



Comment on **essd-2021-60**

Anonymous Referee #2

Referee comment on "A national extent map of cropland and grassland for Switzerland based on Sentinel-2 data" by Robert Pazúr et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-60-RC2>, 2021

The authors present an agricultural cropland, grassland and shrub map for Switzerland based on a random forest classification using optical Sentinel-2 metrics. The overall high impact of agriculture on biodiversity and landscape alteration (including the implied consequences on disaster risk and other domains) demand for a large scale understanding of land cover distribution and organisation in this field. The authors present Switzerland as a challenging case for a random forest based cropland, grassland and shrubland map. This seems plausible and makes the study an interesting case.

Overall, the data and manuscript have good potential for publication. However, I would like to see some improvements with regard to the article and the data analysis before recommending it for publication:

- The authors describe the heterogeneous character of Switzerland, which makes it kind of unique among European countries of the temperate climatic zone, and you also point at strict landscape protection measures and a high demand for ecosystem services. Here, I would like to see a more detailed elaboration. To what degree is it heterogeneous? With regard to topography only? What is an example protective measure? Why is the demand for ecosystem services high? As these environmental and regulatory conditions are a major reason for your innovation, this needs to become clearer. I would suggest to also include references for this. Figure 1: How do the biogeographic regions differ?

- Along with the previous comment: I would be happy to see more background information about the used methods. For example references that show the use of annual image metrics for land cover classification (e.g. Pflugmacher et al. 2019, doi: 10.1016/j.rse.2018.12.001). This can be short.

- Line 50: Please use the full form of Google Earth Engine when using it for the first time.

- I wonder whether the application of three-year Sentinel-2 metrics is applicable for agricultural mapping, especially with frequent crop rotation (which seems to be the case in Switzerland, according to your information). Particularly when grassland is part of the annual crop rotation. Isn't this exactly what you try to distinguish? I doubt if with data from three years, you can distinguish land cover that may change on an annual basis. I suggest using the same procedure with data from one year only, e.g. 2018, which was a rather cloud-poor year, and compare results.

- Considering your indices: Tasseled cap metrics are more robust to mapping vegetation in areas affected by shadows than NDVI metrics. The relief map suggests that shadows could be a frequent challenge in your area. It would be interesting to know if your mapping results are weaker, for example, north of a mountain range compared to south of it.

- Line: 129 f.: I am not a huge fan of thresholding. Please explain if the assumption that non-vegetated areas can be identified by a 95th NDVI perc. could lead to misinterpretation when agricultural plots are fallow for a year.

- Line 145: "its" -> "it's" or "it is"

- Following RC1, I would also be interested to see some example testing sites from the different testing datasets.

- Figure 4: Is this from your training plots?

- Please discuss your selection of metrics. In Fig. 4, it seems like cropland and grassland in the Jura and Plateau region could as well be mapped with `ndvi_pc_05` only, while BLUE could as well be left out. What does this mean for a potential transfer of the models?

- Please discuss what using elevation means for the transfer of your model. I think that elevation could be a very specific variable for Swiss cropland and grassland, not applicable to other regions.

- I underline the comment of RC1: Please show a confusion matrix (maybe instead of Fig. 5) with the exact classification results. This helps to understand where the errors occur.

- In the beginning, you say that a nation-wide map can respond better to the specific demands of local model parameterization compared to a continental map. In line with RC1, I would ask you to show a comparison of your map with large area continental or global maps.

- Please explain your choice for two separate models. Have you tried using one single model for the whole study area? I would be interested to see how this performs and where it is comparatively strong/weak.