Dear Dr. James Thornton

We hereby submit the revised version of our manuscript entitled ‘Long-term hourly stream-water flux data to study the effects of forest management on solute transport processes at the catchment scale’.

We thank you and both reviewers for the insightful and helpful comments and suggestions, which helped us to improve the readability, clarity and quality of our manuscript. We have done our best to incorporate the reviewers’ comments and suggested corrections accordingly.

During the revision process, we noticed that the water balance in the reference catchment was incorrectly calculated due to an incorrect assumption regarding the catchment area. We have now corrected this error and provided an explanation in the manuscript.

In the following, we reply to the reviewers’ comments and explain our changes to the manuscript. We look forward to hearing from you regarding our submission and we are happy to respond to any further questions and comments you may have.

With kind regards,

Heye Bogena and all co-authors

The reviewer's comments are written in bold. The reply of the authors is written in non-bold.

## Correction of reference catchment area (WU17)

During the revision process, we noticed that the water balance in the reference catchment was incorrectly calculated due to an incorrect assumption regarding the catchment area (11.5 ha). This area was derived from a digital elevation model under the assumption that the surface catchment corresponds to the subsurface catchment. However, when calculating the calculated runoff height (i.e., runoff expressed as water depth in millimeters), we found that the runoff was underestimated, while evapotranspiration was overestimated (Table A3).

Table A3: Water balance components for the hydrological year 2012 in the Wüstebach catchment (WU14) and the reference catchment (WU17), comparing different catchment area assumptions. The year 2012 was selected as it was not affected by the deforestation measure. Measured evapotranspiration (ET) from eddy covariance measurements at the ICOS station DE-RuW in the Wüstebach catchment (https://meta.icos-cp.eu/resources/stations/ES_DE-RuW) is also presented.

| Water balance 2012 | WU14 (38.5 ha) | WU17 (11.5 ha) | WU17 (7 ha) |
|---|---|---|---|
| Precipitation (mm) | 1305.1 | 1305.1 | 1305.1 |
| Runoff (mm) | 723.9 | 448.3 | 736.5 |
| Calculated ET (mm) | 581.2 | 856.8 | 568.6 |
| Measured ET (mm) | 552.6 | 552.6 | 552.6 |

To correct this, we re-evaluated the catchment area based on a combination of hydrological observations and discharge measurements, resulting in an updated catchment area of 7 ha. With this corrected area, evapotranspiration calculated from the water balance, i.e. ET = P-R, now aligns much better with observed evapotranspiration from eddy covariance measurements at the ICOS station DE-RuW in the Wüstebach catchment, and the calculated runoff height (i.e., runoff expressed as water depth in millimeters) is consistent with that of WU14 (Figure 10). An accurate catchment area is also essential for reliable solute flux calculations on a per-unit-area basis. Consequently, the solute fluxes presented in Figure 10 now show improved agreement between WU14 and WU17.

We added the following paragraph to the method section:

"By comparing the water balance components of the Wüstebach catchment (WU14) and the reference catchment (WU17) for the hydrological year 2012, which predates the deforestation measure and therefore represents undisturbed baseline conditions, we found that the initial assumption of an 11.5 ha catchment area for WU17, derived from a digital elevation model, resulted in an underestimation of runoff and an overestimation of evapotranspiration (Table A03). After re-evaluating the contributing area based on hydrological evidence, the catchment area was corrected to 7 ha. This adjustment resulted in a more consistent water balance, with evapotranspiration aligning well with eddy covariance measurements from the ICOS station DE-RuW (Table A03), thereby improving the accuracy of subsequent solute flux calculations on a per-unit-area basis."

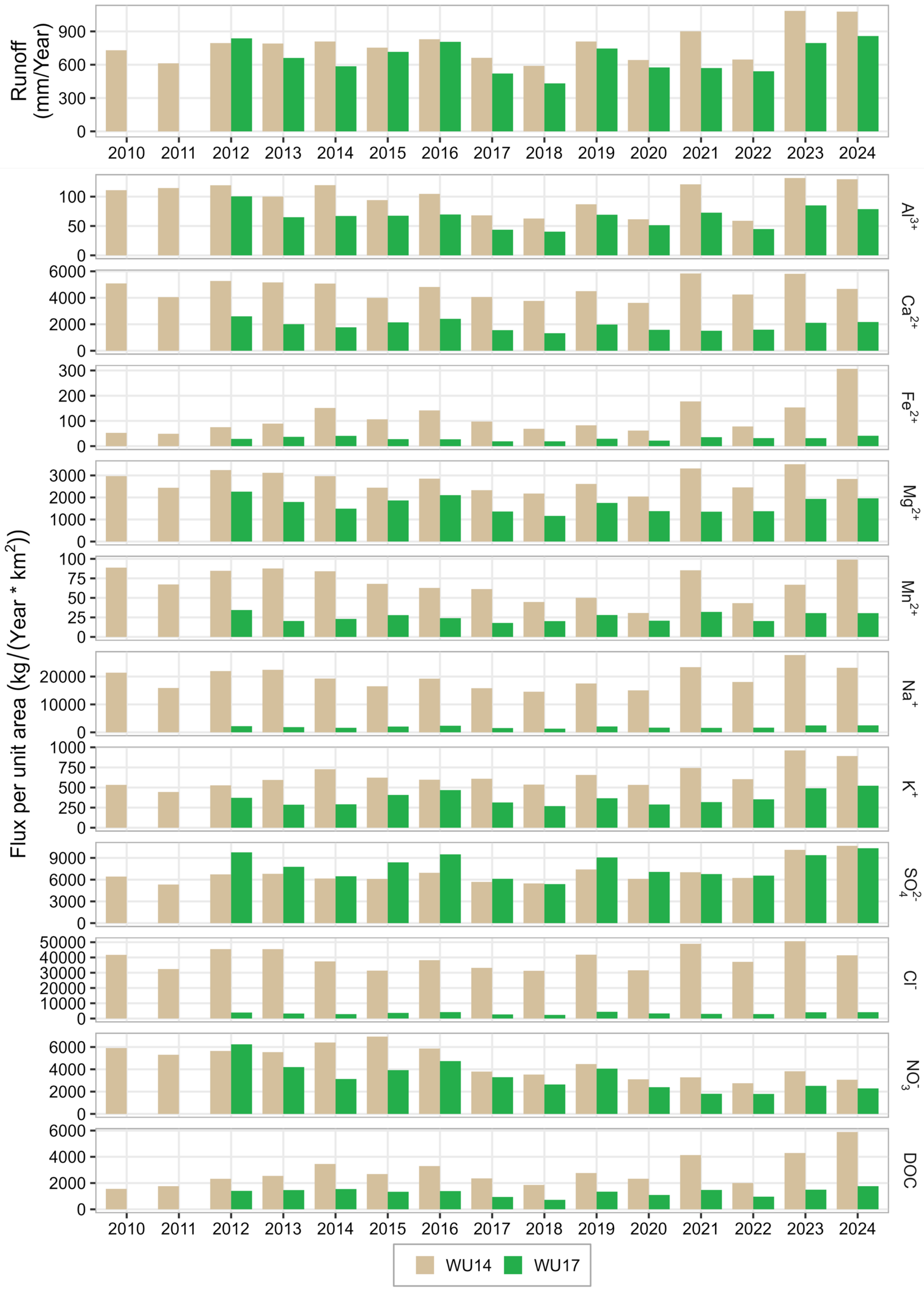



Figure 10: Runoff and annual fluxes of all considered solutes using the composite model for the Wüstebach (WU14) and reference stream (WU17), respectively.

## Responses to reviewer 1

**The data description paper from Bogena et al. (2025) presents a comprehensive dataset of water quantity and quality measurements in the Wüstenbach catchment, part of the TERENO network, and a neighboring reference catchment. Data from these catchments is especially interesting, as they are designed as a paired-catchment study with a >3 year calibration time before forest interventions (i.e., clear-cut) in the Wüstenbach catchment. Therefore, the data have great potential for further investigation on the impact of forest loss on catchment-scale water and solute fluxes, which is a highly relevant topic. To support such analysis, the authors present ways to estimate solute fluxes from grab sample concentration data. The manuscript is well written, and I have no doubt that it will be a valuable contribution to the readers of ESSD. Particularly, I appreciate that all original and processed data are made publicly available.**

We thank the reviewer for the positive evaluation and for recognizing the value of our data set. We appreciate the time and effort devoted to reviewing our work.

**The only major point I have is that there is no detailed data on the quality of the high-frequency concentration measurements via the optical TriOS sensor. Spectral absorbance data, obtained from optical sensors, need calibration and additional quality checks (such as calibration with grab sample data), which should be provided if the data is to be published.**

We agree with the reviewer that the data from the optical TriOS sensor should be calibrated against grab sample data. This calibration had already been performed in our analysis, but we inadvertently omitted a description of the procedure and the outlier detection from the manuscript. We have now added a text on quality control and sensor calibration including measurement accuracy:

"Additionally, WU14 was equipped with an optical sensor (TriOS proPS, Rastede, Germany) to measure variations in nitrate concentrations at 10-minute intervals (Bogena et al., 2018). Spectral absorbance data obtained from optical sensors such as the TriOS require careful calibration and quality control. In this study, we used only the nitrate data, as the SAK254 signal from the TriOS sensor showed a weak correlation with DOC concentrations obtained from grab samples ($R^2$ = 0.55). Outliers were first removed using minimum and maximum nitrate thresholds of 0 and 15 mg $L^{-1}$, respectively, with the latter corresponding to the highest concentration measured in the laboratory. The cleaned dataset was then calibrated against nitrate concentrations from grab samples to correct for measurement offset (Figure A4), yielding an RMSE of 1.262 mg $L^{-1}$."

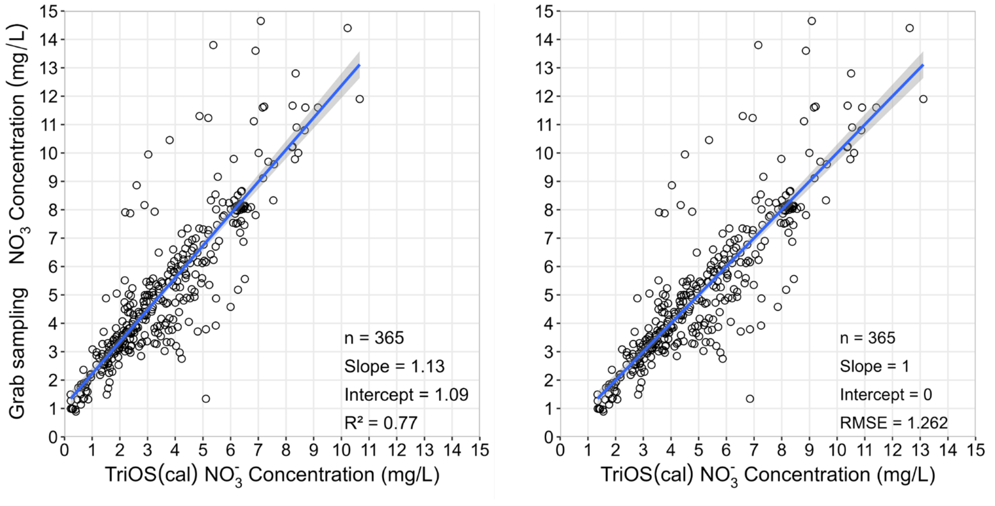



Figure A4. Correlation between nitrate concentrations measured by the TriOS optical sensor and grab samples (left), and between calibrated TriOS nitrate concentrations and grab sample concentrations (right). Corresponding $R^2$ and RMSE values are also shown.

**Please see my one major and some minor comments below:**

**Major:**
**Chapter 3.3 (starting in line 231): As mentioned above, I appreciate the additional provision of high-frequency concentration measurements, which clearly strengthens the manuscript. However, information on the quality control procedure and its results (calibration, outlier detection and comparison to grab sample data) should be provided so that readers of ESSD can trust and better understand the data.**

See comment above.

**Minor:**
**L60-63: with serious consequences for the water quality of rivers (Musolff et al., 2024), reservoirs (Kong et al., 2022), and groundwater (Winter et al., 2025). I recommend adding these two citations.**

Thank you for these helpful citation suggestions; we have included them in the revised manuscript.

**L194-195: Why linear? Why not other methods like cubic spline interpolation or similar? Is linear reliable enough? I suggest to indicate periods of interpolated Q in Figure 2 or to put an additional figure with those periods into the SI, so readers can see that this does not severely affect the Q time series.**

The original discharge time series contained data gaps of varying lengths, ranging from a few minutes to several days, with highly variable distributions. After mutual gap-filling with scaled runoff data from the other stations, the remaining gaps were relatively short. We therefore consider linear interpolation of the described ratios to be sufficiently reliable. However, owing to their short duration, these gaps cannot be meaningfully visualized. Nonetheless, we recognize that some data users may wish to examine the gaps and evaluate the impact of the applied methodology in greater detail. To support this, we have provided two additional data files for WU14 and WU17 in the data supplement, indicating where gaps have been filled, and included corresponding explanatory notes (WU14_discharge_gap_filling.txt and WU17_discharge_gap_filling.txt).

**Figure 4: Is there a reason the x-axes are log10-transformed and the y-axes are not? I suggest log10-transforming the y-axes as well, in line with commonly applied power law C-Q relationships.**

Thank you for this helpful suggestion; we have revised this figure (now Figure 4) accordingly.

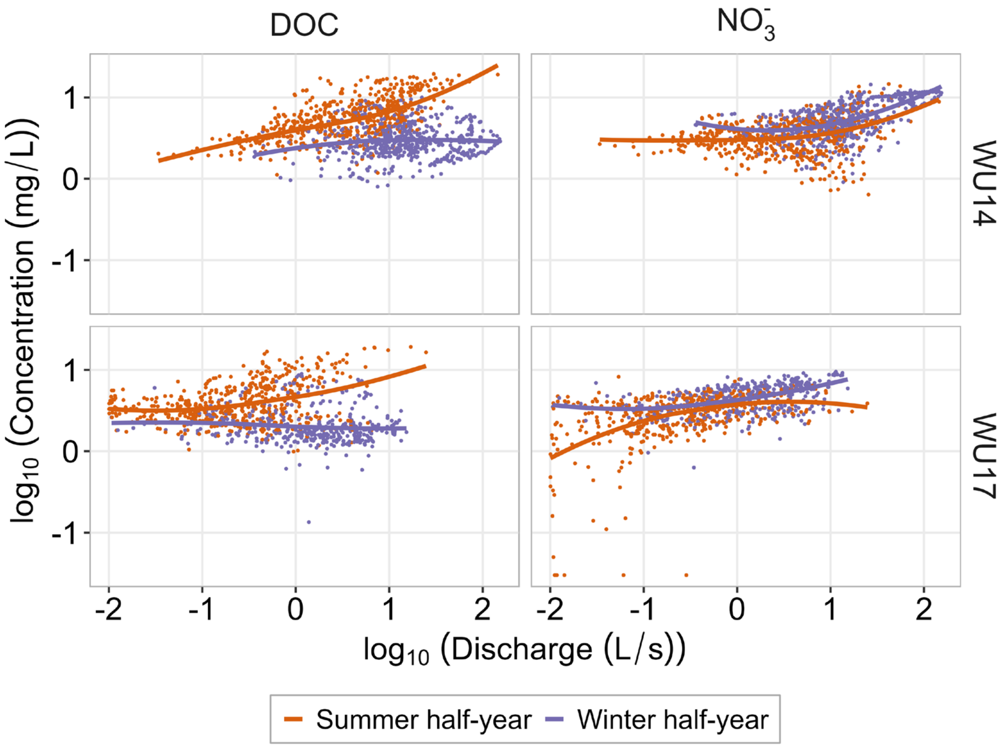



Figure 4: Log–log scatter plots of DOC and nitrate versus discharge measured at stations WU14 and WU17, differentiated by summer and winter half-year. LOESS (Locally Estimated Scatterplot Smoothing) trend lines are shown to highlight non-linear relationships, especially for DOC during the summer half-year.

**Figure 5: I suggest adding the $R^2$, NSE, etc. directly in the Figure. This would make a first visual assessment easier.**

Thank you for this suggestion; but we think that you are referring to Figure A5. We have revised this figure (now Figure 6) accordingly.

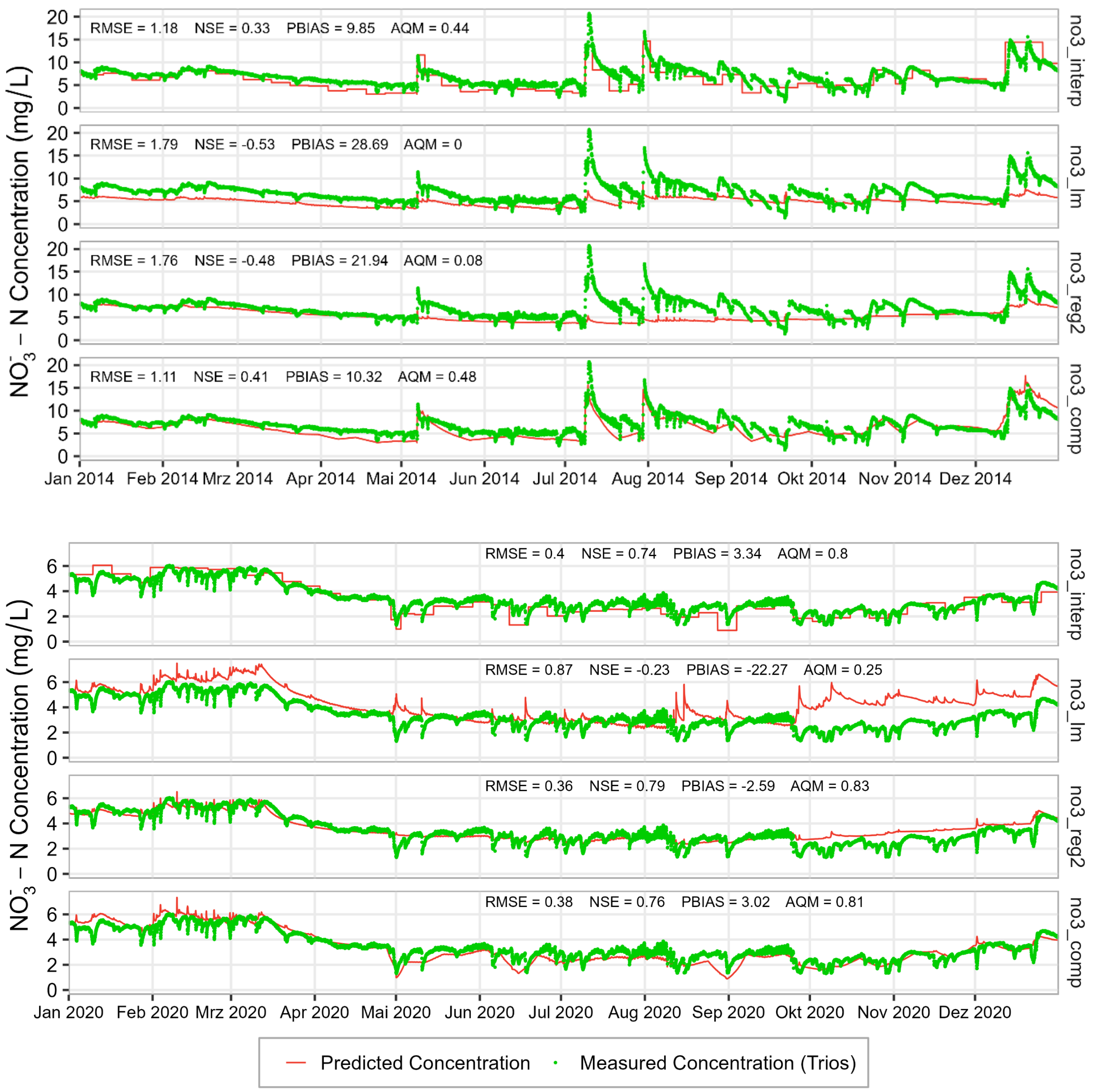



Figure 6: Predicted nitrate concentrations at WU14 using the four prediction models and the high-resolution nitrate concentrations measured with the TriOS sensor for the years 2014 (upper panel) and 2020 (lower panel). Subplots show observed concentrations (green dots) and predicted concentrations (orange lines) for rectangular interpolation (no3_interp), linear regression model (no3_lm), RLOADEST regression model (no3_reg2), and composite model (no3_comp). Quality indices for the nitrate predictions are also presented.

**L397: As Figure A5 appears to be quite relevant for the presented results, I suggest adding it to the main manuscript.**

Thank you for this suggestion; we moved the figure to the main manuscript (now Figure 6).

**L462-476: I think the analysis is sufficient for the purpose presented. However, I would add a sentence to inform readers that nitrate export patterns at the long-term (analyzed via low-frequency data) and the event scale (analyzed via high-frequency data) can considerably diverge, because of different mechanisms that dominate at different time scales (Winter et al., 2024).**

Thank you for this suggestion. Accordingly, we have added the following sentence to the manuscript: *'It should be noted that nitrate export patterns at long-term scales (analyzed using low-frequency data) and at event scales (analyzed using high-frequency data) can differ substantially, as different mechanisms dominate at different temporal scales (Winter et al., 2024).'*

**L484: How much is this mean value influenced by the drought in 2018-2020? I could imagine that this lowers the mean substantially, while other years might have been just as wet as 2024…? In this light, how plausible is an explanation purely based on the wetness state of the riparian zone? Couldn't it be that the decrease in nitrate concentrations might have contributed to this pattern as well, similar to what was argued in Musolff et al. (2017)?**

We believe there may have been a slight misunderstanding, as the statement refers to the export of dissolved iron rather than nitrate. While nitrate concentrations generally exhibit a decreasing trend, dissolved iron shows an extraordinary concentration peak in 2024, which was substantially higher than in both drought and normal wet years.

**L491-492: I suggest citing Škerlep et al. (2023) here, who also found simultaneous increases of Mn and Fe(II) and related them to changes in catchment wetness and related redox conditions.**

Thank you for this citation suggestion; we included it in the revised manuscript.

**L505: Cl- not CL-**
Thank you; we have revised this accordingly.

**Figure 9: It would make it even clearer if the reference catchment were directly indicated as such in the legend, but I leave this to the discretion of the authors**

We appreciate the reviewer's suggestion. However, we consider the current labeling of the reference catchment to be sufficient.

**Added references:**
Musolff, A., Selle, B., Büttner, O., Opitz, M., and Tittel, J.: Unexpected release of phosphate and organic carbon to streams linked to declining nitrogen depositions, Global change biology, 23, 1891–1901, 2017.
Musolff, A., Tarasova, L., Rinke, K., and Ledesma, J. L. J.: Forest Dieback Alters Nutrient Pathways in a Temperate Headwater Catchment, Hydrological Processes, 38, e15308, https://doi.org/10.1002/hyp.15308, 2024.
Škerlep, M., Nehzati, S., Sponseller, R. A., Persson, P., Laudon, H., and Kritzberg, E. S.: Differential Trends in Iron Concentrations of Boreal Streams Linked to Catchment Characteristics, Global Biogeochemical Cycles, 37, e2022GB007484, https://doi.org/10.1029/2022GB007484, 2023.
Winter, C., Jawitz, J. W., Ebeling, P., Cohen, M. J., and Musolff, A.: Divergence between long-term and event-scale nitrate export patterns, Geophysical Research Letters, 51, e2024GL108437, 2024.
Winter, C., Müller, S., Kattenborn, T., Stahl, K., Szillat, K., Weiler, M., and Schnabel, F.: Forest Dieback in Drinking Water Protection Areas—A Hidden Threat to Water Quality, Earth's Future, 13, e2025EF006078, https://doi.org/10.1029/2025EF006078, 2025.

## Responses to reviewer 2

**General comment**
**This manuscript describes a dataset on long-term high-frequency data from an experimental catchment in Germany undergoing a partly clear cut. This is a good fit for ESSD and a quite unique dataset totally deserving publication. The paper sufficiently describes how data was retrieved and especially how the hourly concentration data was interpolated using state-of-the-art methods. Results are compared to in-situ observation of nitrate.**

We sincerely thank the reviewer for the positive overall evaluation of the manuscript and for recognizing the value of the presented data set. We greatly appreciate the time and effort devoted to reviewing our work.

**While I acknowledge the work put into the dataset I have two main points to raise: First, I totally miss information on the forest management. When was clearcutting done? Is there information on the vegetation before and after the clearcut (if not part of this manuscript, can it be found elsewhere?)? This is really needed for using the data with the aim of quantifying and characterizing effects of the management.**

We thank the reviewer for pointing out this oversight. In response, we have added a dedicated section in the revised manuscript describing the forest management activities carried out in the study area. This new section provides a comprehensive overview of the interventions implemented between 2004 and 2024, including underplanting, thinning, selective sanitation felling, clear-cutting, removal of natural regeneration, and the establishment of a fenced enclosure. Each activity is described with reference to its purpose, timing, and the area affected, thereby clarifying how these measures contributed to promoting near-natural and resilient forest stands:

“Between 2004 and 2024, a series of forest management measures were carried out in the catchment areas of the Wüstebach and reference streams to promote more near-natural and resilient forest stands (Table A1). Underplanting was applied repeatedly, with young beech trees planted beneath existing spruce canopies in multiple years across various parts of the catchments (Figure A2). This approach supported natural regeneration and enhanced species diversity. Thinning was another frequently used measure, involving the selective removal of trees to reduce stand density and improve growth conditions for the remaining trees, with treated areas ranging from 5.25 to 12.2 hectares. In addition, selective sanitation felling was performed in 2007 and 2020 to remove beetle-infested spruces and prevent further pest spread.

In 2013, a larger area was entirely cleared through clear-cutting, allowing for the regrowth of near-natural vegetation in the riparian zone. Within the clear-cut area, a fenced enclosure covering 1.98 hectares was established in 2014 to protect young sycamore maple plantations from wildlife browsing (Figure A1). Additionally, the removal of natural regeneration was carried out in 2013, 2016, and 2024 to eliminate unwanted spruce seedlings that could interfere with the establishment of near-natural vegetation.”

Table A1: Forest management interventions and affected areas in the Wüstebach and reference catchments (2004–2024) (unpublished data from Eifel National Park).

| Year | Forest measure | Area (ha) | Explantion |
|---|---|---|---|
| 2004 | Underplanting of beech trees | 4.81 | Underplanting involves planting young beech trees beneath an existing spruce canopy. |
| 2005 | Thinning | 7.67 | Thinning involves removing selected trees to improve growth conditions of the beech trees. |
| 2007 | Selective sanitation felling | 7.67 | Selective removal of beetle-infested spruces prevents further infestation. |
| | Underplanting of beech trees | 7.05 | |
| 2009 | Thinning | 6.12 | |
| | Clear-cutting | 0.15 | Clear-cutting involves the complete removal of trees over a defined area. |
| | Thinning | 6.12 | |
| 2011 | Underplanting of beech trees | 0.71 | |
| 2013 | Removal of natural regeneration | 5.26 | Elimination of natural regeneration of spruce trees. |
| | Thinning | 5.25 | |
| | Clear-cutting | 10.48 | |
| 2014 | Underplanting of beech trees | 4.16 | |
| | Thinning | 7.85 | |
| | Fenced exclosure and planting of sycamore maple trees | 1.98 | Initial plantations of sycamore maple were carried out inside fenced enclosures to protect them from browsing by wildlife. |
| | Underplanting of beech trees | 4.16 | |
| | Thinning | 7.85 | |
| 2016 | Thinning | 7.75 | |
| | Removal of natural regeneration | 7.75 | |
| 2017 | Underplanting of beech trees | 1.98 | |
| | Thinning | 12.2 | |
| 2018 | Underplanting of beech trees | 2.25 | |
| 2019 | Underplanting of beech trees | 5.5 | |
| 2020 | Selective sanitation felling | 0.72 | |
| 2023 | Thinning | 7.13 | |
| 2024 | Removal of natural regeneration | 8.52 | |

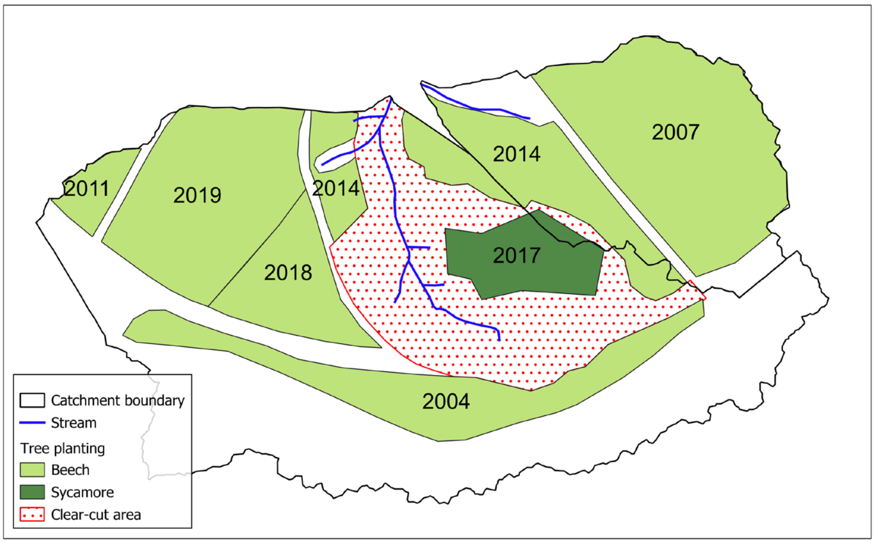
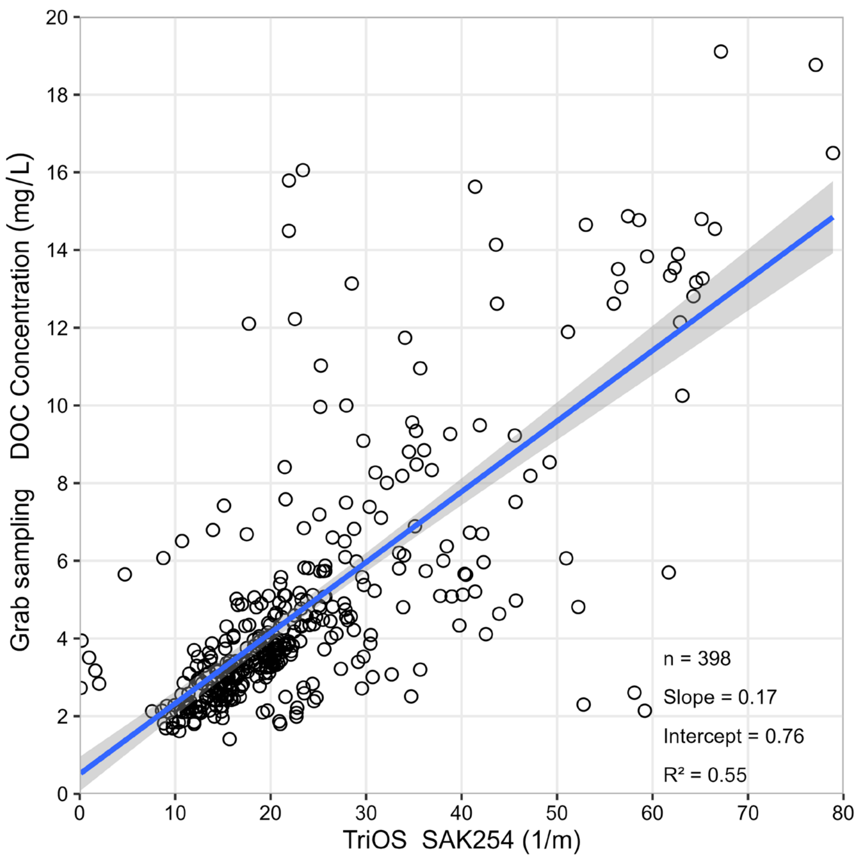


Figure A1. Planting areas of beech (Fagus sylvatica L.) and sycamore maple (Acer pseudoplatanus L.) showing the planting year in the study area (unpublished data from Eifel National Park).

**Second, I found the evaluation of DOC flux estimation less stringent as for nitrate. For nitrate a comparison to rather independently measured concentration was done (though information on the data procedure is missing). Can this be done for DOC as well, even if only for a smaller portion of time? If not, I would like to see that more clearly stated in the manuscript.**

We thank the reviewer for this valuable suggestion. We attempted to establish a correlation between the DOC data obtained from grab samples and the SAK254 data derived from the TriOS measurements. However, the correlation was not sufficiently robust to justify the use of SAK254 data for generating hourly DOC time series ($R^2$ = 0.55, see Figure below).




The underlying causes of this weak correlation remain unclear and would require a more comprehensive investigation, which lies beyond the scope of the present study. Therefore, we continue to rely exclusively on nitrate data for the validation of the interpolation method. This is now reflected in the manuscript in a revised paragraph, which also includes a more detailed description of how the hourly nitrate time series was derived from the TriOS measurements:

"Additionally, WU14 was equipped with an optical sensor (TriOS proPS, Rastede, Germany) to measure variations in nitrate concentrations at 10-minute intervals (Bogena et al., 2018). Spectral absorbance data obtained from optical sensors such as the TriOS require careful calibration and quality control. In this study, we used only the nitrate data, as the SAK254 signal from the TriOS sensor showed a weak correlation with DOC concentrations obtained from grab samples ($R^2$ = 0.55). Outliers were first removed using minimum and maximum nitrate thresholds of –0.05 and 15 mg $L^{-1}$, respectively. The cleaned dataset was then calibrated against nitrate concentrations from grab samples to correct for measurement offset (Figure A4)."

**Specific comments**

**L23: Consider to mention „observation“ or „monitoring“ or „data“ in this sentence as quantification alone could also refer to a model quantification only.**

We changed the text to:

“A substantial body of knowledge concerning the functioning of catchments has been derived from the observation and quantification of solute and suspended matter fluxes in rivers”

**L33ff: I suggest to cut down the list of prediction methods and rather shortly mention the variables needed for the composite model.**

Since we employ all of the methods mentioned, we believe it is appropriate to retain their explicit names. We also consider listing the variables required for the composite model to be too detailed for an abstract. Therefore, we would prefer to keep the sentence as it is.

**L57ff: Check format of the references. Here, authors (year) seems to be the better format.**

We appreciate the reviewer’s suggestion. However, we believe that the current format fully complies with the ESSD specifications. Therefore, we would prefer to retain the sentence as it is.

**L70-73: Consider to move this sentence to the lack of long-term data statement above.**

Thank you for this suggestion. We moved the sentence accordingly.

**L91-93: Consider to remove this sentence and use the references for the sentence before.**

We appreciate the reviewer’s suggestion. However, we believe it is important to clarify that these are citations from applications in several studies, rather than references to code development. Therefore, we would prefer to keep the sentence as it is.

**Site description:**

**Consider to put key variables on landuse, topography, climate… into a table comparing both subcatchments.**

We thank the reviewer for this comment; however, we believe that adding a table comparing the two catchments would provide little added value, as most key variables—such as topography, land use and climate—are very similar.

**Consider to change the chapter name to acknowledge the bigger section on previous work.**

We change the chapter title to “2 Site description and previous work”

**Will the exact timing of clearcutting activity be reported at a later point in the manuscript? If not, this could be a place.**

A more detailed section on forest management has been added (see response above).

**Data and methods:**

**Fig. 2: Consider to indicate the time of clearcutting in the figure.**

Thank you for the suggestion. We have added a marker to indicate the timing of the clearcutting.

**L213 and 214: Redox potential and pH are not a physical parameter from my point of view. Consider to change to "in situ parameters of water quality". Change this also later on (e.g. Fig. A1, A2)**

We agree with the reviewer's comment and have changed everywhere in the manuscript the term "physical parameters" to "physicochemical parameters" as we believe this more accurately describes these variables.

**Fig. 3: This gives a good overview. However, time reference and number of samples are missing. This is data across a major management intervention. Does it make sense to report values before and after the clearcutting? That would, however, come with the uncertainty around the question "when does the after-clearcutting period ends?".**

We agree with the reviewer's comment and have revised Figure 3 and Figure A5 to distinguish between the periods before and after the clear-cut by displaying two box plots side by side. In addition, we have added a new table to the appendix (Table A4) presenting the time references and the number of samples for each solute.

Table A4: Number of stream water samples collected before and after the clear-cut for each solute, including start and end dates.

| Solute | Before clear-cut | | After clear-cut | | Start date | End date |
|---|---|---|---|---|---|---|
| | WU14 | WU17 | WU14 | WU17 | | |
| Al | 398 | 348 | 684 | 678 | 04.01.2010 | 16.12.2024 |
| Ca | 407 | 350 | 676 | 675 | 04.01.2010 | 16.12.2024 |
| Cl | 406 | 352 | 681 | 677 | 04.01.2010 | 16.12.2024 |
| DOC | 407 | 349 | 710 | 666 | 04.01.2010 | 16.12.2024 |
| Fe | 395 | 172 | 682 | 658 | 11.01.2010 | 16.12.2024 |
| K | 400 | 348 | 683 | 675 | 04.01.2010 | 16.12.2024 |
| Mg | 406 | 351 | 684 | 675 | 04.01.2010 | 16.12.2024 |
| Mn | 404 | 217 | 656 | 494 | 04.01.2010 | 16.12.2024 |
| Na | 406 | 338 | 680 | 668 | 04.01.2010 | 16.12.2024 |
| NH4 | 127 | 17 | 352 | 339 | 11.01.2010 | 16.12.2024 |
| NO3 | 407 | 352 | 698 | 680 | 04.01.2010 | 16.12.2024 |
| SO4 | 407 | 352 | 696 | 680 | 04.01.2010 | 16.12.2024 |

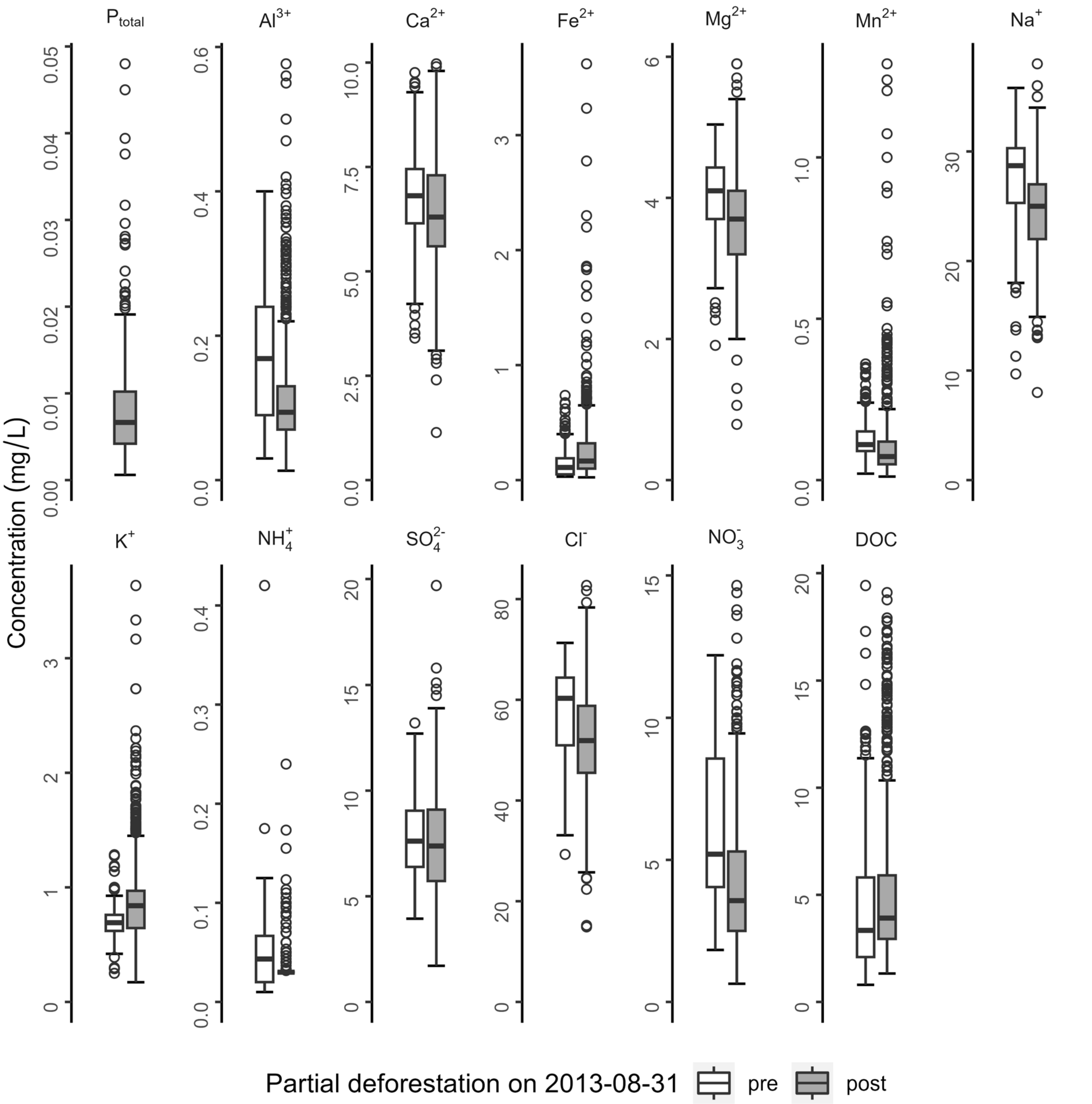



Figure 3: Boxplots showing the distributions of all considered macro- and micronutrients, dissolved aluminum and DOC determined from stream water samples taken at discharge station WU14. The box shows the median and the interquartile range, and the whiskers extend to 1.5 times the interquartile range away from the box. Information on the number of stream water samples collected before and after the clear-cut for each solute, as well as the start and end dates of the sampling period, is provided in Table A4.

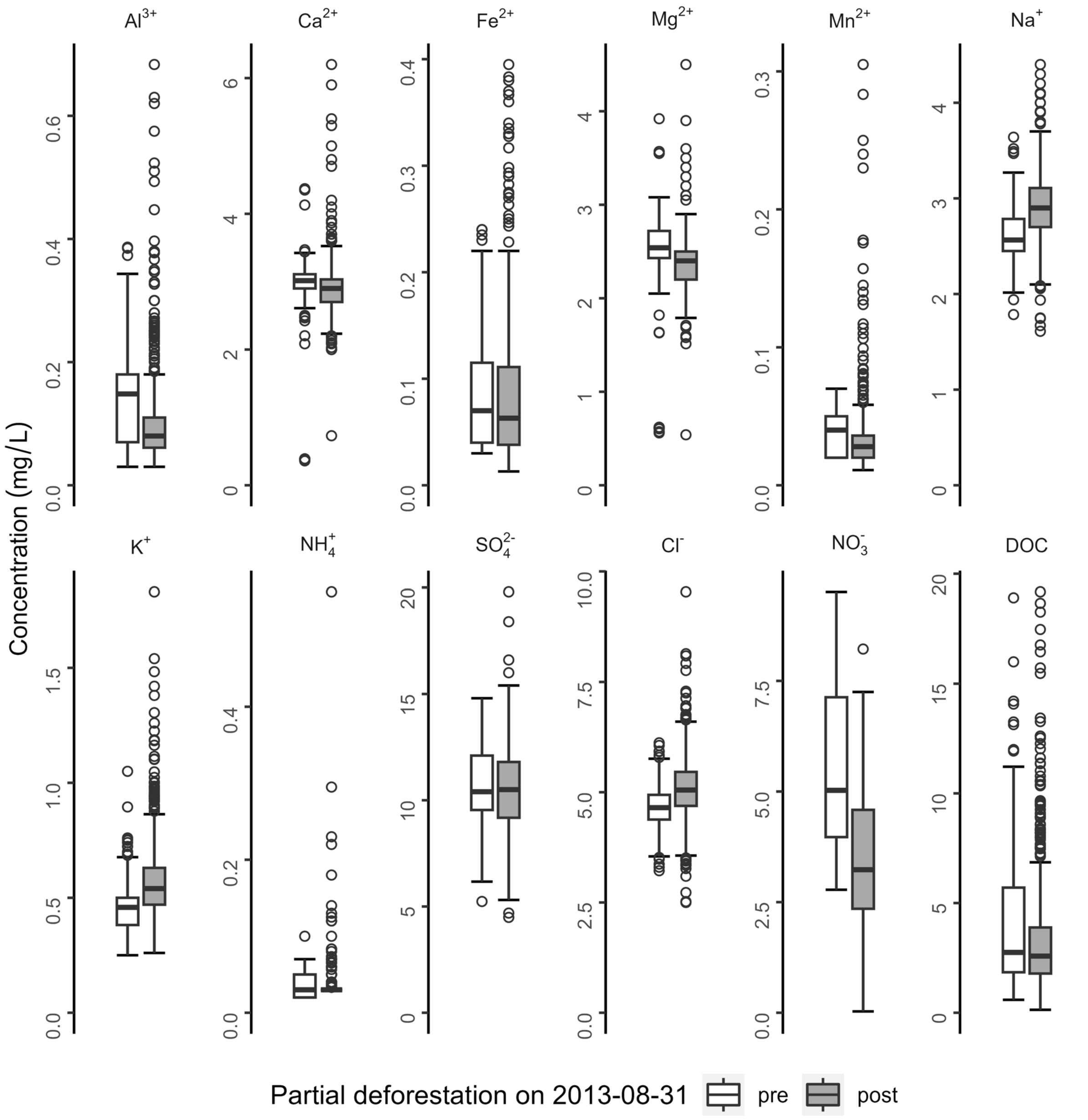



Figure A5: Boxplots showing the distributions of all considered macro- and micronutrients, dissolved aluminum and DOC determined from stream water samples taken at discharge station WU17. The box shows the median and the interquartile range, and the whiskers extend to 1.5 times the interquartile range away from the box. Information on the number of stream water samples collected before and after the clear-cut for each solute, as well as the start and end dates of the sampling period, is provided in Table A4.

**L260f: Make a link to the EC in the chapter before.**

Thank you for the suggestion. We extended the following sentence on the high EC in the Wüstebach stream accordingly:

*"The high NaCl content and corresponding high EC values (Figure A1) are mainly caused by the large amount of road deicing salts entering the headwater of the Wüstebach catchment (Płaczkowska et al., 2024)."*

**L315f: So far there is no description on how the data quality of the TriOS concentrations was ensured. If that is not described later, I suggest to ensure that this procedure is adequately described to referenced here. This also plays a role when you compare TriOS concentrations that are corrected to the lab-derived concentrations with the LOADFLEX estimated concentrations also relying on the same lab-derived concentrations. Something you should comment on.**

Thank you for the suggestion. In the revised manuscript, we have added a text on quality control and sensor calibration including the measurement accuracy (see our response to Reviewer #1).

**L316: What is the reason not to do the same exercise for DOC concentrations? The lines 265-269 indicate that you test your models for two substances nitrate and DOC. Doesn't TriOS also provide continuous DOC concentrations measurements? So, for DOC there is no "independent" verification at the moment, right?**

See comment above.

**L329f: Indicate if model parameters are constant over time (egret/ WRTDS uses a quite similar equation but estimates parameter for each time step). The same is true when describing the composite model line 345ff.**

The model parameters are constant over time in both methods.

**L359ff: In this chapter it is not clear if these metrics are applied to lab-measured concentrations vs. LOADFLEX-concentrations or/ and to TriOS vs. LOADFLEX.**

Thank you for the comment. In the revised manuscript we have clarified this:

*"To validate the model results against the TriOS-measured nitrate concentrations, we used three well-known statistical methods: root mean square error (RMSE), Nash-Sutcliffe efficiency (NSE), and percent bias (PBIAS), which are briefly described here."*

**Results:**

**Table 1: Indicate unit for RMSE.**

We have added the unit for RMSE.

**Table 2: Mention that this is for nitrate.**

We now mention this:

*"Table 2: Average quality measures (AQM) for four solute prediction models in predicting nitrate concentrations in the Wüstebach stream for 2014 and 2020. Green fields indicate the highest quality, while red fields indicate the lowest quality."*

**L477ff: Consider to put this example-analysis into a separate sub-chapter of the results.**

We thank the reviewer for the suggestion. We believe that creating a separate sub-chapter is not necessary, as this section primarily describes the results of the solute concentration predictions.

**Fig. 9: It would be helpful to also report annual discharge as the first or final plot here.**

We thank the reviewer for the suggestion. We have added annual discharge as the first plot to this figure (now Figure 10).

**Data access and availability:**

**Does it make sense to indicate where the measured concentrations from the lab-analysis can be found? This seem to be only given for Nitrate but not for all other substances.**

The measured concentrations from the laboratory analyses are provided in the files *"WU14_elements_ds_concentrations.txt"* and *"WU17_elements_ds_concentrations.txt."* To make these files easier to locate, we have revised their descriptions accordingly:

"Discharge and concentration of elements from discontinuous sampling at station WU14 (concentration data from laboratory analysis)"

"Discharge and concentration of elements from discontinuous sampling at station WU17 (concentration data from laboratory analysis)"