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Global atmospheric response to summer thermal-forcing in the Mediterranean Sea

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The aim of this work is to analyse observations and modelling experiments in order to give evidences of a large-scale atmospheric response to summer Mediterranean SST anomalies. Such a relevant feature was formulated on the basis of a recent encouraging idealized study by L. Z. X. Li (2006) who showed, for the first time, that winter Mediterranean SST anomalies could force a global atmospheric pattern. This work frames in the AMMA-EU project, in which a set of AGCM sensitivity experiments have been carried out for isolating the influence of the Mediterranean on the West African Monsoon (WAM). The boundary condition used in the simulations is derived from a previous observational work by the authors (Polo et al. 2008) that found a time-evolving SST mode from FMAM to SOND, with maximum amplitude in the eastern basin, associated with summer (JJAS) WAM rainfall.

Observations and model evidences support the hypothesis of a hemispheric pattern initiated in the Mediterranean basin, pointing out both a local baroclinic response and a barotropic circumglobal circulation. This atmospheric teleconnection pattern extends to the entire Northern Hemisphere midlatitudes, reflecting the waveguide effect of the westerly jet, and has a surface impact on the North Pacific and Atlantic basins.