General Comments

The manuscript entitled „Subsurface Flow and Phosphorus Dynamics in Beech Forest Hillslopes during Sprinkling Experiments: How fast is Phosphorus replenished?" written by Michael Rinderer, Jaane Krüger, Friederike Lang, Heike Puhlmann, and Markus Weiler was rewritten according to the suggestions of the editor and two referees. The main concern was that P fluxes were not presented, even though one of the objectives was to quantify P losses with subsurface flow. The authors substantially rewrote the manuscript. They focus now on soil solution P replenishment and P buffering capacity of the mineral soil as these are important processes for plant P nutrition. In addition, they make a rough estimation of the annual P flux from one of their research sites.

Unfortunately, I have more concerns with the new version of the manuscript than with the first one. These are the reasons:

1. Now the authors try to meet two goals, which makes the manuscript more difficult to read. They start the introduction with plant P nutrition issues, but do not come back to them in the discussion. They should for example discuss the implications of P leaching from the forest floor and P retention in the mineral soil for plant nutrition. What about the effect of different tree species? They cite several studies form other beech forest ecosystems, but are there also results from other tree species? Nutrient flushing might be of great importance for plant nutrition. What are the processes that lead to P flushing? What role do microorganisms play?
2. In order to be able to estimate the annual P flux of one of the three research sites, the authors used the P concentration after the nutrient flush and ignored the high soil solution P concentrations during the first two hours of the experiment (nutrient flush). In the first version of the manuscript the authors wrote that climate change may lead to more frequent high-intense rainfall events. Hence, nutrient flushing might become more relevant and it would be interesting how large the P flux would be during such high-intense rainfall events (not annually). In addition, the authors write in line 400 that "up to 40 % of the annual P flux might occur during single events, which would suggest that the fluxes during the first flush have an important share on the annual flux and cannot be neglected". The P flux during the sprinkling experiment (first flush and rest of the time) could have been calculated for all three research sites.

Hence, I would suggest to either focus on P replenishment and buffering or P fluxes from the ecosystem and to discuss the chosen topic in more detail.

Specific Comments

L 170-190 Still, the statistical methods used are not described. In line 247 you write "was significantly higher", but it is not explained anywhere how you tested this.

L 205 The trench cannot yield vertical SSF.

L 297 You found that especially vertical SSF is of importance for P transport. Hence, suction cups installed in a large number and spread over a research site, should yield good estimates of soil solution P concentrations, especially when soil heterogeneity is high.

L 336-339 Explain the process behind nutrient flushing.

L 367-368 This is only right if the nutrient flush at the beginning of the experiment is not relevant. You did not calculate the flux for the flush, hence, I cannot confirm that your statement is right.

L 397 Which ecosystems are included in the meta-analysis of Sohrt et al. (2019)?

Technical corrections

L 243 6 time -> 6 times

L 398 either delete the colon or the parentheses

L 419 suggest -> suggests

L 431 ecosystem -> ecosystems

L 432 relative -> relatively