Influence of the Mediterranean sea on the West African Monsoon: intraseasonal variability in numerical simulations

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The influence of May to October SST anomalies in the Mediterranean sea (MED) on the West African monsoon (WAM) is investigated, analysing the outputs of numerical sensitivity experiments performed with three atmospheric general circulation models (ARPEGE, ECHAM, UCLA model) in the framework of the AMMA-FP6 project. The precipitation and atmospheric dynamics response to the SST forcing is explored, in terms of intraseasonal variability, evaluating the individual models and the ensemble mean.
A positive precipitation response to warmer than average conditions in the MED is found in the Sudano-Sahelian belt in August-September. The proposed dynamical mechanism underlying the MED action on the WAM is based on the modifications in the SLP gradient between the west and east MED sub-basins and in the moisture content in the lower troposphere produced by the SST forcing. A warmer eastern MED in August-September enhances the west-east pressure gradient throughout the basin and feeds the lower troposphere with additional moisture, reinforcing the northerly Etesian wind and the moisture convergence toward the monsoonal front. Furthermore, the additional available moisture contributes to reinforce and to northward shift the Saharan heat-low and to enhance the moist static energy meridional gradient over West Africa, favouring the northward displacement of the monsoonal front.