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Investigating relationships between Teleconnections around the Mediterranean and their influence on aerosol transport using a Regional Climate Model (RegCM4)

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Teleconnection patterns have a strong influence on the circulation of the surrounding regions. The presence of aerosols also influences the climate at the mesoscale. However, their presence in a particular location is strongly affected by wind speeds and direction. This brings out an important link between teleconnections and the transportation of aerosols. This work was focused on nine teleconnection patterns in and around the Mediterranean Sea.

The Regional Climate Model (RCM), RegCM4.0, was used to simulate the climate of 1984 to 2008 for a domain covering Europe and North Africa, at 50 km resolution. A general method for calculating the indices for these patterns was identified and the respective indices were constructed from this simulation, as well as from reanalysis data. The interactions between the patterns and wind vectors were studied, as well as the interaction with aerosol concentration. This analysis has revealed many relationships between various teleconnections, as well as a tendency to induce large cyclic wind flows that extend over several pressure levels. Finally, this influence on circulation was related to correlation field maps that revealed the nature of aerosol transportation as a result of the value of the teleconnection indices.