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SUPPLEMENTARY INFORMATION

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Amplification of mega-heatwaves through heat torrents fuelled by upwind drought

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Supplementary information
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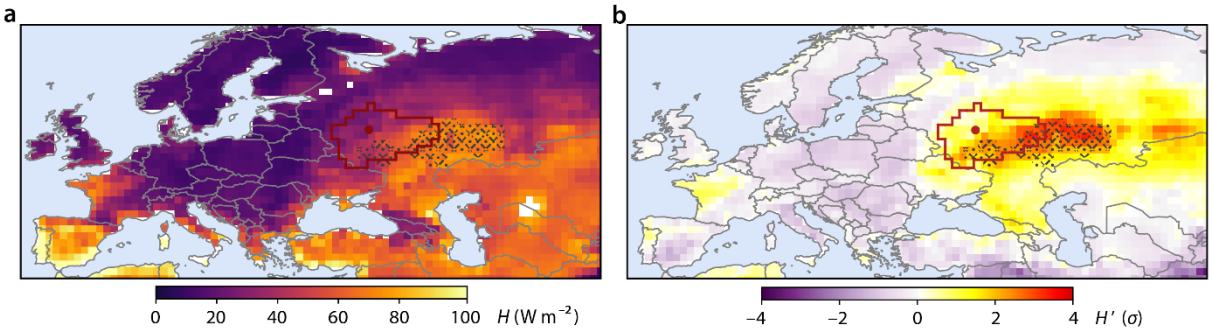

Figure S1 | Surface sensible heat fluxes during the 2010 mega-heatwave. a, Average surface sensible heat fluxes (Wm^{-2}) during the 2010 mega-heatwave, based on GLEAM v3.2a[31,32]. Analogous to the maps in Fig. 2 in the main text, both the heatwave region (red contour) and drought region (black net) are shown. **b,** As a, but for anomalies of surface sensible heat fluxes, expressed in number of standard deviations (σ). The climatology used to calculate anomalies is based on data of all years from 1980 to 2016. Note that this figure similar to Fig. 2b in the main text, except for the units and the fact that areas other than the heatwave region are not masked out.

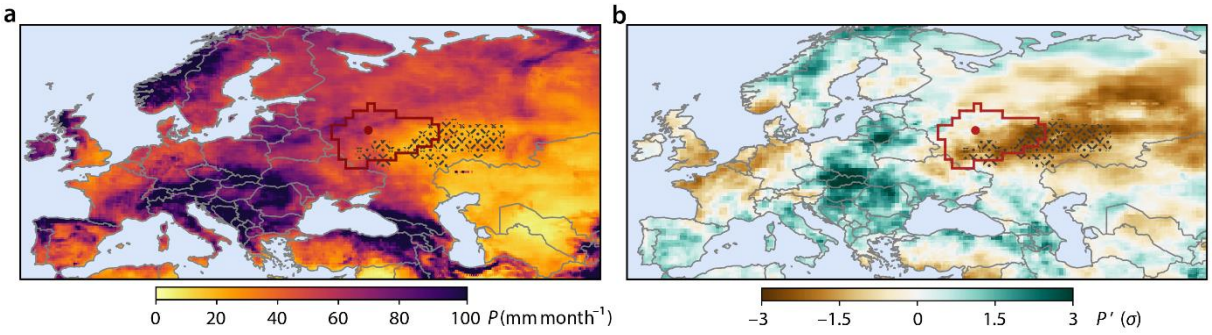

Figure S2 | Long-lasting precipitation deficits from March to July 2010. a, Accumulated precipitation (mm/month) from springtime until immediately before the occurrence of the 2010 mega-heatwave (March–July). Precipitation data were obtained from MSWEP v1.2 (ref. 35). **b,** Same as a, but for the corresponding precipitation anomalies, with the climatology being based on years 1979 to 2016. Analogous to Fig. S1b, anomalies are again expressed in number of standard deviations (σ). In all individual months after March and prior to the mega-heatwave in early August 2010, precipitation in the neighbouring area east of the heatwave region was anomalously low.

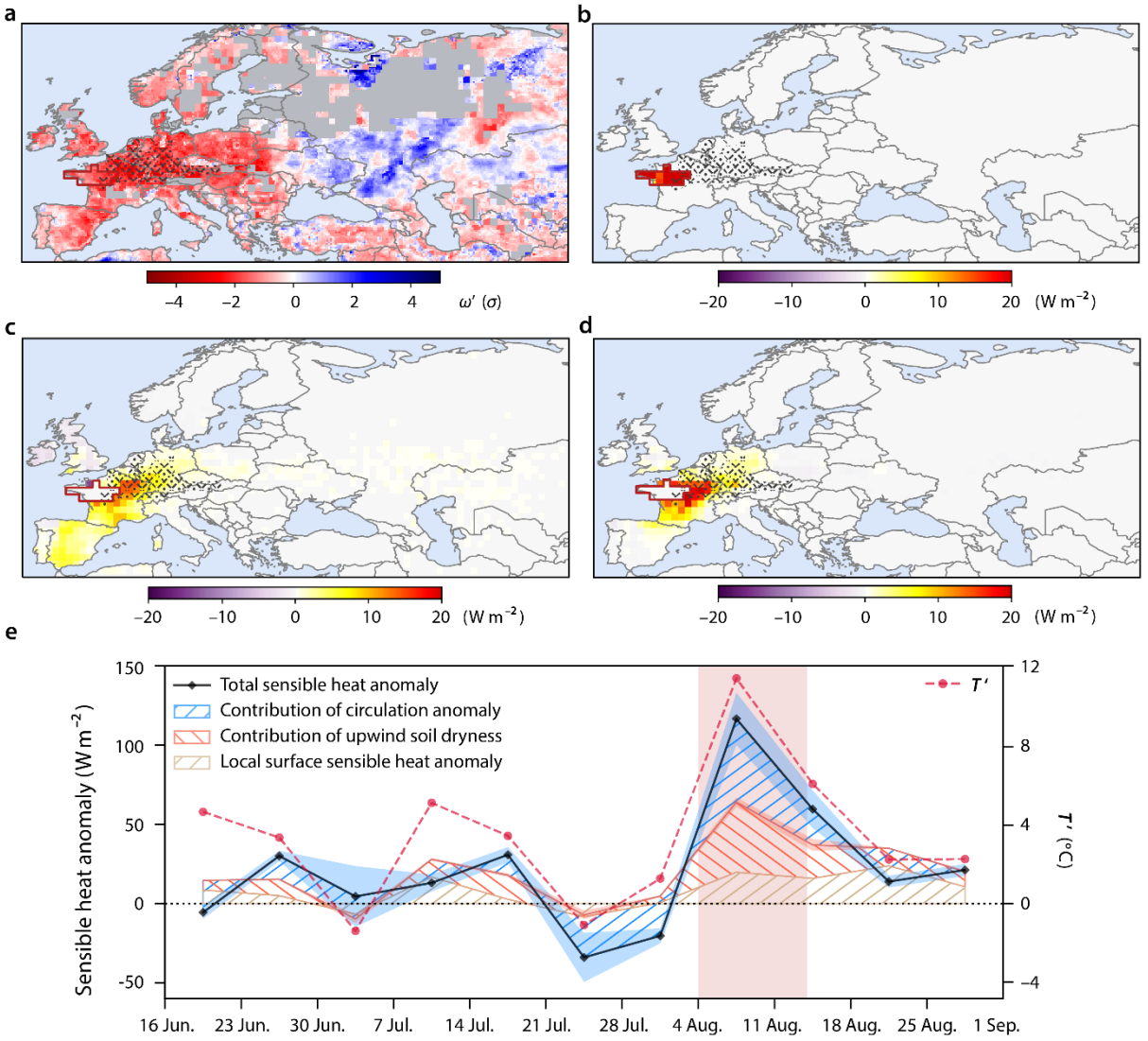

Figure S3 | Origin of the sensible heat anomaly during the 2003 mega-heatwave. Like Fig. 2, but for the 2003 mega-heatwave[9] (4–13 August).