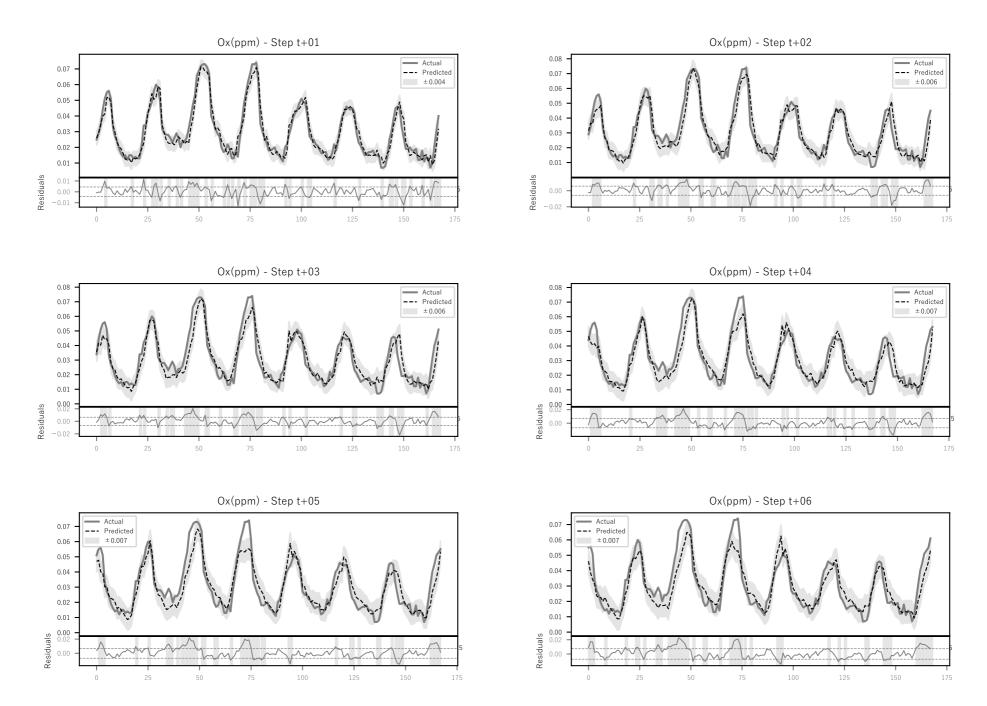
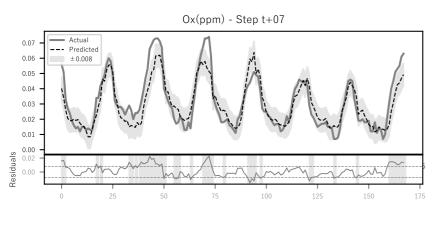
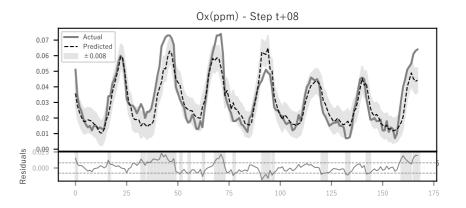
泉川 - オキシダント予測の分析

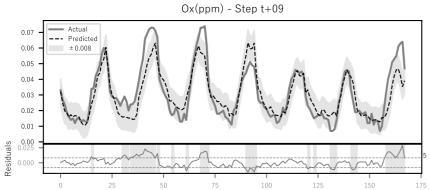
Model Parameters: Prefecture code: 38 Station code: 38205090 Station name: 泉川 Target item: Ox(ppm) Number of data points in the train set: 13684 Number of data points in the test set: 5865 Forecast horizon (hours): 24 Model: LightGBM Objective: regression Boosting type: gbdt Number of estimators: 400 Learning rate: 0.04 Elapsed time: 0 min 22 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_lag15, U_lag16, U_lag17 U_lag18, 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: 0.8941, MAE: 0.0038, RMSE: 0.0052 Ox(ppm)_t+02 - R²: 0.8238, MAE: 0.0050, RMSE: 0.0067 Ox(ppm) t+03 - R2: 0.7688, MAE: 0.0058, RMSE: 0.0077 Ox(ppm)_t+04 - R²: 0.7166, MAE: 0.0065, RMSE: 0.0085 Ox(ppm)_t+05 - R²: 0.6763, MAE: 0.0069, RMSE: 0.0091 Ox(ppm) t+06 - R²: 0.6389, MAE: 0.0073, RMSE: 0.0096 Ox(ppm)_t+07 - R²: 0.6043, MAE: 0.0076, RMSE: 0.0100 Ox(ppm) t+08 - R²: 0.5907, MAE: 0.0078, RMSE: 0.0102 Ox(ppm)_t+09 - R²: 0.5724, MAE: 0.0080, RMSE: 0.0104 Ox(ppm)_t+10 - R²: 0.5557, MAE: 0.0082, RMSE: 0.0106 Ox(ppm)_t+11 - R²: 0.5383, MAE: 0.0083, RMSE: 0.0108 Ox(ppm)_t+12 - R²: 0.5123, MAE: 0.0086, RMSE: 0.0111 Ox(ppm)_t+13 - R²: 0.4912, MAE: 0.0087, RMSE: 0.0114 Ox(ppm)_t+14 - R²: 0.4769, MAE: 0.0088, RMSE: 0.0115 Ox(ppm) t+15 - R²: 0.4647, MAE: 0.0089, RMSE: 0.0117 Ox(ppm) t+16 - R²: 0.4653, MAE: 0.0089, RMSE: 0.0117 Ox(ppm)_t+17 - R²: 0.4559, MAE: 0.0090, RMSE: 0.0118 Ox(ppm)_t+18 - R²: 0.4484, MAE: 0.0090, RMSE: 0.0118 Ox(ppm)_t+19 - R²: 0.4330, MAE: 0.0091, RMSE: 0.0120 Ox(ppm) t+20 - R²: 0.4409, MAE: 0.0091, RMSE: 0.0119 Ox(ppm)_t+21 - R²: 0.4347, MAE: 0.0091, RMSE: 0.0120 Ox(ppm)_t+22 - R²: 0.4346, MAE: 0.0091, RMSE: 0.0120 Ox(ppm) t+23 - R²: 0.4426, MAE: 0.0091, RMSE: 0.0119

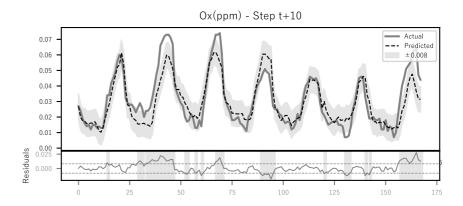
Ox(ppm)_t+24 - R²: 0.4350, MAE: 0.0092, RMSE: 0.0120

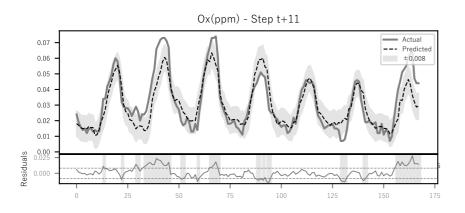


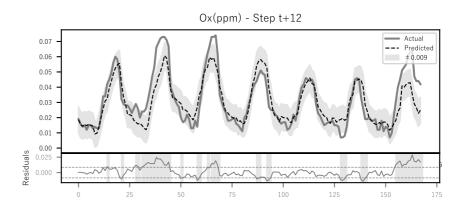


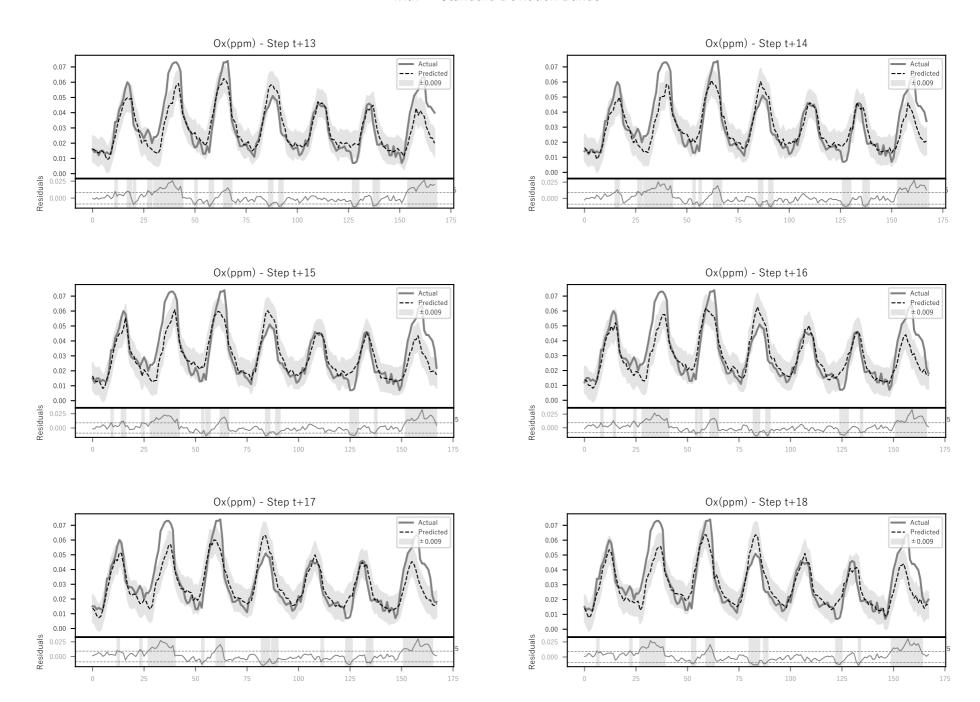


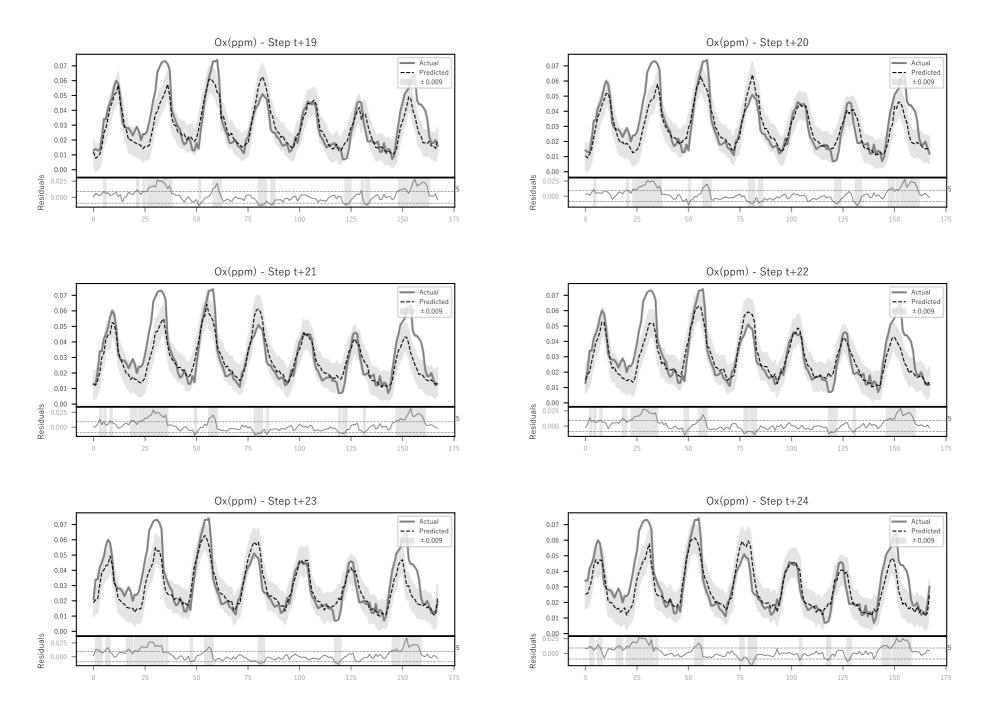


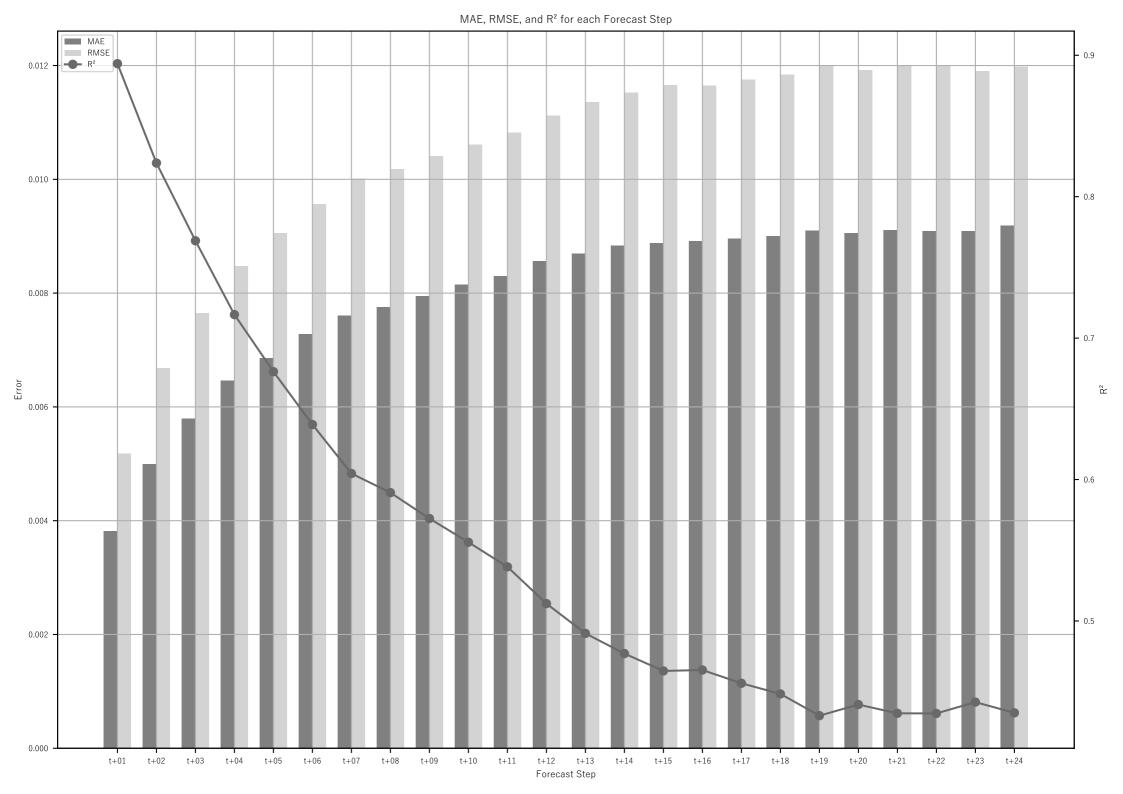












Normalized Feature Importance (per feature) 1.0 $Ox(ppm)_lag1 - 1.00$ 1.00 1.00 1.00 1.00 1.00 1.00 | 1.00 | 0.88 0.83 0.40 0.36 0.39 0.43 0.41 0.20 0.17 0.00 0.00 0.08 0.20 0.39 1.00 U_roll_std_6 - 0.28 0.34 0.39 0.43 0.30 0.37 0.77 0.13 0.87 0.65 0.71 0.70 0.69 1.00 0.91 0.82 0.73 0.37 0.66 - 0.8 Normalized Importance (per feature) 1.00 0.99 dayofweek - 0.00 0.00 0.00 0.02 0.14 0.09 0.17 0.42 0.41 0.84 1.00 1.00 1.00 | 1.00 | 1.00 1.00 1.00 1.00 1.00 1.00 | 1.00 1.00 0.95 0.75 0.74 0.80 0.79 NO2(ppm)_roll_std_6 - 0.12 0.16 0.10 0.06 0.11 0.21 0.18 0.40 0.57 0.63 0.63 0.42 0.54 | 0.67 | 1.00 0.57 0.96 0.40 0.68 0.27 0.24 0.19 V_roll_std_6 - U.12 U.13 U.14 NO2(ppm)_roll_mean_3 - 0.16 U.09 U.08 U.03 U.00 U.00 U.01 U.03 U.03 U.07 U.074 V_roll_std_6 - 0.12 0.13 0.12 0.06 0.17 0.10 0.26 0.35 0.41 0.84 0.42 0.66 0.69 0.18 0.23 hour_sin - 0.04 0.09 0.27 0.42 0.58 0.60 0.58 0.46 | 0.63 | 0.03 0.51 0.42 0.00 0.00 0.00 0.01 0.19 0.12 0.24 0.05 0.01 0.15 Ox(ppm) roll std 6 - 0.25 0.20 0.27 0.08 0.08 0.05 0.10 0.00 0.00 0.31 0.00 0.38 0.37 0.62 0.48 | 0.53 0.25 0.41 0.27 0.00 0.00 0.02 - 0.2 U_roll_mean_3 - 0.11 0.15 0.04 0.00 0.13 0.08 0.00 0.19 0.11 0.50 0.00 | 0.25 | 0.12 | 0.27 | 0.42 | 0.40 | 0.26 | 0.23 | 0.21 | 0.22 | 0.29 | 0.23 | 0.11 | 0.31 Ox(ppm) roll mean 3 - 0.05 0.05 0.07 0.20 0.23 0.15 0.14 0.34 0.30 0.00 0.01 0.00 0.00 0.03 0.28 0.00 0.00 0.00 0.11 0.29 0.75 0.10 0.00 - 0.0 00)x(ppm)_t+02 0x(ppm)_t+12 0x(ppm)_t+13 Ox(ppm)_t+ Forecast Step Normalized Feature Importance (per step) 1.0 $Ox(ppm)_lag1 - 1.00$ 0.93 0.89 0.81 $0.34 \quad 0.33 \quad 0.19 \quad 0.19 \quad 0.20 \quad 0.11 \quad 0.07 \quad 0.08 \quad 0.12 \quad 0.06 \quad 0.00 \quad 0.00 \quad 0.12 \quad 0.20 \quad 0.25$ 0.46 | 0.64 | 1.00 U roll std 6 - 0.00 0.29 0.60 0.64 0.26 0.32 0.43 0.72 0.81 0.88 0.85 0.85 0.8 0.76 | 0.74 0.14 0.17 0.29 0.36 0.35 0.69 0.78 0.82 | 0.83 | 0.68 | 0.77 | 0.82 0.86 0.88 | 1.00 0.93 dayofweek - 0.00 Normalized Importance (per step) NO2(ppm)_roll_std_6 - 0.00 0.33 0.22 0.30 0.29 0.55 | 0.76 | 0.92 0.88 0.86 0.98 1.00 0.80 0.91 0.89 0.82 0.97 0.86 0.84 0.89 0.95 0.96 0.86 0.27 0.35 0.32 0.60 | 0.81 | 0.88 | 1.00 0.78 0.40 0.38 0.37 0.75 V roll std 6 - 0.00 0.24 0.24 0.72 0.56 0.62 0.65 0.77 0.65 | 0.71 | 1.00 0.82 0.79 | 0.90 0.23 hour_sin **–** 0.01 0.29 0.61 0.90 0.95 1.00 0.94 0.73 | 0.82 0.71 0.37 0.00 0.01 0.27 0.37 0.35 Ox(ppm) roll std 6 - 0.40 0.42 0.83 0.22 0.00 0.02 0.41 0.04 0.24 0.81 1.00 0.83 0.84 0.89 0.83 0.96 0.76 0.23 0.73 0.22 0.36 0.22 - 0.2 U_roll_mean_3 - 0.00 0.42 0.12 0.26 0.44 | 0.40 | 0.65 1.00 0.82 0.69 0.72 0.42 0.27 0.42 0.63 | 0.78 0.73 0.91 0.19 0.27 Ox(ppm) roll mean 3 - 0.000.43 0.38 0.39 0.26 0.25 0.11 0.22 0.34 1.00 0.40 - 0.0 t + 140x(ppm)_t+02 Ox(ppm)_t+10 0x(ppm)_t+19

Target