

## ***Interactive comment on “Inter-laboratory comparison of cryogenic water extraction systems for stable isotope analysis of soil water” by Natalie Orlowski et al.***

**Anonymous Referee #2**

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This work provides a good initiative towards the standardization of a procedure that can be carried out in multiple ways. The inclusion of laboratories worldwide depicts this need as well as the large variety of extraction systems developed to carry out the CWE. The idea of involving multiple laboratories under the same approach is well done and supported with a good protocol (despite the possible sources of errors described by the authors). However, even if the authors do not mention a specific method or guidelines at the end of the paper; the information provided can lead to the best practice.

On the Methods (page 5, lines: 27-32) and Discussion (page 14, lines: 15-22) sections, the authors mention the “performance test” carried out by the laboratories. The analysis

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of this data needs more attention on the Results section and it can be integrated with a  $Z_{score}$  graph as the one showed by Orlowski et al (2016). This type of plot will help to see the proportional laboratory efficacy to reach the labeled water. In addition, it will be important to add information about the performance test carried out by the laboratories, because the paper only mentions the data of two laboratories and leave on the dark the data from the other 14.

The laboratory capacity to successfully extract soil water is essential for most of the projects relying on that information (the reason why the authors defined the experiment). This work shows that despite having identical soil and water samples, as well as the protocol extraction (“pre-defined extraction method”), no one of the laboratories was able to reach the water signature. The proposed rehydration process could be affected by small differences among the soil samples sent to each laboratory (non-homogeneous composition between subsamples of the same soil). This brings the question if different subsamples of soil were analyzed to test the homogeneity among samples as the authors did with the water? In addition, did any of the laboratories send a sample of rehydrated soil for its physical and chemical analysis? Because this can help the authors to support their assumption (Discussion section, page 17; 13-15)

Despite the authors sentence (Discussion section, page 20, lines: 1-2): “We found no clear tendency for which approach should be applied, thus at present, and much to our dismay, we cannot define any standard protocol for CWE”; the information contained in this paper can give important clues about the feasibility of applying one specific method. If the authors apply the  $Z_{score}$  graph (Orlowski et al, 2016) mentioned previously (second paragraph); they can determine which methods lead towards a more accurate extraction among all the setups evaluated considering the pre-defined protocol (analysis 1) and considering the laboratory protocol (analysis 2). In this way, the authors can provide as “take-home messages” the laboratory practices that lead towards better results.

If the authors change the notation from 20

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The amount of sample material used per laboratory is not reflected in table 1 and this information can help to understand the differences.

#### References

Orlowski, Natalie, Dyan L. Pratt, and Jeffrey J. McDonnell. "Intercomparison of soil pore water extraction methods for stable isotope analysis." *Hydrological Processes* 30.19 (2016): 3434-3449.

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