

ANALYSIS OF AEROSANITARY AND BIOTOPOCLIMATE CONDITIONS IN LEGNICA FOR LANDSCAPING PURPOSES

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ABSTRACT

As a result of progressing climate changes and urbanisation the discomfort of living in cities affects a growing number of their citizens. Therefore, it seems reasonable to conduct research dedicated to the assessment of aerosanitary and biotopoclimate conditions as well as to use the results of the research in the landscaping of urban areas. The purpose of the dissertation was to analyse the relationship between air pollutant concentrations and the bioclimate indices describing different weather conditions and their potential for use in the landscaping process. The assessment of aerosanitary and biotopoclimate conditions was based on hourly and daily NO₂, SO₂, CO, O₃, PM_{2.5} and PM₁₀ concentrations and such bioclimate indicators as TE, TRE, STI, PST, PhS and UTCI. Descriptive statistics and frequency analysis were used to assess the temporal distribution of gaseous pollutants and the bioclimate indicators examined. Pearson's correlation analysis was used to determine the relations between the variables studied, and for the best-fitting correlations, multiple regression equations were built. In addition, on the basis of the share of active areas a simplified biotopoclimate map was developed, using cluster analysis based on the *k*-means clustering algorithm. Areas with unfavourable biotopoclimate conditions were identified and recommendations were formulated to increase their biologically active areas, which, in turn, would contribute to improving the city's bioclimate conditions. The conducted research helped to verify and validate the hypotheses set out in the dissertation. It was shown that there are relationships between the concentration of air pollutants and the values of meteorological elements and bioclimate indicators. In the thesis, 7 types of biotopoclimate were identified for Legnica. The recommendation is to use in the landscaping process at least simplified biotopoclimate maps which can be drawn up based on the share of active areas.

Keywords: adaptation to climate change, local climate, air pollution, greenery, bioclimate index, Lower Silesia.