

# Seasonal and diurnal variations of ozone concentration and influencing factors: an application of deep hybrid AI models in Craiova, Romania

## Abstract:

The problem of seasonal and diurnal variations of ozone concentrations and their relationship with meteorological parameters is investigated for Craiova, Romania. By analysing hourly and seasonal trends, this study aims to identify peak ozone formation periods and the key environmental factors influencing their variability. The dataset comprises hourly ozone and meteorological data, enabling a comprehensive assessment of ozone pollution dynamics. The dataset spans five years (2020 –2024) and comprises two categories of data: (i) 7 meteorological parameters and (ii) 13 air pollutants. The open-source data comes from four air quality monitoring stations located in Craiova. The dataset was downloaded from the Romanian Environmental Agency's website (<https://calitateaer.ro/>). Statistical and Machine and Deep Learning techniques, including time-series decomposition, correlation analysis, regression modelling, and spectral analysis, are employed to extract meaningful insights. The findings will enhance understanding ozone formation mechanisms, aiding policymakers in designing effective air quality management strategies.

Keywords: ozone, air pollution, diurnal cycle, seasonal trends, meteorological influence, time-series analysis, feature selection, air quality assessment.

[1] El Mghouchi Y, Udristioiu MT, Yildizhan H, Brancus M. Forecasting ground-level ozone and fine particulate matter concentrations at Craiova city using a meta-hybrid deep learning model. *Urban Climate* 2024;57:102099.

## References:

[2] Udristioiu MT, EL Mghouchi Y, Yildizhan H. Prediction, modelling, and forecasting of PM and AQI using hybrid machine learning. *Journal of Cleaner Production* 2023;421:138496.

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