

ANSWER TO THE INTERACTIVE COMMENTS ON

'A hierarchical approach on groundwater-surface water interaction in wetlands along the upper Biebrza River, Poland'; 25.04.2012:

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General Response

The comments of the reviewers were very helpful for improving the paper. We like to thank them for their good job. We considered all their remarks and will take them into account in a revised manuscript as described below.

As the editor already stated the reviewers also require minor English language editing. Therefore we reviewed and proofread the whole document to improve the English grammar.

Comments of reviewer D. Olago:

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| Comment 1 | Abstract: A summary statement on the influencing first and second order factors should be included as they are referred to extensively in the discussion and conclusion sections, forming some of the outcomes of the study. |
| Response 1 | The abstract has been modified to pay respect to the influencing first and second order factors. |
| C 2 | The word "however" if used in the middle of a sentence, should be preceded and followed by commas. |
| R 2 | The mentioned grammatical rule has been applied throughout the document. |
| C 3 | Pg 9545, lines 25 and 26: Put commas after "was" and before "still" |
| R 3 | The commas have been placed. |
| C 4 | Pg 9546, line 9: symbol should be % not per mil. |
| R 4 | This value is correct, the inclination of the riverbed is indeed 0.23 per mil! |
| C 5 | Pg 9546, line 23: Insert the word "on" after 301 |
| R 5 | The word has been placed. |
| C 6 | Pg 9547 line 5: "on average" not "in average". This should be corrected in other sections of the text as well. |
| R 6 | The suggested changes have been made throughout the document. |
| C 7 | Pg 9547 lines 8 & 9: Text "fig. 4a and b, respectively, should be in brackets. |
| R 7 | The text has been placed in brackets. |
| C 8 | Pg 9547 line 15: "Rising" not "Raising". |
| R 8 | The word was changed. |
| C 9 | Pg 9549, line 17/18: insert the word "the" between "to" and "groundwater" |
| R 9 | The missing word has been included. |

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| C 10 | Pg 9550, line 26: insert "to" after "equivalent" |
| R 10 | The change has been made. |
| C 11 | Pg 9551, line 22: "the" not "he" |
| R 11 | The change has been made. |
| C 12 | Pg 9551, line 24: insert "the" before "valley" |
| R 12 | The change has been made. |
| C 13 | Pg 9551, line 26: Put a fullstop after "floor" |
| R 13 | The change has been made. |
| C 14 | Pg 9551, line 28: "than" not "then" |
| R 14 | The change has been made. The lines 22-28 have been reformulated. |
| C 15 | Pg 9553 line 14: insert "in" before "the region" |
| R 15 | The word has been placed. |
| C 16 | Pg 9554, line 20: change "is steeply narrowing" to "steeply narrows" |
| R 16 | The change has been made. |
| C 17 | Pg 9554, line 22: "on average" not "in average". |
| R 17 | The change has been made. |
| C 18 | Pg 9555, line 5: "an heterogeneous" not "a heterogeneous" |
| R 18 | The change has been made. |
| C 19 | Pg 9555, line 10: "months" not "month" |
| R 19 | The change has been made. |
| C 20 | Pg 9556 line 2: change "at first instance" to "and in the first instance" |
| R 20 | The change has been made. |
| C 21 | Pg 9556 line 5: Explain why the parameter r-squared was set as 1800. What was the rationale? It needs a justification. |
| R 21 | The value 1800 has been chosen out of experience. This value influences the interpolation routine. A lower value creates sharper changes between the interpolated points, a higher value smoothes them. Since we have just a limited amount of points available for the interpolation we used the value to create a continuous surface of exchange fluxes. We clarified this in the text. |
| C 22 | Pg 9556 line 15: change "determines strongly" to "strongly determines" |
| R 22 | The change has been made. |
| C 23 | Pg 9557 line 10: change "can be accounted: to "can account" |
| R 23 | The change has been made. |
| C 24 | Pg 9557 line 25: insert "the" before "slope" |
| R 24 | The word has been added. |
| C 25 | Pg 8558 line 21: change "only can explain partly" to "can only partly explain" |
| R 25 | The change has been made. |
| C 26 | Pg 8558 lines 23&24: The sentence "these point....reach scale" is not clear. Rewrite for clarity. |
| R 26 | The lines 21-24 have been modified and rewritten. |
| C 27 | Pg 9559 line 11: change "rate in depth" to "rate at depth" |
| R 27 | The change has been made. |
| C 28 | Pg 9559 line 24: put commas after "is" and "range" |
| R 28 | The commas have been added. |
| C 29 | Pg 9560 line 13: change "adverse" to "reverse" |

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| R 29 | The change has been made. |
| C 30 | Pg 9560 line 15: “were” not “where” |
| R 30 | The word has been corrected. |
| C 31 | Pg 9560 line 18: put commas after “shows” and “no. 4” |
| R 31 | The word has been corrected and the commas have been added. |
| C 32 | Pg 9560 line 20: spelling “respective” and put a comma after “shows” and on the next line after “4” |
| R 32 | The comma has been added. |
| C 33 | Pg 9560 line 20: change to “the slope crack, and the valley floor is wider, ... |
| R 33 | The change has been made. |
| C 34 | Pg 9561 lines 5 to 8: The sentences starting “By” and ending with “results” are repetitions. Delete. |
| R 34 | The two sentences have been deleted. |
| C 35 | Pg 9561 lines 10 to 12: Explain further or clarify why the head based fluxes and seepage meter flux have that very large discrepancy. In addition, what are the implications of this discrepancy for the results of the study and their interpretations? |
| R 35 | With respect to the uncertainties all the current methods to determine groundwater-surface water exchange possess, this differences seem to be acceptable. One major problem might be that the fluxes are non-steady over a vertical profile in depth. The different methods however have differing assumptions and boundaries; the thermal method integrates a 5 m deep soil profile, the seepage meter measures the flux at the interface. We added a clarifying sentence to the document. |
| C 36 | Pg 9562 line 3: what is meant by “observed but possible”? This sentence is not clear. Rewrite. |
| R 36 | The sentences in lines 3-6 have been rewritten and clarified. |
| C 37 | Pg 9562 line 20: insert “the” after “cover” |
| R 37 | The word has been added. |
| C 38 | Pg 9562 line 24: change “occur therefore” to “therefore occur” |
| R 38 | The change has been made. |
| C 39 | Pg 9562 line 27: insert “the” before “subject” |
| R 39 | The word has been inserted. |
| C 40 | Pg 9562 line 29: change “underlie also” to “also underlie” |
| R 40 | The change has been made. |
| C 41 | Pg 9563 line 27: insert “and are” before “especially” |
| R 41 | The word has been inserted. |
| C 42 | Pg 9563 line 29: change “regard consequently” to “consequently regard” and insert “as being” before “responsible” |
| R 42 | The change has been made and the missing words have been inserted. |
| C 43 | Pg 9564 line 7: change “as these” to “than those” |
| R 43 | The change has been made. |
| C 44 | Pg 9564 lines 16&17: It is not clear to me how groundwater-surface water exchange can influence the formation of meanders. Can this be elucidated? |

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| R 44 | Since the edges of meanders tend to be closer to the slope crack and the groundwater flow lines converge to them, the higher fluxes on these locations could create a positive feedback process supporting the formation of meanders. This hypothesis however, cannot be proofed within this paper, but an investigation concentrated on the meanders would be very interesting! We though modified the mentioned lines. |
| C 45 | Pg 9564 line 28: change "capable to connect" to "capable of connecting" |
| R 45 | The words have been changed. |
| C 46 | Pg 9565 line 3: change "to select" to "of selecting" |
| R 46 | The words have been changed. |

Comments of reviewer #2:

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| Comment 1 | The authors need to sort out the misuse of missing commas after the word however. This appears twice in the abstract (see lines 18 and 27) and should be checked throughout the document. . |
| Response 1 | The mentioned grammatical rule with the missing commas has been applied throughout the document. |
| C 2 | The grammar is generally precise but the authors should check through the document the misuse of the article 'the' and correct them. There are also cases of repetitions in the article |
| R 2 | The usage of 'the' has been revised. We paid attention especially on repetitions and changed them when this was appropriate. Repetitions have been removed. |
| C 3 | The sentence 'Therefore we performed seepage meter measurements in Rogozynek (Fig. 3, No. 4) to have an independent validation of our previously presented results.' is repeated in the validation section (see page 9561 lines 2 vs 6). This could be a minor result of cut and paste but should be sorted out. |
| R 3 | Yes, this was indeed a copy paste error, probably because originally the manuscript was written in word, and then adapted for the LaTeX template in HESS. The two sentences have been removed. |
| C 4 | However is again used without proper use of comma in page 9564 lines, 13, 23. |
| R 4 | The proper use of commas was checked throughout the document. |
| C 5 | Page 9562 line 3 needs some further clarification since it is not clear. |
| R 5 | The statement in the line was erroneous because of a missing word. The sentences in lines 3-6 hence have been rewritten and clarified. |
| C 6 | Page 9558: The sentence 'These points out that the fluvio-plain scale where second order factors are taken into account is inevitable to interpret the results gained from the reach scale' is not clear. It needs to be re-written. |
| R 6 | The lines 21-24 on page 9558 have been modified and rewritten. |
| C 7 | The discussion on morphology and geomorphology is winding and not clearly articulated or justified. Show a clear connection. |
| R 7 | The sentences on page 9558, lines 17-24 and on page 9564, lines 13-20 have been modified to clarify and sharpen the connection between fluxes and morphology. Positive feedback processes can be a link between groundwater-surface water interaction and morphology of river and riverbed. |