

Interactive comment on “Hydraulic characterisation of iron oxide-coated sand and gravel based on nuclear magnetic resonance relaxation modes analyses” by Stephan Costabel et al.

Anonymous Referee #1

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General Comments The paper addresses an interesting and important topic and does help to advance geophysics in the field of hydrogeology. It demonstrates that the NMR method is applicable to characterize zones with iron oxides accumulations, being used in well characterization and hydraulics. The manuscript is well written, but especially the methods section is lengthy. It would be better to shorten it. The results are well presented. In the conclusion, I would recommend to stronger emphasize the difficulties one would expect to use NMR in the field, in contrast to the lab study presented.

Specific comments and technical details The introduction does not capture the current

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state of the art; most of the literature is outdated and new papers missing. In the methods section the textbook knowledge should be deleted. XRD data need to be added in the revision in order to proof mineralogy.

P2, L1: do not repeat "vital". Please make clear more specific what is "vital" to you, avoid generalizing. You may want to include the role of iron in nutrient cycling and biology. Please also do not cite several times a textbook like Schwertmann and Cornell. Cite recent research literature. P2, L6: avoid self-citation if not necessary. There is nice literature from others. So far, the literature used is not state of the art. New and important literature is missing completely in the introduction so far. Include this carefully in the revision. P2, L13: Sorry, your literature is outdated. I will not comment this further. You need to include the current state of the art. Please invest carefully time to update your paper P3, L15: please make the goals of this paper after the setting you used clear to the reader P3 ff, chapter 2.2 and 2.3: please shorten this drastically. This is a research paper and not a student textbook or master thesis. Do not re-state things that can be read elsewhere. If you use formulae in the following, do so if needed for the paper. P7 and 8: you need to add XRD data to show you actually produced ferrihydrite and not a mixture of other iron oxyhydroxides

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