

## ***Interactive comment on “Changes of evapotranspiration and water yield in China’s terrestrial ecosystems during the period from 2000 to 2010” by Y. Liu et al.***

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Received and published: 23 July 2013

We sincerely appreciate your efforts to review our manuscript and give us the constructive suggestions. The following is the answer one by one:

General comments: This study presents BEPS model simulations of evapotranspiration (ET) and water yield over terrestrial ecosystems of China between 2000 and 2010. The BEPS model is a remote sensing based model or approach for quantifying the terrestrial water and carbon cycles. This study is significant since ET is important for understanding water and carbon cycles of terrestrial ecosystems. The authors used

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eddy covariance ET estimates from 5 China Flux towers to validate the BEPS model simulations and compared the BEPS model simulations with ET inferred using statistical hydrological data in 10 basins across China. In addition the authors attempted to address the spatial and temporal variations of ET and water yield in China’s terrestrial ecosystems and evaluated the roles of temperature, precipitation, and LAI in regulating ET. Overall I found the study was important and I commend the effort shown by the authors’ in analyzing huge data sets in this study. However, the study does not provide new information on the spatial and temporal variations of ET and water yield except for the finer spatial resolution (500 m). The authors reported that the results from this study are comparable to other studies but they did not show what is new and what improvements were made to the previous studies to increase our understanding of ET and water yield in China. Answer: Thanks for the efforts to review our manuscript and provide constructive comments. We will seriously revise the manuscript with the consideration of the comments.

I have the following suggestions for the authors: 1. The paper needs editing, proof reading, and check all typographical errors. The grammar needs to be improved, some sections are not easy to read and follow. Specific comments are listed in the supplement file attached. Answer: We will carefully edit the manuscript to remove typographical and grammar errors and rewrite some sections following the comments. 2. Include other international and local references related to this study. For example (Li, X., Liang, S., Yuan, W., Yu, G., Cheng, X., Chen, Y., Zhao, T., Feng, J., Ma, Z., Ma, M., Liu, S., Chen, J., Shao, C., Li, S., Zhang, X., Zhang, Z., Sun, G., Chen, S., Ohta, T. Varlagin, A., Miyata, A., Takagi, K., Saiqusa, N. and Kato, T. (2012), Estimation of evapotranspiration over the terrestrial ecosystems in China. *Ecohydrol.* doi: 10.1002/eco.1341) Answer: This is a good suggestion. Recently, many papers related to regional and global ET have been published, such as Li et al. (2012) and Yao et al. (2013). We cite these papers as references and compare the similarity and difference between this study and their study in the current version of the manuscript in Lines 18-25, P13, Lines 24-26, P14 and Lines 30-31, P14. 3. The ET inferred from statistical hydro-

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logical data in 10 basins (section 3.1.2) cannot be used for BEPS model validation. This is model inter-comparison not validation. For some regions precipitation is interpolated and irrigation is not included in the BEPS model. This section brings a lot of uncertainties and is one of the drawbacks in this study. Answer: The validation of simulated regional ET is a challenge. Many previous studies, such as Zhang et al. (2009), Vinukollu et al. (2011), and Liu et al. (2008;2012a), used the ET estimated using the water balance method to validate simulated ET at the watershed scale. In the previous version of this manuscript, we used the ET estimated using the water balance method to validate modelled ET in 10 major basins in China. As pointed by the reviewer, ET estimated using this method contains some uncertainties related to the sizes of basins and the assumption that the annual change of soil water storage is zero. Following the suggestions from the first and third reviewers, we removed this content in the current version of the manuscript. 4. The spatial patterns of simulated annual ET (page 5415), the authors stated that “the mean of ET in the terrestrial ecosystems of China simulated in this study is somewhat lower than the global value due to the vast semiarid and arid regions in northwestern and northern China and the vast frigid Tibetan Plateau, in which ET is very low”. It is not clear whether these areas were included in the previous studies or not? This needs to be clarified. Answer: This is a good suggestion. We clarified the confusion in Lines 27-28, P 12, in the current version of the manuscript. All these areas were included in previous studies. We only to express the ET level of China during the 2000-2010 were lower than global averages. In the revision we delete “due to the vast semiarid and arid regions in northwestern and northern China and the vast frigid Tibetan Plateau, in which ET is very low” to avoid ambiguity . 5. On the influence of land cover change on ET (page 5423), it is not clear whether the national total ET of cropland increased or decreased. The authors have to rewrite the section and clearly state a decrease or increase in the national cropland ET in China. Answer: It was mentioned that “The national total ET of cropland increased at the rate of 2.83 km<sup>3</sup> yr<sup>-2</sup>” in the discussion version in Lines 25-26, P 5423. This confusion was clarified in Lines 40, Page 17 in the current version of the manuscript.

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Specific comments are listed in the supplement file attached. Answer: Honestly thanks again for revising our manuscript. All specific comments listed the supplement file will be carefully revised.

The response to the specific comments is in the supplement.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/10/C3379/2013/hessd-10-C3379-2013-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 5397, 2013.

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