Dear referee
We highly appreciate your constructive comments and suggestions that will surely improve our manuscript.

General comment
This paper focuses on the assessment of the impacts of controlled drainage on drain flow, groundwater levels and nutrient emission. The authors used a before after control-impact (BACI) sampling design in four adjacent drainage systems to test whether the controlled drainage had a significant impact on nutrient losses. They found that controlled drainage significantly affects the decrease in drain water flow and nitrate loss. The authors also combined the BACI experiment with a dual isotope approach (relation between _18O and _15N) to determine whether denitrification occurred in the impacted plots. The aim of the study is of interest for the readers of the journal and overall the paper is well written. Nonetheless, I suggest changes to the materials and methods section to add some important details, which are missing, and rephrase the conclusions to better highlight the novelty of the study.
We are delighted that you think the paper is of interest and well written, however we are now aware that we missed some important details both in the methods and results, and that the novelty of this study is not sufficiently emphasised in the conclusion. We will of course follow your advice and include more descriptions in the method section and rephrase the conclusion to better highlight the novelty of our study.

Specific comments
- The authors state that field management practices were similar during the three-year monitored period (lines 34-35, page 2), but at lines 22-24, page 5, they justify the lower nitrate concentration with the different agricultural management in the plots in 2011/2012. To avoid inconsistencies throughout the paper, I suggest to describe the field management practices carried out in the plots during the experiment (including the quantities of fertilizers) and clarify the possible effects of previous managements on the results obtained with the BACI experiment
We appreciate your suggestion and a management scheme including fertilizer amount and dates and harvest yield will be added (See the table next page)

Plots	2011/12 IP1, IP2, CP1	CP2	2012/2013 (Y0) IP1, IP2, CP1	CP2	2013/14 (Y1) IP1, IP2, CP1	CP2	2014/15 (Y2) IP1, IP2, CP1	CP2
Crop	SB	WW	WW	WW	WW	WW	WW	WW
Plowing	26 mar	26 sep	8 oct	17 sep	16 sep	16 sep		
Sowing	27 mar	27 sep	9 oct	18 sep	17 sep	17 sep	18 sep	18 sep
Fertilizer application:								
Pig slurry	10 may	19 apr	1 may	1 may	5 may	5 may	1 may	1 may
-amount (ton)	20	30	30	25	18	18	36	36
Mineral, 1st	27 mar	16 mar	15 mar	8 apr	26 mar	26 mar	20 mar	20 mar
-amount (kg)	103[a]	156[b]	125[a]	125[a]	200[c]	200[c]	150[d]	125[d]
Mineral, 2st		20 apr	20 apr	9 may	15 apr	15 apr	20 apr	20 apr
-amount (kg)		172[b]	194[b]	194[b]	215[c]	165[c]	100[b]	100[b]
Harvest	21 aug	21 aug	21 aug	21 aug	21 aug	21 aug	21 aug	21 aug
-yield (hkg ha^{-1})	81, 81, 82	105	98, 100, 97	86	98, 99, 99	99	80, 75, 81	75

SB=spring barley, WW=winter wheat, Fertilizer type: [a]NS 21-24, [b]NS 27-4, [c]NS 28-5, [d]NS 26-13.

- In lines 28-30, page 3, the authors refer to an intensive sampling campaign carried out in Y1 to assess whether the opening would lead to an increase in the release of nutrient enriched water. The results of this intensive campaign are not reported in the paper. Do these results support the findings and are they relevant for the paper? If they are not relevant for the paper, it is better to remove the sentence in the Materials and Methods to improve the clarity of the section.
The data will be added to an existing figure (Fig. 2) and the findings will be discussed more thoroughly in the paper.

- Sections 2.3 and 2.4 omit how the water samples were stored before the analyses, if they were filtered and analysed immediately after the collection. These details should be included in the two sections.
Thanks for pointing this out. The information will be added.

- Figure 1 reports that there are eight piezometers installed in each plot for groundwater level measurements (and water sampling), but in Fig. 2b there are only two series of dots. Do the dots represent an average groundwater level? If so, this information should be included in the caption and the authors should discuss the spatial and temporal variability of groundwater levels and nutrient concentrations and report which values (all the data collected?) they used for the BACI test (Table 2) and for the calculations of total losses of chemicals (Table 3). Furthermore, the description of the locations of piezometers in the plot, as reported in Table S3, is quite confusing. Is it

C2 possible to add letters/numbers in Fig. 1 or have another map in the supplementary material?

We are grateful that you emphasis this. This paper includes many different types of data, therefore it is very important that it is stated clearly which data is used in the respective analysis. We realize that we have not fully succeeded at this therefore it will be clarified in the revised paper.

At each plot 8-9 piezometers were located, but only the piezometers next to the regulation well was equipped with a pressure transducer measuring groundwater levels on a daily basis, which are the data shown in Fig. 2b. All of the other piezometers were measured every month. However, this will be emphasised in the paper and also a new Table with an overview of sampling frequencies and locations will be added (See Table below). A map with numbered piezometers will be added to supplementary information, and these numbers will be used in Table S3.

Plots with CD	IP1 and IP2	
Plots without CD	CP1 and CP2	
Management of regulation well at IP 1-2	closed	opened
Y1 Y2	10-dec-13 17-nov-14	11-mar-14 09-mar-15
Reference period	Y0 (21-nov-2012 to 21-apr-2013)	
Regulation level in Period 2 Period 3	 50 cm * 70 cm	
Number of piezometers pr. plot with pressure transducer	1	
Number of piezometers pr. plot without pressure transducer	8	
Frequency of water sampling in piezometers	2-3 times a month	
Frequency of water sampling in the measuring well	Weekly	
Frequency of drain water flow measurement	Every 10th minute	
Frequency of ground water level measurements in piezometer with pressure transducer	Daily**	
Frequency of ground water level measurements in piezometer with continuous pressure transducer	2-3 times a month	

* until 28 January 2013 for CP1 hereafter 70 cm.

** Often lower frequency due to low inflow time of soil water, thus data from IP2 from all periods was unusable. Dysfunctional pressure transducer at CP1 in beginning of Y0 and at CP2 in Y3.

- The authors should explain why they replaced CP2 values with CP1 in the calculations for Table 3. Did the authors assume that the difference between the samples collected at the two control plots is not significant?
Thanks to your comments we realize that the footnote of Table 3 is poorly phrased. The data represented in the table is the results from CP2, however these results were omitted from the analysis (BACI and calculation of percentage loss) as winter wheat was grown at this field prior to the experiment (2010/11), while spring barley was grown at the other plots. The consequence was that N concentrations were much lower at CP2 compared to the other plots in 2012. Thus it was decided to omit the data from CP2 in Y0. This will be explained more clearly in the footnote.

In Section 4.4 (lines 16-18, page 8) the authors report the slope for the relation between _18O and _15N in Y0 and comment it. In order to improve the consistency and compare Y0 with Y1 and Y2, is it possible to add the data in Fig. 3?
Thanks for pointing this out. The data will be added to Fig.3.

- The Conclusions section reports briefly the main findings of the study, but the novelty is not very clear or is not highlighted as it should be. Therefore, I would recommend to rephrase the Conclusions.
Thanks for your suggestion. We will rephrase the conclusion and emphasis the novelty of the study.

Technical corrections
We appreciate your corrections and will incorporate all of them.
- Figure 2: Please report the origin of nitrate concentrations (drain water?).
- Figure 3: Measurement units are missing in the x and y axis. Please add them and zoom in to improve the readability of the figure.
- Table 1: Please add the measurement units and standard deviations whether average values are reported in the table.
- Table 2: Please report in the caption what 'b.d.l.' means.
- Table 3: Please add the measurement units and standard deviations whether average values are reported in the table.

Again, we appreciate all of your insightful and useful comments. We have tried to take into consideration all of your comments and will improve the manuscript accordingly. Again we are thankful to you for taking the time and energy to help us improve the paper.