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Hydrology and Earth System Sciences Discussions

Interactive comment on "Large-scale runoff generation – parsimonious parameterisation using high-resolution topography" *by* L. Gong et al.

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We appreciate your positive comments and very detailed technical corrections on our manuscript.

Reply to specific comments:

1. Because none of the original TOPMODEL, the TRG model, or the 1-layer VIC models simulates subsurface storm flow, we decided to keep the term "baseflow".

2. The original TOPMODEL does not account for subsurface storm flow. I would guess the reviewer referred to one of the many different modified version of TOPMODEL to include the subsurface storm flow. In our manuscript, we have compared the TRG algo-

rithm, which is based on original TOMODEL concept and the 1-layer VIC model, both don't explicitly account for subsurface storm flow. However, an increased catchment response as groundwater table rises is accounted by both models by the non-linearity of the storage capacity distribution curve.

3. We fully agree that the left tail of the distribution curve dominant the catchment response in most time and the right tail may be responsible for extreme events. However, it is not within the scope of this manuscript to include an in-depth sensitivity study of different part of the distribution curve. Therefore we decided to include this study in the next paper.

4. Yes, we have used TRMM satellite precipitation data for the Willamette and Eel river basin, as stated in section 3.2. The TRMM data has often found to have good agreement with ground measurement, partly because it is bias corrected by ground measurement. Gong et al (2010) has compared TRMM data with ground measurement in one large river basin in China (Dongjiang river basin) and concluded that it is applicable to use TRMM data for the basin for daily hydrological modelling. Of course, the quality of the satellite precipitation may vary in different part of the world, but we did not see major quality issue in the basin we have worked with so far.

5. As a preliminary study, the main focus of this paper is the derivation of storage distribution curve from topography data and the validation of the algorithm against VIC model in a comparative modelling framework. We would definitely conduct split sample test in the following studies to extent the TRG algorithm with more large scale catchments.

We have also made necessary technical corrections: 1. Corrected. 2. We have used "one big challenge is. . ." and "another challenge is" in the context so we decided to keep the word "challenge". 3. As we understand, distribution function approaches is one way to achieve semi-distributed models. (besides it there is also, for example hydrological similarity unit approach). Because here we raise the concept of "semi-

distributed models" as compared with "fully-distributed models", we think it is proper to keep the term "semi-distributed". 4. Corrected 5. Corrected 6. Corrected 7. Corrected 8. All symbols already explained in the table. 9. Corrected 10. Corrected 11. Corrected 12. Corrected 13. Corrected 14. Corrected

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