



Quantifying impact-relevant heatwave durations

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Heatwaves are weather hazards which can influence societal and natural systems. Recently, heatwaves have increased in frequency, duration, and intensity, and this trend is projected to continue as a consequence of climate change. This has triggered extensive research aiming at a better understanding of their impacts and underlying processes. However, the study of heatwaves is hampered by the lack of a common definition, which limits comparability between studies. This applies in particular to the considered time scale.

Here, we determine impact-relevant temporal scales of heatwaves. For this purpose we characterise societal metrics related to health (heat-related hospitalizations, mortality) as well as public attention (Google trends, news articles) in Germany. We calculate country-averaged temperatures and select the warmest periods of varying durations between 1 and 90 days. For each time scale, the societal response is assessed to find the heat wave durations with the most pronounced impacts. This way, we yield impact-relevant heat wave durations for Germany. The results differ slightly between the considered societal metrics but indicate overall that heat waves are most relevant at weekly to monthly time scales. Finally, we also compare impact-relevant heat wave durations between moderate and extreme heat waves, as well as between heat waves occurring individually or jointly with droughts.

Our methodology can be extended to other societal indices, countries, and hazard types to form more meaningful definitions of climate extremes in order to guide future research on these events. An improved understanding of weather and climate hazards with their impacts on society, economy and environmental systems will support better communication for preparation, response, and future adaptation.