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Extreme heatwaves in Europe 1950-2020: analysis of the links between meteorology, population, and impacts

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There is high confidence that heatwaves will become more frequent and more intense under the influence of climate change. Different definitions of heatwaves exist based on the statistical distribution of temperature, in general using thresholds and duration and extension criteria.

If one observes the overlap between these definitions and the actual human and material damage produced by heatwaves, it appears that there is low consistency between the two. In other terms, a large amplitude heatwave in the physical climatological sense may not be equivalently as large in terms of impacts.

By crossing meteorological (E-OBS), demographic (WorldPop, GHS-POP), and impact (EM-DAT) databases at the European scale, we developed indices to classify heatwaves and select extreme ones in terms of impacts. We also proposed a method to evaluate the classification abilities of these indices. Including demographic data in the indices seems central to understand the links between meteorological conditions and observed impacts.