



On the relevance of land surface initialisation in seasonal climate forecasting over Europe for agricultural applications

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Advancing our understanding on the impact of climate variability and extremes on crop production is a crucial element in the development of an integrated seasonal crop yield forecasting system. The early prediction of severe weather events can contribute to the mitigation of adverse effects on agricultural production. Due to their poor skill, seasonal climate forecasts currently play only limited role in supporting the agricultural decision in Europe. In this study we aim at increasing the role of seasonal forecasts in agriculture by studying the impact of realistic land surface initialisation for seasonal climate forecasts on prediction of drought and heat stress conditions, which are among the key factors limiting the maize growth and development in Europe. For this purpose the Combined Stress Index (CSI), which considers both water and heat stress in summer, is here used to predict maize yields. The CSI explains on average 53% of the inter-annual maize yield variability under observed climate conditions. The seasonal climate forecast initialised with realistic land surface initialisation achieves better (and useful) skill in predicting the CSI than with climatological land-surface initialisation in south-eastern Europe, part of central Europe, France and Italy.