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Title: Assessing drought cycles in SPI time series using a Fourier analysis
Authors : Moreira et al.

GENERAL MAJOR COMMENTS

The paper presents the analysis of the drought frequency in Portugal. The Standardized Precipitation Index (SPI) of 12-month scale is used as the drought index. Firstly, a clustering analysis on SPI Principal Component analysis loadings is performed to identify regions with similar SPI drought characteristics. Then, Fourier analysis is applied to the SPI time series in each cluster to identify significant drought cycles. The results show that drought periodicities vary among the three clusters identified. In general, three significant drought cycles have been identified, 4.4/4.7 years, 6 years and 9.4 years. The authors claim that the last two cycles are caused by the North Atlantic Oscillation (NAO) but no further evidence is provided.

The paper is, in general, well written. However there are points needing further analysis and clarification:

1. The authors do not provide any analysis on the NAO and how this atmospheric oscillation is connected to droughts in Portugal. However, they claim that the drought cycles of 6 and 9.4 years are caused by the NAO. Furthermore, no explanation is given for the cycle of 4.4/4.7 years. The authors should provide a detailed discussion about the plausible causes of drought periodicities and the identified significant drought cycles.
2. The authors present only the results of analysis for December. No results are presented for the other months. Are the drought periodicities remain the same? Are the causative factors the same? The authors should present results for other months and, certainly, make the comparison and discuss in detail the results.
3. The conclusion section of the paper should be updated. For example, the authors write “In our point of view the simplicity of the approach used to compare to other….” but no other methods are presented and no comparison is made.

MINOR COMMENTS

1. The quality of some figures is very bad. The authors should improve the Figures 2, 3, 4, 5, 6.

The presented study is noteworthy to the international hydrologic community and falls within the scope of NHESS. The paper merits publication, however, it needs revisions before it would be acceptable for publication in the journal of NHESS.