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Interactive comment on "A global map of emission clumps for future monitoring of fossil fuel CO_2 emissions from space" *by* Yilong Wang et al.

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This paper presents an algorithm for generating distributions of CO2 emission hot-spots based on a high-resolution proxy. It applies this algorithm to generate such a distribution for 2016. It assesses the sensitivity of the distribution to parameters in the algorithm.

The paper is probably in scope for ESSD. My only concern is that it adds value to an existing data product rather than generating significant new data itself. Its main contribution is likely to be the clumping algorithm it uses and I urge the authors to make the algorithm as well as the data available. The paper is also clearly written and presented.

I believe the paper makes a significant contribution. My main concern is some unexamined assumptions. Most crucially the underlying data set is not a true map of emissions but of emission proxies, mainly nighttime lights plus off-line estimates of emissions from power-stations. The spatial distribution of the proxy might well differ systematically from that of real emissions. In particular, there is a good chance that on-road emissions have greater spatial extent around emission cores than nighttime lights and may serve to amalgamate proximal clumps. This is testable now since the recent VULCAN product is available at the same resolution and includes these emissions. I recommend running the algorithm over VULCAN and ODIAC within the contiguous U.S. for the same year and comparing results.

Some specific comments

L140 I did not think the DMSP lights were available for 2016 but that ODIAC had switched to VIIRS.

L240 Probably there is no need to mention the python version though pointing out the package used is good. Note my firm suggestion above that the algorithm be made available.

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