



Early heat waves over Italy and their impacts on durum wheat yields

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In the last decades the Euro-Mediterranean region has experienced an increase in extreme temperature events such as warm spells and heat waves. These extreme weather conditions can strongly affect arable crop growth and final yields. Since the most sensitive period for winter wheat in the Italian Peninsula is May-June, early heat waves from 1985 to 2013 are here identified and characterised. Then, their impact on annual durum wheat yields from 1995 to 2013 is investigated by using durum wheat yield time series retrieved from the Italian National Institute of Statistics - ISTAT for the most important (in term of durum wheat production) 39 areas. Results confirm, as expected, the 2003 peak in the time series of heat wave intensities and highlight other significant events, for instance in 2006, 2007 and 2009. In 2003, the development and growth of durum wheat were greatly influenced by heat stress, as shown by the very low values of durum wheat yields, exceeding -52% in southern Italy. However, the negative peak of yield anomalies (-65%) is recorded in south-eastern Italy in 2009. Results also show a high percentage (w.r.t. the total number of years with significant negative yield anomaly) of concurrent early heat waves/significant negative yield anomaly in many of the investigated areas. In the other areas (e.g., Sicily), lower numbers of concurrent events could be caused by the late occurrence of the early heat waves, i.e. after durum wheat maturity.