A joint analysis of cyclone and precipitation trends in the Mediterranean region

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This study analyses in parallel the precipitation and cyclone activity in the Mediterranean region during the second half of the 20th century. Reanalysis data show a weak but statistically significant reduction of monthly synoptic activity in the Mediterranean region, more pronounced in winter and autumn, then in the remaining season. For the same period precipitation climatology and station time series show a large reduction of monthly precipitation in winter and very little change in summer, except for a reduction in the western Mediterranean areas. This study shows that, though, in general, the pattern of change is less strong and has finer structure and higher spatial variability in winter precipitation than in synoptic activity, the changes in the two fields are consistent. In fact, changes of synoptic activity in the North-Eastern Atlantic affect precipitation in the western Mediterranean regions and changes inside the Mediterranean region itself and over Europe affect precipitation in the eastern Mediterranean. Details of the trends and links between precipitation and cyclone activity are discussed (also in comparison with previous studies) and regional features are highlighted. The analysis is extended also to extreme precipitation events and to the weather systems associated with their occurrence.