



Assessment of the chestnut production weather dependence

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The vegetative cycle of chestnut trees is highly dependent on weather. Photosynthesis and pollen germination are mainly conditioned by the air temperature while heavy precipitation and strong wind have significant impacts during the flushing phase period (Gomes-Laranjo et al., 2005, 2006). In Portugal, chestnut tree orchards are located in mountainous areas of the Northeast region of Trás-os-Montes, between 600 and 1000 m of altitude. Topography controls the atmospheric environment and assures adequate conditions for the chestnut production.

In the above mentioned context, remote sensing plays an important role because of its ability to monitor and characterise vegetation dynamics. A number of studies, based on remote sensing, have been conducted in Europe to analyse the year-to-year variations in European vegetation greenness as a function of precipitation and temperature (Gouveia et al., 2008). A previous study focusing on the relationship between meteorological variables and chestnut productivity provides indication that simulation models may benefit from the incorporation of such kind of relationships. The aim of the present work is to provide a detailed description of recent developments, in particular of the added value that may be brought by using satellite data. We have relied on regional fields of the Normalized Difference Vegetation Index (NDVI) dataset, at 8-km resolution, provided by the Global Inventory Monitoring and Modelling System (GIMMS) group. The data are derived from the Advanced Very High Resolution Radiometers (AVHRR), and cover the period from 1982 to 2006. Additionally we have used the chestnut productivity dataset, which includes the annual values of chestnut production and area of production provided by INE, the National Institute of Statistics of Portugal and the meteorological dataset which includes values of several variables from different providers (Meteorod, NCEP/NCAR, ECA&D and national Meteorological Institute).

Results show that satellite and meteorological data are complementary in what respects to the evaluation of the spatial and temporal evolution of the chestnut production. The satellite data proves to be very useful to monitor the spatial and temporal evolution of the vegetation state in the locations of the chestnut orchards and when tested as potential predictors by means of correlation and regression analysis.

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