



Integrated analysis of air pollution and meteorological conditions in Osijek and Slavonski Brod

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Ozone, nitrogen oxides and particulate matter are the key indicators of air quality with potentially harmful impacts on the human health and environment. As a part of the air quality research in Osijek and Slavonski Brod, the goal was to analyse the key indicators of air pollution: ozone, nitrogen oxides and particulate matter. The data collected from the state air quality monitoring network during 2022 and 2023 enabled the analysis of the concentrations of these pollutants and their connection with the meteorological parameters to understand their distribution.

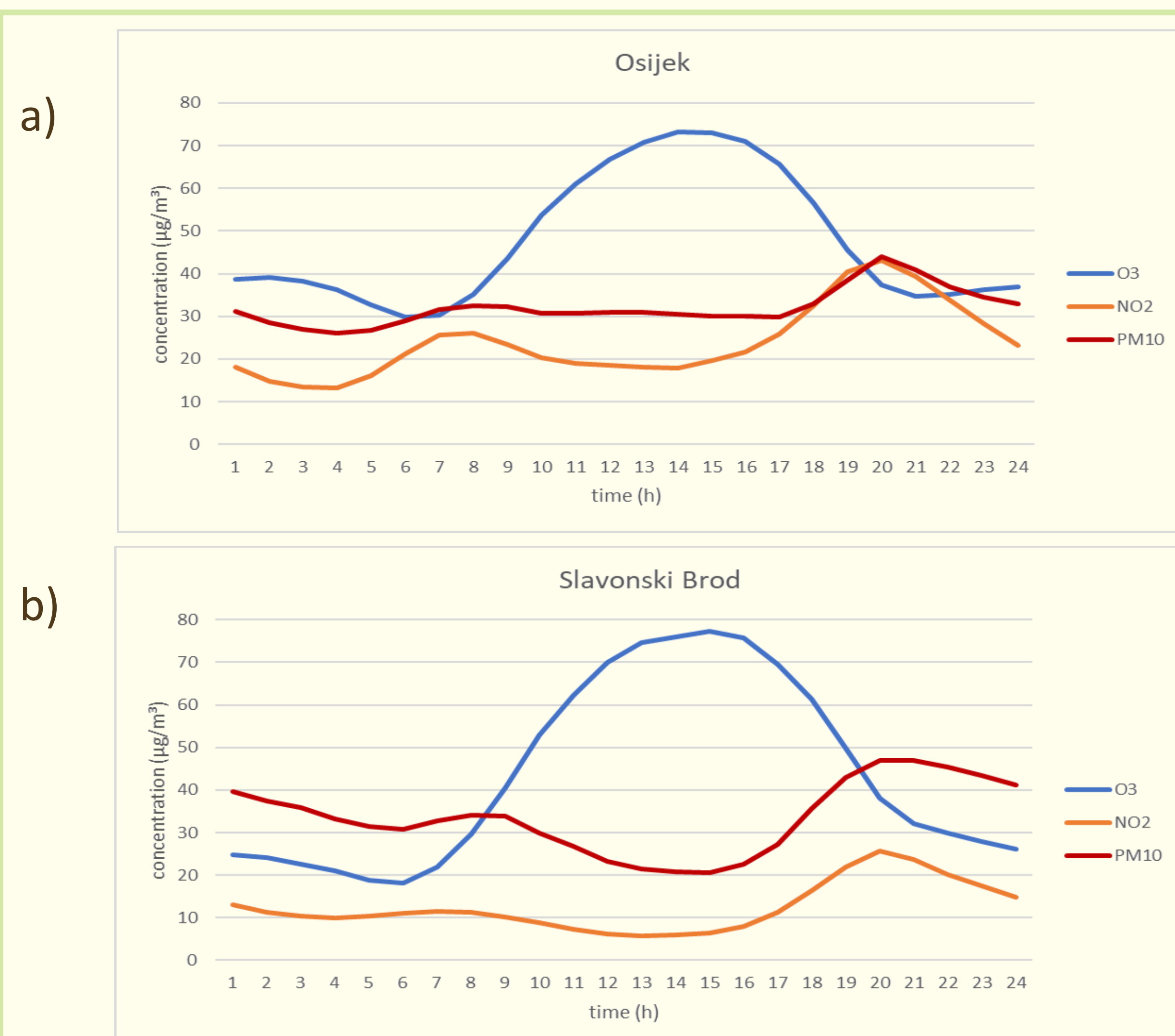


Fig. 1. Daily trend a) Osijek b) Slavonski Brod

The concentration of ozone in the troposphere depends on the primary pollutants (nitrogen oxides and volatile hydrocarbons), that is, on the precursors from which it is formed as a secondary pollutant. In the troposphere, ozone is formed by photochemical reactions and the concentration of ozone has a daily trend with a maximum around noon, because that is when the solar radiation that causes photochemical reactions is most intense. The nocturnal minimum is caused by ozone decomposition reactions, and this is especially true in polluted areas where the present pollutants decompose ozone (Fig. 1.) In particular, the strong connection between nitrogen oxides and particulate matter is highlighted, which has important implications for public health, given their link to respiratory and cardiovascular diseases.

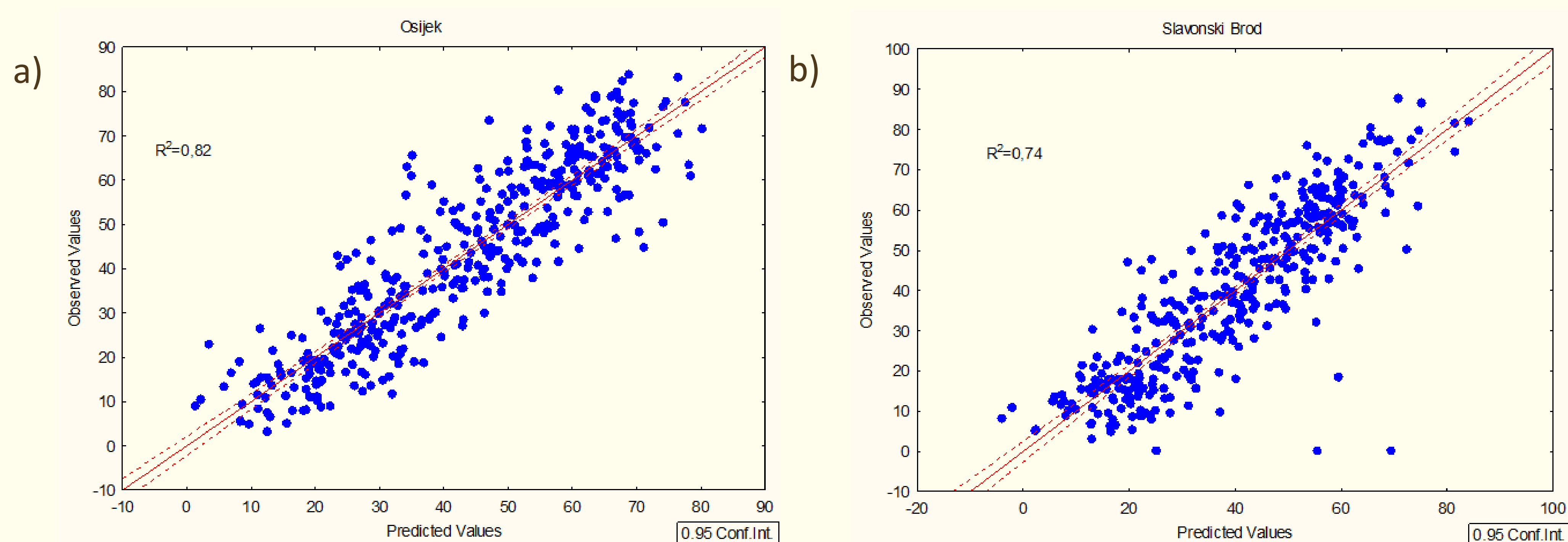


Fig. 2. Linear regression a) Osijek b) Slavonski Brod

The analysis of data on concentrations of ozone, nitrogen oxides, particulate matter and meteorological parameters indicates that the origin of the observed air pollutants is mostly local (Fig. 2). The results of this research can provide useful guidelines for the development of strategies to reduce air pollution and improve the quality of the environment in Slavonia.