

## ***Interactive comment on “Development of a global 30-m impervious surface map using multi-source and multi-temporal remote sensing datasets with the Google Earth Engine platform” by Xiao Zhang et al.***

### **Anonymous Referee #2**

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The paper describes a new impervious surface dataset developed by combining several remote sensing instrumentation at 30m resolution. As described in the introduction, several datasets describing impervious studies exist at a global scale. The strength of this paper is in my opinion the use of multi-sensor information and the use of an open-source platform the generate these maps (Google Earth Engine). Furthermore, a relatively good accuracy of the map is achieved compared to three other impervious surface products. The paper is very well written and is easy to follow. The introduction also gives a very good overview of current existing literature. The paper is

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very mature and contains all information one would expect for this kind of work. Most of the comments that popped in my mind while reading the paper were assessed later in the manuscript. As such, for me only minor revisions are necessary. I describe some comments below.

#### General comments

- Training points are achieved from Globeland30 and are not independent based on independent experts (which is done for the validation data). Several checks are done on the training data, but you are still using a derived product with errors to train your model. In the discussion, this problem is assessed (section 5.2). However, I would state this more clear that the training sample can contain errors in the material and methods section and potentially move the discussion to the material and methods section or refer in the material and methods section that this problem will be assessed later.
- Only homogeneous training points from Globeland30 are included. Therefore, the training points are always clear impervious surfaces leading to only clear impervious surfaces to be classified later. Don't you underestimate the total amount of impervious surfaces then in your final product? How does the total % of impervious surface compare to Globeland30, GLC and NAUCI for the globe? This can maybe be compared to the results presented in figure 5
- The validation points are retrieved from 12 regions. How representative are these regions for the globe? Since impervious areas might have very different characteristics depending on the region. For Africa for example, the validation points are achieved for two big cities only.

#### Specific comments

- Globeland30 data from 2010 is used as training data. How do you account for changes in urban areas between 2010-2015? You state that there is an irreversible state from non-impervious to impervious surfaces, but this could mean that some im-

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pervious surfaces in 2010 have now changed to impervious in 2015.

- Add to table 1 that the 15 + 85 percentile are used for the Landsat bands and vegetation indices

- Line 265, remove 'the'

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