

## ***Interactive comment on “Comparison of parameters influencing the behavior of concentration of nitrates and phosphates during different extreme rainfall-runoff events in small watersheds” by J. Moravcová et al.***

### **Anonymous Referee #2**

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The manuscript submitted by Moravcová et al. presents an interesting research topic on the nitrate and phosphate responses to discharge increases at watershed level. The classification of hysteretic responses in different categories and their distribution on a plane that considers the rotational direction and the relative increase in concentration is interesting because allows a fast description of each single event. The analysis considering short and long term precipitation events and the inclusion of water from snow melting coupled to the land uses is interesting. Unfortunately, I concur with the comments provided by the other referee. The language is too baroque and too wordy:

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sentences are too long and there is a lot of repetition. Furthermore, there is a lack in consistency of word use that really hinders the text comprehension. I strongly encourage the authors to revise style, use of words and English language in general. Also, a deep revision of the text internal structure is urgent. Each section of the manuscript is sprinkled with bits (and sometimes entire paragraphs) that belong to other sections. These revisions should be an essential step into getting a more clear and concise text. As it is, it results very difficult to follow what the authors are trying to explain. The Introduction is not really helpful in establishing the background information needed to present the objectives of the study or the methods used. It is too vague, there is too much information that it is not used or further explored in the following text. For instance, in page 12107 there is a reference a classification system for hysteretic loops that is not neither used nor discussed afterwards. Also, several aspects about hysteretic loops are already introduced in the text before even defining the concept. The Introduction does not offer any tie-in to the objectives. Furthermore, the objectives are mentioned are just passed over at the end of the section. The succinct presentation of the objectives does not offer any hypothesis about how the different hydrological parameters and land uses might affect the nitrate and phosphate responses. The Description of the catchments section is missing a lot of needed information, some of which, as I said, is found in other sections of the manuscript. For instance the first paragraphs of the Results and Discussion section. The description of each catchment is too general and presents little information relevant to the study. We learn there are two sub catchments in the Jenínský catchment in page 12116, in the Results section. The information summarized in Table 1 should be referenced in this section since it covers the entire 2006 – 2010 period and not only the data from the selected 26 events. Furthermore, nitrate and phosphate concentrations for the Kopaninsky catchment are missing from Table 1. This section should also explain the main differences between study sites, especially regarding land uses, and why there are two sub catchments in one catchment and just one in the other. Figures 1, 2 and 3 should be referenced in this section. These figures should be bigger in size. As they are now, it is very hard

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to understand what they are showing. Figures 2 and 3 could use some breaks along the discharge axes to improve clarity. It also should be explained what is the criteria for choosing only 19 and 7 events in a 5 year data series. Is there a discharge or precipitation threshold criterion? The Methods section also needs to be expanded and clarified: What is water quality in this study? If you are focusing in nitrate and phosphate concentrations as the title of the manuscript states, then refer to them directly. Concerning the sampling, where were the automatic samplers located? What are the standard analytical methods? They should be mentioned and referenced with the proper citations. The Data analysis is difficult to understand. Many parameters should be explained in more detail. Some of them are not explored in the Results and Discussion, therefore I wonder if they should be included at all. I do not understand what are the stable areas defined under the “stable” parameter. Does it refer to non-agricultural areas? What are the I and II soil infiltration categories? Why is the slope of the catchments an important factor to consider? The statistical evaluation section is lost on specifics (which variables are species data, which ones are explained variables, which ones are covariates. . .) but there is little explanations as to why is this way. What does it mean that a parameter presents a significance level  $<0.05$  in a Monte Carlo permutation test? Why is important to consider it? In this section it is mentioned that the analysis are performed for short and long term precipitations, and snow melt (the table with the corresponding data is not referenced until page 12118). What the threshold separating short and long term precipitations is? According to Table 2, there is some overlap between both: long term precipitation ranges from 0.3 to 46 hours, while short time precipitation ranges from 1.1 to 11.1 hours. How have you measured the time for snow melting inputs? All this information should be in the Monitoring or Study site sections. The Results and Discussion section is also very hard to follow. Here there are some badly explained concepts. What does mean: “Due to terrain configuration there is also very frequent occurrence of rapid summer storm events. . .” What does terrain configuration refer to and how does it affect precipitations? What is volatility of discharges? How do you assess soil contamination in sub catchment J1 (page 12117, line 28)?

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The contamination is by nitrate, phosphate or both? The size of a hysteresis loop is the same as the area? The interchangeable use of sub catchment P23 and Kopaninsky catchment is confusing. The dynamics of phosphate and nitrate concentrations in the different events and the catchments are always the same? I do not understand by after the RDA analysis STABLE and INF are used as covariates and hydrological data is re-analyzed afterwards. Maybe it's just me, although a bit more clarification would be helpful. In page 12127 there is a reference to the rise in air temperature but there is no data about it. Finally, there are a large number of tables and figures. I have already pointed out some instances where figures could be merged into one for ease of reference and comparison, but also Figures 11 and 12 could be merged. There are also some that I wonder if they are really necessary: I do not think it is necessary to show a “typical” c-q response (figures 5 and 7), and since the data from Table 3 is already presented in Figures 4 and 6, the table could be omitted.

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