



Impacts of climate variations on winter cereal production in Spain

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Water shortage and the increase in extreme weather events may cause higher yield variability. Agricultural losses are very dependent on weather and farmers need climatic and seasonal forecast information that anticipates variations in crop productions. On the other hand, changes in climate could alter crop distribution and policies dealing with climate should learn about the impact of climate change on crop productions. On the basis of these motivations we consider it to be of great interest to analyse the association between regional and large-scale climate variables and crop production. The aim of this work is to find the sources of Spanish winter cereal productivity variations in the climate historical time series. Climate over the Iberian peninsula shows large interannual variations. There are also some clues about the increasing frequency of extremes. For the same period, winter cereal time series also show significant interannual variations. To conduct this study we investigated the links between climate variables and the year-to-year cereal productivity fluctuations. Therefore, the different phases of cereal growing were related to climate and a model was derived to explore the response of cereal productivity to climate. First, climatic signals were filtered by applying Empirical Orthogonal Function analysis. Correlation analysis between cereal productivity and climate variables allowed us to identify signals in regional fields, such as precipitation, drought, maximum and minimum temperatures, and in large-scale atmospheric fields, such as sea level pressure and moisture fluxes.