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Atmospheric response to a warm Mediterranean Sea as observed in summer 2003

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The summer of 2003 was not only associated with extremely warm air temperatures over continental western Europe; in the western Mediterranean SST anomalies exceeded the long term mean by more than 5K. In this study we use one of the latest versions of the ECMWF model (at T159 with 40 levels in the vertical) in order to quantify the influence of the anomalously warm Mediterranean Sea as observed in summer 2003 on the global atmosphere.

The largest response is found over the western Mediterranean Sea (precipitation). Furthermore, the Mediterranean SST anomalies have a significant impact on precipitation in the ITCZ over Africa. The atmospheric response in other areas, including Europe, is rather small. Experiments in which the whole Mediterranean is uniformly warmer than the climatological average (by 2K) give a very similar response.