

Response to Review ESSD-2020-201-RC2

This paper introduces an extended time-series (2000-2018) of NPP-VIIRS-like NTL data through a cross-sensor calibration from DMSP-OLS NTL data (2000-2012) and a composition of monthly NPP-VIIRS NTL data (2013-2018). The authors claim that compared with the annual composited NPP-VIIRS 20 NTL data in 2012, their product of extended NPP-VIIRS-like NTL data shows a good consistency at the pixel and city levels with R^2 of 0.87 and 0.95, respectively. The paper is well organized and written clearly, and the data set should be of interest to users who use the NTL data. Therefore, the paper should be accepted for publication after the follow issue is addressed.

Response: Thank you very much for your suggestions and comments. The manuscript has been revised carefully according to your comments. Please see our response and revision below.

Comment 1: It is strongly recommended that a short description of the uniqueness of the method used should be included in the abstract. The current abstract only tells the reader that there is a new product and it is better, but it fails to say what it is and how it is produced. For example, if the uniqueness is that they relied on the vegetation index adjusted NTL to perform the simulation, it should say so up front in the abstract, so that readers can get the main point without having to read the entire paper. Other than that, the paper is well written.

Response: Thanks for your suggestion. In this study, we developed a new cross-sensor calibration method using image enhancement. This method includes four key steps. In the Step 1 we adjusted the DMSP-OLS NTL data using a vegetation index, named as the enhanced vegetation index-adjusted NTL index (EANTLI). In the Step 2, the EANTLI and NPP-VIIRS NTL data (2012-2013) were used as the input and label data of auto-encoder (AE) model. By training the AE model, a model of NPP-VIIRS-like NTL data simulation was built. In the Step 3, driven by the EANTLI from 2000 to 2012 in the trained AE model, the NPP-VIIRS-like NTL data was built. Finally, by merging with the composited annual NPP-VIIRS NTL data (2013-2018), an extended time-series (2000-2018) of NPP-VIIRS-like NTL data were built.

We have added a short statement of our methodology in the abstract, as “However, the difference in their spatial resolutions and sensor design requires a cross-sensor calibration of these two datasets for analyzing a long-term urbanization process. Different from the traditional cross-sensor calibration of NTL data by converting NPP-VIIRS to DMSP-OLS-like NTL data, this study built an extended time-series (2000-2018) of NPP-VIIRS-like NTL data through a new cross-sensor calibration from DMSP-OLS NTL data (2000-2012) and a composition of monthly NPP-VIIRS NTL data (2013-2018). The proposed cross-sensor calibration is unique due to the image enhancement by using a vegetation index and an auto-encoder model.”