

## **Summer atmospheric circulation intra-seasonal variability related to Saharan aerosols transport in the Mediterranean**

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The Mediterranean region is interested by aerosol transport of different origins: anthropogenic pollution from Europe, marine and forest fires emissions, mineral aerosol from the Sahara. The Saharan aerosol intrusion into the Mediterranean is related to specific atmospheric conditions favourable to the extraction from the surface, the lifting above the boundary layer and finally the advection northwards. The summer Mediterranean SST is characterized by a positive gradient toward the Levantine basin, and this longitudinal thermal profile is linked to the circulation anomalies over the basin. The aim of this work is to relate the atmospheric circulation intra-seasonal variability to the Saharan aerosol transport in summer (June through September, JJAS) forced by the Mediterranean SST anomalies. We focus on the low and mid troposphere circulation to study mineral aerosol extraction and transport, respectively.

Using NOAA Extended Reconstructed SST and NCEP-DOE Reanalysis 2 atmospheric variables, the covariance between Mediterranean SST and atmospheric circulation over Europe and northern Africa is studied. The association between SST gradient in the Mediterranean and mineral aerosol transport from the Sahara is investigated using the Goddard Chemistry Aerosol Radiation and Transport (GOCART) aerosol optical depth (AOD) in the period 2000-2007.

The summer atmospheric intra-seasonal variability related with the aerosol transport in the Mediterranean is investigated using the circulation classification software developed in the framework of COST733 Action (Harmonisation and Applications of Weather Type Classifications for European regions). Results show that strong Saharan aerosol emission is related to an increased occurrence of synoptic patterns favouring high pressure western North Africa and northeasterly surface winds over eastern North Africa. While strong aerosol transport in the Mediterranean basin is related to an increased (reduced) occurrence of synoptic patterns favouring high pressure (pure zonal flow) over western North Africa (across the Mediterranean).