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Climatic variability effects on summer cropping systems of the Iberian Peninsula

M. Capa-Morocho (1), B. Rodríguez-Fonseca (2), and M. Ruiz-Ramos (1)

(1) AgSystems group, Producción Vegetal: Fitotecnia, ETSI Agrónomos, Technical University of Madrid, Spain, (2) Departamento de Geofísica y Meteorología. Universidad Complutense de Madrid, Madrid, Spain

Climate variability and changes in the frequency of extremes events have a direct impact on crop yield and damages. Climate anomalies projections at monthly and yearly timescale allows us for adapting a cropping system (crops, varieties and management) to take advantage of favorable conditions or reduce the effect of adverse conditions. The objective of this work is to develop indices to evaluate the effect of climatic variability in summer cropping systems of Iberian Peninsula, in an attempt of relating yield variability to climate variability, extending the work of Rodríguez-Puebla (2004).

This paper analyses the evolution of the yield anomalies of irrigated maize in several representative agricultural locations in Spain with contrasting temperature and precipitation regimes and compare it to the evolution of different patterns of climate variability, extending the methodology of Porter and Semenov (2005). To simulate maize yields observed daily data of radiation, maximum and minimum temperature and precipitation were used. These data were obtained from the State Meteorological Agency of Spain (AEMET). Time series of simulated maize yields were computed with CERES-maize model for periods ranging from 22 to 49 years, depending on the observed climate data available for each location. The computed standardized anomalies yields were projected on different oceanic and atmospheric anomalous fields and the resulting patterns were compared with a set of documented patterns from the National Oceanic and Atmospheric Administration (NOAA).

The results can be useful also for climate change impact assessment, providing a scientific basis for selection of climate change scenarios where combined natural and forced variability represent a hazard for agricultural production. Interpretation of impact projections would also be enhanced.

References

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