

The paper describes 30m resolution population density maps for the US. The resultant map is a product of disaggregating 2010 US Census block-level data using an NLCD and additional geospatial layers to identify uninhabited areas. The paper describes only EPA EnviroAtlas Dasymetric Population maps and does not mention other high-resolution population maps available for the entire conterminous US. For example, a 30m resolution population density maps for the conterminous US has been already created and it is available via the SocScape project (<http://socscape.edu.pl>, see paper for further information <https://www.sciencedirect.com/science/article/pii/S0198971516301983>). The 2010 map available via the SocScape project is a product of disaggregating block-level population data using NLCD2011 and land use map for further identification of uninhabited areas (Theobald 2014) and uses a similar approach to dasymetric modeling (Mennis and Hultgren, 2006).

Authors should describe other high-resolution maps available for the US and discuss how their product advances the map that already exists (available via the SocScape project)

We thank Dr. Dmowska for her comments and introducing us to the SocScape project. We are intrigued by both your population grids and racial diversity grids. The primary focus of our paper was to advance the intelligent dasymetric mapping (IDM) method specifically. To that end, we developed two modern IDM toolboxes with new functionality to mask uninhabited areas, clarified Eq. 3, modified Eq. 5, and released an updated national 30m dasymetric population map for the CONUS. We initially chose to limit our comparison to the 2016 version of the EnviroAtlas 30 m dasymetric population map because that map was developed with the specific methods we were intending to improve.

The authors agree the dasymetric methods are similar, particularly for ancillary class densities determined with sampling, but the identification of uninhabited areas and our use of sub-national zones are different. In a comparison of national level RMSE using the methods described in Dmowska and Stepinski (2017) our results were comparable, with our RMSE being slightly higher. The Theobald land use map (Theobald 2014) is likely a better proxy for identifying uninhabited areas for CONUS in 2010. However, the Theobald land use map was developed using 2006 land cover data and we question what alternatives are available if the Theobald map is not updated for 2020 or for areas that do not have the benefit of comprehensive land use data. The combination of identifying uninhabited areas along with the use of regional zones was beneficial for our product and would likely be useful for others.

The authors acknowledge that the SocScape-30 population density map described in Dmowska and Stepinski (2017) is important and warrants comparison. We particularly appreciate Fig. 3 as it effectively illustrates the challenges of assuming homogenous density of ancillary classes. We referenced Dmowska and Stepinski (2017) in our introduction and added a comparison to the project in our discussion.