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The role of Mediterranean SST in the European heat wave of summer 2003

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During Summer 2003, Europe was affected by one of the driest and persistent heat waves. During this event, the Mediterranean sea surface temperature (SST) was exceptionally warm (SST anomalies of 2-4 Celsius degrees). We investigated the possible role of the Mediterranean SST in enhancing the amplitude of the heat wave. Several Atmospheric General Circulation Model (AGCM) sensitivity experiments were conducted with and without Mediterranean SST anomalies. First it was found that the AGCM was able to simulate the evolution and structure of the heat wave using observed global SST anomalies, suggesting that the main features of the heat wave were potentially predictable. The experiment with SST anomalies over the Mediterranean only was also able to simulate the upper level anticyclone over central Europe, even though it was weaker, and about half of the amplitude of the heat wave of the global SST anomaly experiment. This suggested that the Mediterranean SST was responsible for more than half of the amplitude of the global SST effect.