Hydrology and Earth System Sciences Discussions

Interactive comment on "Aspects of seasonality and flood generating circulation patterns in a mountainous catchment in south-eastern Germany" *by* T. Petrow et al.

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Received and published: 14 May 2007

The paper deals with the statistical analysis of annual flood peak discharge series, annual precipitation maxima series and flood generating circulation patterns in the Mulde catchment (Germany). Two main conclusions of the analysis, which are formulated by the authors, are as follows:

"Differences in the statistical parameters skewness and coefficient of variation of the discharge data are found in the catchment from west to east, which are however not reflected in the landscape characteristics such as soil, elevation or land-use. It is suspected that the location and the duration of the precipitation field are the most influenc-

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ing factors for the discharge."

Ě"the cyclone Vb-weather regime generates the most extreme flood events in the Mulde catchment whereas westerly winds produce frequent and hence small floods"

The authors supposed that the obtained results can be a basis for improvement of the traditional flood frequency analysis (FFA); the improvement by invoking new information on dominating flood generating circulation patterns in addition to statistical information extracted from the runoff measurements only.

General Comments

Major corrections are necessary before the paper can be accepted for publication.

1. In order to estimate the statistical parameters of the annual flood peak discharges, the data of both summer and winter floods were used by the authors. In the Mulde catchment, however, these are the floods of different origin as one can conclude from the paper. As opposed to summer floods, precipitation is not the only and the determinant source of winter floods; snowmelt rate strongly influences on flood peak discharge in winters. This fact can lead to heterogeneity of the discharge series analyzed in the paper and instability of the estimated statistics. I suggest excluding winter floods from the statistical analysis.

2. I have not found in the paper any results confirming the conclusion that the landscape characteristics influence on the changes in the flood statistics over the basin area only slightly (as compared to precipitation). As it follows from the beginning of Section 4.4, this conclusion is based on the results shown in the preceding section. A reader could conclude from Section 4.3 that the statistical parameters change from one sub-catchment to another but it's not obvious that the role of landscape characteristics is minor. It is also shown in Section 4.3 that the direct relationship exists between the location of the precipitation field and the location of the flood event; this result testifies to the influence of precipitation on flood generation but does not testify against the

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influence of the landscape characteristics on flood generation. On the other hand, spatial variations of the landscape characteristics strongly control (for example, through infiltration losses) magnitude of rainfall floods in many river basins and influence on differences in temporary flood statistics over a basin area. Probably, this is not the case for the Mulde catchment (because of a medium area, peculiarities of flood generation in a mountainous basin) but it should be clearly shown in the paper.

Specific Comments

1. In my opinion, the significance of the exposed distinction in coefficients of variations and skewness over the basin area looks questionable. As it follows from Fig. 7, coefficients of variation are rather close (0.7-0.8) for all gauges except Berthelsdorf and Nossen. Distinctions in coefficient of skewness are more visible but sample variation of this coefficient should be too large. I suggest testing statistical significance of the exposed distinctions of the comparable statistics or, at least, to show standard deviations of their estimations.

2. For the lengths of the data samples used in the study, the Kolmogorov-Smirnov test is unsuitable to reveal the best fits of distribution function. I suggest excluding the testing from Section 3.1.

3. As it is rightly pointed in the Introduction "independence, homogeneity and stationarity are required characteristics of the data to legitimate flood frequency analysis". However, only stationarity is statistically tested in Section 3.1. Please clarify the sentence "a threshold time of 7 days between two AMS floodsĚ guarantees the independence of two close-by flood events". Was such a threshold selected because the time of concentration for the basin is much smaller than 7 days? Statistical homogeneity of the flood series is not tested (see General Comments).

Technical Comments

The most of needed technical corrections are listed in the published Referee Com-

ments. Additionally, the following corrections are needed:

1. A part of the text is repeated twice in Section 2.2.1

2. Table 3; Figs. 5, 6 illustrate prevalence of magnitudes of the summer floods over the winter ones. Three illustrations look redundant for one result.

1. Does the paper address relevant scientific questions within the scope of HESS? YES 2. Does the paper present novel concepts, ideas, tools or data? NO 3. Are substantial conclusions reached? NO 4. Are the scientific methods and assumptions valid and clearly outlined? NOT COMPLETELY 5. Are the results sufficient to support the interpretations and conclusions? NO 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientific (traceability of results)? YES 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES 8. Does the title clearly reflect the contents of the paper? YES 9. Does the abstract provide a concise and complete summary? YES 10. Is the overall presentation well structured and clear? THERE ARE SOME OPTIONAL ILLUSTRATIONS 11. Is the language fluent and precise? YES 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES 14. Are the number and quality of references appropriate? YES 15.Is the amount and quality of supplementary material appropriate? NOT COMPLETELY

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 589, 2007.

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