



Climate change and wheat productivity in Spain

Sara Hernandez-Barrera (1) and Concepcion Rodriguez-Puebla (2)

(1) University of Salamanca, Fundamental Physics, Salamanca, Spain (sarahb@usal.es), (2) University of Salamanca, Fundamental Physics, Salamanca, Spain (concha@usal.es)

Climate variables are examined in relation to wheat productivity to derive empirical statistical models and to analyse how global warming affects crop variability. The relationships between wheat productivity (WP) and different climate variables are obtained by using the Partial Least Square regression method, which extracts the dominant modes of climate accounting for variations of the crop. We found greater dependence of WP on the diurnal range of temperature over Iberian Peninsula and sea surface temperature over the North Atlantic during the growing stage of the yield, while the aridity index over Iberian Peninsula and zonal winds at 250 hPa over the Atlantic affect WP during the maturity stage. From these statistical relationships we derived two empirical models, one considering regional-scale variables, the other based on large-scale variables. The empirical models are applied to assess the WP simulations using outputs of six climate models corresponding to the Coupled Models Intercomparison Project phase 5 (CMIP5). The study compares the trend and variability of the regional and large-scale simulations, providing a decline in WP in the 21st century