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Interactive comment on "Identification of runoff formation with two dyes in a mid-latitude mountain headwater" *by* Lukáš Vlček et al.

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We would like to thank the referee for his review and the helpful comments.

Responses to comments: 1. Agreed.

2. Agreed, it will be clarified.

3. Agreed, it will be deleted.

4. Agreed, it will be clarified.

5. Agreed, it will be changed.

6. Profiles were excavated stepwise in 0.5 m-wide segments. The pictures were first taken in squares of 0.5 m x 0.5 m of a profile section, and later processed, analyzed,

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and joined in the software and finally displayed in our figures in 1.5m-wide profiles.

7. We agree to include the issue in the discussion. However, we believe that the detected preferential flow patterns give valuable insights into active preferential flowpaths during natural rain events. The flow patterns are likely intensified and additional flow processes might occur, but our experimentally detected dominant flowpaths will very likely play a crucial role. Moreover, we applied our experiments in a dimension [1.5 m-scale] which is well established in the dye experiment literature.

8. Agreed, it will be changed.

9. Agreed, text will be changed accordingly.

10. Agreed, sentence will be clarified.

11. Agreeed, it will be changed.

12. Agreed, text will be shortened.

13. Agreed, text will be shortened.

14. This statement will be clarified. Background info: The pH value slightly influences the visible (= "eyeball-detectable") color of FLC solutions, as it changes from neon greenish-yellow to a dull goldish-yellow depending on pH. This is because when FLC is in its ionized (= deprotonated) form at pH > ∼6, it has significantly different fluorescence behavior/characteristics than when it is at or below pH ∼6 (below pH ∼6 it is mostly protonated, H+ group adds to COO–). The fluorescence of FLC is due to the photo-physical characteristics of the fluorescein anion at pH > ∼6. Its color (visible absorbance) is influenced by its concentration. The most intense neon greenish-yellow color (visible absorbance) occurs at concentrations of 0.1 to 1 g L-1. The most intense fluorescence occurs when the salt Sodium-Fluorescein (= Uranine) is fully dissociated, according to Käss (1998). Absorbance and fluorescence are both observed in the same spectral range (∼450-550 nm).

15. This point is answered together with point 14.

16. The high sorption of FLC to organic matter together with the pH likely explain the suppression the fluorescence. Also, sprinkling of the plots only (and not the entire hillslope), may have prevented observation of FLC in the stream because of lack of hydrological connectivity by lower saturation of the soils outside of the sprinkling plots. Since we observed that Brilliant Blue was not strongly diluted at the Peat Bog hillslope (still strong blue color near the stream), we can assume that dilution was rather small. Our experimental data is not sufficient for a detailed calculation, as BB concentrations are well suited for qualitative detection but not for detailed quantification (as it is possible for FLC).

17. P15 Agreed, text will be shortened.

18. This table shows a comparison of the headwaters of the upper Otava River – which consists of many small headwaters and forms one of the most prominent catchments in the Šumava Mts. region. Our experimental catchment “Rokytka Headwater” is a subcatchment of the upper Otava River. The Otava River catchment is the reference & target area, e.g for scaling up of runoff formation processes and for the implementation of flood protection measures etc.

19. Agreed, will be removed.

20. Agreed, information will be added.

21. Agreed, will be changed.

22. Agreed.

23. Agreed, will be changed.

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