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Comment on egusphere-2022-301

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Community comment on "Reference soil groups map of Ethiopia based on legacy data and machine learning-technique: EthioSoilGrids 1.0" by Ashenafi Ali et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-301-CC1, 2022

Dear Editor,

This is a very useful work and I congratulate the authors for taking the initiative. I have the following concerns, which I believe the authors will address for this work to be useful.

(1) My main concern relates to the discrepancy between the map they produced in Figure 7 and the Soil Atlas of Africa (see Jones et al., 2013), which is currently the authoritative reference material. For their map to be useful, it is important to reconcile with the map and wherever discrepancies exist it will be helpful to explain. Below are some of the discrepancies:

1.1. Cambisols are represented by a small proportion of the area in isolated pockets of Ethiopia according to the Soil Atlas of Africa. On the other hand, in this manuscript Cambisols are the top ranked in Figure 8. The explanation given for this in the manuscript is unsatisfactory.

1.2. Areas bordering Dijibout and Eritrea that are predominantly covered by Leptosols (according to the Soil Atlas of Africa) are now covered by Fluvisols according to this manuscript. Many of these mountaineous areas are not expected to have Fluvisols because Fluvisols naturaly form in fluvial, lacustrine or marine deposits and periodically flooded areas.

1.3. Areas in eastern and southeastern Ethiopia bordering Somalia that are predominantly covered by Calcisols and Gypsisols (according to the Soil Atlas of Africa) have a continuous cover of Cambisols and some Fluvisols according to this manuscript. That cannot be possible.

1.4. Areas in northwestern Ethiopia bordering Sudan that are predominantly covered by Nitisols, Luvisols and Alisols (according to the Soil Atlas of Africa) have almost a continuous cover of Vertisols according to this manuscript. That also does not make sense given that Vertisols form in depressions and level plains.

1.5. Andosols were shown in Eastern Ethiopia where they are not expected to occur (Andosols are formed from volcanic ejecta) and are common in the Rift Valley. Their occurence outside is uncharacteristic.

2. The colour coding in the map is realy confusing. For example, Acrisols, Cambisols and Leptosols were shown with colours that look alike. For this map to be useful it will be good if it is done with the same colour coding of the Soil Atlas of Africa and the Harmonisation of the soil map of Africa described in Dewitte.

Jones, A., Breuning-Madsen, H., Brossard, M., Dampha, A., Deckers, J., Dewitte, O., Hallett, S., Jones, R., Kilasara, M., Le Roux, P., Micheli, E., Montanarella, L., Spaargaren, O., Tahar, G., Thiombiano, L., Van Ranst, E., Yemefack, M. and Zougmore, R. (Eds.), (2013). *Soil Atlas of Africa. European Commission*, 176 pp., European Commission Luxembourg. DOI: 10.2788/52319

Dewitte, O., Jones, A., Spaargaren, O., Breuning-Madsen, H., Brossard, M., Dampha, A., Deckers, J., Gallali, T., Hallett, S., Jones, R., Kilasara, M., Le Roux, P., Michéli, E., Montanarella, L., Thiombiano, L., van Ranst, E., Yemefack, M. and Zougmore, R. (2013). Harmonisation of the soil map of Africa at the continental scale. *Geoderma* **212**: 138-153. ODI: 10.1016/j.geoderma.2013.07.007.

My appeal to the authors is to compare their soil profile data with used for creating the map with the data used for the Soil Atlas of Africa.

It is also important to check whether imbalances in sample sizes among soil types (e.g., preponderence of vertisols and fewer Gypsisols) has influenced the analysis.

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