

## ***Interactive comment on “Groundwater–surface water relations in regulated lowland catchments; hydrological and hydrochemical effects of a major change in surface water level management” by Joachim Rozemeijer et al.***

**Anonymous Referee #1**

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### General comments

This manuscript evaluates the changes in water flow, water flow paths and solute concentration when changing the water level management of several polders in the Netherlands. Water level management and connection to water quality in shallow coastal areas is a timely issue of great scientific interest and within the scope of HESS. This work presents result of quite a large experiment and combines that with water and solute balance modeling. Scientific significance and quality is good but quality of the presentation is only fair. While I acknowledge the very valuable database and efforts

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behind that I am disappointed with the description of the results, discussion and conclusions. I miss a description of variability of the managed systems vs. the changes induced by the new flexible water level management. I miss a presentation of the exported solute loads. I finally miss a concluding discussion on the pro and cons of this study. At the moment it states some results but leads to nothing.

Below some more details can be found:

#### Abstract:

This abstract is way too long. This should be shortened to at least half the present size. What I miss is a bit more quantitative information on the water and solute flux changes induced by the new water level regimes.

Page 2 Line 11: Switching to past tense in the first sentence of the last part does not really fit.

#### Introduction

The introduction needs to be more concise and more consequently structured in the positive and negative sides of water level management and the lack of knowledge based on that.

P2L24: “The Netherlands” or “the Netherlands” or “Netherlands” (P4L20)? Be consequent through the manuscript.

P3L3: Is there information about the costs of the large-scale pumping vs. the costs of the damages that would occur if no pumping was done?

P3L16ff: Why do you mention the seed dispersal and germination two times in a row? Would one sentence on this not do the job?

P3L16ff: Are there distinct riparian zones in these managed catchments? I initially thought on a dominance of artificial ditches without any riparian zone around it.

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P5L18: Every regime will have water levels between min and max. Do you mean an artificially fixed min and max? If so, clarify this in the text.

#### Methods

P6L17ff: Where is the hydroclimate information coming from?

P6L25: This is the first time that you mention that the study areas are reclaimed wetlands. This should be done much earlier to better focus the objectives. I thought this is also about the interference with intense agriculture. . .

P8L22f: I would not call nitrate and sulfate an element. . . be precise.

P8L23: Please use subscript when stating the ions.

P9L12: Was that actual ET or potential ET? If actual ET was measured how do you transfer the values to a different type of vegetation?

P9L14: But how realistic is that? Shouldn't higher variability in water levels also translate to higher variability in ET?

P9L14: You should very briefly describe how the storage of the system was assessed.

P9L25: It would make it more convincing if you state the type of averaging you did and discuss (later on) the potential errors you introduce by fixing the concentrations to the average.

Fig 3: You should spend a bit more time on this figure. Please adjust font size (labels of the panels are huge compared to the axis). On the axis it is "Cl-concentrations" on the legend "chloride concentrations" – be consistent here. What is the difference between the green and blue lines? I cannot see this stated somewhere.

#### Results

P11L4: This second sentences is quite useless.

P11L15f: This sentence is the same as the one in L22f and quite similar to P12L2f:

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Please double read your text to avoid such things. That doesn't make the reader happy.

P12L19: When reading "solute balancing" I would rather expect to learn about the change on solute loads or concentrations and load but not concentrations alone. Overall load quantification would make sense to judge on the changes of export to downstream water resources (probably decreasing) in contrast to the concentration changes (increasing).

#### Discussion

P13L6: When talking about "significant" differences I would expect that you show the significance by a statistical test, which you did not do. Either show the significance or change wording to "substantial" or something similar.

P14L5f: This sentence seems to be in a wrong logical order. The outlet flux is not compensating the large groundwater influx but groundwater influx is compensating the large outlet flux. Conclusions

I expected a bit more in the conclusions than just restating the findings. So, what does that mean? Is this good or bad in terms of water quality and quantity? Does this now more resemble a natural behavior? What about the exported solute fluxes? Based on that would you recommend applying similar measures to other polders, regions? Here is a lot room for reflecting on the findings.

Fig 5: Check typos in the axis description.

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