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Intense precipitation at the Mediterranean coast: role of cyclones and teleconnections

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Precipitation events during winter at 15 Mediterranean coastal locations have been identified and their link to cyclones and North Hemisphere Teleconnection Patterns has been analyzed. While a negative trend has been detected in total precipitation at many locations, no trend has been found for intense and severe events. The negative phase of the North Atlantic Oscillation (NAO) and the East-Atlantic pattern (EA) compete for exerting the largest influence on the frequency of precipitation events, except the most intense events, which show no convincing link to any teleconnection pattern. A strong link between precipitation events and cyclones is shown for all stations, as the probability of detecting a cyclone within a distance of 20 degrees from each station increases with the intensity of the precipitation event and decreases with the duration of a dry period. The analysis of Sea Level Pressure and Geopotential height at 500hPa highlights the important role of cyclone depth, circulation strength, surrounding synoptic condition, and slow speed of the cyclone center for producing intense precipitation events.