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Hydrology and Earth System Sciences Discussions

Interactive comment on "Hydrological modelling for meso-scale catchments using globally available data" *by* A. Gafurov et al.

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1. The Neckar basin was chosen for this study to check the performance of the model structure and the modeling method for low resolution data. This is why the same available data was used for both catchments and the model performance comparisons in the Neckar basin were planned to justify the used methods which were then transformed into Chirchik basin. Using dense data for Neckar basin and coarse data for Chirchik basin for the same model would probably not justify the used method from the obtained results.

2. The results indicate useful information for several purposes of water resources management and planning issues and it also shows the possibility to model first-info water balances using globally available data in catchments were very course or no

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ground observations are available.

a. Table 1 gives comparison of mean and variability of simulated and observed daily discharges at 5 gauging stations. From these comparisons the applicability of the results for different purposes of water management issues can be obtained. Among 5 main gauging stations, the Vaihingen-Enz station gives the lowest performance result. The reason for this was assumed to be the effect of watershed that is mainly covered by Black Forest. b. The results are applicable for certain purposes in both catchments. Information on overall water balances and possible water availability of the catchment for the certain period can be used in many applications, for instance irrigation allocation or hydropower generation in the Neckar basin. The figure 9, which shows low performance of the model in low flow periods, is mainly due to human impact of the Neckar River where up to 40 % of the discharge in the Neckar River is coming from waste water treatment plants in low flow periods (Landesanstalt für Umweltschutz Baden-Württemberg (LFU), Siedlungswasserwirtschaft 18, 2001). Also, the Neckar River is controlled in low flow periods for transportation purposes. Better suited graphs are available for justification of the result conclusions using daily flow duration curves. For Chirchik basin, the results can be very useful since such information is hard to find in the region where almost no ground based data are available for water balance analysis. The information can be useful for several hydropower plants in Chirchik stream and also for irrigation purposes and operation of Charvak reservoir in different seasons to maintain the minimum environmental and ecological requirements.

3. The authors were not aware of this paper, but will be exploring it and the references will be included in revised paper.

4. Thanks for the comment. We will take it into consideration in the revised paper.

5. As stated in the article the Chirchik basin is very mountainous area. The shapes and hillslopes accordingly affect the un-uniformity of precipitation fall in the catchments. The stations that are located in the valleys may give a different picture of precipitation

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when plotting against elevation due to orography effects. For example, the station with the minimum precipitation amount in figure 14 (Ustep-Ters) is located in the valley where the effect of orography may play a great role on the representation of this meteo-station. This is why it can be visible from the figure 14 that relationship does not really support the increase of rainfall with elevation. Manual comparisons do actually support the change of the precipitation according to the elevation which will also be plotted in an additional graph in the revised version of the publication. Different time period precipitation series are available and they are used to build rainfall elevation relationship. Stations are now included in Figure 2 of the revised publication.

6. The daily duration curves for the Neckar basin are compared and the results are found to be applicable for different purposes of water management issues. The model for the Neckar basin was run on a daily scale and the calibration was done on monthly values. Since the monthly values were reliable for different purposes, the daily duration curves also gave good results without being calibrated on daily scale when plotted against observed daily discharge data in Neckar basin. Since the method test was successful in Neckar basin for daily discharge curves, the same assumption are assumed to be valid in Chirchik basin and that this gives a reasonable daily values for planning issues.

7. The overview of relevant literature will be extended.

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