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Hydrology and Earth System Sciences Discussions

Interactive comment on "Space-time variability of hydrological drought and wetness in Iran using NCEP/NCAR and GPCC datasets" *by* T. Raziei et al.

Anonymous Referee #2

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The aim of the paper is to analyze hydrological drought and wetness variability in Iran between 1948-2007. In particular, drought occurrences are analyzed in terms of the Standardized Precipitation Index (SPI), based on NCEP/NCAR and GPCC datasets aggregated at 24 months.

General comments The paper complements a previous study by Raziei et al. (2010) where drought variability in Iran has been analyzed through SPI on 12-month time scale based on GPCC and NCEP/NCAR datasets, as well as on observations at 32 rain gauge stations, for the common period 1951–2005. As far as I understand the

main novelty provided by this paper with respect to the previous one is the analysis of the linear and non linear trends of the area covered by dry and wet events, which reveals a different behaviour between the GPCC and the NCEP/NCAR datasets, due to the fact that GPCC generally captures greater percentage of area interested by both drought and wet events than NCEP/NCAR data. With regard to the application of the Principal Component Analysis to the SPI series computed on NCEP/NCAR and GPCC datasets, results are rather similar to those obtained by Raziei et al. (2010). In particular, although there is an agreement in identifying four sub-regions characterized by independent drought variability, however a different time behaviour of SPI series is represented by the two datasets in these areas, with special reference to Northern and Central Iran. My personal feeling is that further efforts should be carried out by the authors to explain the reasons behind such discrepancies, in order to properly differentiate the manuscript with respect to the previous study by Raziei et al. (2010), for instance by investigating the role of orographic forcing on precipitation field in Central Iran, as they state in the conclusions. In addition, it would be interesting to check what happens in terms of meteorological drought, namely by considering a smaller aggregation time scale of SPI series (e.g. on a 3 or 6- month time scale), as longer time scales (such as 24-month), characterizing hydrological drought, involve accumulation processes of water deficit through the soil, which might introduce a significant source of complexity in the analysis. Few specific comments follow.

Specific comments

1. Introduction Rows 23-25 p. 3250: The first sentence is a well established fact for scientists working in the field of drought analysis since about the 70's, when the first studies by Yevjevich et al. where published. Thus, I suggest to remove reference to Pereira et al. (2009) or at least to add references to previous studies on this topic.

Rows 20-24 p. 3253. Difference between this manuscript and previous studies on drought space-time variability in Iran must be better highlighted.

2.2 Methods Rows 15-23 p. 3255: In the brief description of SPI make reference directly to McKee et al. (1993) rather than on following studies. Rows 26 p. 3256: Ut and Lt in Eq. (1) are not explained in the text. Rows 1-4 p. 3257: The sentence starting with “In our case ...” is unclear.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 3249, 2010.