

Review of manuscript “Spatially resolved soil solution chemistry in a central European atmospherically polluted high-elevation catchment” by Daniel A. Petrash et al.

### Specific comments

Note: “X -> Y” means replace “X” by “Y” in the text

- page 2, row 1 “Blazkova et al., 1996” -> “Blazkova, 1996”
- page 2, row 3 “Blazkova et al., 1996” -> “Blazkova, 1996”
- page 2, row 6 “Fen et al. 1998” doesn’t appear in the references. Is “Fenn et al. 1998” meant? If so, this citation doesn’t support the before stated sentence, because it mainly reflects the situation in North America.
- page 2, row 6 “Hruska et al. 2003” -> “Hruska and Kram, 2003”
- page 2, row 8 “Gradowski et al., 2008” -> “Gradowski and Thomas, 2008”
- page 2, row 9 “Matschullat et al., 1998” -> “Matschullat et al., 1992”. This citation doesn’t give relevant information on the bioavailability of phosphorus. Please replace accordingly.
- page 2, row 10-11 This sentence isn’t relevant for the introduction. It may be shifted to section 2.1.
- page 2, row 10-18 “For this aim, a nests of suction lysimeters was installed ...” -> “For this aim, nests of suction lysimeters were installed ...”
- page 2, row 30 Would this kind of orthogneiss with the reported composition really be termed “alkaline”?
- page 3, row 1 “... m, UDL’s ...” -> “... m a.s.l., UDL’s ...”
- page 3, row 2 At page 2, row 30, the parent material was named “alkaline gneiss”. Is this the same as “porphyric granite”? Please clarify! How can Podzols develop on “alkaline gneisses”?
- page 3, row 4 Are the given figures the runoff for one month? Please clarify!
- page 3, row 9 I wouldn’t consider saplings trees up to 40 yrs.
- page 3, row 12 Please delete “The.”
- page 3, row 12-13 Please give the depth interval for the pH figures.
- page 3, row 13 “... a pH increases in throughfall measurements ...” -> “... a pH increase in throughfall ...”.
- page 3, row 13-14 Two times the same citation in one sentence isn’t necessary.
- page 3, row 14-15 A comparison of pH(H<sub>2</sub>O) and pH(KCl) doesn’t makes much sense.
- page 3, row 15 “Hruska, 2000” -> “Hruska, pers. comm.” (unpublished data weren’t published in 2000).
- page 3, row 16-26 The content of this paragraph may be better placed in the results section. In addition figures presented should be given with standard deviation. Presented figures are a strange mixture of 13 or 14 catchments. Please revise consistently!
- page 3, row 27 Section “2.2.1” follows “2.1”. Please check for consistency.
- page 3, row 28 “... at a 50-cm depth below ...” -> “... at 50 cm depth below ...”. Please change consistently throughout the manuscript.
- page 3, row 28 Were the lysimeters installed 50 cm below soil surface or below forest floor? Please clarify!
- page 4, row 6 The sampled depth intervals aren’t horizons. Please specify!
- page 4, row 8 The given citation (FAO 2006) isn’t about soil description. Please give correct citation!
- page 4, row 14 “open squares ...” -> “open square ...”
- page 4, row 19 Please specify the relation of soil to water for pH measurement.

- page 4, row 19-20 Please specify the meaning of soil moisture determination for the study, if any.
- page 4, row 22 “5 ° C” -> “5°C”
- page 4, row 23-27 The sequence of the determination of exchangeable cations seems in an incorrect order. Where NO<sub>3</sub> and SO<sub>4</sub> determined in the BaCl<sub>2</sub> extracts?
- page 4, row 28 Consider “For a phosphorus (P) release estimation, ...” -> “For a estimation of phosphorus (P) availability, ...”
- page 4, row 28-29 Please specify the soil:solution relation and the concentration of the solution.
- page 5, row 1 “DPSox” in table 2.
- page 5, row 3 “Beauchemin et al., 1999” -> “Beauchemin and Simard, 1999”
- page 5, row 4 “Borovec et al., 2018” -> “Borovec and Jan, 2018”
- page 5, row 11 Please introduce the meaning of D.L. at the first appearance! If detection limit is meant, consider to use “limit of quantification” instead.
- page 5, row 14 Please explain the meaning of “non-parametric data”.
- page 5, row 14-22 The description of the factor analysis resembles - in my view as a non-statistician – a parametric method. Please specify the non-parametric component of the statistical analysis.
- page 5, row 20 Please check the grammatical structure of the sentence.
- page 5, row 24 The reporting of results for soil texture and pH in one subchapter appears strange to me. Why not report pH together with other soil chemical variables?
- page 5, row 26-28 This sentence is more or less a repetition from section 2.2.1. Accordingly, it may be omitted.
- page 6, row 1 Please give a definition of “pebbles” and “cobbles”.
- page 6, row 4-7 Consider to shift this part to section 3.3.
- page 6, row 10 Is the mean given for all five sampling plots?
- page 6, row 16 Please check “twice larger” for correctness.
- page 6, row 17 “Hruska et al., 2001” isn’t in the references. Please check.
- page 7, row 4-6 Water volumes haven’t been mentioned before. This sentence may be omitted or the relevance of water volumes for the study should be emphasized.
- page 7, row 9 “... to be higher at ...” -> “... to be highest at ...”
- page 8, row 2 According to figure S2, explained variance is 24%
- page 8, row 3 According to figure S2, explained variance is 18%
- page 8, row 3 Is “Fig. S2” meant here?
- page 8, row 6-11 This part seems rather to be dedicated to the discussion. However, logical and grammatical consistency should be checked.
- page 8, row 7 Please explain the meaning of “apparent insignificant correlation”.
- page 8, row 23-24 “Manderscheid et al., 1995“ -> “Manderscheid and Matzner, 1995“
- page 8, row 24 “Hruska et al., 2000“ appears twice in the references. Which one is meant?
- page 8, row 24 “Armbruster et al., 2004“ -> “Armbruster and Feger, 2004“
- page 9, row 9 “Meyer et al., 2001“ is missing in references.
- page 9, row 12-14 Please check grammatical consistency of the sentence.
- page 9, row 20 Is “Novak et al., 2005“ meant here?
- page 10, row 4 What is meant with “areal control” here?
- page 10, row 4-6 I can’t follow this statement.
- page 10, row 8-9 What is the rationale behind the comparison of K and Na outputs?
- page 10, row 14-15 To which other period is the spring season of 2013 compared here?
- page 10, row 21 “Heuck et al., 2016” -> “Heuck and Spohn, 2016”
- page 10, row 23 “... in the 50 cm-depth ...” -> “... in the 40-80 cm depth ...”?

- page 12, row 5 "... these periods ware compared." -> "... these periods were compared."
- page 12, row 11 Figure A1a isn't visible in the manuscript. If "Figure 2A is meant, it should be corrected throughout Appendix A.
- page 12, row 26 Consider "... in soil pore spaces ..." -> "... in soil pores ..."
- page 12, row 28 What is meant with "direct precipitation"? If the "contribution of direct runoff (or "event water" as in eq. 2) to total runoff" is meant, a clear definition of "direct runoff" should be given.
- page 15, row 21 "Fenn, E.M.;" -> "Fenn, M.E.;"
- page 15, row 22 "Stottlemeye, R." -> "Stottlemyer, R."
- page 15, row 24-25 "FAO: Guideline for soil description; Rome, Italy, 2006" should be cited here.
- page 15, row 32-16/2 Please give correct title of the reference.
- page 16, row 3-7 "Hruska et al., 2000" appears twice. Please indicate the respective citations with "a" and "b".
- page 16, row 13 This line should be deleted.
- page 16, row 22 "Ma, L; Teng, F-Z.; Lin, L.:" -> "Ma, L; Teng, F.-Z.; Lin, L.; et al.:"
- page 18, row 2 "Soiling" -> "Solling"
- page 19, Figure 1 (b) Please consider to shift the sentence starting with "in the studied UDL ..." to the text body of section 2.1.
- page 23, Figure 2A The content of this figure relates to Appendix A and should be placed in the supplements accordingly?