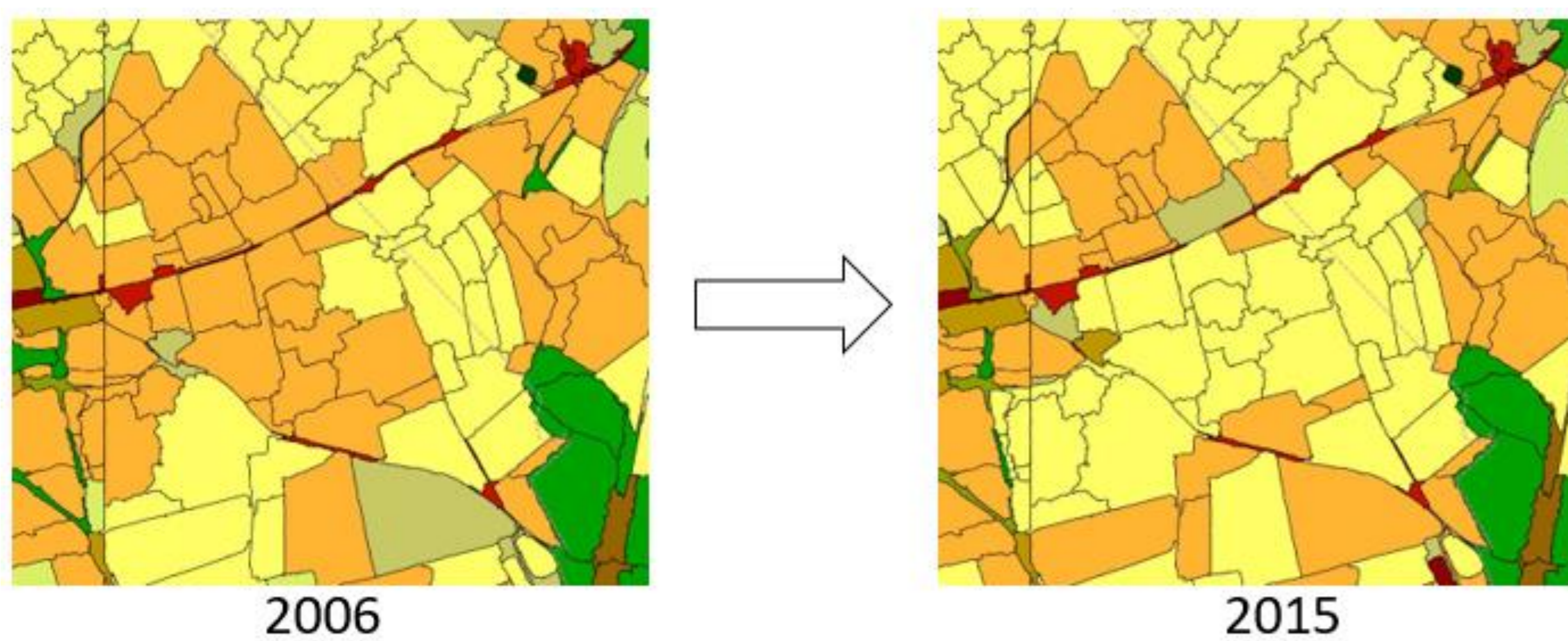
Material and methods

2 bird occurrence datasets for 2 periods : 2001-2007 and 2015-2018

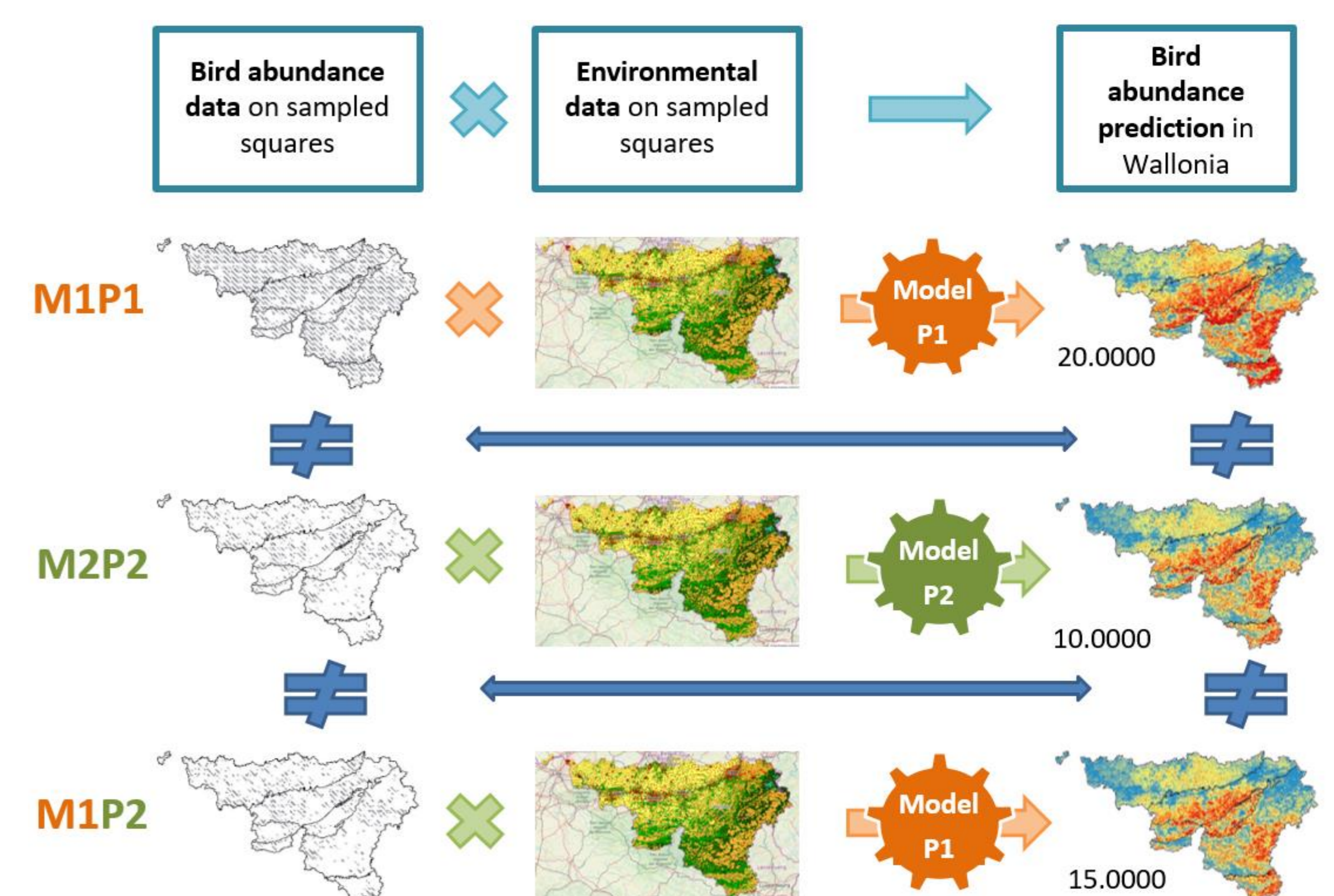
- 1km² squares/2 surveys (1hour)
- All birds except migratory

2 environmental datasets produced by LifeWatch-WB

- Land cover classification (pixel-based – 10 classes)
- Aerial views based classification

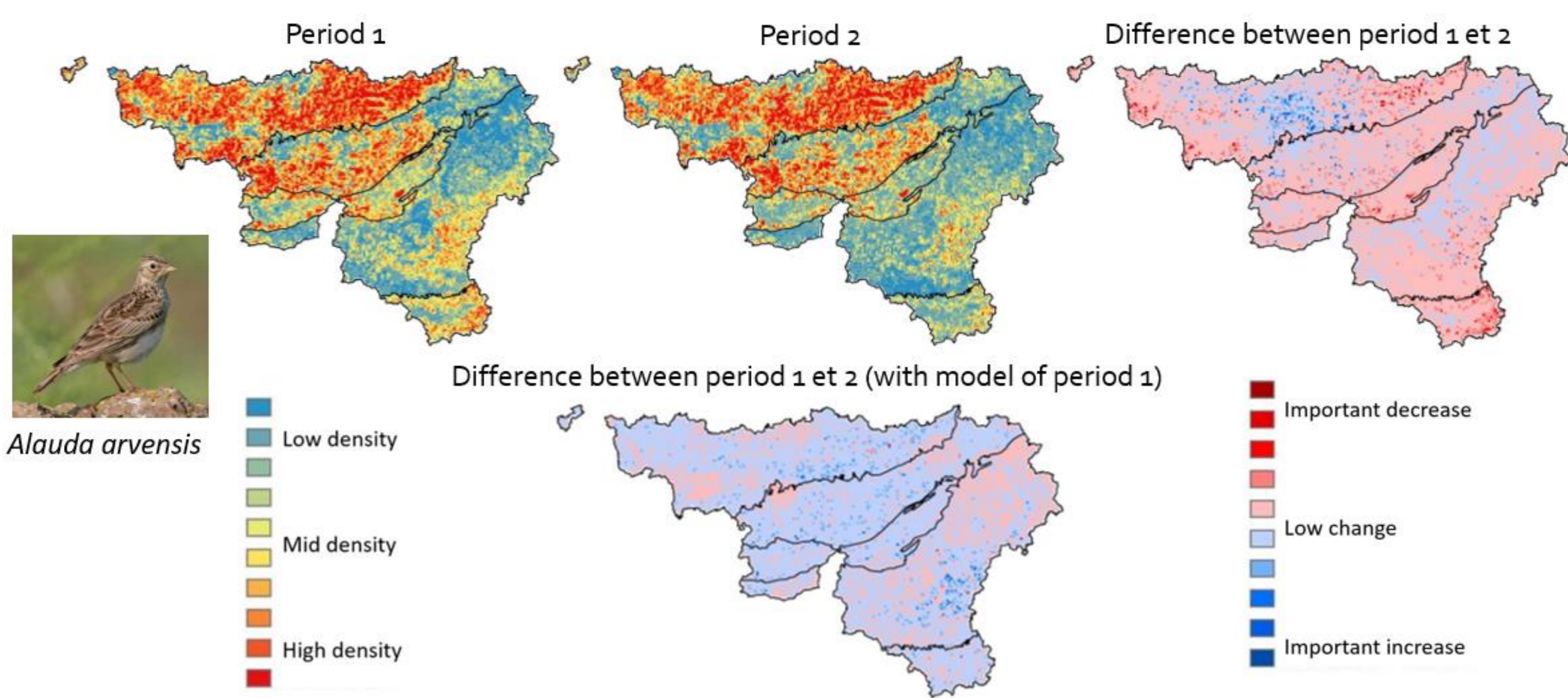


Different GAM models are built to study the change of populations



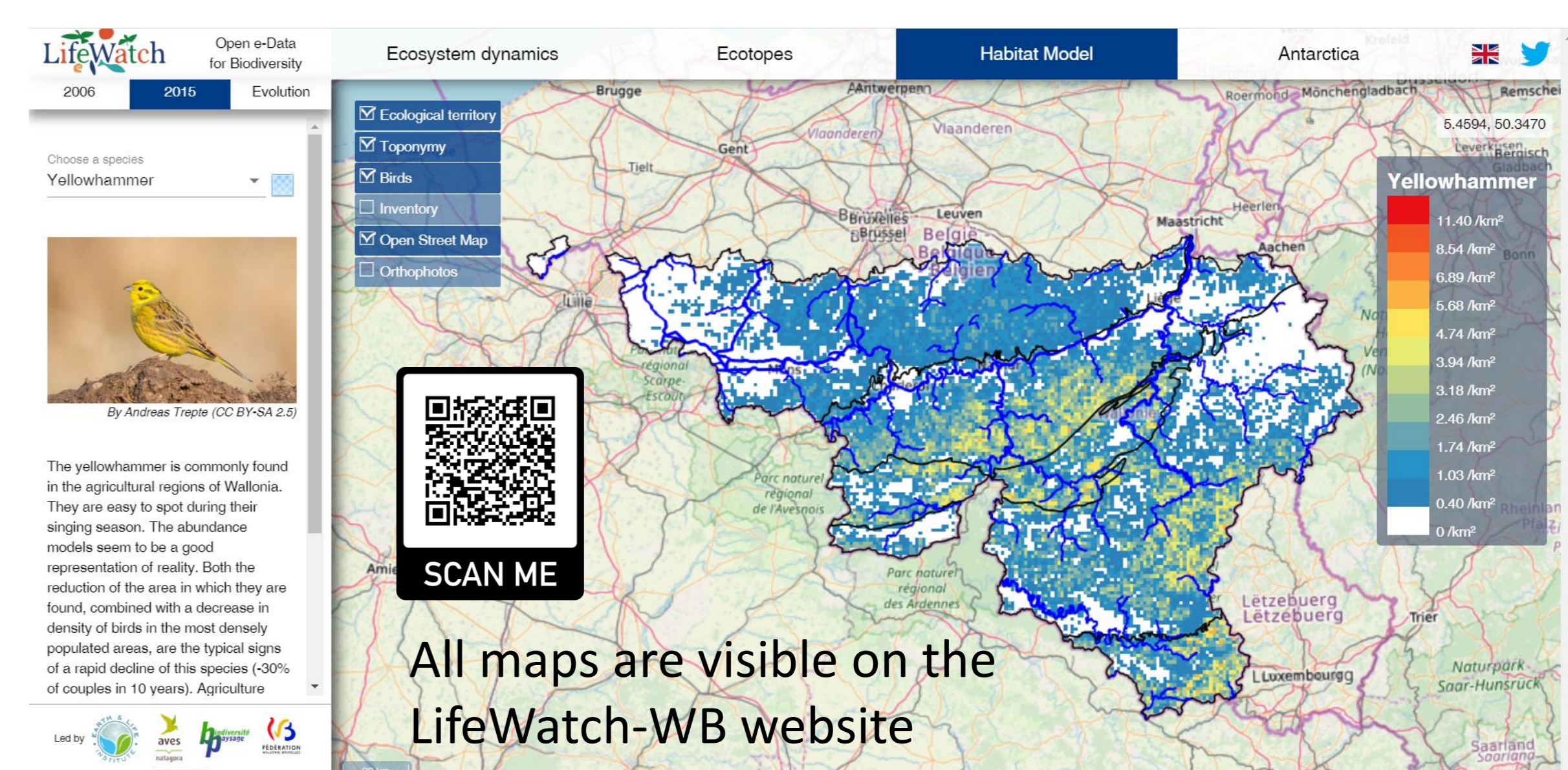
Results

- ✓ According to the trends between independent models (M1P1 and M2P2), on 77 studied species, 25 species are increasing and 52 are decreasing
- ✓ Good adequacy between trends obtained with independent models and trends of bird raw dataset
- ✓ Bad prediction of models with bird and environmental data of a period, crossed with environmental data of an other period
 - For example, according to the model, several species specialized of crops would increase because crops increase, but in actual fact we observed a decrease between the 2 periods
- ✓ Direct modelling of relative difference of abundance identifies quite well trends, but not necessary the real change



Conclusion

- ✓ Future change in bird populations is difficult to predict
- ✓ Land cover variables are not sufficient to predict change of bird population. It is necessary to add more precise variables (crop rotation, spatial configuration, forest structure)



Please, if you have any questions, contact me :
thomas.coppee@uliege.be



Affiliations

- ¹Biodiversity and Landscape Unit, Gembloux Agro-Bio Tech, Université de Liège, Belgium
- ²Département Études, Natagora, Namur, Belgium
- ³UFZ – Helmholtz Centre for Environmental Research, Department of Community Ecology, Halle, 06120, Germany
- ⁴German Centre for Integrative Biodiversity Research (iDiv) Halle-Jena-Leipzig, Leipzig, 04103, Germany
- ⁵Earth and Life Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium