We are highly appreciated for your constructive comments and suggestions on our manuscript. Those comments and suggestions are valuable and helpful for revising and improving our article, as well as inspiring our research. We have carefully reviewed the comments and have revised the manuscript accordingly. Our responses are given in a point-by-point manner below and **BLUE** fonts. Please find our detailed responses in supplement to all these comments/suggestions and thank you again for everything you have contributed.

RC3

This manuscript introduced the GMIE-100 dataset, which identifies global irrigated cropland using drought stress performance and machine learning. This is a valuable dataset that could benefit various fields, including agriculture, environmental science, and water resource management. However, I have some major concerns about this MS that need the authors to clarify before it is further processed.

1 The title of the manuscript indicates that the dataset represents the largest irrigated area. How does the author interpret this "largest area"? This requires the author to provide explicit clarification within the text. Additionally, how does the author consider the possibility of overestimation of this largest area relative to the actual distribution, given that our focus is on the actual distribution range?

Response: Thanks for your valuable suggestion comments. The largest area should be understood separately for region with regular irrigation (RIR)and region with irregular irrigation (RIO). For RIR, the largest area means the cropland area irrigated one time at least for last three years (2017-2019). Because we detect irrigation every year for this region. To avoid missing fallow land, we identify the largest extent for last three years (2017-2019).

For RIO, it means the cropland area irrigated one time at least for last ten years (2010-2019). For RIO, irrigation occurs occasionally. We detect whether the cropland is irrigated in the driest year. But in the normal year, the irrigation maybe not necessary in this area. So, this means the largest extent area for last ten years (2010-2019).

We add this explanation in the conclusion and discussion part (Line 477-483).

As for the overestimation irrigated cropland, we can make sure that irrigation occurs one time at least in RIR for last three years (2017-2019) and in RIO for last ten years (2010-2019). In terms of principle of this method, we detect irrigation when it is necessary under water stress. On the other hand, when we compare our result with nation census data, the

result shows high consistent. Compared with USGS-LGRIP30 and GRIPC-500, our result didn't show much overestimation.

2 The samples are derived from different collection methods. It is crucial for the author to clarify whether samples collected through different methods exhibit consistent representation and describe irrigated land in the same manner. If their collection standards vary, the author needs to explicitly discuss the impact on the results.

Response: Thanks for your valuable suggestion. The representation of samples was extremely important for the final accuracy. Nevertheless, it is hard to collect the irrigation field point globally, even crop types samples. So, we fused three independent sources, the GVG field data, USGS-samples and visual interpenetration data. You can see the distribution of samples from three sources in the following figures and a specific number for each country.

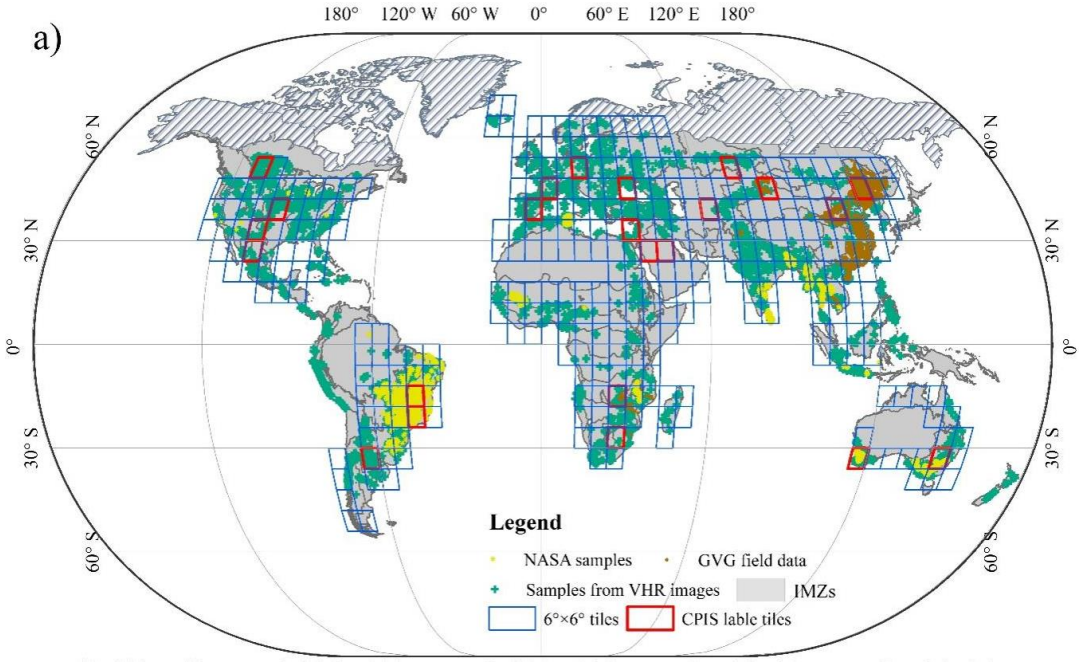


Table 1 Number of samples in different countries and sources

Sources	Number	Distributed country
GVG field data	78,338	China(72,224) \Cambodia\Ethiopia\Zambia\ Zimbabwe
USGS-samples	17,076	Brazil (13,368), Australia (2,192), Thailand (393), and Tunisia (389)
VHR-interpratation	19,965	Rest Countries
total	115,379	

From different country, there is varied dominant samples source. Such as in China, most of samples was obtained from GVG field survey. While in Brazil, major samples were from USGS samples. Except country with GVG and USGS-samples, the visual interpretation

data was dominant sources of samples. This also ensure the represented manner of irrigated cropland.

This could definitely introduce some uncertainty in terms of samples representatives. This effect should be acceptable in arid and semi-arid regions because the irrigation performance is relatively easy to identify. However, the uncertainty maybe enlarged in wet region due to complex manner of irrigated cropland.

We add this uncertainty of representations in the discussion part (Line 510-517) shown as below:

"It is hard to collect the filed samples globally, we fused three sources of samples. From different country, there is varied dominant samples source. Such as in China, most of samples was obtained from GVG field survey. While in Brazil, major samples were from USGS samples. Except country with GVG and USGS-samples, the visual interpretation data was dominant sources of samples. This also ensure the represented manner of irrigated cropland. Overall, the number of samples was very large. Basically, this irrigated and rain-fed samples database could meet the globally irrigated cropland mapping compared with global cropland expansion mapping research (Potapov et al., 2022), which achieved cropland mapping globally with thousands samples.

Meanwhile, this fused samples maybe introduce some uncertainty in terms of representation. This effect should be acceptable in arid and semi-arid regions because the irrigation performance is relatively easy to identify. However, the uncertainty maybe enlarged in wet region due to complex manner of irrigated cropland. "

3 In terms of accuracy assessment, merely providing overall accuracy is insufficient. Please refer to best practices for reporting accuracy as outlined in papers such as Olofsson et al. 2014 [1]. Moreover, I have not observed quantification of uncertainty, which necessitates further work from the author.

Olofsson P, Foody GM, Herold M, Stehman SV, Woodcock CE, Wulder MA. Good practices for estimating area and assessing accuracy of land change. Remote Sensing of Environment 2014; 148:42–57. https://doi.org/10.1016/j.rse.2014.02.015.

Response: Thanks for your valuable comments. We will changed all the accuracy assessment following the commended practice and evaluate the uncertainty of total area estimation.

Briefly, the overall accuracy of GIME-100 was 83.6%±0.6% with producer accuracy of 86.1%±0.7% and UA of 82.20%±0.8%. And the total area of GMIE is estimated as 403.17±9.82Mha, accounting for 23.4%±0.6% of the global cropland.

For the GCPIS data ,the overall Accuracy was 97.87%±0.1% with producer accuracy of 81.75%±0.2% and UA of 92.68%±0.1%. And the total area of GCPIS is estimated as 11.5±0.01Mha.

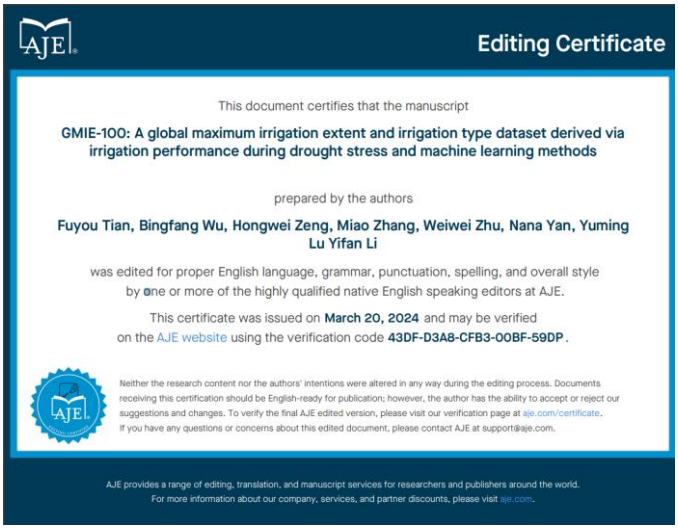
We have changed the statement of accuracy assessment and area estimation in the body text.

4 The results and discussion sections lack necessary citations. Many explanations proposed by the author lack corresponding literature support, which makes it difficult for me to be convinced of the correctness of your interpretations. Please see the annotations I've made in the manuscript.

Response: Thanks for your specific comments. We add necessary citation in the revised version. Please see the resubmitted version.

5 I have made several annotations in the manuscript indicating areas that need revision. It is advised that the author make corresponding modifications and carefully review the entire document to rectify similar errors.

Response: Thanks for your nice suggestion. Firstly, AJE have re-polished this MS for us, and the certification is show as below. Also, we carefully check the whole MS again and revised the similar errors. Please see the revised version.



AJE

Editing Certificate

This document certifies that the manuscript

GMIE-100: A global maximum irrigation extent and irrigation type dataset derived via irrigation performance during drought stress and machine learning methods

prepared by the authors

Fuyou Tian, Bingfang Wu, Hongwei Zeng, Miao Zhang, Weiwei Zhu, Nana Yan, Yuming Lu Yifan Li

was edited for proper English language, grammar, punctuation, spelling, and overall style by one or more of the highly qualified native English speaking editors at AJE.

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Potapov, P., Turubanova, S., Hansen, M. C., Tyukavina, A., Zalles, V., Khan, A., Song, X. P., Pickens, A., Shen, Q., and Cortez, J.: Global maps of cropland extent and change show accelerated cropland expansion in the twenty-first century, Nat Food, 3, 19-28, 10.1038/s43016-021-00429-z, 2022.