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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Climate change and its impacts on river discharge in two climate regions in China" *by* H. Xu and Y. Luo

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We greatly appreciate the Referee #2's detailed comments and suggestions on our manuscript, that really helpful for us to improve the current manuscript, and that for future scientific paper organizing. Our responses are as follows. Comment 1: Section 2.2.1: Because the two catchments investigated are located at the semi-arid climate region and the subtropical humid climate region, respectively, whether the SWAT model is suitable for two different climate regions? It is better to add more detailed descriptions on model development. Response 1: Thanks for this suggestion. We fully agreed with the referee's suggestion. SWAT is a comprehensive, semi-distributed, processes based river basin model, which has been developed with the continuation of USDA

Agricultural Research Service (ARS) modeling experiences for a period of over 30 years combined with the multiple user groups from worldwide. SWAT has been used across worldwide at varying watershed scale and environmental conditions that represent a wide range of climate, soils, and landuse (Arnold. et al., 2012). That said, we definitely would like to add the detailed description on the model development and application to improve our manuscript. Comment 2: Lines 10-13, Page 7104: Which kind of data series were used for model validation? 1961-1997 and 1961-1994? or 1991-1997 and 1991-1994? Response 2: We used a previously calibrated SWAT model of River Huangfuchuan and River Xiangxi which has been ppublished in HESS (Xu et al., 2011). The SWAT models were calibrated for 1961–1990 baseline period using monthly river discharge from Xiangshan gauging station of River Xiangxi and Huangfu gauging station of River Huangfuchuan, and validated with recent monthly river discharge data (1991–1994 Xiangxi; 1991–1997 Huangfuchuan). We would like clarify this correction in our manuscript. Comment 3: Titles of the section 3.1.1 and 3.1.2 are more suitable for "Changes of annual: : :: : :" and "Changes of seasonal: : :: : :" Response 3: Thanks for this suggestion. We definitely would like to change the titles of the two sections according the suggestion. Comment 4: Section 3.2.3: Extreme discharge analyzed in this paper is the annual mean discharge. It is better to use daily flow data for extreme events. Because short time scale data is more representative for extreme events. Response 4: In addition to assessing projected changes of mean annual and seasonal river discharge, we also assess changes in high and low monthly discharge, expressed as Q05 and Q95 respectively, where for example, Q05 is the runoff exceeded only 5% of the time. So the Extreme discharge analyzed in this paper is based on simulated monthly mean discharge. The techniques adopted for downscaling in this study do not account for projected changes in the intensity of rainfall at daily timescales. So the simulated daily flow is not used for extreme events analyzed in this study. Comment 5: Line 24, Page 7110: Q50 is usually described for a 50th percentile value rather than a mean value. Therefore, it needs to be clarified whether the 50th percentile or the mean value is used in this study? Response 5: Q50

is the median flow, with the monthly mean flow exceeded in 50% of months over the simulated 30-yr period. We like clarify this correction in our manuscript. Technical corrections: 1. Line 15, Page 7106: “Huangfuchan” should be “Huangfuchuan”; 2. Figure 7: Please add units for the x axis. Response : Many thanks for this corrections. We would like correct the first one according suggestion, and would like revise the figure title as “Figure7. Extreme flows changes for 7 GCMs projections under 2020s, 2050s and 2080s time horizons for River Huangfuchuan (left) and River Xiangxi (right) (% difference from 1961–1990 baseline) for Q05, Q50 and Q95 flows (i.e. exceedance in % of months over the simulated 30-yr period).”

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 7099, 2015.