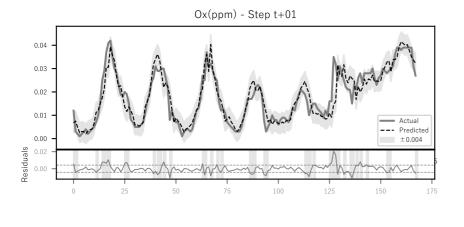
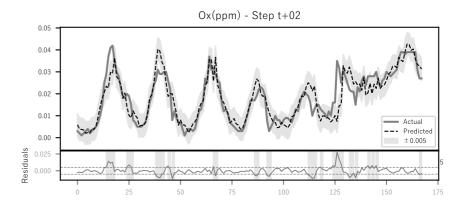
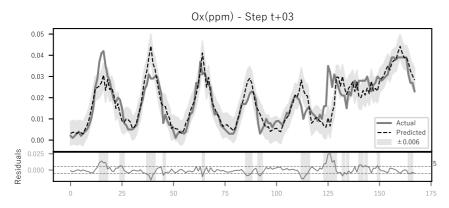
垣生小学校 - オキシダント予測の分析

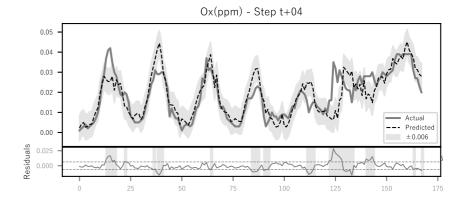
Model Parameters: Prefecture code: 38 Station code: 38201090 Station name: 垣生小学校 Target item: Ox(ppm) Number of data points in the train set: 13463 Number of data points in the test set: 5770 Forecast horizon (hours): 24 Model: LightGBM Objective: regression Boosting type: gbdt Number of estimators: 400 Learning rate: 0.04 Elapsed time: 0 min 25 sec Number of used features: 140 Features: NO(ppm), NO2(ppm), U, V, Ox(ppm)_lag1 Ox(ppm) lag2, Ox(ppm) lag3, Ox(ppm) lag4, Ox(ppm) lag5, Ox(ppm) lag6 Ox(ppm)_lag7, Ox(ppm)_lag8, Ox(ppm)_lag9, Ox(ppm)_lag10, Ox(ppm)_lag11 Ox(ppm) lag12, Ox(ppm) lag13, Ox(ppm) lag14, Ox(ppm) lag15, Ox(ppm) lag16 Ox(ppm)_lag17, Ox(ppm)_lag18, Ox(ppm)_lag19, Ox(ppm)_lag20, Ox(ppm)_lag21 Ox(ppm)_lag22, Ox(ppm)_lag23, NO(ppm)_lag1, NO(ppm)_lag2, NO(ppm)_lag3 NO(ppm)_lag4, NO(ppm)_lag5, NO(ppm)_lag6, NO(ppm)_lag7, NO(ppm)_lag8 NO(ppm)_lag9, NO(ppm)_lag10, NO(ppm)_lag11, NO(ppm)_lag12, NO(ppm)_lag13 NO(ppm)_lag14, NO(ppm)_lag15, NO(ppm)_lag16, NO(ppm)_lag17, NO(ppm)_lag18 NO(ppm)_lag19, NO(ppm)_lag20, NO(ppm)_lag21, NO(ppm)_lag22, NO(ppm)_lag23 NO2(ppm)_lag1, NO2(ppm)_lag2, NO2(ppm)_lag3, NO2(ppm)_lag4, NO2(ppm)_lag5 NO2(ppm) lag6, NO2(ppm) lag7, NO2(ppm) lag8, NO2(ppm) lag9, NO2(ppm) lag10 NO2(ppm)_lag11, NO2(ppm)_lag12, NO2(ppm)_lag13, NO2(ppm)_lag14, NO2(ppm)_lag15 NO2(ppm)_lag16, NO2(ppm)_lag17, NO2(ppm)_lag18, NO2(ppm)_lag19, NO2(ppm)_lag20 NO2(ppm)_lag21, NO2(ppm)_lag22, NO2(ppm)_lag23, U_lag1, U_lag2 U_lag3, U_lag4, U_lag5, U_lag6, U_lag7 U_lag8, U_lag9, U_lag10, U_lag11, U_lag12 U_lag13, U_lag14, U_lag15, U_lag11, U_lag12 U_lag13, U_lag14, U_lag20, U_lag20, U_lag21 U_lag28, U_lag19, U_lag20, U_lag21, U_lag22 U_lag23, V_lag1, V_lag2, V_lag3, V_lag4 V_lag5, V_lag6, V_lag7, V_lag8, V_lag9 V_lag10, V_lag11, V_lag12, V_lag13, V_lag14 V_lag15, V_lag16, V_lag17, V_lag18, V_lag19 V_lag20, V_lag21, V_lag22, V_lag23, Ox(ppm)_roll_mean_3 Ox(ppm)_roll_std_6, NO(ppm)_roll_mean_3, NO(ppm)_roll_std_6, NO2(ppm)_roll_mean_3, NO2(ppm)_roll_std_6 U_roll_mean_3, U_roll_std_6, V_roll_mean_3, V_roll_std_6, Ox(ppm)_diff_1
Ox(ppm)_diff_2, Ox(ppm)_diff_3, NO(ppm)_diff_3, NO2(ppm)_diff_3, U_diff_3 V_diff_3, hour_sin, hour_cos, dayofweek, is_weekend Metrics per Forecast Step: Ox(ppm)_t+01 - R²: 0.8730, MAE: 0.0036, RMSE: 0.0050 Ox(ppm)_t+02 - R²: 0.7913, MAE: 0.0047, RMSE: 0.0064 Ox(ppm) t+03 - R²: 0.7169, MAE: 0.0055, RMSE: 0.0075 Ox(ppm)_t+04 - R²: 0.6524, MAE: 0.0062, RMSE: 0.0083 Ox(ppm)_t+05 - R²: 0.5976, MAE: 0.0067, RMSE: 0.0089 Ox(ppm) t+06 - R²: 0.5406, MAE: 0.0071, RMSE: 0.0095 Ox(ppm)_t+07 - R²: 0.5019, MAE: 0.0074, RMSE: 0.0099 Ox(ppm) t+08 - R²: 0.4596, MAE: 0.0078, RMSE: 0.0103 Ox(ppm)_t+09 - R²: 0.4280, MAE: 0.0080, RMSE: 0.0106 Ox(ppm)_t+10 - R²: 0.4091, MAE: 0.0081, RMSE: 0.0108 Ox(ppm)_t+11 - R²: 0.3789, MAE: 0.0083, RMSE: 0.0111 Ox(ppm)_t+12 - R²: 0.3630, MAE: 0.0084, RMSE: 0.0112 Ox(ppm)_t+13 - R²: 0.3584, MAE: 0.0085, RMSE: 0.0112 $Ox(ppm)_t+14 - R^2$: 0.3475, MAE: 0.0086, RMSE: 0.0113 Ox(ppm) t+15 - R²: 0.3393, MAE: 0.0086, RMSE: 0.0114 Ox(ppm) t+16 - R²: 0.3429, MAE: 0.0087, RMSE: 0.0114 Ox(ppm)_t+17 - R²: 0.3353, MAE: 0.0087, RMSE: 0.0114 Ox(ppm)_t+18 - R²: 0.3324, MAE: 0.0087, RMSE: 0.0115 Ox(ppm)_t+19 - R²: 0.3353, MAE: 0.0087, RMSE: 0.0114 Ox(ppm) t+20 - R²: 0.3321, MAE: 0.0088, RMSE: 0.0115 Ox(ppm)_t+21 - R²: 0.3303, MAE: 0.0088, RMSE: 0.0115 Ox(ppm)_t+22 - R²: 0.3239, MAE: 0.0088, RMSE: 0.0115 Ox(ppm) t+23 - R²: 0.3274, MAE: 0.0088, RMSE: 0.0115

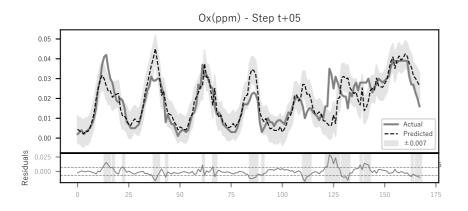
Ox(ppm)_t+24 - R²: 0.3284, MAE: 0.0088, RMSE: 0.0115

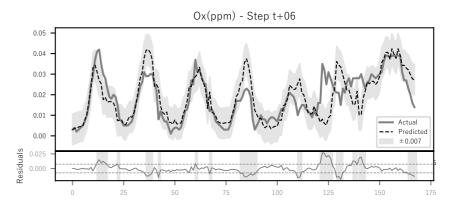


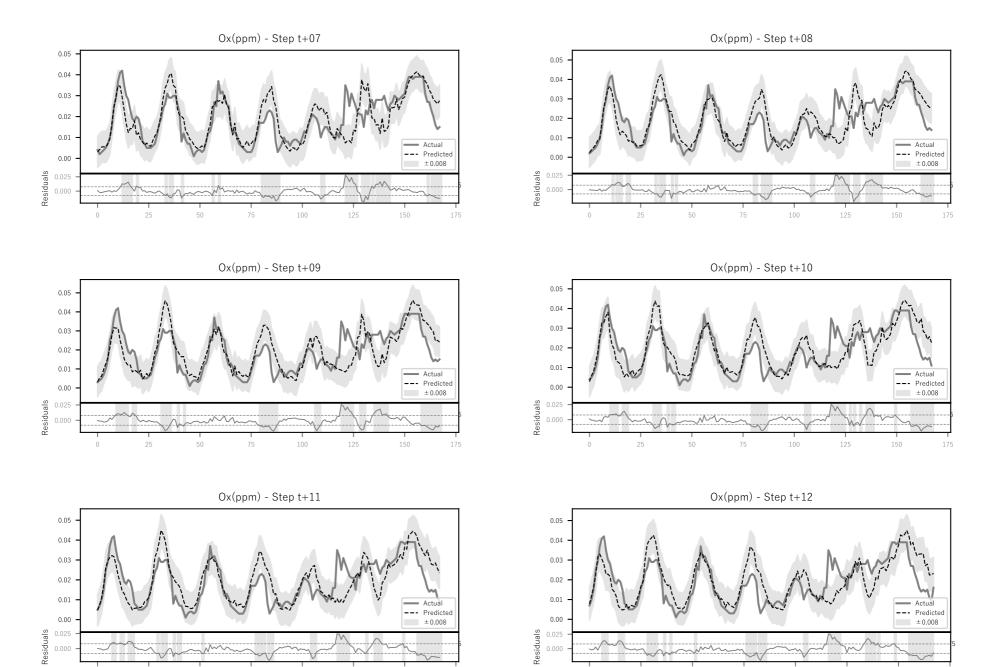


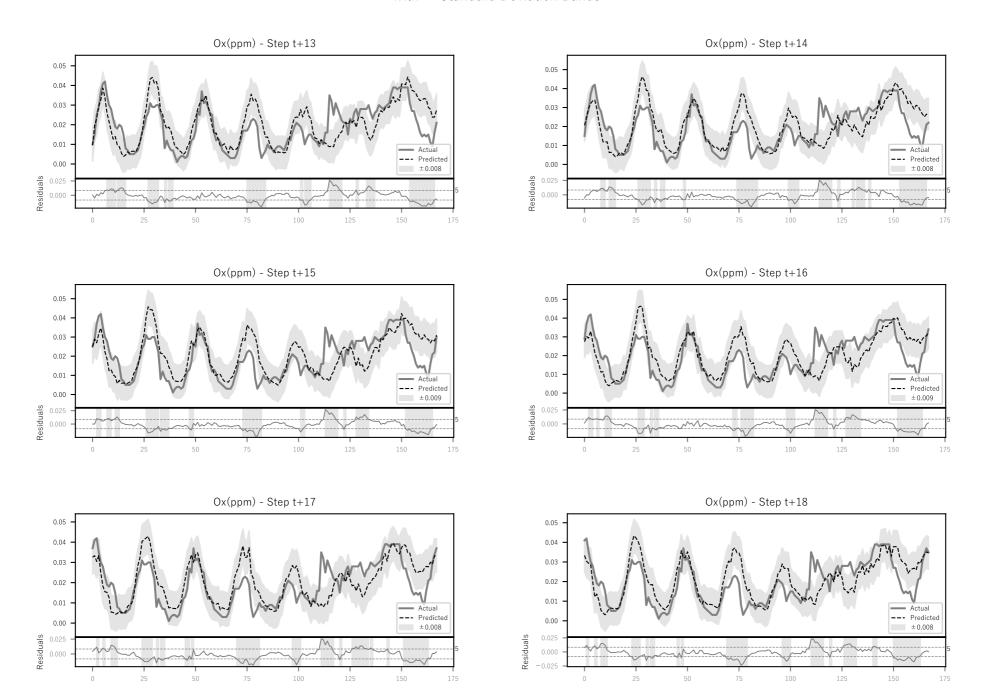


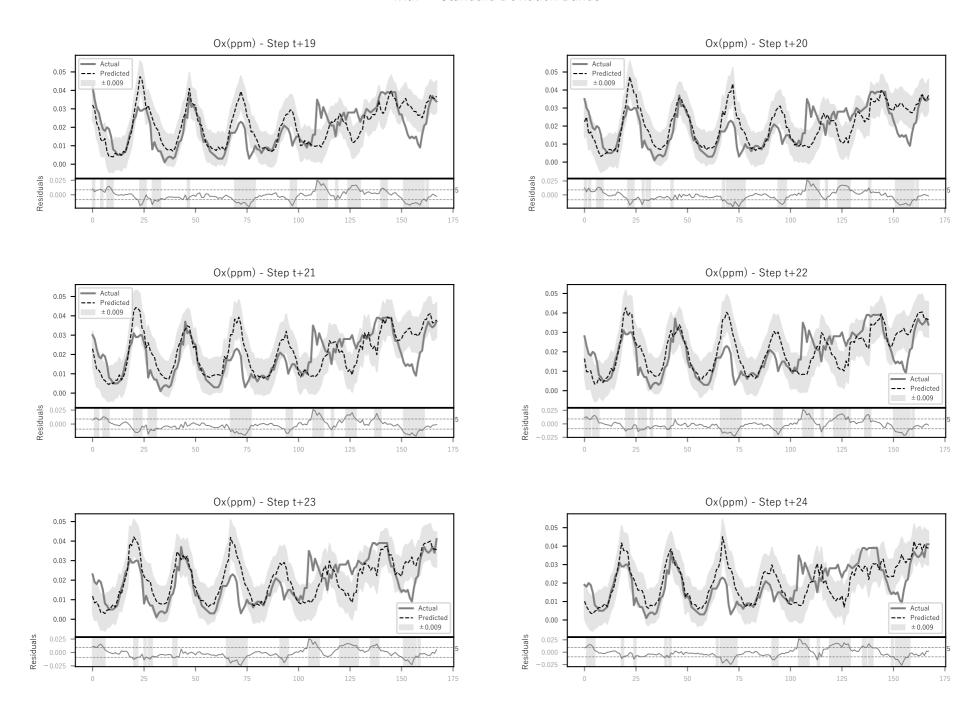


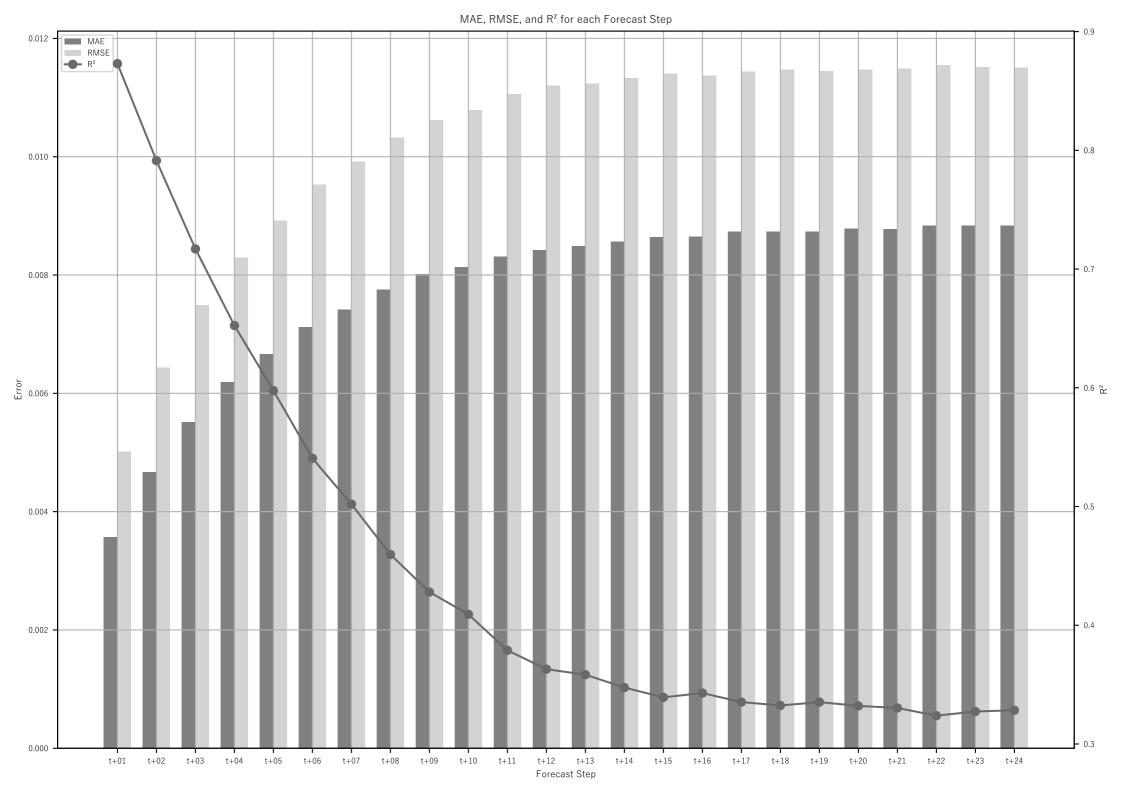












Normalized Feature Importance (per feature) 1.0 1.00 | 1.00 | 0.85 0.42 0.24 0.08 0.11 0.47 0.54 Ox(ppm)_lag1 - 1.00 1.00 | 1.00 | 1.00 1.00 | 1.00 0.97 0.33 0.63 0.57 1.00 dayofweek - 0.05 0.00 0.00 0.04 0.00 0.04 0.09 0.19 0.69 | 0.86 | 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.8 1.00 0.74 Normalized Importance (per feature) V_roll_std_6 - 0.12 0.14 0.20 0.09 0.16 0.29 0.06 0.00 0.70 0.78 0.80 0.51 0.56 0.66 0.88 NO2(ppm)_roll_std_6 - 0.10 0.13 0.09 0.08 0.19 0.23 0.00 0.19 0.66 0.67 0.68 0.72 0.75 0.70 0.42 0.37 U **-** 0.78 0.78 0.42 0.30 0.09 0.16 0.35 0.16 0.02 0.00 0.06 0.26 0.26 0.15 hour_sin - 0.00 0.04 0.04 0.15 0.41 0.57 0.84 | 1.00 | 1.00 0.92 0.73 0.14 0.00 0.00 0.00 0.00 0.25 0.38 0.29 v **-** 0.63 | 0.69 0.36 | 0.34 | 0.39 | 0.21 | 0.11 | 0.41 0.28 | 0.18 | 0.00 | 0.00 | 0.38 | 0.37 | 0.33 | 0.13 | 0.16 0.26 0.41 0.26 0.05 U_roll_std_6 - 0.15 0.12 0.15 0.15 0.08 0.04 0.16 0.03 0.42 0.60 0.36 0.08 0.40 0.41 0.60 0.70 0.23 0.39 0.38 - 0.2 0.87 hour_cos - 0.42 0.49 0.28 0.29 0.09 0.13 0.00 0.00 0.00 0.00 0.05 0.26 0.82 0.31 0.00 0.00 0.00 0.00 NO(ppm)_roll_std_6 - 0.10 0.06 0.05 0.00 0.09 0.00 0.12 0.14 0.23 0.04 0.41 0.27 0.12 0.29 0.40 0.43 - 0.0 Ox(ppm)_t+08 Forecast Step Normalized Feature Importance (per step) 1.0 $Ox(ppm)_lag1 - 1.00$ 0.80 0.72 0.73 0.75 0.61 0.43 | 0.42 | 0.33 | 0.20 | 0.16 | 0.14 | 0.18 | 0.09 | 0.17 | 0.15 | 0.14 | 0.03 | 0.00 | 0.13 | 0.27 | 0.33 dayofweek - 0.00 0.01 0.11 0.23 0.17 0.29 0.40 0.42 0.40 0.59 0.62 0.70 0.71 0.77 0.87 0.84 1.00 0.91 0.8 0.82 0.49 0.73 0.81 0.98 0.79 1.00 0.77 0.87 0.97 0.98 0.99 V_roll_std_6 - 0.00 0.17 0.39 0.75 0.88 0.79 0.78 0.80 0.91 Normalized Importance (per step) NO2(ppm)_roll_std_6 - 0.00 0.18 0.25 0.40 0.58 0.73 0.72 0.95 0.76 0.71 | 0.80 0.77 0.84 1.00 0.82 0.70 0.72 0.70 0.81 0.72 0.80 0.84 0.72 0.43 0.36 0.43 $0.37 \quad 0.37 \quad 0.33 \quad 0.20 \quad 0.21 \quad 0.19 \quad 0.11 \quad 0.13 \quad 0.09 \quad 0.11 \quad 0.08 \quad 0.11 \quad 0.02 \quad 0.00 \quad 0.02 \quad 0.10 \quad 0.15$ \cup - 1.00 0.80 | 0.88 | 1.00 | 0.96 | 0.84 0.83 0.92 0.95 0.68 0.62 0.42 0.10 0.00 0.25 0.39 0.48 | 0.57 | 0.65 0.61 hour_sin **–** 0.07 0.23 0.33 0.92 0.72 $0.43 \quad 0.30 \quad 0.32 \quad 0.22 \quad 0.04 \quad 0.06 \quad 0.05 \quad 0.03 \quad 0.02 \quad 0.07 \quad 0.00 \quad 0.17 \quad 0.14 \quad 0.09 \quad 0.14 \quad 0.15 \quad 0.06 \quad 0.07 \quad 0.09 \quad 0.19 \quad$ 0.02 U_roll_std_6 - 0.02 0.00 0.29 0.49 0.65 0.55 0.69 0.43 0.60 0.75 | 1.00 0.93 0.25 0.38 0.75 0.37 0.36 0.17 - 0.2 0.78 0.46 0.57 0.74 0.87 hour_cos - 0.95 0.98 0.96 1.00 0.80 0.71 0.70 0.42 0.01 0.18 0.32 0.91 0.82 0.76 0.24 0.00 0.07 0.36 0.18 0.26 0.42 0.43 0.76 0.72 | 0.87 0.68 | 0.67 0.82 1.00 NO(ppm)_roll_std_6 - 0.00 0.01 0.78 0.24 0.35 0.32 0.37 0.41 - 0.0 0x(ppm)_t+02 0x(ppm)_t+10 Ox(ppm)_t+12

Target