

ABSTRACT

Light pollution is no longer seen as a problem only for astronomy. Light pollution is an emerging environmental problem that comes along with more intensive urbanization and industrialization. In the last few years, it has been recognized as a serious pollution problem with negative consequences for the environment and human health. The threat to human health from light pollution has increased dramatically in recent decades, and it is estimated that today more than 80% of the world's population is affected by the prevalence of light pollution in various forms. The main producers of light pollution are large cities and industrial complexes, street and advertising lighting. Most of the emitted light is directed or reflected upwards, creating so-called light domes above the residences. In the night sky, changes in brightness are prominent in suburban environments, while these changes are less noticeable in rural landscapes.

This thesis examines the state of light pollution and its impact on the brightness of the night sky in the Czech Republic and Ukraine for the period 2013-2021 using data from VIIRS satellite images received from the Google Earth Engine platform. JavaScript code was created for this data to group the images to create a map of light pollution damage per calendar year and classify light spots by degree of pollution. After that, all the obtained data were uploaded to ArcGIS Pro, where I visualized the data and processed it statistically.

The results indicate that the changes in light pollution are not associated with the change of season, rejecting my first hypothesis that the intensity of light pollution differs between the cold and warm seasons. Another result was that the pollution is constantly growing and increases by 7.6% of the area and 12.1% of the brightness of the pollution in the Czech Republic and 6.4% of the area and 9.4% of the intensity of the brightness in Ukraine. If today's annual growth of light pollution is maintained, in 5 years we will get an increase of 52% of the area of pollution and 98% of brightness. This work also presents a detailed map of the intensity of light pollution in the investigated area, providing a comprehensive view of the issue.

Keywords: light pollution, satellite images, night sky brightness, VIIRS, GIS.