Summary

The natural environment that surrounds us is exposed to the influence of many different pollutants, mainly of anthropogenic origin. A common phenomenon observed over urbanized areas and in their immediate vicinity is artificial light pollution of the night sky. This is a significant problem of the modern night city landscape. The decrease in the visual quality of the night sky is noticed by both scientists dealing with this field and ordinary inhabitants. The consequences of excessive amounts of artificial light in the lower part of the troposphere are noticeable throughout the ecosystem and affect humans, animals and plants. It becomes necessary to improve the condition of the light-polluted night sky in most places in the world today. To understand the scale and distribution of the phenomenon, its long-term monitoring and further analysis of its characteristics, variability and components are necessary. Systematic and focused research on the issue of excessive external emission of artificial light is conducted in the world by only a few interdisciplinary research groups and non-governmental organizations. To better understand the described phenomenon, a wireless, automatic network monitoring the state of the urban night sky was established in Toruń in 2020, and since then it has been systematically expanded. As part of the doctoral dissertation, the entire process of building a light pollution monitoring network in an urbanized area was presented, as well as the results of tests and analyses carried out based on measurement data recorded by self-designed measuring devices. The scientific research carried out allowed us not only to know the degree of artificial light pollution in the area of Toruń, but also to know the seasonal and spatial (horizontal and vertical) variability of the described phenomenon. Thanks to the use of additional independent photometers, the obtained results were also related to the results obtained outside human clusters. This allowed us to determine the differentiation of light pollution in the gradient of decreasing human impact.

Keywords: light pollution, LoRa, monitoring network,LoRaWAN, night sky, vertical measurement, spatial distribution, SQM, Toruń