

Earth Syst. Sci. Data Discuss., referee comment RC2  
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## Review comments

Anonymous Referee #2

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Referee comment on "The Fengyun-3D (FY-3D) global active fire product: principle, methodology and validation" by Jie Chen et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-27-RC2>, 2022

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General comments:

This paper introduced a new data set of active fire using FY-3D satellite. The authors introduced the product specifications, underlying algorithm and notably they compared their product with MYD14A1 MODIS active fire product. I believe such a product, other than MODIS, should surely be welcomed for the community. But unfortunately, I cannot offer its publication in ESSD. However, my views might be biased because of vegetation modeling perspective. Below are my arguments:

- In the background, the authors seem mixing different products of fire mapping. The area actually burned by fire, or burned area products, are the dominant products in terms of fire mapping nowadays used by Earth system science community. Notably, these data can allow estimation of fire emissions for multiple substances, such as CO<sub>2</sub>, black carbon and aerosols, which are crucial for climate prediction. They also allow for study fire impacts on ecosystems, another critical domain of vegetation fires in the field of Earth system science. The second dominant fire product by satellite mapping, is the one presented here but also made available by MODIS team, that is, active fire mapping. When the authors mentioned "continuous degradation" of mainstream global fire products. I don't know what the authors are referring to. I don't see this degradation. ESA is actively working on 20m-resolution burned area mapping which reveals much higher burned area in Africa than moderate resolution data. (

<https://doi.org/10.1016/j.rse.2018.12.011>).

- Is there degradation in active fire mapping by MODIS? I am not sure on this though. But at least MODIS active fire product provides a long term data covering about 20 years and there no other better data so far (prior to the publishing the current data in the paper).

- The paper lacks serious ground validation of the product. The only serious validation is shown in Fig. 5, but the paper only says the ground truth data are derived from visual interpretation (line 371). More information is absolutely needed on ground truth data to demonstrate that such data can be trusted and provide ground truth.

- How about omission and commission errors? These are basic metrics used in satellite product evaluation. But such information is absent in the current paper.

- In my first general comment, I elaborate on the usefulness of burned area product in the field of Earth system science. For active fire product, as is also stressed in the paper by the authors, the major usefulness is fire monitoring. But this will need fast response and accuracy. This comes to the major evaluations standard used in the paper when they compare with MODIS data. I think a 0.03° threshold error for the monitoring purpose is quite of high tolerance. This means the error could be permitted 3 times as much as the spatial resolution of the product? Is this too big?

- In the comparison with MODIS data, what do you do with pixels which are identified as active fire but not shown in your data? I don't understand how 'matching' and 'mismatching' can cover the concept of commission and omission errors.

- I suggest authors could consider a target remote sensing journal, where more specialized reviewers are more likely available and can provide more relevant comments to help improve the quality of the work.

- The author should work to improve readability. So far the english and arrangement are fine, but to follow the paper needs quite a lot effort.

Nonetheless, I also have some minor comments, which I hope can help:

Line 13: I don't see what the author mean here. There are uncertainties by different products. But I don't see they are in 'continuous degradation'. The authors have to provide evidence when making such a conclusion.

Line 35: " millions of lost wildlife". pls check.

Line 49-52: The citation of MODIS fire products of Giglio et al. 2003 is outdated. The most recent, as far as I know, is Giglio et al. 2018 (<https://doi.org/10.1016/j.rse.2018.08.005>). Also, I think the temporal resolution is daily. Pls check.

Line 64: what is the sense of this 16 days temporal resolution ?

Line 70-72: citation needed.

Line 83-84: Wang et al. 2012 evidence for decrease in reliability of MODIS fire products? What are the quantitative standards for 'high-quality'?

Line 115-118: what is the relevance for fire mapping?

Line 241: should the identification of cloud pixel meet any one these criteria in Table 3?

The brightness temperature seems referring to all channels of 20, 24 and 25. The authors should state specifically which of them they are referring to when using this in the article. E.g., line 250. Or at least clear definition is needed to indicate which bands the authors are referring to when talking about "background rightness temperature", and other terms.

Line 453: The authors confuse on the concept of 'precision' vs. 'accuracy'. see [https://en.wikipedia.org/wiki/Accuracy\\_and\\_precision](https://en.wikipedia.org/wiki/Accuracy_and_precision) Accuracy and precision are two measures of observational error. Accuracy is how close or far off a given set of measurements (observations or readings) are to their true value, while precision is how close or dispersed the measurements are to each other. Here the practice could be best called a consistency test with MODIS data, because neither MODIS or FY-3D gives the true value.

Line 100: FY-3 => FY-3D?

Line 379-381: the text says that the threshold is  $0.02^\circ$  but the equation says a threshold of  $0.03^\circ$ . Which one is the correct? Also see line 427.

Line 425: given the scope of the whole globe, visual checking of underlying surface areas to exclude water, ice, snow and bare land seems quite challenging. Are there a lot pixels ?

Line 423-425: if MYD14A1 has a daily temporal resolution, is this in contradiction with that data set with observation time less than 1 h is selected?

Line 123: Product overview. I suggest the authors put a table specifying the main characteristics of the data, saving the readers' time to find them through the texts.