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Tropical Atlantic Forcing and Predictability of extreme warm Events in Europe

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Europe has been rapidly warming up since the late-1970s. Concurrently, extreme weather events have become more frequent over most of the continent. Statistical and model studies have been used to link recent European heat waves to climate change. Here, we first report analyses using station-based temperature data for 1950-2003, indicating that European heat waves can be associated with the occurrence of specific summertime atmospheric circulation regimes. Based on model results, we then show that during the record warm summer of 2003, the excitation of these regimes was significantly favoured by the anomalous conditions in the Tropical Atlantic. Given the significant persistence of tropical Atlantic climate anomalies, our results are encouraging for the prospects of long-range forecasting of extreme weather in Europe. In addition, they offer a new perspective on the projected increasing frequency of heat waves suggested in many climate change scenarios.