Here comes our response, in **bold text**, to the Anonymous Referee #1 comments.

Moderate Comment:

All figures in Supplement show essential results in this paper. Therefore, I would recommend all figures (Fig. 1-4 and Fig. S1-S4) are explained in this text as Fig. 1-8. We agree with this comment and have changed the manuscript accordingly.

In sections 4.3 and 4.5, I would recommend to use Table 3 and/or Fig. 4 for discussion in order to understand more detailed.

We agree with this comment and have changed the manuscript accordingly.

Table 2 is complicated. I would recommend that chemical data are rearranged in the following order: pH, ANC, TOC; major anions (mg/l); major cations (mg/l); trace elements (μ g/l); and ultra-trace elements (ng/l).

We agree with this comment and have changed the manuscript accordingly.

P5731, L5-10: In this section, the differences of trace elemental concentrations between filtered and unfiltered samples were discussed. However, the figure and Table showing these results were lack. What did the symbols in Fig. S2 (right) represent?

It is correct that we discuss the difference between filtered and unfiltered samples, but in our study all the data are for unfiltered samples. That is why you do not see both kinds of data in the tables and figures. The filtration process in these humic and iron rich systems can have negative impacts on the concentration of trace elements. There are few sites that had enough inorganic particles in our study to justify filtration. Please see Table 3 on page 14 in Köhler (2010), please note the meaning of the different colours in the table:

"All lab filtered samples may be classified according to their [FM]/[TM] ratio. This analysis allows for distinction between metals occurring mostly in the filtered fraction and those where either (a) a significant fraction is removed during the filtration process or (b) a significant amount of metal is leached from mineral particles or smaller particles with significant metal content influenced the metal content (particle contamination). In order to identify which quantitative effects were observed the results were classified according to a number of percentiles and then colored according to the observed [FM]/[TM] ratio. Yellow and red fields require special attention while both green and white fields are regarded as acceptable.

None of the median fractions of [FM]/[TM] is above unity indicating significant fractions of the metals in particulate form. According to Table 3, the metals may be divided into two classes using the lower 25% of the samples as separation criteria; those with [FM]/[TM] fractions near unity (close to 0.7 or above) in more than 75% of the sampling occasions and those where the fraction in 25% of the samples is close to 0.5 or below."

	Cu	Zn	Cd	Pb	Cr	Ni
lower 5%	0.64	0.41	0.61	0.22	0.31	0.66
lower 25%	0.84	0.64	0.80	0.45	0.72	0.85
median	0.92	0.82	0.90	0.61	0.86	0.91
upper 75%	1.03	0.94	1.00	0.79	0.93	0.96
upper 95%	1.61	1.32	1.20	0.94	1.00	1.15
	Co	As	V	Мо	Fe	Mn
lower 5%	0.31	0.76	0.43	0.92	0.19	0.18
lower 25%	0.56	0.85	0.67	0.95	0.47	0.41
median	0.72	0.91	0.75	1.00	0.62	0.66
upper 75%	0.91	0.95	0.86	1.03	0.75	0.91
upper 95%	0.99	1.00	0.95	1.10	0.94	1.00
[#] White fields indicate fractions [FM]/[TM] above 1 representative of samples where leaching or particle contamination occurred, green fields indicate fractions [FM]/[TM] between 0.5 and 1.						

Table 3: Analysis of frequency of [FM]/[TM] in the whole data set for various metals [#].

[#] White fields indicate fractions [FM]/[TM] above 1 representative of samples where leaching or particle contamination occurred, green fields indicate fractions [FM]/[TM] between 0.5 and 1, yellow fields indicate fractions [FM]/[TM] between 0.25 and 0.5 and red fields indicate fractions [FM]/[TM] below 0.25. For this dataset samples with metal concentrations below 3*limit of quantification have been removed. This limit has been chosen arbitrarily.

Table 3 on page 14 in Köhler (2010).

In the right plot in S2 the data is from this study and triangles are River Anråse å, squares are River Lugnån, circles are River Danshytteån and crosses are Getryggsån. In the left plot the data are from three Swedish long-term monitoring sites, that are situated in the investigated rivers; Aneboda, Gårdsjön and Kindla. This is now explained in the legend text and the figures are now within the manuscript itself, not as supplementary information.

Minor Comments:

P5722 L5-6: 'In each of these basins exists Swedish long-term monitoring sites.' -> 'In each of these basins, Swedish long-term monitoring sites exist.'

We agree with this comment and have changed the manuscript accordingly.

P5722 L10-11: 'Concentration changes downstream are then' -> 'Concentration changes in downstream are then'

We agree with this comment and have changed the manuscript accordingly.

P5722 L14-15: 'In addition we want to test' -> 'In addition, we test' We agree with this comment and have changed the manuscript accordingly.

P5722 L21-22: 'when the weather was stable.' -> 'when the weather was stable (Fig. 2).' We agree with this comment and have changed the manuscript accordingly.

P5722 L22-23: 'In in total 243 grab samples were taken (Fig. 2 and Table 1) The majority of the samples' -> 'Total 243 grab samples were taken and the majority of the samples' **We agree with this comment and have changed the manuscript accordingly.**

P5723 L5: 'Research Station in R. L, Buskbacken in R. G., Gardsjon in R. A. and Kindla in R. D.' -> 'Research Station in R. L., Buskbacken in R. G., Gardsjon in R. A. and Kindla in R. D.'

We agree with this comment and have changed the manuscript accordingly.

P5723 L11-12: 'Mean annual rainfall and runoff ranged from 1050 and 550 mm, respectively at R. A., to 750 and 250 mm at R. L.' -> 'Mean annual rainfall and runoff ranged from 1050 and 550 mm at R. A. to 750 and 250 mm at R. L., respectively.'

We agree with this comment and have changed the manuscript accordingly.

P5724 L18-19: parentheses ->deleted We agree with this comment and have changed the manuscript accordingly.

P5724 L24: 'HNO3' ->deleted

We agree with this comment and have changed the manuscript accordingly.

P5725 L2: 'Samples for anion analysis (chloride (Cl),... and sulphate (SO4))' -> 'Samples for anion (chloride (Cl),... and sulphate (SO4)) analysis' We agree with this comment and have changed the manuscript accordingly.

P5725 L8-10: 'ICP-OES and anions analysis where performed at the Department... at Vattenlaboratoriet, Uppsala Municipality.' -> 'ICP-OES and anions analysis performed at the Department... at Vattenlaboratoriet, Uppsala Municipality, respectively.' We agree with this comment and have changed the manuscript accordingly.

P5726 L9: 'cat- and anions' -> 'cations and anions' We agree with this comment and have changed the manuscript accordingly.

P5727 L5: 'Na, P, SO4, for R. G.' -> 'Na, P, and SO4 for R. G., respectively.' We agree with this comment and have changed the manuscript accordingly.

P5728 L9: 'The rivers (Table 2) are discussed in the following order: R.A., R. L., R. D, and R. G.' -> 'The rivers are discussed in the following order: R.A., R. L., R. D., and R. G.' **We agree with this comment and have changed the manuscript accordingly.**

P5728 L23: '(results not shown)' -> deleted We do not agree, it could be of interest for the reader.

P2734 L17-18: '(for Co and Mn respective Al and Cr see Figs. S3 and S4).' -> '(for Co vs. Mn and Al vs. Cr see Figs. S3 and S4, respectively).' We agree with this comment and have changed the manuscript accordingly.

P5734 L21: '(data not shown)' -> deleted We do not agree, it could be of interest for the reader. P5735 L2: '(see Table 11.5 in Stumm, 1992)' -> '(Stumm, 1992)' We do not agree, this gives detailed and vital information about what we refer to.

P5735 L4: '(see PCA plots on page 196 and 202 in SEPA, 1999)' -> '(SEPA, 1999)' We do not agree, this gives detailed and vital information about what we refer to.

P5740 L27: Kohler et al. (2011) This paper is not referred in the text. On P5733 L18 we referred to the paper Köhler et al. (2011), in the first submitted manuscript.

P5745 Table 1 For Example, what is the superscript (1, 2, 2, 3) of Solitary houses? I understand these numbers are CODE of CORINE, but do these numbers of superscripts need in this Table?

We agree with this comment and have changed the manuscript accordingly.

P5748 Table 2 I would recommend to delete the notes under this Table '+ is ICP-OES... and Se < 500.' and '++ Anions analysed on a... system.' These notes are demonstrated in the text. Therefore, I would recommend to delete the superscripts (+ and ++) of elements in this Table. We agree with this comment and have changed the manuscript accordingly.