<u>**Reviewer #1:**</u>

We thank reviewer #1 for taking the time to review our manuscript. In the following section we will reply to all comments of reviewer #1 with R1-1 (i.e. reviewer 1, comment 1) and A1-1 (i.e. author response to R1-1), respectively.

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R1-1: It is intresting about the d-CNRS for deep soil water measurement through groundwater wells, but I only suggest the manuscript should be shorted and the story wil be easy for reading..

A1-1: We are glad that the downhole CRNS approach appeals to the reviewer. We know that the manuscript is detailed and

10 therefore a bit long. Given that this is the first study that presents d-CRNS, we decided to provide both, a broad as well as an in-depth analysis and explanation of the d-CRNS approach. This includes necessary neutron transport simulations and field measurements to understand, apply, and reproduce the method.

In our opinion, this requires:

15 - a theoretical description of the measurement volume (i.e., the sphere of influence) and the response of downhole neutron intensities in different shielding depths based on neutron transport simulations

- the derivation of equations for a mathematical description of the sphere of influence and a first set of equations to describe the response of neutron intensities to changes in soil moisture in different (shielding) depths

- a recommendation for an inversion algorithm to derive soil moisture from observed downhole neutron intensities

20 - a description of correction procedures for downhole neutron observations which are not identical with those for above-ground neutron intensities and lake-side neutron measurements to facilitate calibration against in-situ reference measurements of soil moisture

- and lastly, a first field application of the d-CRNS approach to demonstrate its applicability

25 Addressing these points leads to the slightly extended length of the manuscript. Nevertheless, we will try to shorten selected paragraphs and will work on a more concise writing style in the revised version of the manuscript.