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Discussions

Interactive comment on "Generalized drought assessment in Dongliao river basin based on water resources system" *by* B. S. Weng et al.

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Received and published: 30 December 2014

Thank you for your affirmation of our study. The manuscript has been carefully revised including all the symbols, letters, acronyms and ïň Agures. We appreciate the detailed and useful comments and suggestions from you. The point-by-point answers to the comments and suggestions were listed as below.

1. line 15-23 (6708): where do the authors take the information about soils?

Answer: Water and energy transfer process model in DRB (WEP-DRB) needs to input soil data, so we analysis the characteristic of soils in Dongliao River Basin. Please see Table 1.

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2. line 24 (6708) to line 8 (6708): averages on how many years? Maybe authors can show the annual distributions in one single plot.

Answer: Line 24-25 (6708): The precipitation is decreasing from upper to lower reaches, and multi-year average precipitation is reduced from 710 to 450 mm from 1960 to 2011. Line 3-8 (6709): The temperature is decreasing from southwest to northwest, and multi-year average values reduce from 6.7 to 5.6 âŮęC from 1960 to 2011. The evaporation is increasing from upper to lower reaches, and multi-year average values change from 5850 to 1200 mm from 1960 to 2011. The runoff is decreasing from upper to lower reaches, and multi-year average runoff reduces from 150 to 25 mm from 1960 to 2011, that from June to September accounts for 80 % of annual runoff.

3. line 24 (6708): Four seasons? Unbelievable!

Answer: We accept the referee's suggestion; this error has been corrected in the revised manuscript. DRB is controlled by the Pacific low and Siberian high with four distinctive seasons.

4. line 10-13 (6709): badly explained and Jia et al is not in the references so that it is impossible to check.

Answer: We accept the referee's suggestion; this error has been corrected in the revised manuscript. Line 19 (6709): Jia Y, Ni G, Kawahara Y, et al. Development of WEP model and its application to an urban watershed [J]. Hydrological Processes, 2001, 15(11): 2175-2194.

5. line 3-15 (6710): how did you simulate runoff? This part is too long and there are no comments inside with respect to the tables. Data are displayed in three tables but can be displayed in only one.

Answer: Water and energy transfer process model in DRB (WEP-DRB) is a distributed model for simulating the land surface hydrological processes. In this model, surface runoff in the water body group is estimated as precipitation minus evaporation; sur-

face runoff in the impervious area group can be obtained by doing balance analysis of depression storage, precipitation and evaporation on land surfaces; surface runoff in the soil-vegetation group consists of two parts, namely the infiltration excess (Hortan-type runoff) during heavy rainfall periods and the saturation excess (Dunnetype runoff) during the other periods. A heavy rainfall period is defined as a period during which the rainfall intensity is larger than the saturated soil hydraulic conductivity.More details of WEP-DRB can be found in the studies by Jia (2003) and Jia et al. (2006). Data displayed in three tables are clearer than displayed in only one, so we display in three tables. References: Jia.Y.: Development and application of WEP model, Advances in Water Science(AWS), 14, 50–56, 2003. Jia, Y., Wang, H., Zhou, Z., Qiu, Y., Luo, X., Wang, J., Yan, D. and Qin, D.: Development of the WEP-L distributed hydrological model and dynamic assessment of water resources in the Yellow River basin, J. Hydrol., 331, 606–629, 2006.

6. line 3 (6711): PSDI was never explained before nor as an acronym, nor his meaning.

Answer: It is the Palmer drought severity index (PDSI). Please see line 7 (6708).

7. line 8-10 (6712): this matching is not clear at all!

Answer: Comparing the results evaluated by GDAI and the observed drought disaster records in Lishu county (Fig. 2a) and Gongzhuling city (Fig. 2b), we could see that the GDAI is able to assess the characteristics of droughts in DRB. Because the results evaluated by the GDAI are in reasonable agreement with the drought disasters actual happened in Lishu country and in Gongzhuling city. It can express the characteristic of drought disasters happened no matter during drought periods or during crop growth periods.

8. Figure 1: there are numbers which are not explained.

Answer: They present the numbers of the assessment units. We divide the Dongliao River Basin into 64 assessment units. The methods are as the following. Firstly, it is

divided by the location of reservoirs in main stream (i.e. the Erlongshan Reservoir) and the layout of the upper, middle and lower reaches of the basin (i.e. the three segments of the Dongliao River Basin). Secondly, it is divided by the location of reservoirs (i.e. the Bayi Reservoir, the Jinman Reservoir et al.) or other main hydraulic engineering in tributary streams. Lastly, it is divided by the irrigation areas with considering the various crop planting structures.

9. Figure 2: what is the black line?

Answer: The black line is the results evaluated by the GDAI.

10. Figure 4-6: all the elements in the ïñĄgures have to be explained. It's not clear how the authors built the maps. (geostatistics or what... and which method?)

Answer: For the generalized drought times (GDT) of various drought levels, assessment units were chosen when their GDT were greater than or equal to the minimum of average GDT of sixty-four assessment units in five decades. For the GDD or GDS of various drought levels, the maximum GDD (MGDD) or GDS (MGDS) of each unit was calculated firstly. Assessment units were chosen when their GDD or GDS was greater than or equal to the minimum of average MGDD or MGDS of sixty-four assessment units in five decades. Then, their centers were calculated using Mean Center in ArcMap 9.3.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 6703, 2014.