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Analysis of heat stress for the agricultural purposes in Croatia in the past, present and future

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We analyzed consecutive days with maximum daily air temperatures in the Croatia using meteorological data in the 110- and 30-year periods. The aim of this study was to define the critical maximum daily air temperature, as an indicator of occurrence of heat stress in agriculture. The spatial distribution of affected areas due to heat stress in the past, present and future climate conditions has been analyzed. Heat stress was defined as at least ten consecutive days with a maximum daily air temperature equal or great than a certain critical temperature. Vulnerable area, due to heat stress, was defined by the existence of at least six years with heat stress through a 30-year period (with probability of 20%). A sharp rise in the number of days with maximum daily air temperature above the critical maximum daily air temperature is observed. The spread of the heat stress area for the critical temperature between 30C and 34C shows in the period 1981-2010 compared to the reference period 1961-1990. The future projection of maximum daily air temperature, based on numerical simulations of regional climate model (RegCM), shows continued tendency to spread endangered areas due to heat stress, which could affect the whole of Croatia to the end of the 21st. Heat stress analysis indicates that the critical maximum daily air temperature is from 30C to 32C. To determine the final value of the critical temperature in the definition of heat stress for agricultural purposes, it is necessary to connect with the most common breeding agricultural crops in Croatia.