SOIL Discuss.,
doi:10.5194/soil-2016-29-SC1, 2016

Interactive comment on "Hydrological corridors for landscape and climate restoration: Prioritization of re-greening areas in Kenya and Tanzania" *by* Judith E. M. Klostermann et al.

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Received and published: 28 June 2016

4. Where do the data come from that were used to create Figures 2-6? How were these images created? This is especially important for Figures 3-6, which are assessments (not measurements). Also, the labels for each of the land areas only appear in Figure 6, and so the authors' observations throughout the manuscript are nearly impossible to follow.

The reviewer is right to request more details on the data and procedures to create Figures 2-6. First of all, the fact that labels of the potential corridors only appeared in Figure 6 was indeed confusing. These have now been added to Figure 1 to better set the scene for the assessment from the start of the paper. Concerning the data and

procedures used to construct Figures 2-6, the first paragraph of Section 3.1 Method for soil restoration has been extended as follows: "For prioritizing regions for soil restoration, we take the existing level of degradation as a relevant first indicator. Degradation can be assessed by the soil depth loss and the carbon content of the soil relative to undisturbed conditions. Current soil organic carbon content, as well as ceiling values under agricultural land use and natural conditions were derived from the S-world global soil mapping approach (Stoorvogel, 2014). Ongoing degradation was determined by combining an assessment of vegetation cover degradation (Schut et al., 2015) and its effect on soil properties as modelled using S-world. For assessment of regreening potential, a number of land management interventions was considered. Different sustainable land management (SLM) interventions have different applicability limitations and their effectiveness also depends on environmental conditions. Spatial assessment of applicability limitations of SLM measures took into account land use, slope, rainfall, and soil depth and texture (cf. Fleskens et al., 2016). The number of options for recovery and their simulated effectiveness represent relevant indicators to include in our study."

Further in the same section, the sentences 'In order to calculate the effects, both restoration and prevention were expressed regarding their effect on SOC, which can be considered a proxy indicator for soil productivity. The extent to which they contribute depends on time.' were extended to read as follows: "'In order to calculate the effects, both restoration and prevention were expressed regarding their effect on SOC, which can be considered a proxy indicator for soil productivity. The initial values and maximum potential for both effects were informed by the S-World global soil modelling approach (Stoorvogel, 2014). The SLM measure-specific extent to which restoration and prevention potentials are reached depends on time."

In Section 3.2, the first sentence 'Figure 2 shows the annual soil depth loss in the research area, whereas Figure 3 shows the SOC restoration potential' was revised to read: "Figure 2 shows the annual soil depth loss in the research area, whereas Figure

3 shows the SOC restoration potential as determined with S-World simulations."

Figures and captions were revised accordingly to indicate areas and data sources.

References:

Fleskens, L., Kirkby, M.J., Irvine, B.J. (2016) The PESERA-DESMICE modelling framework for spatial assessment of the physical impact and economic viability of land degradation mitigation technologies. Frontiers in Environmental Science 4:31. doi: 10.3389/fenvs.2016.00031.

Schut, A.G.T., Ivits, E., Conijn, J.G., ten Brink, B., Fensholt, R. (2015) Trends in Global Vegetation Activity and Climatic Drivers Indicate a Decoupled Response to Climate Change. PLoS ONE 10(10): e0138013. doi: 10.1371/journal.pone.0138013

Stoorvogel, J.J. (2014) S-world: A global map of soil properties for modeling. In: Arrouays, D., McKenzie, N., Hempel, J., Richter de Forges, A., and A. McBratney (Eds). Global Soil Map: Basis of the Global Spatial Soil Information System, Taylor & Francis Group. pp. 227-231.

Interactive comment on SOIL Discuss., doi:10.5194/soil-2016-29, 2016.

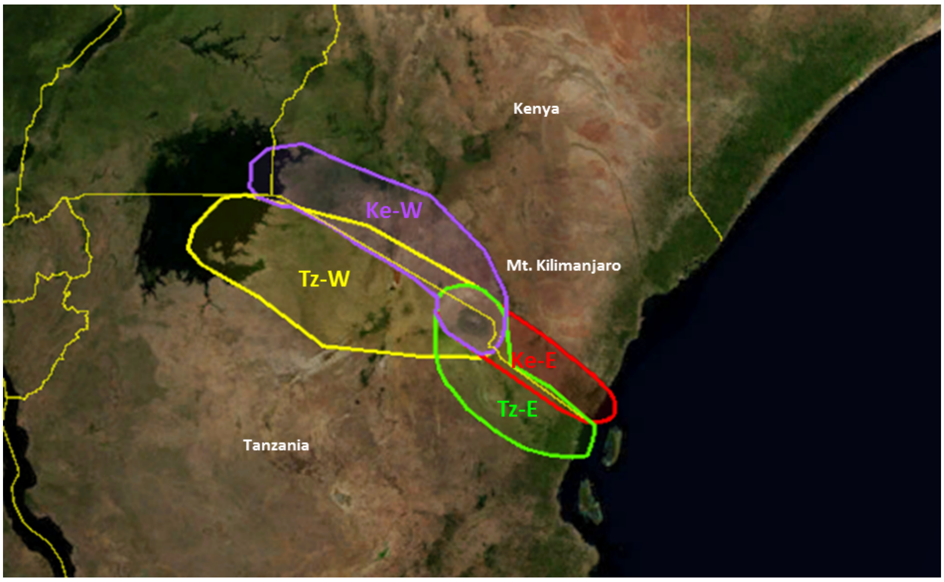

Fig. 1. Figure 1: Potential Hydrological Corridors in Kenya (Ke-W, Ke-E) and Tanzania (Tz-W, Tz-E) (imagery from Google Earth).

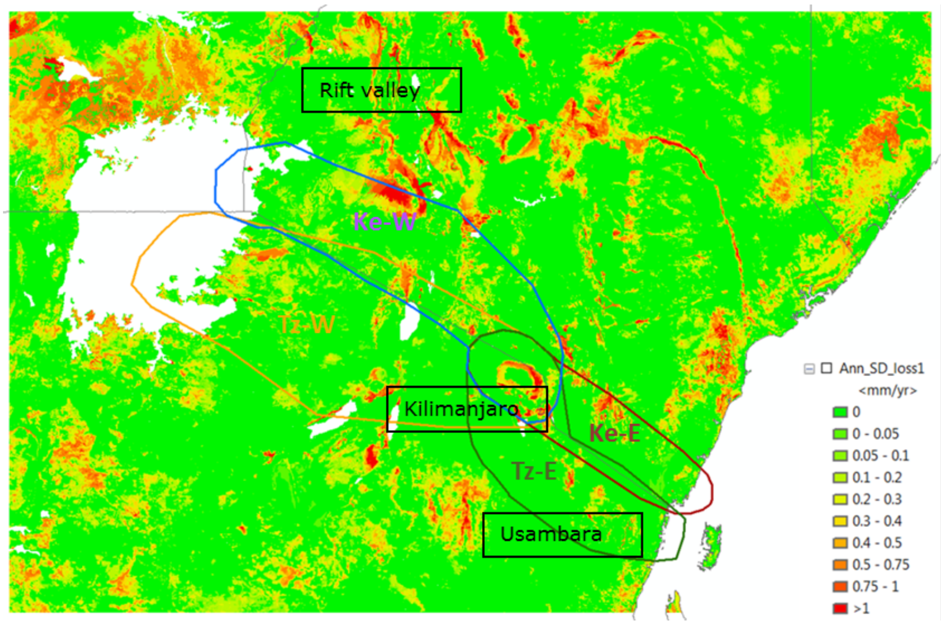

Fig. 2. Figure 2: Annual soil depth loss (mm/year) based on S-World simulations.

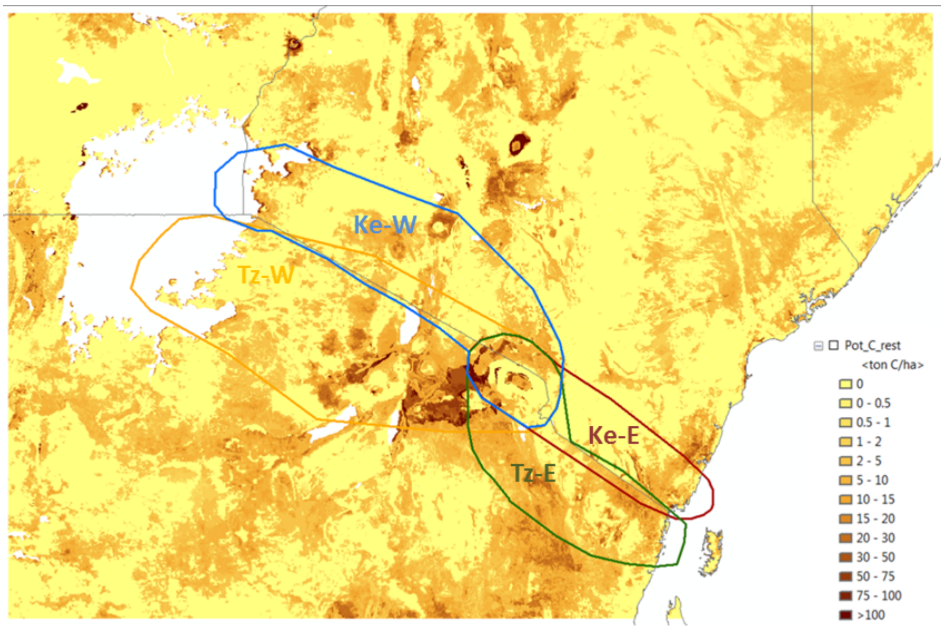

Fig. 3. Figure 3: SOC restoration potential (ton C/ha) based on S-World simulations.

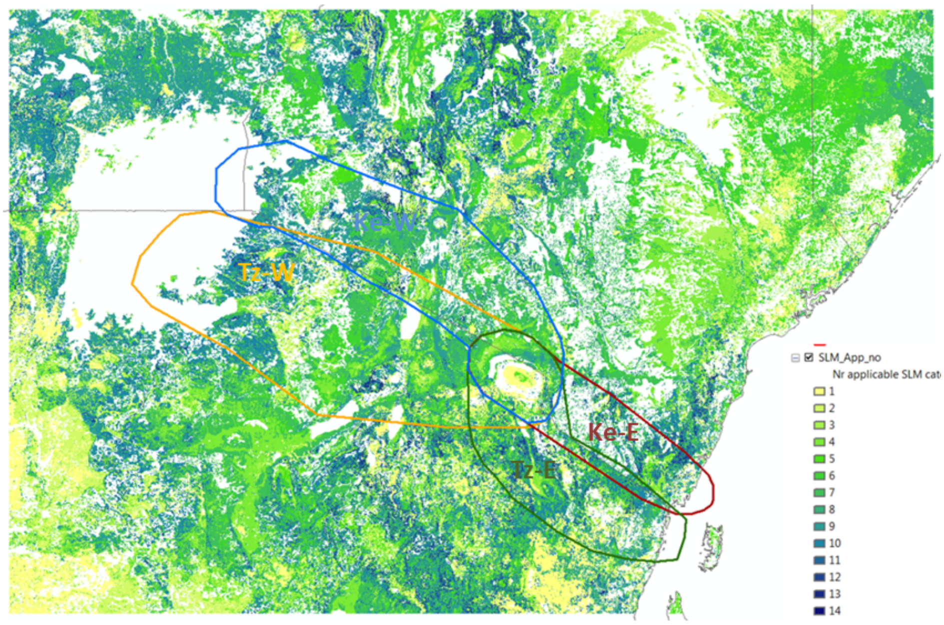

Fig. 4. Figure 4: Number of applicable SLM categories.

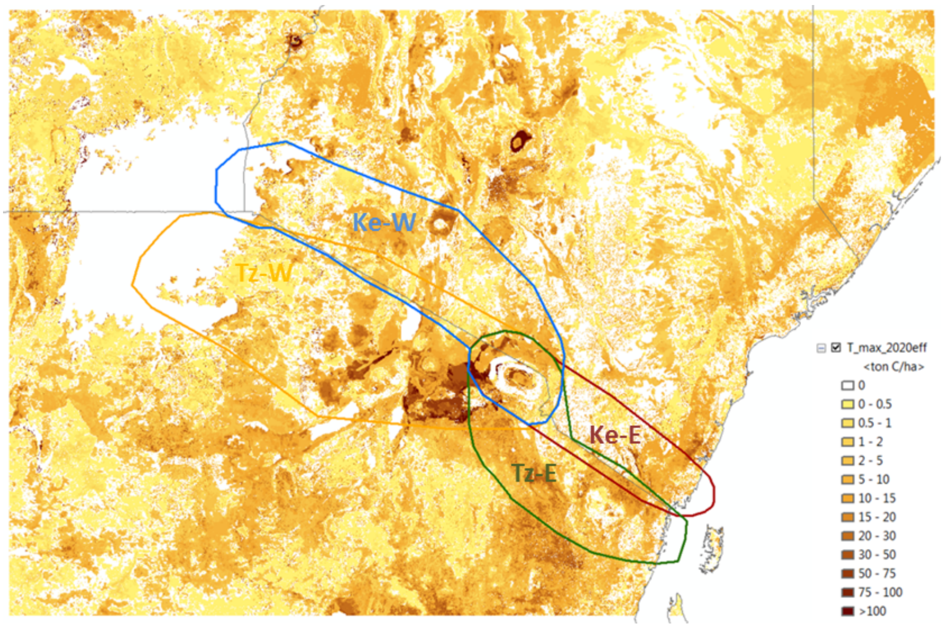

Fig. 5. Figure 5: Total effective SOC restoration potential by 2020 (ton C/ha) realizable by applicable SLM measures.