



## **Quantitative evaluation and exclusion of the blooming effects in the DMSP-OLS nighttime light images with a simple self-adjusting model**

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The night-time light (NTL) data from the Defense Meteorological Satellite Program (DMSP) Operation Linescan System (OLS) provides an important observation for human activities; however, DMSP-OLS data suffers from problems such as saturation and blooming. There have been increasing attentions on saturation effect and correction. While for blooming effect, few researches is existing. Most researches about blooming effect are still qualitative rather than quantitative. This paper takes China as study area to measure blooming distance of DMSP-OLS data and explore the contributions of three main factors on blooming effect. We also developed a self-adjusting model (SEAM) to correct blooming effects in DMSP-OLS data based on a spatial response function and without using any other ancillary data. We found that the average effective blooming distance is about 3.5 km in China, and it is related to the water area surrounding the city. The performance of SEAM was evaluated in whole China and twelve cities with different population sizes. Results show that SEAM can largely reduce the blooming effect in the original DMSP-OLS data and enhance its quality. The images after blooming effect correction have higher spatial similarity with Suomi National Polar-orbiting Partnership (NPP) Visible Infrared Imaging Radiometer Suite (VIIRS) images and higher spatial variability than the original DMSP-OLS data. The effectiveness of the proposed model will improve the capacity of DMSP-OLS images for mapping urban extent and modeling socioeconomic parameters.