

## ***Interactive comment on “Qualitative soil moisture assessment in semi-arid Africa: the role of experience and training on inter-rater reliability”***

**by M. Rinderer et al.**

**M. Rinderer et al.**

michael.rinderer@geo.uzh.ch

Received and published: 26 June 2015

-> We thank the reviewer 1 for constructive comments and suggestions on the manuscript and will address them all in the revised version:

Anonymous Referee #1 General Comments This is an interesting paper that examines the ability of farmers/students/experts in carrying out a qualitative test for soil moisture. Although the sample is small, the results are encouraging particularly when training is provided. The potential of this approach for soil moisture assessments is clearly acknowledged at the end of the paper, i.e. upscaling and data transmission via SMS.

C2248

Overall the paper makes a good contribution to the literature.

Specific Comments 1. Some reference to the literature on citizen science and more recent attempts at involving students in collecting soil related information should be added, e.g. the OPAL initiative, GLOBE, etc. 2.

-> We will include a paragraph about citizen science and crowd-sourcing initiatives (e.g. OPAL and GLOBE) in the conclusions showing the potential application of the qualitative scheme

2. What is the source of soil information in the pilot area? Existing soil maps? A survey undertaken by the authors?

-> The soil information stated in the discussion paper was determined in the course of an analysis in the field. In the meantime additional lab analysis and discussion with soil scientists resulted in the following soil classification: Profile 1: Chromic Cambisol Colluvic Clayic / Profile 2: Haplic Cambisol Siltic Ruptic. (WRB, 2014). The texture is ranging from clay to loamy sand. Further soil information will be updated in the site description section (chapter 2.2) and citation will be given.

3. What is the soil classification system used, e.g. WRB 2006, WRB 2014 as the combination of Haplic Andosol, loamic, fluvic does not conform to any combination of Reference Soil Group or Qualifiers in these systems. Please explain.

-> We used the WRB (2014) and will state this in the text (site description, chapter 2.2) and list of reference. The soil description in the first manuscript was preliminary, but after final evaluation of all data was updated to Chromic Cambisol Colluvic Clayic, according to WRB (2014).

4. Soil moisture and volumetric content of water in the soil are closely related to soil texture. What is the range of soil textures in the plots?

-> The texture is in the range of clay and clay loam, with intercalated layers of loamy sand. Texture classes will be given in the site description and we will add further

C2249

information on how the texture influences hydraulic properties like wilting point and field capacity.

5. Please clarify how you mapped the measured volumetric content of water to your soil moisture classes, e.g. did you use the median of the estimate soil moisture classes to do the assignment?

-> For Fig. 3a and 3b: Corresponding qualitative wetness classification were made by the first author at the same time the gravimetric samples were taken to avoid the influence of a potential drying effect as sampling was slow and took longer than the qualitative test with the farmers, students and experts. We will add this sentence at the end of section 2.2.

6. More detail should be added to the description of your wetness classification scheme. Although you refer to a previous paper, you also refer to a modification and this should be explained here in more detail.

-> The modification was necessary to account for local peoples' every-day experience which, in Tanzania, is more related to farming and brick making but not to hiking and outdoor recreation activities like in Switzerland. We will state this clearly at the end of the introduction section (chapter 1). We will reformulate and extend the section in chapter 2.1 on the description of the wetness classes.

7. The soil moisture of the uppermost layer is not representative of the whole soil profile. How do you know these samples were at equilibrium? Think about replacing the outdated reference of 1927 to something more recent.

-> The thought was, that it might be possible to anticipate wetness at root depth knowing the characteristics of the water retention curve but we will skip that part in the method and discussion section and recommend to use the qualitative classification scheme in combination with the "Spade Method" (Görbing, J. & Sekera, F., 1947). We will add a more recent citation for crop root depth but decided to keep the 1927 refer-

C2250

ence because a lot of work on crop physiology has been done early in the 20th century and is still valid. To clarify this part in the revised version of the manuscript, we will rewrite and add a few related statements.

8. Add a reference to the Mann-Whitney test and Bonferroni significance.

-> We will add the original reference

9. Although the test appears to be visual, it also involves removing some of the top soil. If this is being done multiple times by the farmers/experts/students, does this not affect the result due to disturbance?

-> Yes, if every farmer would have removed the uppermost soil, that would have been misleading. People were instructed accordingly and only the first participant actually removed the uppermost soil. All following participants were assessing the soil sample at the soil surface. To avoid confusions, we will skip the part at the end of section 2.1.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 3029, 2015.

C2251