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Reply on RC1

Robert Pazúr et al.

Author 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-AC1>, 2021

Reviewer's comment (RC): About the data set used for classification. (1) Sentinel-2 data of three years (2017~2019) were used for mapping cropland and grassland, so that are there landcover changes in the selected years? As far as I am concerned, we need an annual cropland map for agricultural applications, I am puzzled whether this cropland/grassland map is applicable.

Author's reply (AR): The purpose of this study was to differentiate permanent grassland from the areas of different crops. However, due to the crop rotation cycle, some cropland areas may be covered by temporary grassland for a single year. From our mapping perspective these annual grasslands (set-aside fields or meadows) may still be considered as croplands since their dominant use over the time period is cropland. This areas also do not fulfil the criteria to be classified as permanent grasslands. Such differentiation of land uses is only possible using a robust modelling approach which considered more than a single year in the classification model. We have clarified this aim in lines 12, 41 and 58 (in the traced version of the manuscript).

RC: About the features used for classification. I have seen all features used in this study is listed in Table 1, and I found features like `ndvi_pc_05`, `ndvi_pc_25`, so are these features 5th percentile of NDVI recorded from all three-year Sentinel-2 data?

AR: Yes, eg. , the "ndvi_pc_05" means 5th percentile of NDVI recorded from all three-year Sentinel-2 data. We mentioned this in the Tab.1 caption (see the new version of the manuscript).

RC: Generally, we consider the time series characters for cropland/crop type mapping, for example, Low et. al (2015), Hao et. al (2018), I am not sure whether the features collected in this study have the potential to separate cropland, grassland and shrubland.

AR: Thanks for this comment. We found that the time series parameters were crucial to distinguish between cropland, grassland, and shrubland. Using the observations from three different growing seasons, the parameters of the distribution of those features we collected were found as the most important in the modelling process. See section 3.1 of the results.

RC: Furthermore, Figure 4 showed the value range of indices of cropland, grassland, and shrubland, I suggest using some separability measurement methods, like JM distance to evaluate the separability.

AR: We did not apply the separability measure as this are were only informative plots that helped us to justify the usability of the metrics. In the end the separability was defined through interaction of all metrics using the random forest model. Their importance is documented in the new Fig. 5.

RC: And I am also concerned about whether the features of high separability are applicable in the entire study region.

AR: The separability differed between the two regions (Jura and Plateau, and Alps) which demonstrates the different usefulness of the metrics between the two strata. The usefulness of each metric is then prioritized by the random forest model and documented in the new Fig. 5.

RC: For parcel-level testing dataset validation, please show the location of the validation samples, and then show some validation examples to better clarify the validation samples.

AR: Thanks for this comment. However, we described the distribution of the samples and validation procedure in the manuscript. We prefer to not include it as an illustration as the parcel-level testing was used as only one testing approach and we also think that the number of figures in the edited version of the manuscript is already relatively high.

RC: Please show the confusion matrix of the validation samples, which could clearly indicate the misclassification samples.

AR: We included the confusion matrix into the manuscript. Please see Table 2.

RC: Please compare your cropland/grassland map with some existing land cover map, such as FROM-GLC, GLC_FCS30 by wall-to-wall comparison. This can prove that your national outperformed the global products.

AR: We compared our map with the three different datasets with the global coverage: PROBA-V LC, FROM_GLC and GLC_FCS30. The illustration is provided in Figure 8.