Hydrol. Earth Syst. Sci. Discuss., 9, C112–C114, 2012
www.hydrol-earth-syst-sci-discuss.net/9/C112/2012/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Tree ring-based reconstruction of October to November runoffs in the Jiaolai River since 1826" *by* L. Ma et al.

Anonymous Referee #2

Received and published: 20 February 2012

General comments In principle, the reconstruction of river runoff on the basis of tree ring analyses is a powerful tool for assessing long-term changes in the hydrological regime of a given region. In the present paper, the authors aim at reconstructing the long-term runoff of the Jiaolai River in an arid region of Inner Mongolia, China. In my opinion, the present manuscript suffers from several severe drawbacks that make it impossible to recommend it for publication. The reasons for this assessment are as follows. Firstly (and most importantly), I cannot agree with the authors' conclusions that the reconstruction of the runoff is based upon a "stable and reliable" foundation. Figure 5 clearly shows that there are substantial variations between the measured and the reconstructed runoff, which even exhibit entirely opposite trends during certain periods of time. Even if certain statistical requirements are met, the results presented do not provide a suitable basis for runoff reconstruction. Therefore, all the respective

calculations given in the text, the figures and the tables have no solid foundation. Secondly, the authors provide no information on the tree ring chronology such as: which elm species has been investigated? What are the locations from which the trees have been selected? How many trees and how many cores per tree have been sampled? What was the age of the trees, and have there been any corrections for age effects? Even if details on the tree ring chronology are already published (e.g., Ma et al. 2011), this kind of information is essential for the present study, and not all readers might have access to the source of the respective information. Thirdly, the authors stress the close correlation between precipitation and runoff, but no information is provided on precipitation. Fourthly, the distance to ground water often is decisive for the growth (and even survival) of trees in arid regions, but ground water is mentioned only once (p 71, L 4), and is not related to tree growth. Fifthly, the Discussion and conclusion almost entirely is a mere repetition of the results, and fails to consider important implications such as land use or irrigation. Therefore, I regret that I have to recommend rejecting the paper in its present state from final acceptance.

Specific comments: P 66, L 4: What are "hydrological climate changes"? Do the authors mean climate changes that affect the hydrology of a given region? Or do they mean climate changes that are connected with changes in precipitation or evapotranspiration? P 68, L 12-13: Give the scientific names of the tree species. P 68, L 26-28: Instead of this rather vague statement, the aim of the study should be formulated more precisely here. P 69, L 3: Give the scientific name of the elm species, and provide more information on the tree ring chronology used (see General comments). P 70, L 3-10: It is not climate in general but the precipitation-driven runoff that the authors consider to be decisive for tree growth. Hence, the authors need to explain how runoff should affect tree growth two or three years after a given precipitation/runoff event. In most probability, this would involve groundwater depth, but the authors do not take this into account here. They try to explain the time lag between precipitation and runoff on p 71, L 20-23, but this remains rather superficial and does not really consider the groundwater table. P 71, L 1ff: In contrast to its title, section 3.2 does not provide an

explanation on the basis of physiological mechanisms but remains rather descriptive. P 72, L 5: It remains unclear whether summer or September is most important for elm growth. P 73, L 6: How does winter temperature come in here?

Tables: Table 2: To which time period do the data refer that have been used for calculating the correlation coefficients? Figures: Fig. 4 is useless and can be omitted.

Technical issues: There are several errors in citing and listing the references. These need to be thoroughly checked. A certain amount of language editing is also necessary because several terms are not properly used (e.g., "tree wheel" instead of "tree ring"). P 66, L 2: I assume that "hounded" should mean "haunted", but I would suggest rewording here. P 66, L 9: What does "Feng" mean? P 66, L 10: What does "section" mean here? P 66, L 16: It does not make sense to give the mm-values of precipitation with 2 decimal places. P 67, L 6: Delete "via". P 67, L 15-16: The information contained in the sentence "This river is located . . ." has already been given on p 66, L 25. P 67, L 16-18: These citations obviously refer to the sentence in L 15. P 67, L 23: Reword the phrase "more-less-less-more-less". P 70, L 18-21: This sentence is hard to understand. Rephrase. P 71, L 10-11: "The runoff in July . . .": this is a repetition of p 70, L 12. P 71, L 23-24: There is no cause-effect relationship to the preceding sentence. P 72, L 22-26: This sentence can be shortened. P 76, L 5: Replace "significant" with "significantly".

Figures: Fig. 1: The size of the figure should be extended to increase readability. The term "Hydrological stations" in the legend is misleading as data from only one station have been used. What does "runoff stand" in the figure caption mean? Fig. 2: The lettering of the y-axes is missing. The lines of Sample size and STD cannot be discerned. The term "STD" needs to be explained in the figure caption. Fig. 7: Should "sliding changes" mean "moving averages"?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 65, 2012.