

# **The length of western European summer heat waves has doubled since 1880**

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The 2003 European heatwave was a very extreme climatic event unprecedented in the last 500 years. Anthropogenic influence has at least doubled the risk of such an event since 1851, and more frequent and intense events can be expected in the future. We analysed a new dataset of 54 high quality homogenized daily maximum temperature series from western Europe to define more accurately the change in frequency, persistence and variance of extreme summer temperatures. Here we show over the period 1880 to 2003, the length of summer heatwaves over western Europe has doubled and the frequency of hot days has increased by 173%. We show that the average Daily Summer Maximum Temperature (DSMT) has increased by  $1.5 \pm 0.5^\circ\text{C}$ . This increase has been accompanied by an increase in the DSMT variance of  $6 \pm 2\%$  averaged over the whole domain and  $10 \pm 2\%$  for central western Europe. These conclusions help further the evidence that western Europe's climate has become more extreme than previously thought and that the hypothesized increase in variance of future summer temperature has indeed been a reality over the last 125 years.