Dear Referee 2

Thank you for your kind and encouraging comments on our study. Your comments and our responses to them are listed below.

- The terms “sensor” and “well” are used interchangeably throughout the manuscript. For the sake of clarity, I’d suggest sticking with only one term. The sensor could be viewed as a part of the monitoring well, therefore in my opinion it makes more sense to use “well”. The goal is to optimally select wells.

RESPONSE: We agree that the frequent synonyms change disrupts the reading flow. We would propose the following solution:

Since this approach originates from standard sensor optimization and therefore, the term "sensor" is primarily used in the literature, we would retain it in the methodology section to make the comparison with other studies more straightforward. We would then use the term "well" exclusively in the results. At the beginning of the results section, we would include a sentence stating that we are applying sensor optimization to optimize groundwater monitoring wells. Therefore, the term well is used as a synonym for a sensor in the following.

- 7 and fig.6 on p.17: The performance metric nRMSE is used in Figure 6. Is it the RMSE relative to the standard deviation or the range of observations? Please explain this detail on page 7, where the RMSE equation is given.

RESPONSE: Thanks for the hint. The rRMSE used is relative to the **range** of observations. We will include the corresponding formula of rRMSE in the manuscript eq. (10).

- Lines 248-253: Although it is clear, why a single set of kriging parameters is used in the production of the map series, on what basis this particular parameter set is selected. Perhaps the values for the parameters can be provided in one additional sentence

RESPONSE: You're right. We will add the used kriging parameters (Nugget, Sill, Range) in lines 249-251 to the manuscript and the target parameter of the optimization (minimization of the mean square error) as follows: “The associated partial sill (42.70m), range (17,85m), (lag size 1,48m), nugget (0.05m) were optimized using automated CV-diagnostics to achieve the lowest mean square error.

- Line 346: It seems that reduction stages (or steps as it is used in the caption of Fig.5) refer actually to the fraction of the wells used in the analysis. My understanding from a 10% reduction is that 90% of the wells, that is 432 wells, are used. Please consider rewording or clarifying this issue where necessary.

RESPONSE: We have indeed expressed ourselves misleadingly. When we speak of a 10% reduction step in this section, the percentage refers to the remaining number of wells, so 10% means that 10% are remaining, and 90% are removed. From chapter 3.3 on, it is used in a reverse sense. We will adjust the wording in this section and caption of Fig. 5 and 6 to use "remaining subset" instead of "reduction stages." We hope this makes it more precise.

- Line 346-347: “Consequently, well 154-304-1, the highest-ranked well shown with rank 59 (bottom),…” – This is confusing because one would expect the well with rank number 1 the “most important” well.

RESPONSE: We agree and can see your point. We would change the order in Figure 6 from "most important" (top) to "least important" (bottom) as suggested.

- I'd suggest adding a little discussion in the conclusions section about the relative value of 1-D (hydrograph) data versus 2-D data. Which should be preferred if both are available? For which type of monitoring data does the presented approach work better?

RESPONSE: That is an excellent suggestion. Thank you very much for that as well! We would include your recommendation in the discussion as follows:

"Using hydrographs (1D) as input data set, the applied approach allows an information-based assessment of the operated monitoring network, with the goal of the best reconstruction of selected remaining wells. The outcomes can thus be used to identify key wells for selecting representative subnetworks, equip important wells with improved data loggers, or release installed sensors/loggers at redundant wells for more suitable locations. With two-dimensional input data, the spatial dependency structures and the area of influence of the wells can be considered for optimizing. The goal of a 2D based reduction is thus to identify wells that are most suitable to reconstruct a spatially continuous groundwater surface. Moreover, the 2D data also allow a network extension, that is not feasible based on 1D data. Especially in combination with numerical groundwater models, we see a great synergy potential for an extension of the monitoring network tailored to the dynamics of the aquifer. When using 2d data, however, one must be aware that that the optimization approach makes suggestions based on regionalized data (either by interpolation or other methods). If these do not represent the reality sufficiently (i.e. poor regionalization), this will be also reflected in the optimization results."

- The website link for the reference on lines 559-560 needs to be corrected as it does not seem to be active

RESPONSE: We have just checked the link. It worked here. However, it takes a long time until the page is built because the file is opened directly as a pdf. We'll keep an eye on the link and change it if there are problems in the future.