Application of geospatial models for suitability and distribution potential of citrus: a case study in eastern Sicily.

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**Keywords.** geostatistical software, citrus, spatial distribution, land cover

**Abstract.**

Climate changes are responsible of considerable effects on agriculture due to the variation of temperatures and weather patterns. Policy makers have implemented different actions for a transition towards sustainable food and agriculture reducing the impacts on the environment. The environmental monitoring is of upmost importance in the identification of these actions as it allows to protect the resources monitored, mitigate impacts and ensure a sustainable use of the natural resources.

Advanced technologies such as remote sensing (RS) and geographical information system (GIS), coupled with statistical tools, are helpful in determining the variation in the land cover due to climate changes. Based on the literature, the geostatistical tool Software for Assisted Habitat Modeling Package (SAHM) is a promising tool for environmental monitoring.

On this basis, this study contributed to monitor changes in suitability of a specific vegetation over time in a territory by using the SAHM tool. In the case study, the aim was to predict the citrus coverage variation in Eastern Sicily by the application of different geospatial models available in SAHM. Based on the bioclimatic data, current and future species probabilities of occurrence were studied in the Syracuse area by using different models (e.g., Maxent, BRT, Mars, GLM, and Random Forest). Comparisons between the results obtained using the different models were carried out and accuracy measures were analysed.

The results were provided through thematic maps and plots, showing the current and future suitability of the plants’ presence at different bioclimatic conditions. The outcomes of this study are relevant for companies as well as to support territorial administrations in land use planning.