

Interactive comment on “A precipitation-based regionalization for Western Iran and regional drought variability” by T. Raziei et al.

Anonymous Referee #1

Received and published: 25 September 2008

General Comments

The paper addresses a relevant scientific question such as the identification of subregions characterized by hydrological homogeneity. In particular the research has dealt with Iran, identifying precipitation subregions on the basis of intra-annual patterns and drought sub-regions considering the Standardized Anomaly Index (or Precipitation Index) computed on annual precipitations. The first investigation has been developed through the joint use of advanced statistical tools and a detailed analysis of meteorological and orographic causes of different precipitation regimes in the area. In particular the spatial distribution of precipitation is studied by means of principal component analysis applied to several variables describing the time-distribution within the year of

precipitation in each station. The adopted procedure is accurate and it is applicable in other situations and the overall results of the statistical analysis are always plausible from a physical point of view. On the other hand, the analysis of the spatial distribution of drought through the Precipitation Index cannot be considered a real advancement with respect to other studies (included the paper of the same authors Raziei et al., 2008, based on the use of SPI). More specifically, the use of the Precipitation Index presents several limits, such the following: - the index is based on the hypothesis that the basic variable be normally distributed , limiting the field of application, - the spatial average of PI_t (both original index and re-weight index) computed in the stations located in the subregion , is not able to identify the occurrence of a drought affecting only a portion of considered region (since the negative values of the index in some stations can be masked by the positive values in other station of the region) - the application refers only to the annual precipitation and it is not able to analyse shorter or longer time intervals , which are of interest for studying drought phenomenon. Thus the result of the analysis that has confirmed for the specific case study the identification of the same sub-regions for drought with reference to the analysis made through the SPI does not seem of general validity.

A very positive comment refers to the quality of statistical methods used along the paper, e.g for analysing spatial patterns by PCA, for checking normality of probability distribution, as well as for defining clusters of stations.

Specific comments

- it should be justified at page 2141 line 21-23 the reason of the use of the Mann Kendall for analyzing the linear trend instead of the more traditional t-Student test. - in table 4 for computing the intercepts (p_2) it is suggested to use a new variable, such as $\text{current year} - 1964$; instead the value for $t=0$. This way, the intercept can be interpreted as the value of the trend at the beginning of record.

Technical corrections.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

A few formal corrections are suggested: -table 1 could be improved since in the first column both investigated variables and characteristic values of PCA are listed, that can create some confusion. It is suggested to add an horizontal line after the last investigated variable -in page 2138, line 21, probably Pi refers to the mean rainfall. - the symbol used for re-weighted Precipitation Index PI_t in equation (3) could be changed in order to distinguish it from the original Index of equation (2), - the conclusion on the use of only two sub-regions (page 2151, line5) should be referred to meteorological drought instead than hydrological, since the analysis is based on precipitation. The same comment refers to page 2136, line 13.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2133, 2008.

HESSD

5, S1240–S1242, 2008

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

