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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Water balance of selected floodplain lake basins in the Middle Bug River valley" *by* J. Dawidek and B. Ferencz

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Many paragraphs of the chapter conclusion and discussion presented in the manuscript refer to the aim and hypotheses from the line 8 - 15 e.g. Line 21-23: In all cases, horizontal component values considerably prevailed over vertical (atmogenic) ones, that is, they were one order of magnitude (occasionally more) higher.

Line 1-4 Confluent lakes with a transit flow of flooding water through the basins were characterized by the largest disparity between vertical and horizontal water balance components. Line 5 – 7 The volume of horizontally exchanged water in the confluent–profundal lake in Wola Uhruska was approximately 50 times larger than the average volume of precipitation and evaporation. etc. . . . The manuscript will be completed with

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clear statement if we hypothesized correctly or not. Equations 4 and 5 are constructed properly and do not require re-writing but all the symbols used in equations will be explained in details in the corrected manuscript. Two inflows in equation 4 are different in their origin. They concern two different crevasses (contrafluent and confluent), which are active during positive potamophase of the floodplain lake. Two outlets in equation 5 are related to confluent and contrafluent phase of the cycle. Both equations must be taken into account for the final water balance of the contrafluent-confluent lake basin. The manuscript will be supplemented with symbols indicating clearly the origin of inflow or outflow in accordance with the Table 2.

Technical vocabulary used in the text (jargon) has no counterpart in the limnological literature and it results from the specific hydrological functioning of the floodplain lakes (described in the manuscript). Vocabulary typical of the floodplain lakes have appeared previously in the literature concerning hydrology of river valleys. An attempt to simplify the language and the use of terms commonly used can make the wrong impression that there is fundamental difference between the way of supply (in time and space) floodplain lakes and lakes of different origin.

Abstract will be rewritten in order to obtain a more synthetic form. Definitions will be moved to the introduction section. Repeated words will be deleted and their meanings clarified, eg. complexities.

Fluctuations of hydro chemical parameters which are mentioned in the introduction of the manuscript do not apply to hydro-chemical processes studied by the authors. The indicated fragment relates to the qualitative factors that allowed (other authors) to distinguished functional periods of dynamic floodplain lakes. Reference to the literature (Hamilton and Lewis, 1987; Garcia de Emiliani, 1997) in the manuscript is very clear.

Sentence : this study is the first attempt in the literature on the subject of comparing water balance equations for floodplain lake basins depending on the type of connections the lake has to its parent river" is not precise because as the reviewer rightly points

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out the aim of our work was not comparing equations but elements of water balance equations of lakes with various types of fluvial supply. We disagree with the suggestion that the article presents one balance equation in terms of all types of lakes. Reviewer's suggestion is justified only at a very general level. Conceptually, each balance equation (regardless of the field where it applies) is a combination of income and losses. The main problem in the manuscript, was construction of individual equations for each type of lake connection to the parent river. This is the first in the limnological literature so detailed approach to calculate the water balance of floodplain lakes. Taking into account the water balance of the lake frequency and duration of the functional periods (potamophase and limnophase) are less relevant, and much more important is the quantity of gains and losses. Frequency and duration of potamophase and limnophase are not consistent with water balance time frame (usually one year), and their analysis is a separate research problem, not considered in this article. We deliberately limited climate information to the quantity of precipitation and evaporation, due to the objective of the manuscript. The paper refers to the analysis of the structure of the major components of water balance, depending on the type of lakes' fluvial supply. Analysis of the impact of climatic conditions on the lake water balance is an issue for a different study. It is not the rationale to supplement manuscript with detailed climatic elements.

All the sentences which are written without any substance will be deleted or defined precisely (pages 10062, 10063, 10064, 10065) Each equation used in the manuscript will be complemented by a constituent unit of the water balance. The elements of water balance relate to the water surface and this fact will be clearly stated in the paper

An analysis of the time period of events as well as inflow and outflow conditions relevance to the weather/climate of the study area is an important but secondary issue, and it does not comply with the stated aim of the paper.

The remark concerning line 13 (hypothesis) which suggest to supplement Table 1 with the weather conditions is a repeat of the aforementioned problems. Authors responded to the remark above. It might be hard to understand that eastern border of Poland (and

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European Union) helped maintaining natural character of the lakes but it is true. The eastern border of the EU (study area) has been for many decades a zone free from all human activities (agriculture, industry, infrastructure). Even carrying out limnological studies requires to obtain special permits. It helped to restore the natural processes of the valley functioning. Page 10066 (Section 3). Remark: In line 9, authors wanted to say that they did something special to find reliable results. The original sentence is " Although the structure of the equation (commonly used to calculate water balance) is simple, it is not easy to obtain reliable results. This fragment contains no suggestion that obtained results are extraordinary. However, undoubtedly this is the first in the literature so detailed approach to the water balance of floodplain lakes. Temporary flow measurements were recorded once a week and daily readings of water levels allowed to calculate daily flow rates (rating curve). Daily flow rates and the lake volume allowed to calculate the flushing time of each lake under study. In extreme fluvial conditions (intensive supply with river water) the Tf value was less than one day.

Described in the methods section and emphasized the importance of the accuracy of calculations, taking into account the positive and negative potamophase guaranteed reliable water balance equations. Results and discussion relate to the obtained results (the quantity and structure of the water balance elements) and not to the methods we used to gain the results.

Page 10067: taking into account our previous commitment that we will describe of the double symbols (issue mentioned above) in equations 4 and 5 (clarification of confluent and contrafluent inlet and / or outlet) this remark will be applied

Page 10070: Line 4 in order to dispel doubts about language, manuscript will be reviewed by a native speaker.

Page 10070: Thousand separators will be used to read numbers easily. Results section will be rewritten according to the reviewer suggestions.

Page 10071: specific values of water balance elements were shown in Table 2, so

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there is no need to repeat them in the manuscript

Page 10072 – 10075: discussion section will be modified according to the suggestions of both reviewers. We will specifically refer to the objectives and hypothesis

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 10061, 2013.