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Machine learning methods were used for the first time to identify adverse meteorological conditions (AMC). The Ostankino district of Moscow was selected for the study. The study utilized meteorological measurement data from the Ostankino TV tower in a layer up to a height of 503 m, retrospective ERA5 data on wind at the 925 hPa level, 3-hour precipitation totals, and the height of the atmospheric boundary layer, as well as pollutant concentration measurements for the period of 2020–2025. When constructing the AMC machine learning models, significant predictors were identified, the most informative of which were 3–6-hour moving averages of the temperature difference in the 2–253 m layer and the average wind speed in the 201–305 m layer over the previous 3–6 hours. A local AMC identification model was developed and tested using five machine learning algorithms. It was found for the binary classification of atmospheric conditions that ensemble methods (CatBoost, random forest) provide the best balance between minimizing missed AMC and minimizing false alarms ($F1 = 0.62\text{--}0.64$). Significant predictors of AMC will serve as a basis for improving the statistical methods used for AMC forecasting.

Keywords: adverse meteorological conditions, machine learning methods, local AMC model

Tab. 5. Fig. 1. Ref. 22.