

Interactive comment on “Analysis of frequency and duration of the functional periods on the basis of long-term variability of limnetic processes within the Bug River valley” by J. Dawidek and B. Ferencz

Anonymous Referee #2

Received and published: 21 July 2015

Overall I like this paper and would like to see it published, but it will require a lot of work to get it into shape for publication.

Overview: The manuscript examines hydrologic connectivity (HC) between the Bug River (Poland) with floodplain lakes utilizing stage data and geospatial data sets, and also some field data of lake morphology. The paper has several merits, including i) examines different types of floodplain lakes, ii) it considers the topographic aspects of the floodplain, as well as lake type, and iii) the manuscript provides quantitative indices

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of HC. The manuscript does have several shortcomings, however, including;

i) The writing needs to be strengthened and more to the point. It is not clear, for example, what are the actual objectives of the study. Also, the actual hypothesis that is put forward (pg. 13149) is quite general and is not supported by the prior review of the literature. The sentence which follows ("Moreover.... confluent lakes...distance....") sort of comes across as a secondary hypothesis, but the writing is awkward and not very clear. I suggest the authors spend some time working on the writing and put forward clear hypothesis and study objectives which are gleaned from a critical review of the literature.

ii) The LER index: while I agree that topography is important to HC, it really depends on the channel connections, such as slough, crevasse, as well as the batture or tie channels. Has this been considered for each of the lakes? If so, this should be specified. Also, the highest topographic rise on the floodplain (Fig. 2) is not what is most relevant here because water always takes the lowest path to infill the lake basin. The authors should see the paper by J. Phillips (2013) and Hudson et al. (2013), and referenced below.

iii) But the main criticism - throughout the paper - is that the authors should note that their study has not measured actual lake hydrology (stage), but instead uses historic river stage data as a surrogate. The authors make the assumption that lake stage is entirely controlled by river stage. The authors should review two key papers by Hudson et al. (2012, 2013) related to floodplain lake connectivity for alluvial rivers and flood plains (referenced below). The paper by Hudson et al. (2012) makes a comparison of river stage and lake stage data for different types of lakes, and the paper illustrates the prospects and problems of utilizing river stage data to study HC. In fact, since the authors are studying different types of lakes they should note that the paper by Hudson et al. (2012) shows strong differences in lake stage variability because of lake type which are not caused by river stage.

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iv) The authors mainly provide an ecological rationale for the research, including ecological floodplain parameters (poto- and limo-phase). While i think this is justified, since this is a case study one would expect that the actual hydrologic work is related to actual floodplain ecological phenomena and processes, or ecosystem services, within the Bug River valley. What are the key biological species (plants or animals) which are linked to the floodplain hydrology? This is a good opportunity which the authors have not seized.

Additional comments: In general, there is a lot of analysis, although it does not always relate to the main goal of the study and some of it seems extraneous. For example, the atmospheric precipitation approach is quite sophisticated but it is really not very useful in this study. And this is not surprising because there were no actual measurements of lake stage. And, local evaporation rates would also need to be taken into account.

pg. 13158: discussion about infiltration is really speculative, as no data is put forward in regards to infiltration. This obviously depends a lot on the sedimentology (coarse or fine-grained), which the authors have not considered.

Fig. 3: it is not clear what is meant by " forward similarity" and 'backward similarity"

Fig. 7. a line graph is not appropriate because the data are distinct water years. Use a column/bar chart.

Key references to include: Phillips, J.D. 2013. Hydrological connectivity of abandoned channel water bodies on a coastal plain river. *River Research and Applications* 29, 149-160.

Hudson P.F., Sounny-Slittine M.A. & LaFevor M. (2013), A new longitudinal approach to assess hydrologic connectivity: Embanked floodplain inundation along the lower Mississippi River, *Hydrological Processes* 27 (15): 2187-2196.

Hudson P. F., Heitmuller F. T. & Leitch M. B. (2012), Hydrologic connectivity of oxbow lakes along the lower Guadalupe River, Texas: The influence of geomorphic and cli-

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matic controls on the "flood pulse concept", *Journal of Hydrology* 414: 174-183

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 13145, 2014.

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