Dear Referee #1,

First of all, thank you very much for the helpful comments and your kind feedback. We are very happy to read that you find it an excellent paper. Your comments are listed below, along with our responses to each one.

- Abstract "Our results show that this approach is generally better than the best randomly selected wells". This sentence must be changed because it seems to insinuate than one could change n monitoring wells randomly and they could performed better than the optimized approach (because of the world "generally').

RESPONSE: You are right, thanks for noticing this subtle detail. We will change the sentence to "Our results show that the proposed approach performs better than the best randomly selected wells"

- Introduction: "there is a dualism between monitoring costs and monitoring quality (i.e., the information gained by monitoring)" This sentence is not logical. Perhaps you mean that the higher the cost of monitoring, the better the quality of the data, provided that the monitoring is well designed. In other words, one could spend a lot of money and yet do not improve the quality of information unless the money is well spent. A deeper issue not addressed in the paper is how the expenditure in monitoring may improve the quality of groundwater, which means that groundwater monitoring is tied up to groundwater management.

RESPONSE: You are right. What we meant is that there are usually economic interests behind groundwater management and thus behind a monitoring network. As a result, many monitoring networks meet minimum requirements for groundwater management but are not scientifically sufficient to monitor the dynamics of the aquifer. We will explain this in more detail in the revised version of the paper.

- Introduction: "How does a reconstruction/interpolation error develop when a given number of monitoring wells are reduced? How does the error of reducing wells according to information content compare to a random reduction?" These sentences are confusing. Perhaps you mean: "How does the reconstruction/interpolation error varies with changes in the number of monitoring wells? How does a random reduction of monitoring wells affect the information content gained by groundwater monitoring?" I urge the authors to improve the logical meaning of their paper's text.

RESPONSE: Yes, we may have expressed ourselves somewhat misleadingly here. Thanks for your suggestion, which we will adopt only slightly modified. Our suggestion for the change would be: "How does the reconstruction/interpolation error vary as wells are progressively removed from the monitoring network in the order of the proposed ranking, and how does this compare to the removal of randomly selected wells?

- Section 2.1.4: you propose that an mxn matrix can be decomposed into matrices Q and R, such that A = QR; then you propose that there is matrix C such that A CT = Q R; unclear why not: A CT not equal to QR CT

RESPONSE: You are right. The sentence is misleading. What is meant is:

The reduced matrix QR factorization with column pivoting decomposes a matrix **A** ∈ $R^{m \times n}$ into a unitary matrix **Q**, an upper triangular matrix **R** and a column permutation matrix **C (eq. 6)** such that $\boldsymbol{AC^T = QR}$. We will modify the sentence accordingly

- Section 2.4.2 "Outlier values that exceeded a moving average (window size 11) of ±3 σ were removed during preprocessing" Perhaps you mean: "Data values that deviate by more than ±3 σ from the moving average (with a window size of 11 values) are considered outliers and were removed from further processing"

RESPONSE: We agree. The sentence you suggested is more comprehensible. We will gladly change it accordingly in the revised version of the paper.

- Section 2.4.3 " omnidirectional Gaussian semivariogram model" I believe you mean "an isotropic Gaussian semivariogram model"

RESPONSE: In the literature, we find both terms used as synonyms. Therefore, we think that the "omnidirectional Gaussian semivariogram model" is also correct. Maybe we could write "omnidirectional Gaussian semivariogram model (also called isotropic Gaussian semivariogram model)" to account for both terms?

- Figure 2b: the Pareto front of number of wells vs RMSE: what about Pareto fronts for the other goodness-of-fit criteria? such the NSE or the KGE?

RESPONSE: Figure 2 shows the results of GridSearchCV. Here, all combinations of the basis types, *n* basis-modes, and *n* monitoring well are tried using the k-fold-cross-validation method. The goal was to determine the most appropriate parameter combination for our task. We have chosen RMSE as the metric here, as this is the criterion used for minimization in the model. It is correct, that other goodness-of-fit criteria such as the NSE or the KGE could also be shown, but we think that would be kind of an overkill. Moreover, as can be seen in Figure 5, where the error propagation over all n monitoring wells is shown for RMSE, NSE, KGE, MAE, and R^2, the goodness-of-fit parameter correlate well and there are only subtle differences. The difference to figure 2b is that here the number of base modes (1043) and the base (identity) are fixed.

- Figure 7: add GMW (groundwater monitoring well) to the list of acronyms

RESPONSE: Thank you. We will add it to the acronyms.