

This paper produced a long-term SIF dataset (LHSIF) from 1995 to 2023. This topic is of significant importance for global-scale carbon simulation and vegetation studies. I think the datasets preprocessing procedures are solid. However, there are some questions I am concerned, especially about the reliability of the inter-annual trend in the SIF data from 1995 to 2000. There are many spelling errors in sentences throughout the paper. I listed as much as I could found. Please double check to avoid such errors and also try to avoid using 'Figure.... illustrated...' as the beginning of a paragraph in the result section. Following a logical writing orders is necessary. I recommend minor revision and here are some comments I wish the authors could give explanations before accepting this paper for publication.

Minor Reviews:

1) You didn't mention how do you do quality control for GPP provides by FLUXNET. Did you use the quality flag data of "GPP_DT_VUT_REF" during SIF production?

2) I am concerned whether the interannual trend in SIF before 2000 is true or reliable. For example, in Figure 7, we did not see much difference in yearly maximum global-averaged SIF based on the SIFu or SIFc from 2000 to 2023. The large discrepancy mainly occurs in year 1995 to 2000, when SIFu is significant higher than the SIFc with a significantly decreasing trend (mainly provided by GOME?). However, there exists large discrepancy between SIFu and SIFc before 2000. How could you convince the readers that such inter-annual trend in SIF in year 1995 to 2000 is reliable? There is no validation of this trend from 1995 to 2000 as far as I can see in the paper.

3) Line 21: You should better change a word to substitute 'tool' in line 21. How could a dataset be a tool? How about "Therefore, the long-term harmonized SIF dataset with a fine 0.05° resolution is valuable for estimating global photosynthesis over extended periods."

4) Missing space in multiple places in sentences.

Line 22: Missing space: "The LHSIF dataset is available at <https://doi.org/10.5281/zenodo.14854185> (Zou et al., 2025)."

Line 138: There should be a comma in " $0.5^{\circ} \times 0.5^{\circ}$, and $1^{\circ} \times 1^{\circ}$ ".

Line 144: GPP (Berry et al)

Line 153: Missing space : 2 m.

Line 154: Missing comma: f(NIRv), f(VPD), and f(AT),

Line 159: "L-BFGS-B" algorithm (Byrd et al., 1995)

Line 167: Two blank spaces here. " 0.05° , were"

Line 445: Missing space before the reference.

5) Incomplete sentence in Line 267: "The temporal and spatial distributions of the spatial downscaling residuals were analyzed (Fig. 4). The residual was calculated as the difference between ? As shown..."

6) L353: Please do grammar check and change this sentence to: "To highlight the overall

correlation, the data in June for these two sites were removed from the scatter plots.”

7) Line 434: Upper foot label for m-2 in “residual less than $0.05 \text{ mW m}^{-2} \text{ sr}^{-1} \text{ nm}^{-1}$ ”.

8) Line 303: please add an ‘and’ in “0.05; and significant increase”.