

Interactive comment on “Development of streamflow drought severity- and magnitude-duration-frequency curves using the threshold level method” by J. H. Sung et al.

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We would like to thank all of the reviewers for their detailed and useful comments on our paper. A number of extremely constructive comments were made which when implemented will improve this review article considerably. We adopted all reviewers' opinions and then revised a lot.

Responses to Review #2

General comments: The paper developed streamflow drought severity- and magnitude-duration-frequency curves using four threshold level methods, for The Seomjin River

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basin which is located in southwestern Korea. Globally, the paper is well written and structured. However, in my opinion, in terms of water supply and water use, the concept of daily drought is embarrassing. The daily deficit concept is better than daily drought. In addition, the results confirm this point of view ““That is, the drought identification techniques based on real precipitation and natural streamflows did not reflect the drought concept in terms of water supply and water use””.

Ans)

In addition, although this study used the daily streamflow data, the period this study is focusing on is greater than a month. The time resolution in this study (defined as duration) is variable from 30 to 270 days. The threshold selection is totally different from drought time scale. The daily variable threshold is Q70 of FDCs obtained from the antecedent 365 daily streamflows. So, it is daily-varied values.

A relevant article “A review of Twentieth Century Drought indices Used in the United States” of Richard R. Heim Jr. (2002) should be cited in this paper.

Ans.) We added the article since it had shown very useful results.

Many concepts and definitions are given and clarified. P14682 §25: Could you define the drought’s threshold of “River Survey Report (K-water, 1992)”.

Ans) We added the brief meaning of desired yield in this study as follows:

The desired yield threshold for sufficient water supply and environmental instreamflow was determined by Korean central government. That is, it is related to social and economic droughts since it associates the supply and demand of some economic goods and environmental safety. The desired yield threshold differed considerably from the other levels and represented more realistic conditions because the desired yield is equivalent to the planned water supply.

Table 3: “drought order” refers to which characteristic: duration, magnitude and severity? Or is it another characteristic? If we consider the duration, 102 days has the order

146 and not 50. If we consider severity 148 052 571 has the order 146 and not 50. In consequence, you should explain your ordering.

Ans) Another reviewer presented that drought onset and duration become meaningless. Since we agreed, we deleted Table 3 and relevant statements. So, it isn't necessary to explain the order of drought in Table 3.

Technical corrections

P14684 §5: from 28 September to 7 January 1989, instead of October. Ans) We revised it.

Table 2&3: you should add units in some columns Ans) We added the missing units.

Figures 8 & 9 are not cited in the text. Ans) In the section 4.4, the two figures are cited. However, the figures and related explanations were changed since the duration was extended until 270 days.

It seems that a table is missing: table "6" about severity

Ans) We restructured the article. So the table number was changed. It is Table 4 in the revised manuscript.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/10/C8016/2014/hessd-10-C8016-2014-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 14675, 2013.

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