Dear reviewer,

In this document, your original comments are framed by a box and our answer follows.

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1. The methodology section is too brief and the reader needs to go through many other publications to gain even an overview of the current one. This is inconvenient for the general readers. E.g. in line 12 of page 3, instead of directly pointing to Caserio et al. (2018), just very briefly give an overview of the salient features of the algorithm.

Similarly, for line 19 of page 3, explain why analyzing he cluster of contiguous hot pixels advantageous than the spatial maxima method. Additionally, what could be the disadvantages of this method and how are they taken care of: e.g. What are the possibilities that pixels representing different intensities taken as an average may lead to an overall over or underestimation for a grid or lead to a mixing of two very different signals.

We have added several sentences in the beginning of the methodology section. However, since the methodology has already been published and this paper is intended to describe a dataset, we preferred to keep comments on the methodology short in order to keep the focus of the reader on the data.

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2. Section 2.2.2 : state the background, advantages and disadvantages for using the Equations 1 and 2.

Equation 1, user's accuracy: The User's Accuracy is the accuracy from the point of view of a map user. This metrics represents the frequency with which a class on the map corresponds to the ground truth. In our case, the User's accuracy is quantified between at least the verified flaring locations and at most the sum of the verified and the likely flaring locations.

Equation 2, commission error: Commission errors are calculated by reviewing the classified sites for incorrect classifications. In the present work, the commission error is quantified between at least the locations without any industry or infrastructure and at most the sum of the locations without any industry or infrastructure and the unlikely flaring locations.

We have updated the manuscript accordingly.

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3. Section 2.3: The BC estimation formula seems too oversimplified. E.g. equation 4 does not take into account the different flares leading to different amounts of BC emissions over the year. This may be a reason leading to underestimation w.r.t. other inventories: I believe authors should instead try something like a weighted average or a more representative method to arrive at a better estimate.

The BC emission factor takes into account the different state of a flare in terms of burning efficiency in that it is determined as a function of temperature (please refer to Figure 3). While appearing to be simple, we argue that this methodology goes beyond differentiating between static flare types by parameterising the underlying physical reason (flare temperature resp. burning efficiency). It is therefore able to account for different and varying emission factors. Equation 4 is used to compute the total activity or emission of a flaring site. We agree that the estimation of the number days of operation for each flaring site is the part of the entire method with the most assumptions and thus

the largest potential source of errors. However, we consider it to be a valid approach when only detections of hot spots are available as input. Please refer to our answer to the corresponding comments by Chris Elvidge for more details.

4. The diagrams need to be more complete by themselves e.g. y label missing in fig 11, 12 (only writing it within caption is not sufficient), cbar label missing in fig 10

Figure 10, 11 and 12 were removed from the manuscript following the recommendation by the other anonymous reviewer.

Page 2 Line 11: Contributions to what e.g. CO2 equivalent?

Page 2 Line 14: Replace 'emitted' by 'from'

Page 3 Line 4: Replace 'chapter' by 'section'

Page 21 line 9: what is Upstram?

Page 24 Line 4: Replace 'allow' by 'allows'

The Upstream oil and gas industry is that part of the oil and gas industry which includes searching for potential underground or underwater crude oil and natural gas fields, drilling exploratory wells, and subsequently drilling and operating the wells that recover and bring the crude oil or raw natural gas to the surface. An addition was made to the text.

All the other recommendations were followed.