

Interactive comment on “Estimating distributed soil texture using time series of thermal remote sensing – A case study in central Europe” by B. Müller et al.

Anonymous Referee #1

Received and published: 20 April 2016

The authors tried to estimate the soil texture information from the thermal remote sensing observation, using PCA method and MLRE estimator, and soil sample data. Such approach is innovative and worthy of further exploration of its application for other type of data, for example, microwave or optical RS data. It seems to me this approach is more generic and can be applied for different types of remote sensing observations. Nevertheless, i do have some comments for the authors to consider, for a better presentation of their works.

Major concerns: 1. As said, it seems this approach can be applied for other type of RS observations (i.e. microwave or optical). Although the author mentioned the work done by Santanello et al. 2007 in the discussion, their approach is completely

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different (e.g. using Noah model) from the current study. The author is encouraged to do analysis on how the current proposed PCA+MLRE approach can be applied using microwave/optical RS data.

2. In the study area, the silt predominates, yet the uncertainty associated with the estimation of silt is the largest. There is no detailed discussion on why such uncertainty. Are there any further investigation on how many soil samples over silt area? or some analysis from thermal inertia over silt? In addition, it would be better to indicate explicitly the percentage of areas of the test site, in terms of different soil texture, from the estimate and the available in-situ data (e.g. % sand area, % silt area, etc.).

3. In the introduction, the authors argued that the choice of thermal RS is due to the thermal inertia. The thermal inertia can be derived from RS images with Anne Verhoef's approach. I am wondering if the PCA+MLRE was applied with the thermal inertia time series, would the results be different or similar? Please also provide some discussions on this point.

4. Some presentation of the results are not detailed and, therefore, easy to cause confusions for readers. I will detail this point with minor comments as following.

Minor comments: 1. Page 4, line 19-20, "PC1 and PC2 show similarities to the Corine land cover pattern and geology pattern"

It is not obvious from the Figures. And, i cannot figure out how and why they are similar, and what does it mean by this similarity? Please quantify such similarity using more detailed information.

2. Page 6, line 24-25, here you compared the estimated distribution of soil texture (Fig.7) with the available qualitative agricultural soil map (Fig. 2). However, such comparison for readers is difficult, as the color legend are different from the two figures. Is it possible to unify the color legend of the two to enable the direct comparison?

3. Page 6, line 26-27, "Further analysis of the soil texture distribution reveals relations

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to topographic structures, different land cover types and geology (Figure 1 and 2)". Just by saying that, i cannot find any further analysis on this point in the text. Please provide them with detailed analysis. This will assist the readers to understand straightforwardly.

4. Page 6, line 31-33 "..... in Fig. 7 (without figure)", i was lost here.

5. Page 7, line 22-23. "These outliers are stable, spatially and throughout the CV variants". I cannot find them. It is not obvious. Please use circles to highlight those hot spots.

6. Page 8, Line 5-6. Here you used the time series of thermal remote sensing data. What about using microwave/optical data as well? Please add some more discussion on this aspect here.

7. Page 15, Figure 7 caption, line 4, ' ... are shown in red, respectively blue"?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-115, 2016.

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