



Role of circulation in European heatwaves using flow analogues

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The intensity of European heatwaves is connected to specific synoptic atmospheric circulation. Given the relatively small number of observations, estimates of the connection between the circulation and temperature require ad hoc statistical methods. This can be achieved through the use of analogue methods, which allow to determine a distribution of temperature conditioned to the circulation. The computation of analogues depends on a few parameters. In this article, we evaluate the influence of the variable representing the circulation, the size of the domain of computation, the length of the dataset, and the number of analogues on the reconstituted temperature anomalies. We tested the sensitivity of the reconstitution of temperature to these parameters for four emblematic recent heatwaves : June 2003, August 2003, July 2006 and July 2015. We provide general guidelines for the use of flow analogues to investigate European summer heatwaves. We found that Z500 is better suited than SLP to simulate temperature anomalies, and that rather small domains lead to better reconstitutions. The dataset length has an important influence on the uncertainty. We conclude by a set of recommendations for an optimal use of analogues to probe European heatwaves.