



Statistical distributions for the SPI computation

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In the meteorological drought monitoring it is a common practice to transform the observed precipitation amounts to the corresponding Standardized Precipitation Index (SPI). For this purpose, the 2 parameter Gamma distribution is typically employed. However, in regions where the frequency of months with no recorded precipitation is high, this approach usually gives unreliable SPI values. Thus, some other statistical distributions for precipitation records which also incorporate the zero precipitation data should be more appropriate. In this study three such distributions are analyzed: Censored Gamma Distribution (CG), Compound Poisson Exponential Distribution (CPE) and the Square Root Normal Distribution (SQRTN). The goodness of fit of the theoretical and empirical distributions in their tails is investigated in more details. The monthly precipitation series from several Mediterranean stations with secular records are used for this purpose. The results show that it is not possible to recommend a single, optimal distribution. It is suggested that the ratio of skewness and the coefficient of variation could be the indicator for the choice of the most appropriate distribution for a particular region.