

MS No.: essd-2023-9

MS Type: Data description paper

Title: High-resolution distribution maps of single-season rice in China from 2017 to 2022

Dear editor,

We are very grateful for your suggestions on our manuscript “High-resolution distribution maps of single-season rice in China from 2017 to 2022” (MS No.: essd-2023-9). Based on the previous revision, we further revised our manuscript according to these suggestions. Consequently, our manuscript has been improved even more.

Our detailed responses are in the supplement. Please note that the suggestions are in **bold**, followed by our responses in regular text. The revised and newly added sentences have been highlighted in **red**.

Sincerely,

Ruoque Shen, Wenping Yuan, on behalf of all co-authors

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## Reply to Editor

### I have a few minor suggestions:

Thanks for your suggestions. We revised the manuscript based on these suggestions.

**1. In line40, please give the full term of MODIS at the first-time appearance**

We revised the sentence and added the full term of MODIS.

**2. Since transplant is the key to identifying rice in this study, an explanation is needed before this sentence to clarify plant and transplant. For example, the days it lasts, the way it was performed (i.e. was the transplant performed manually or by machine?)**

Thank you for the suggestion, we revised and added some sentences in the method section to describe the transplanting of rice.

“The common method of rice establishment is transplanting. Rice seeds are first planted in a small field or a nursery, and then transplanted to the main field after the rice seedlings reach the three-leaf stage. The transplanting method can be divided into machine transplanting, manual transplanting, and seedling-throwing. All the transplanting methods require the field to be flooded, which is the main feature that distinguishes rice from other crops.” (Lines 144–147)

**3. Besides, it has been reported that direct-seeded rice (DSR) is increasingly used. For DSR, rice seeds are sown directly into the field, as opposed to the traditional method of growing seedlings in a nursery, then transplanting them into flooded fields. If DSR was adopted, then the approach used might fail to detect rice areas. These should be discussed.**

We added several sentences in the Discussion about direct-seeded rice.

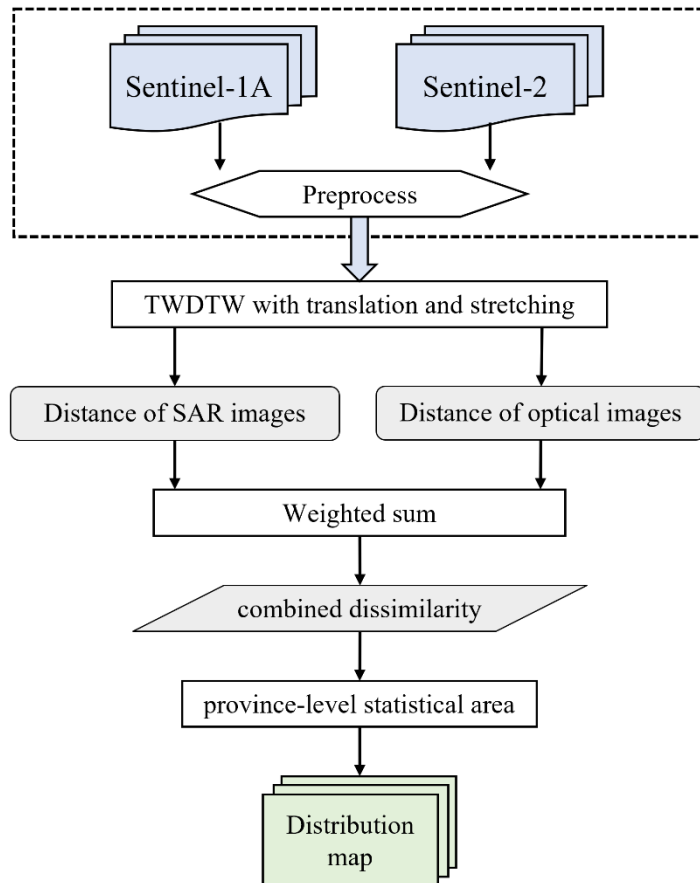
“In recent years, due to the shortage of rural labor, direct-seeded rice (DSR) has been increasingly used in China (Chakraborty et al., 2017). Unlike transplanting, DSR does not require seedling raising and transplanting. Instead, the seeds are sown directly in the main field. Depending on the field conditions, there are three types of DSR: wet direct seeding, water direct seeding and dry direct seeding (Farooq et al.,

2011). The wet direct seeding sowed the seed in puddled soil surface, and the water direct seeding sowed the seed in flooded fields. Most of the DSR belongs to these two types. In contrast, the dry direct seeding sowed the seed in a dry field. Therefore, our method can be used to identify rice fields of wet or water direct seeding by capturing the moisture or flood signal, while rice fields using dry direct seeding cannot be identified using our method. Some studies have also pointed out that certain types of DSR may have a weak flooding signal compared to transplanting, making it difficult to distinguish them from other crops using traditional classification methods (Guo et al., 2019). At present, the proportion of dry direct seeding in China is small, and it has a limited impact on the accuracy of the distribution map. However, as dry direct seeding continues to spread, its impact on rice mapping will become difficult to ignore. New methods for rice mapping must be developed in the future.” (Lines 312–323)

**4. I think a conceptual flow chart will be greatly helpful for readers. Could you add a conceptual figure to describe the method used?**

We added a conceptual flow chart in the method section.

“Figure 3 shows the flow of the single-season rice mapping method proposed in this study, including four steps: (1) preprocess of the Sentinel data; (2) calculate the distances of SAR and optical bands separately using the TWDTW method with translation and stretching; (3) combine the distances of the two bands using a weighted sum; (4) generate the distribution map using a threshold determined by the provincial-level statistics.” (Lines 125–128)



**Figure 3:** The conceptual flow chart of the method.

**5. The insert in the figures should be adjusted to cover the north of 23 N, and better show the entire Taiwan area.**

The maps in the manuscript were created following the requirements of the Standard Map Service of the Ministry of Natural Resources of the People’s Republic of China (<http://bzdt.ch.mnr.gov.cn/index.html>). According to the standard, the northern boundary of the inserted map should be close to the Tropic of Cancer and should not include the entire island of Taiwan.

**6. It seems Figure 10 was not cited in the main text. Please check.**

We checked and found that we did not miss the citation of Figure 10, it was in Lines 230–234 of the previous revision. Since we added the flow chart as Figure 3, the Figure 11 is now cited in Lines 237–241 of this version.

## References

Chakraborty, D., Ladha, J. K., Rana, D. S., Jat, M. L., Gathala, M. K., Yadav, S., Rao, A. N., Ramesha, M. S., and Raman, A.: A global analysis of alternative tillage and crop establishment practices for economically and environmentally efficient rice production, *Sci Rep*, 7, 9342, <https://doi.org/10.1038/s41598-017-09742-9>, 2017.

Farooq, M., Siddique, K. H. M., Rehman, H., Aziz, T., Lee, D.-J., and Wahid, A.: Rice direct seeding: Experiences, challenges and opportunities, *Soil and Tillage Research*, 111, 87–98, <https://doi.org/10.1016/j.still.2010.10.008>, 2011.

Guo, Y., Jia, X., Paull, D., and Benediktsson, J. A.: Nomination-favoured opinion pool for optical-SAR-synergistic rice mapping in face of weakened flooding signals, *ISPRS Journal of Photogrammetry and Remote Sensing*, 155, 187–205, <https://doi.org/10.1016/j.isprsjprs.2019.07.008>, 2019.