

Reply on RC2

Aizhu Zhang

Community comment on "High-resolution and Multitemporal Impervious Surface Mapping in the Lancang-Mekong Basin with Google Earth Engine" by Genyun Sun et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-251-CC2>, 2022

This manuscript provided 10-m resolution impervious surface area data using Sentinel-1 and Sentinel-2 data in Lancang-Mekong Basin. Overall, the novelty of this paper is not qualified for publication in ESSD for the following reasons.

(1) Mapping of impervious surface area at the global scale with 10-m or 30-m resolutions has been widely reported in many studies. The method employed in this paper doesn't show significant improvement regarding the novelty of mapping approaches as well as the mapped results and influences.

Response: In this paper, we propose a framework for fusing multi-source data based on the GEE platform to address the lack of available multi-temporal 10m impervious surface datasets due to multiple factors in the Lancang-Mekong Basin, and finally publish a dataset of impervious surfaces in the Lancang-Mekong Basin for the period 2016-2021.

(2) Although the migration strategy of training samples across years highlights in this paper, some concerns may introduce uncertainties in this study. For example, the sampling in 2016 may omit those urbanized regions in 2021, which may bias the classification results (see Table 4). Also, the threshold of SAD is challenging to determine if these pixels have experienced change or not.

Response: In fact, the rate of renewal of impervious surface categories is much less than the rate of area expansion. That is, there will be the same material and spatial characteristics of impervious surfaces in urbanized areas in 2021 that existed in 2016. Considering this, the ultimate purpose of samples migration is simply to avoid the error that occurs in imaging over many years of images, and if this error does not exist, it is in fact only necessary to use the model trained in 2016 for classification. About the threshold of SAD, we experimentally obtained the division thresholds by selecting a number of sample points, including both changing and non-changing classes.

(3) The temporal consistency check is not the novelty of this work. This approach was initially proposed in the RSE paper in 2015 (in the case of Beijing). Unfortunately, I didn't find the citation of this work when they introduced the "temporal consistency check" part, and the overall framework is highly similar to that one.

Title: A 30-year (1984–2013) record of annual urban dynamics of Beijing City derived from Landsat data.

Response: Thanks, we should cite it here.

(4) It is unfair to compare the local mapping results with those of global products because it is a space-specific application at the river basin. I think the proposed approach cannot be extended directly to other regions (even the globe).

Response: It is true that this comparison is unfair and that the globally shared samples and methods may not yield good results for a special region like the Lancang-Mekong Basin. However, this is the only method used for comparison, as no other products specific to the LMC Basin exist. It also illustrates the need to develop products for a particular region, which is the point of our proposed methodology.