

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2022-208

Anonymous Referee #2

Referee comment on "Influence of vegetation maintenance on flow and mixing: case study comparing fully cut with high-coverage conditions" by Monika Barbara Kalinowska et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-208-RC2>, 2022

General comments

The authors have conducted and described field research and analysis of the process of solute transport in the open channel under various conditions of the occurrence of aquatic vegetation. The work is particularly interesting from the point of view of river engineering and eco-hydrology. I recommend this paper for publication after discussion and revision.

Principal criteria

Scientific significance (good). The manuscript represents a contribution to scientific progress within the scope of Hydrology and Earth System Sciences (however, the new ideas and proposed formulas are characterized by some uncertainty due to the relatively small number of measurements and variants related to the occurrence of vegetation).

Scientific quality (good). The results were discussed in an appropriate way, considering related works and including appropriate references.

Presentation quality (good). The scientific results and conclusions are presented in a clear, concise, and well-structured way.

Specific comments

My main doubt is the definition of the mean water flow velocity U (U_{NV} , U_{VEG}), the changes of which the authors analyze in section 3.2 Influence of vegetation maintenance of flow hydraulics. If it is the value calculated according to formula (3) (line 159) and presented in Table 1, it is the speed of pollutant transport in the channel rather than the average water flow velocity (understood as $U=Q/A$, where A is the cross-sectional area). Here, the speed of movement of the substance is the result of both advection (water movement) and dispersion (the mechanical one, as well as the one resulting from the water flow velocity distribution). This should be explained and discussed by the authors. It would be important to show in the article what were the average flow velocities resulting from hydrometric field measurements (also examples of velocity distributions in channel sections) and to compare them with the solute transport speed. So, while I am convinced by the presented relationships between vegetation cover V and solute transport parameters (point 3.3, Figs. 10, 11), the conclusions about the influence of vegetation on the flow hydraulics are debatable. In my opinion, according to formula (3), the velocity U is also a parameter characterizing the transport of solutes, not the flow hydraulics. In my opinion, the confirmation of this is the linear dependence of $U(V)$ and $DL(V)$.

My second general remark is that in my opinion a limited number of field measurements (covering the canal with vegetation 70-100%) is definitely not enough to present a linear relationship as in Fig. 9. But the authors are aware of this, as they write about in the article, however, the question is always whether this is the right time to publish these results. Perhaps it would be better to present the current results in the form of a scientific communication and publish the final results after completing the measurements and analyzes.

Technical Comments

Lines 197-199. Show examples of measured flow velocity distributions in channel sections.

Line 115. 'Using map algebra...' What does it mean?

Lines 131-137. What was the frequency of the measurements?

Figure 7. There is no green triangle for the P5 - distance 506 m

Lines 213-214 '... and Figure 7c in Biggs ...' I am not sure if this way of referring to the results of other researchers allows the reader to easily follow the discussion of the results

Line 232 There is Fig.10, it should be Fig. 11