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Identification of European heatwave families

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Mainly caused by anthropogenic climate change occurring heatwaves have become more frequent and extreme throughout the 21st century. Summer heatwaves over Europe are mainly caused by positive phases of the North Atlantic Oscillation (NAO) and jet stream anomalies, subsequently causing atmospheric blocking over different parts of Europe. With this work we aim to define families of European heatwaves caused by different atmospheric regimes. In the long run this could help predicting European heatwaves and their length, intensity and spatial extend. To identify European heatwaves and their spatial extend we use the graph framework DeepGraphs. Within this framework every extreme heat day is considered a node and a heatwave is defined as the union of all nearest neighbour nodes (which are connected by edges).

Two clustering steps are applied to cluster the heatwave into families depending on their length, season and spatial extend.

Our results reveal a promising way to classify European heatwaves based on their atmospheric cause which could help forecasting heatwaves in the future.