



Response of wheat yield in Spain to large-scale patterns

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Crops are vulnerable to extreme climate conditions as drought, heat stress and frost risk. In previous study we have quantified the influence of these climate conditions for winter wheat in Spain (Hernandez-Barrera et al. 2015). The climate extremes respond to large-scale atmospheric and oceanic patterns. Therefore, a question emerges in our investigation: How large-scale patterns affect wheat yield? Obtaining and understanding these relationships require different approaches. In this study, we first obtained the leading mode of observed wheat yield variability to characterize the common variability over different provinces in Spain. Then, the wheat variability is related to different modes of mean sea level pressure, jet stream and sea surface temperature by using Partial Least-Squares, which captures the relevant climate drivers accounting for variations in wheat yield from sowing to harvesting. We used the ERA-Interim reanalysis data and the Extended Reconstructed Sea Surface Temperature (SST) (ERSST v3b). The derived model provides insight about the teleconnections between wheat yield and atmospheric and oceanic circulations, which is considered to project the wheat yield trend under global warming using outputs of twelve climate models corresponding to the Coupled Models Intercomparison Project phase 5 (CMIP5).

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