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Discussions

Interactive comment on "Mapping soil erosion using magnetic susceptibility. A case study in Ukraine" *by* P. Nazarok et al.

Anonymous Referee #2

General comments: The objective of the paper is to evaluate possible use of magnetic susceptibility measurements to derive information related soil erosion processes. This topic is not new but the effort of using it for soil mapping is still interesting. The presented results are interesting and believable. Unfortunately, the discussion at the international level is completely absent. The weakness of this work is English, which needs to be corrected extensively. Also other aspect should be improved or explained before to be accepted publication.

Specific comments: Abstract: Abstract needs corrections in accordance with the recommendations provided below. Introduction: It should be explained in the introduction (through references to literature) what is the relationship between the magnetic susceptibility and soil properties. What causes the magnetic susceptibility of soils? Which

soil properties (influenced by soil erosion) influence magnetic susceptibility of soils? Why is there a correlation between magnetic susceptibility and the content of organic matter? Page 832, lines 15-21: Opinions in rows 15 to 21 should be accompanied by references to the literature. Line 23: What does it mean "the power of humus profile"? Line 24: Reference "Soil erosion, 2001" has to be corrected. Page 834, line 13: Abbreviations (e.g. TOV, C/N) should be explained. Lines 20-21: The aim of the paper should be rewritten. I am not sure whether the objective corresponds to the results shown in the work. Authors studied relationship between the soil magnetic susceptibility and humus content. It should be distinguished between the erodibility and the extent of soil erosion. In this case the MS measurements reflect the extent of soil erosion in the studied area (because erosion decreases humus contents). But the extent of soil erosion corresponds well to the index of soil erodibility due to the ongoing erosion. Materials and methods: Page 835, line 1: "annual precipitation is 460 mm" instead of "amount of precipitation is 460 mm". Line 17: "index of soil erodibility" instead of "index of soil erosiodibility". Line 16: The only citation of hardly accessible document is not enough. At least principle of the method for humus determination should be written. In the "Materials and methods" section also other characteristics of the soils should be listed to enable their comparison with the results of other studies (e.g. parent material, soil pH, soil texture, carbonate content). Results and discussion: The main weakness of this part is the absence of discussion at the international level. Page 836, line 12: "high erosion risk" instead of "high erosion danger". Line 14: Explain the abbreviation "H" at its first use in the text. Line 19: If there are linear relationships, then "r" values should be listed only and probability values should be added or statistical significance should be indicated. Lines 22-24: The sentences are unclear and should be rewritten. Page 837, line 5: "distribution law" instead of "distribution low". Lines 3 and 10: This looks like a repeating information in these paragraphs. Line 13: What does it mean "capacity of a soil profile"? Line 17: What does it mean "negative dynamics"? Page 838, lines 5-25: It should be pointed out that classifications based on the absolute values of MS and humus content are dependent on the study site (they are influenced by parent material,

initial soil properties, soil genesis, etc.) and should not be generalized. Conclusions: This section should be rewritten in accordance with the improved discussion. Page 839, line 4: The authors used (here and previously) several synonyms that make the text difficult to read: "erosion index", "erosive index", "index of the erosion risk", "erodibility index". For the results and conclusion it is necessary distinguish between the soil erodibility and the extent of soil erosion. The first can be independently calculated and the second can be evaluated according to humus content. The obtained results should be explained more clearly. The MS values can be directly related to soil humus content and thus to the extent of soil erosion. As a result of long-term erosion (with decrease of humus content), the MS values also show the relation to the erodibility index in the studied area.

Interactive comment on Solid Earth Discuss., 6, 831, 2014.