

Comment on hess-2022-69

Anonymous Referee #2

Referee comment on "Spatiotemporal optimization of groundwater monitoring networks using data-driven sparse sensing methods" by Marc Ohmer et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-69-RC2>, 2022

General comments:

The submitted manuscript presents a versatile optimization strategy for monitoring well networks that can be used on temporal and/or spatial hydraulic head data. The methodology and its demonstration using the example data set are presented nicely with sophisticated plots and graphs. The analysis and interpretation of results are considerably elaborate, which increases the quality of the manuscript but on the other hand, makes the discussion hard to follow in some of the paragraphs for the non-expert reader.

The manuscript is in general very well written. There are only some minor issues that need to be addressed for improved readability.

Specific comments:

- 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.
- 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.
- 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.
- 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.

- 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.
- 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?

Technical corrections:

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