



Role of atmospheric dynamics in controlling frequency of extreme precipitation events over the Mediterranean region

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Lasting long enough (from several days to months) episodes with extreme precipitation events (extreme precipitation climate events, EPCE) are quite typical for the Mediterranean region's climate. An analysis of geographical distribution of frequency of occurrence of the EPCE as well as its intraseasonal variation during the Mediterranean rainy season months is performed. Also investigated is the role of large-scale atmospheric dynamics processes over the Mediterranean region in determining the EPCE conditions over the area. An objective methodology based on earlier suggested approach by Carill et al., Clim Dyn, 2008 is adopted to determine frequencies of occurrence of extreme events in several atmospheric characteristics. Daily data on precipitation for 1960-2000 from gridded multiyear dataset National Centers for Environmental Prediction–National Center for Atmospheric Research NCAR-NCEP Reanalysis Project (NNRP) are adopted in the study. A data set with daily data on dynamic tropopause pressure and column integrated water vapor content is created. Effects of the role of atmospheric dynamics in determining occurrence of extreme precipitation events over the MR and their multiyear linear trends are analyzed. Statistically significant dependence of the ExtPrecF on those in the two tropospheric parameters is demonstrated by the patterns with spatial distributions of the DynTroPF-ExtPrecF and PrecWatF-ExtPrecF correlations.

In particular, over the western part of the region (east-Atlantic, south-Europe-Mediterranean region) the EPCE's during are mainly moderated by the DynTroPF effects. Over the areas with more continental climate conditions- to the south-east and north-east of the MR (north-Africa, Arabian Peninsula, Middle East, east-Europe), the EPCE's seem to be mainly regulated by availability of extreme moisture content in the atmosphere.