



Variability and changes of precipitable water over Europe (1948-2012)

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There is an evidence that the contemporary warming enhances the hydrological cycle in parts of the world (Trenberth 1998, Lenderink and van Meijgaard 2008, Allan 2012). One reason of it is that the heating at the surface causes the enhancement of the evaporation rate (Trenberth, 1998). At the same time the water-holding capacity of the air is increasing because of higher air temperature. Clausius-Clapeyron equation provides a powerful constraint on how saturated moisture content varies with air temperature (Allan 2012). The aim of this paper is to check the variability and long-term changes of atmospheric moisture content, expressed as precipitable water (PW) amount in the atmosphere over Europe in the period 1948-2012 and its relation to trends in temperature and precipitation. The NCEP/NCAR reanalysis (Kalnay et al., 1996) 6 hourly data of PW and E-OBS dataset (Haylock et al., 2008) of daily gridded mean temperature and precipitation totals are used. For each calendar month 65-year averages and standard deviations are analyzed to present the intra-annual variability of PW. Then in 13 following five-year periods and for each calendar month separately the empirical distributions of 6-hour average PW values are developed and compared and the temporal changes of mean, median and selected percentiles are analysed to check for possible trends. The relation between mean daily PW and mean temperature and precipitation totals are also analysed.