

# ***Interactive comment on “Annual variation characteristics of Eurasian hydrologic elements and their linkage with climate and environment changes during 1951–2015” by Jia Qin et al.***

**Jia Qin et al.**

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This manuscript analyzed the variations and the zonal differences of hydrological elements in Eurasia, and their causes during the recent few decades. I found the analysis results are interesting and believe that it would add useful information on water resource changes in middle and high latitudes of Northern Hemisphere. However, in my opinion, some revisions to the manuscript are needed, most of which are editorial, but also including the addition of some explanatory text.

– Section “Introduction” It well introduced the research status and progress of Eurasian hydrology in this part, and the corresponding shortcomings were also pointed out.

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– Section “Materials and methods” I recommend to add a map to show the locations of the river basins, which could be a supplement to table 1, and I think it could effectively enhance the understanding of the study. In addition, more data descriptions should be added in the section, such as evaluation of the data quality.

Reply: Thanks for the suggestion. We agree and some data descriptions and evaluations were added in the section “Materials and methods” in lines 75-77, lines 82-90, lines 92-97, and lines 111-116. Table 1 listed the locations of the controlled hydrological stations of the eleven major river basins in Eurasia. They are categorized in different latitudinal zones, and the longitudes of the river basins (controlled hydrological stations) in different latitudinal zones were listed from west to east in Table 1. Considering Table 1 and the familiarity of these rivers, after seriously discussion, we decided not to add an additional location map in the manuscript.

– Section “The results” The analysis in this part is credible, but the descriptions or presentation in some sentences should be revised according to the Figures. For example, there has some data lose in Figure 10, would it impact the trend conclusion of that part? The authors should detailed analyse and clear it in the text.

Reply: Thanks for the suggestions. We have read through the manuscript and revised the sentences or words which were unclear and confused (Lines 131-134; Lines 216-218; Lines 221-222; Lines 227-232). The default data in 1994-1995 and 2009-1010 of Figure 10 were abnormal, and we have added some explanations in the section “Materials and methods” (Lines 95-97).

–In section 3.4, the energy and water balance was considered to analyse the reason for river discharge variations. I suggest add trend lines in corresponding Figures or address some words in text to clear the trends of each energy budget. I think it would help to understand the discussion of this section.

Reply: Thanks for the suggestions. We have rewritten this part, and split it into two paragraphs. The analysis was focus on decadal variability, and the unreasonable state-

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ments about “trend” were eliminated in the text. All the revisions were in red (Lines 216-240).

–In addition, I’ve made some corrections of English writing, the major ones, but the manuscript still needs throughout edit on English. Some edits: Line 30: replace “nutrients” with “nutrient” Line 49, 51 and throughout the text: replace “analyze” with “analyse”, and replace “analyzed” with “analysed” to make the writing consistent in the whole text Line 61: replace “kilometers” with “kilometres” Line 64: replace “analyzing” with “analysing” Line 93: should read SPSS (Statistical Product and Service Solutions) software Line 105,108,111, 189, 195, and Table 1: replace “altitudes” with “latitudes” Line 108: replace “R2” with “R<sup>2</sup>” Line 150: should read “freeze-thaw” Line 177: replace “Yeniesei” with “Yenisei” Line 197: replace “Rs” with “Hs” Line 206, 235, and 245: should read “significantly” Line 209: should read “Rn, mainly” Line 446: replace “that” with “which”

Reply: we have accepted all the comments and revised them one by one in the manuscript. In addition, we have asked a professional English editor to check and revise English throughout the text. All revisions will be marked in the manuscript.

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