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Evaluation of variations in precipitation component of the water cycle for the EU FP6 CIRCE Project

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During last decades of the past century the Mediterranean region was experiencing a notable overall precipitation decline. The period was also characterized by a precipitation rise over northern west Europe as well as a rise (mainly over the south-eastern part of the Mediterranean region) in the frequency and intensity of extreme precipitation events (EPE) during early-spring season. Also noted were significant variations in major teleconnection regimes. To investigate the physical mechanisms involved, globally defined daily NCEP/NCAR reanalysis data for 1961-2000 on precipitation (Prec), integrated water vapor (IWV) and dynamic tropopause pressure (PDT) are analyzed. Frequencies of days with extreme (above 75 percentiles) values of the Prec, PDT and IWV in each month of the 40 year period are determined. Also calculated are the numbers of days per month with the IWV values higher than 10 kg m-2 (IWV10). Linear trends of the characteristics well as their spatial correlations with the time series of major teleconnection indices are determined. Results of the analysis allow explaining observed trends in the Mediterranean precipitation by the corresponding variations in the frequency of the IWV10's. The trends appear to be associated with the global warming process.