

## **Trends in frequency of extreme precipitation climate events in the Mediterranean region according to NNRP data for 1961-2000**

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Evaluations of observation data demonstrate notable rise in the frequency and intensity of extreme precipitation events (EPE) over the globe. Significant parts of the Mediterranean region also seem to be experiencing the trend. Analysis of the issue represents a problem however since the region is not well enough covered by the observations. The paper presents results of application of a new approach (Carril et al. 2008) for investigation extreme events based on daily gridded data. The NCAR/NCEP data for 1961-2000 are used. Monthly data on the number of days with high values of integrated water vapor higher than  $10 \text{ kg m}^{-2}$  (IWV10) and 75 percentile of precipitation are obtained (Krichak et al. 2009). The IWV is used to account for synoptic situations characterized by narrow zones with strong meridional water vapor transport, which are contained within extratropical cyclone warm sectors (“atmospheric rivers”, Neiman et al. 2008). Zhu and Newell (1998) showed that >90% of the meridional water vapor transport at midlatitudes takes place in atmospheric rivers. Linear trends of the EPE and IWV10 are computed by performing regression analysis in which the relationship between the number of EPE (or IWV10) days in a month and time is modeled by a least squares function. The analysis below is limited by the cool season months (September, November, January and March) only. Figs.1a-d present patterns with the IWV10 trends during September, November, January and March. Corresponding EPE patterns trends during the same months are given in Figs. 2 a-d, respectively. It may be noted that September – January period is characterized by a decline in the frequency of the EPE’s over the Mediterranean region. A rise in the frequency of the EPE characterizes the region during March however whereas the negative trend zone is displaced to the southern Europe (Figs. 2a-d). The trends seem to be in good agreement with those in the IWV10 (Figs. 1a-d). Positioning of the zone with negative trend in the EPEs appears to be determined by intensity of positive trend in the frequencies of extreme IWV10 over central NH Africa – S. Asia and eastern Atlantic.

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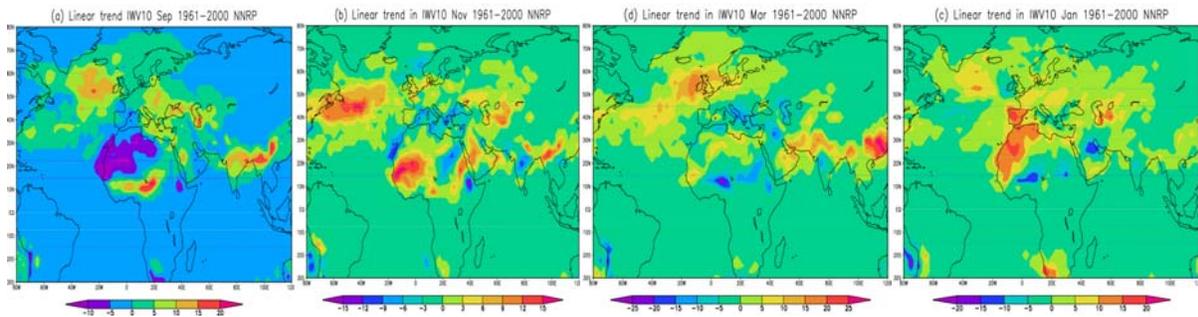
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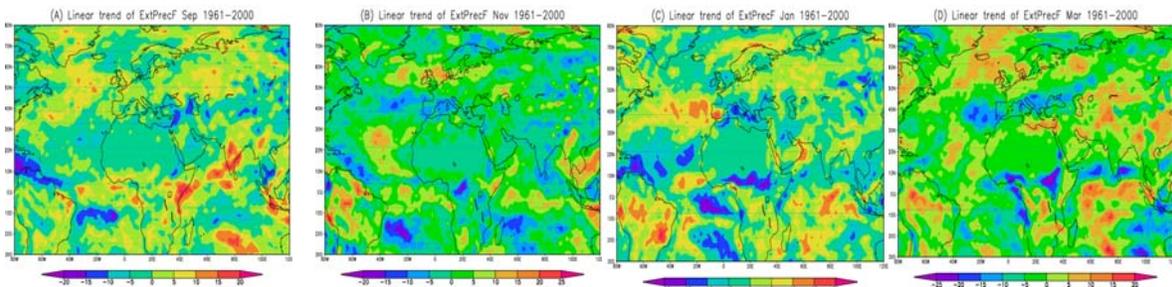
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Figs 1. 40-y trend in frequency of IWV10 (a) Sept., (b) Nov., (c) Jan., (d) Mar



Figs.2. Same as in Figs. 1 but for EPE