

## ***Interactive comment on “Trends and regime shifts in climatic conditions and river runoff in Estonia during 1951–2015” by Jaak Jaagus et al.***

### **Anonymous Referee #2**

Received and published: 25 April 2017

#### General comments

In general the article is well prepared and worth to publish with minor revision.

Most of introduction is devoted to regime shift, while not enough attention was paid to previous investigations on climate parameters and especially on river runoff change. Authors should to reveal novelty of their study too, i. e. to show if their study differs from the previously conducted in Estonia.

I disagree that correlation coefficients can be provided in the article without evaluation of statistical significance. You can easily do that.

The reasons why “after numerous tests” certain set of parameters for regime shift detection was chosen should be described more clearly. In some cases, very short peri-

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ods (e. g. <10 years (line 234) or 6 years (line213)) were described as regime shift. It not clear what is the difference between short-term fluctuations and regime shift.

The term “trend” can be used only in case of statistically significant changes. Otherwise increase, decrease, tendency or other terms should be used.

The purpose of section 3.1 remained unclear for me. There is a lot of different circulation indexes presented as well as a lot of regime shifts were found. However, it's difficult to understand significance of all this findings. For example, what mean negative trends in POL index values and how that relates to climate conditions in investigated area? I would suggest to remove this paragraph, while results of atmospheric circulation regime shift analysis can be used in other part of the text for explanation of tendencies of climate and runoff parameters.

#### Specific comments

Page 1. Line 20-22. It is not clear for me if authors analyzed correlation between AO and NAO, while I didn't find such information in the following text. Moreover, what is a purpose of such correlation? From my point of view, it is not related with tasks of research. Page 4. Lines 106-110. I suppose, that such detailed information about relocation of two stations isn't important. Only statement about data homogeneity can be left in the text. Page 7. Line 221-223. Results presented in this part of text don't fully meet data in Table 3 (e.g. up to 5 mm in monthly precipitation). Moreover monthly data about changes in stations aren't presented in mentioned table. Page 10. Line 292. You mention that you detected regime shifts in NAO and AO indices, however in introduction you mentioned that such shifts were already discovered in other research. Page 11. Line 321 and 337. Two statements about annual river runoff contradict each other. Page 11. Line 326-327. In this paragraph you talk about already observed changes. So you don't need to wait the end the 21st century and consequently the last sentence of this paragraph have no sense. Page 11. Line 338-339. What are the specific features of the last two distinguished groups of rivers? Page 12. Line 352.

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Do you think that March is winter month? Figure 1 should be improved with additional regional map where location of investigated area can be seen in more general context.

#### Technical corrections

Page 1. Line 19-20. The main idea of the sentence “All meteorological...” should be expressed more clearly. Page 4. Line 106. I would propose to use “station location” instead of “the measuring sites of the stations”. Page 4. Line 112-113. The sentence “The wetting...” is difficult to understand. Page 4. Line 95 and line 221. What mean “increasing trend”. Is it gradual change in trend values? I suppose that you should use the term “positive trend” or “significant increase of in river runoff” instead of. Page 7. Line 195. The expression “had a jump by” isn’t usually used in English language. Table 4. It isn’t clear if the regime shifts are upward or downward. Not always shifts sign correspond to general tendency.

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[Interactive comment on Earth Syst. Dynam. Discuss., doi:10.5194/esd-2017-24, 2017.](#)

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