

Interactive comment on “Generating a global gridded tillage dataset” by Vera Porwollik et al.

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Thank you very much for providing helpful feedback. Please find below a point by point response to your comments.

Referee #3: My main concern is that the authors have used a series of assumptions and simplified rules to produce their deterministic dataset. However, they haven't acknowledged the uncertainties derived from this process. How confident the user can be in the categories assigned to each cell? I understand that a partial or full verification is not feasible due to the lack of verification data. As the authors mention, the figures/table in S11 can't be considered as a verification as there is a mismatch in the dates. However, the results do suggest that there can be large errors locally.

Authors' response: Our mapping rules are generated on the basis of literature findings on globally relevant tillage types, their underlying reasons, and purposes. In the

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absence of any statistical data for soil management at the global scale (except for Conservation Agriculture (CA) practices), we use proxy relations and data which can indicate tillage types of relevant difference but representative enough for existing cropping systems. We are aware that the use of proxy data and an area prioritization based on simple rules cannot reproduce the spatial patterns of actual tillage systems but rather should be seen as an approximation to reality making best use of available knowledge and data. The comparisons to other data illustrate that major spatial patterns can be reproduced but as you mentioned locally errors might be large. We have extended the discussion of these points in section 4.2, making clear that the data set presents a scenario of current conditions that is based on plausible combinations of best knowledge and data.

Referee #3: Also, there is no mention of uncertainties in the input dataset used (point 2.2.). How reliable are the input datasets used and how is this going to influence the output dataset?

Authors' response: Indeed, each input data set comes with its own uncertainties, which is often not described explicitly but reflected in discrepancies between different data sets on the same entity such as land use patterns (see e.g. Porwollik et al. 2017). We have not explicitly tested the propagation of input data uncertainty but focused on the uncertainty in the parametrization of our allocation rules. We now include this aspect in the discussion, as suggested.

Referee #3: All this should be more explicitly acknowledged in your discussion, so that users are fully aware of the limitations of the dataset. This is my main criticism which I would like to see addressed.

Authors' response: We will add text on uncertainty of our rule based approach, the used input and the output data.

Referee #3: Figure 2: In general, the figures/maps are nice and the choice of colour palette is adequate, except for figure 2, which uses the “rainbow” colour scheme. The

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'rainbow' palette is the default one in many mapping software, and has been widely used in the past. However, it not only poses problem for colour-blind readers (approx. 10% of male population), but also gives misleading perceptions of thresholds in data (e.g. Light and Bartlein, 2004; Hawkins et al., 2015). There is growing support within the scientific community to abandon the use of rainbow colour scheme. It is of course ultimately a personal choice from the authors, but I would suggest you redo the map choosing a different colour scheme.

Authors' response: We agree to your suggestion and improved figure 2 by dropping the rainbow but applying the viridis-color scheme with a break per color step. We additionally included a further break point resulting in an increased shaded pattern in the probability map (in what has been shaded all red only, now is appearing in yellow to light greenish colors). These finer scaling shows more clearly that a lot of high probability values end up in between 0.9 and 1 but especially a lot between 0.999 and 1.

Referee #3: Page 6, line 222: remove "have been"

Authors' response: Agree.

Referee #3: Page 13, line 410: remove "of"

Authors' response: Agree.

Referee #3: Page 18, line 508: remove "in" in "may persist low in"

Authors' response: Agree.

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