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Hydrology and Earth System Sciences Discussions

Interactive comment on "Impact of climate change and anthropogenic activities on stream flow and sediment discharge in the Wei River basin, China" *by* P. Gao et al.

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Thank you for your interesting comments. We revised the manuscript and marked the required changes. We think the revised paper is significantly improved.

(1) We agree that it would be very useful to have more information on land use. Unfortunately, land use data are only available for the years 1980 and 2005. We do not have information on vegetation growth in this period and therefore we have no way to evaluate forest ET impact on stream flow.

(2)We agree that air temperature is an important factor impacting on ET. Therefore, we

included this information into the manuscript.

(3)We included a justification for the selection of the flood season into the introduction (see as well tab. 3 in the manuscript). Most of the runoff in the Loess Plateau is generated by excess rain, which occurs during the many short-duration, high-intensity rainstorms in the flood season. And several studies indicate that a few intensive rainstorms in this time of the year produce most of the runoff and sediment. The sediment discharge in the flood season accounted for nearly 90% of the total sediment for the year in the Wei River (Chen, 1996; Zhu, et al., 2008).

(4)Double mass curve method was first used to analyze the consistency of precipitation data in Susquehanna watershed United States by Merriam at 1937 (Merriam, 1937), and Searcy made a theoretical explanation of it (Searcy et al., 1960). In the last 30 years, Chinese scientists analyzed the effect of soil and water conservation measures and land use/cover changes on runoff and sediment using double mass curve method, and have achieved good results (Mu, et al., 2010). In this study, double mass curves of precipitation vs. stream flow and precipitation vs. sediment are plotted for the two different periods to estimate changes in regression slope (proportionality) to quantify the overall efficiency of soil conservation measures before and after transition years. The conceptual models are simulation and forecasting of stream flow and sediment discharge based on different scenarios.

(5)We used the Pettitt's test to detect the transition year in this paper. The details of the change point method also included into the manuscript.

Reference:

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