



Mapping climate change impact on vegetation and the associated uncertainties in the Euro-Mediterranean area

Nabil Laanaia, Jean-Christophe Calvet, Dominique Carrer, and Roland S  f  rian
CNRM, UMR 3589 (Meteo-France, CNRS), Toulouse, France (nabil.laanaia@meteo.fr)

Crops, grasslands and forests in the Euro-Mediterranean area are already affected by the climate change impacts and will be even more in the future. The knowledge of the extent of these impacts will allow the implementation of adaptation strategies of agriculture and forestry to climate change. The aim of this study is to explore the potential implications of climate change and characterize significant future vegetation trends and their uncertainties. The ISBA (Interactions between Soil, Biosphere, and Atmosphere), land surface model is developed by Meteo-France for meteorological, hydrological and climatic applications. In this study, ISBA is forced by the atmospheric variables produced by different climate models. We use an ensemble of four climate models, following the RCP8.5 scenario, to drive the ISBA model. The simulations cover 114 year from 1986 to 2099. Two time horizons 2029-2058 (near future) and 2070-2099 (distant future) are compared to the 1988-2017 period. The ISBA model is used to provide several simulations of plant growth and carbon storage. Four vegetation types (rainfed straw cereals and grasslands, broadleaf and coniferous forests) are considered. The leaf area index simulations are used to determine phenology variables (leaf onset, leaf offset). A statistical analysis is used to quantify the impact of climate change and to show whether the future trends are significant or not. The uncertainties related to these trends are characterized. A spatial classification method is used to map the spatial variability of the impact of climate change.