

Reviewer 1

General assessment after revision: All of my concerns about the first version of the manuscript are adequately answered and revised. Most of my previous recommendations on the presentation and discussion of the results are taken into account. If not, the authors provide adequate and comprehensible arguments for not doing so, which is fine. In particular, I appreciate the new passages in the discussion section and the extended explanations on the silhouette index including its application for the Endelave case study. The paper has much potential to motivate and inspire similar approaches on improving and partly automating the combined TEM/SNMR interpretation in future hydrogeology projects. My opinion is that the manuscript, after a few minor changes, is ready for final publication without another round of review.

The attached file contains a short list of typos that I noticed while reading and recommendations to (hopefully) improve clarity of a few specific formulations.

P1L31: "...to improve resolution of..." => "...to improve the identification of..."

Author response: Fixed

P5L27 (After the reference to Larsen et al., 2000): This might be a suitable position to inform the reader briefly about T2 and T2*, both being a product of the inversion of the steady state SNMR data. T2 is first mentioned in the results section without any explanation where it comes from. Instead, a short introduction somewhere in the methods section is needed.

Author response: We have added a sentence to shortly describe T2 and that we are inverting for it alongside the water contents and T2*

After Larsen et al., it now reads: *"The data are also inverted for T₂, more directly linked to pore geometry, but is not used in the subsequent clustering."*

P6L6 The information that T2* is linked to pore size should appear before discussing the dead time issue. I recommend copy-and-pasting the whole sentence to P6L1 after "...termination is not possible". The link to the very last sentence in this paragraph ("This can be used...") would get lost in this case, but this one not necessary anyway and can be removed.

Author response: Fixed

P7L8 on => of

Author response: Fixed

P9L15 "results section" => "methods section"

Author response: Fixed

P11L4 in => and

Author response: Fixed

P13L3 First mentioning of T2 – This parameter should be introduced beforehand, please see my comment on P5L27.

Author response: After adding the description in the methods section this is not the first mention of T2.

P13L13 "...less interaction of excited hydrogen spins with the grain surfaces"

Author response: Fixed

P15L1 The sentence starting with “The two data points...” is a relic from the first version of the manuscript and has to be removed.

Author response: Fixed

P15L8: on => of

Author response: Fixed

P15L8: “...are based...” => “...represent...”

Author response: Fixed

P15L9: “...to provide a type of uncertainty.” => “...to demonstrate the uncertainty related to the discretization of the resulting model.”

Author response: Fixed

P15L14: Figure 8a

Author response: Fixed

P20L16 Figure 10b

Author response: Fixed

P22L17 “when interpreting based only on a single dataset.” => “when interpreting one of the individual datasets alone.”

Author response: Fixed

P23L17 “...resulting in interactions leading to...” => “...resulting in a faster exchange of energy between excited hydrogen spins and pore walls leading to...”

Author response: Fixed

P23L30 “which proved sufficient in ...” => “which has proven to be sufficient in ...”

Author response: Fixed

P24L12: Remove the extra bracket

Author response: Fixed

P24L29: “possible better to delineate” => “possible to better delineate”

Author response: Fixed

Reviewer 2:

Thanks for the revision.

The authors made a good job addressing my questions and issues. I recommend publication with some minor final corrections.

Final remark: Please check for consistency in phrasing: Sometimes you talk about silhouette index, other times it is scores or total average silhouette scores while in the caption it is just average value.

Author response: All phrasing of silhouette has been set to silhouette index for consistency.

Reviewer 3:

The authors appear to have taken care to implement the changes requested by the two reviewers who participated in the 1st round. This has, notably, improved the description of the methodology, which is the main point of novelty. I have just a couple reservations with respect to the terminology and definitions appearing, for example, in Figure 1.

Are we meant to believe that clay (presumably saturated, given that "unsaturated" is indicated for one of the porous media types in the figure) has a water content of <10%? This seems wrong. In my experience, clays often have porosities exceeding 50%. Did the authors mean the (saturated) "drainable" porosity or something of this sort?

Author response: Yes, it is true that water content of clay can exceed 50%. Here, we are describing the SNMR sensitive portion of the water within clays, which is extremely limited by the low pore sizes that water is residing in.

Also, echoing reviewer 1, "saline sand" is not a good term and has not been amended in the figure.

Author response: We agree with this and the wording has been changed to reflect the other changes to the manuscript.

In S3, I recommend swapping "fairly-defined" (strange English) for "moderately-defined" or "loosely-defined" or something like that.

Author response: We agree with this, and the wording has been changed to "moderately-defined".

As for the data availability statement, is "available upon request" coherent with EGU/Copernicus policies?

Author response: As the data from the SNMR is in a format made specifically for steady-state, it won't be readable by others. Therefore, the statement is kept as "available upon request" so that some help with reading this can be given.