

Interactive comment on “Drought evolution characteristics and precipitation intensity changes during alternating dry-wet changes in the Huang-Huai-Hai River basin” by D. H. Yan et al.

Anonymous Referee #2

Received and published: 12 May 2013

The study of droughts in current and future climate is for obvious reasons very important and relevant. However, this paper does not in my opinion meet the requirements in terms of scientific significance, scientific quality or presentation to be considered for publication in HESS. The motivation is not clear, the conclusions are not supported by the results and I therefore recommend that this paper is rejected.

Specific comments

1. Scientific objective. The main goal of this paper is to examine whether the precipitation intensity following a drought can be connected to the severity of the drought. The

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reasoning behind this hypothesis is not clear to me, and the authors do not offer any explanation as to why this phenomenon would occur. Firstly, the authors need to establish why there would be such a connection and what causes it. Is it circulation-driven? Local effects? Secondly, the authors needs to state why this is important. Are the dry soils more vulnerable to flash floods? Are heavy rains after a prolonged drought more damaging then in normal conditions?

2. Scientific content. The results are presented in table form and in graphs showing the frequency of events, but there is no test of the significance of assumed changes. Are these real changes or just natural variability? The conclusions needs to be drawn on statistical tests showing significance and or/trends. These are standard tools in any scientific study and I encourage the authors to employ them. Furthermore, there is no mentioning of the sample size of the events (apart from the total amount of droughts (?) in table 6), although this has a major impact on the significance of the results. If the sample size is too small there is a great risk of biased results, and the uncertainty increases. Are the statistical frequencies different from normal conditions, meaning the frequencies of heavy rain in normal conditions? Without a test of significance, the conclusions from the study are not valid.

3. The study uses a definition of drought which is based on deficits in terms of precipitation, and this might be a good measure of drought for decision makers, but it is questionable when it comes to statistical evaluation. The standard form of drought characterisation is through indices which describe standardised anomalies, such as the SPI. This means that frequencies and return periods are comparable, whereas using fixed limits means that an area in principle can be in constant drought or have almost no drought. You mention in the Hai River basin which is in “drought 9 years out of 10”. This describes a dry region, not a reoccurring drought.

4. It is not clear to me if the clustering using self-organizing maps where done within this study or in a previous study. If it was in this study it needs a more extensive explanation with results, otherwise you need to reference to earlier work.

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5. The presentation of the paper is no up to standard. The abstract is too long, but it also lacks an introductory section to put the paper into context. There is a lengthy explanation of the results, but in an abstract I want to read just an overview of the most important findings. I also miss a motivation for the paper, as stated earlier. There are also erroneous references and references missing, and these needs to be more carefully checked. The results are described very carefully in the text, but the same information is found in figures and tables. There is no need to specifically state what is easily deductible from a figure or table. The results section can be substantially reduced, pointing out the most important results. Figure 2 would be easier if the numbers were coloured or patterned. Figure 4 should show anomalies rather than absolute number. In figure 5 needs to be made much clearer and also without Chinese signs.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 2665, 2013.

HESD

10, C1638–C1640, 2013

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