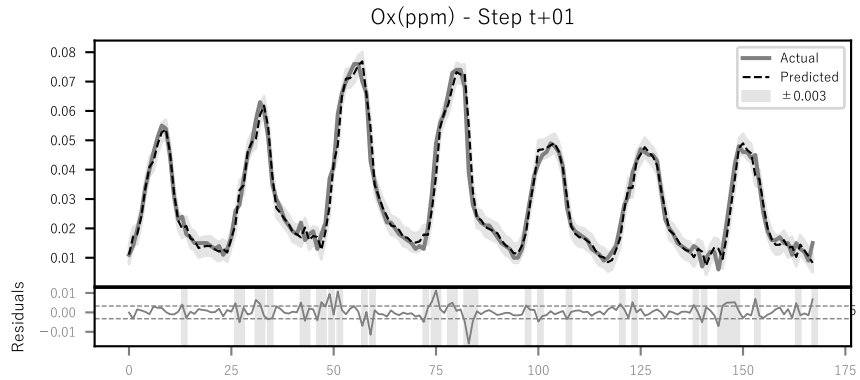
西条 - オキシダント予測の分析

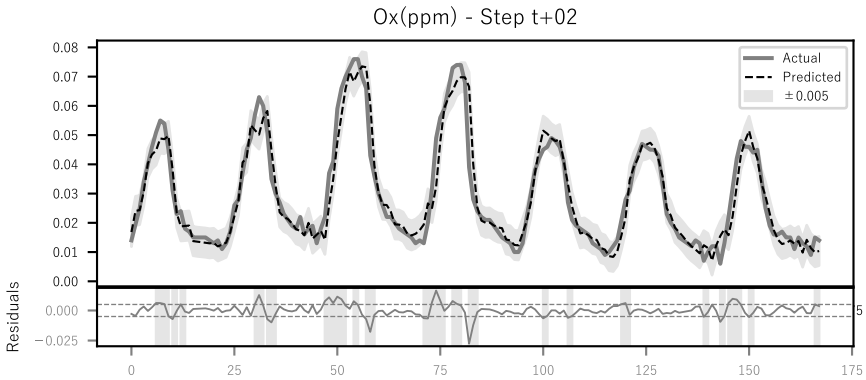
Model Parameters:
Prefecture code: 38
Station code: 38206050
Station name: 西条
Target item: Ox(ppm)
Number of data points in the train set: 13685
Number of data points in the test set: 5866
Forecast horizon (hours): 24
Model: LightGBM
Objective: regression
Boosting type: gbdt
Number of estimators: 400
Learning rate: 0.04
Elapsed time: 0 min 37 sec
Number of used features: 141

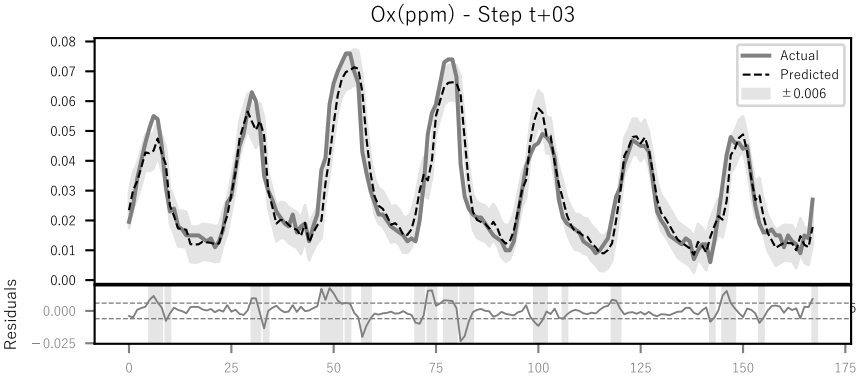
Features:
Ox(ppm), NO(ppm), NO2(ppm), U, V
Ox(ppm)_lag1, Ox(ppm)_lag2, Ox(ppm)_lag3, Ox(ppm)_lag4, Ox(ppm)_lag5
Ox(ppm)_lag6, Ox(ppm)_lag7, Ox(ppm)_lag8, Ox(ppm)_lag9, Ox(ppm)_lag10
Ox(ppm)_lag11, Ox(ppm)_lag12, Ox(ppm)_lag13, Ox(ppm)_lag14, Ox(ppm)_lag15
Ox(ppm)_lag16, Ox(ppm)_lag17, Ox(ppm)_lag18, 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_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

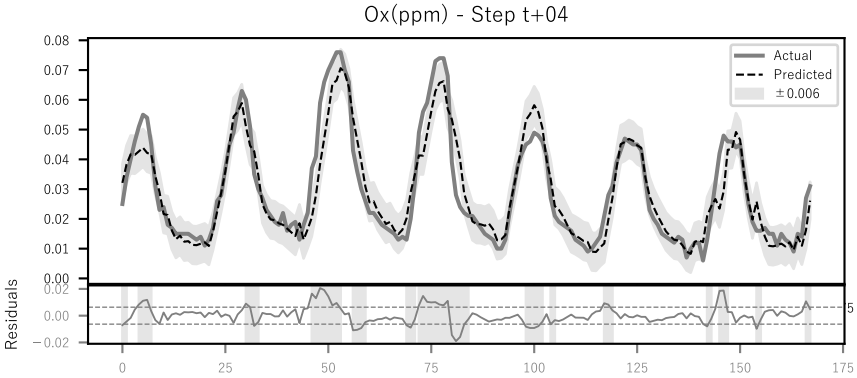
Metrics per Forecast Step:
Ox(ppm)_t+01 - R^2: 0.9442, MAE: 0.0027, RMSE: 0.0037
Ox(ppm)_t+02 - R^2: 0.8753, MAE: 0.0040, RMSE: 0.0056
Ox(ppm)_t+03 - R^2: 0.8193, MAE: 0.0049, RMSE: 0.0067
Ox(ppm)_t+04 - R^2: 0.7720, MAE: 0.0055, RMSE: 0.0075
Ox(ppm)_t+05 - R^2: 0.7216, MAE: 0.0061, RMSE: 0.0083
Ox(ppm)_t+06 - R^2: 0.6795, MAE: 0.0066, RMSE: 0.0089
Ox(ppm)_t+07 - R^2: 0.6445, MAE: 0.0069, RMSE: 0.0094
Ox(ppm)_t+08 - R^2: 0.6053, MAE: 0.0073, RMSE: 0.0099
Ox(ppm)_t+09 - R^2: 0.5849, MAE: 0.0075, RMSE: 0.0101
Ox(ppm)_t+10 - R^2: 0.5655, MAE: 0.0077, RMSE: 0.0104
Ox(ppm)_t+11 - R^2: 0.5452, MAE: 0.0079, RMSE: 0.0106
Ox(ppm)_t+12 - R^2: 0.5333, MAE: 0.0080, RMSE: 0.0108
Ox(ppm)_t+13 - R^2: 0.5121, MAE: 0.0081, RMSE: 0.0110
Ox(ppm)_t+14 - R^2: 0.4933, MAE: 0.0083, RMSE: 0.0112
Ox(ppm)_t+15 - R^2: 0.4903, MAE: 0.0084, RMSE: 0.0113
Ox(ppm)_t+16 - R^2: 0.4774, MAE: 0.0085, RMSE: 0.0114
Ox(ppm)_t+17 - R^2: 0.4700, MAE: 0.0086, RMSE: 0.0115
Ox(ppm)_t+18 - R^2: 0.4581, MAE: 0.0087, RMSE: 0.0116
Ox(ppm)_t+19 - R^2: 0.4534, MAE: 0.0087, RMSE: 0.0117
Ox(ppm)_t+20 - R^2: 0.4539, MAE: 0.0087, RMSE: 0.0117
Ox(ppm)_t+21 - R^2: 0.4386, MAE: 0.0088, RMSE: 0.0118
Ox(ppm)_t+22 - R^2: 0.4355, MAE: 0.0088, RMSE: 0.0119
Ox(ppm)_t+23 - R^2: 0.4411, MAE: 0.0088, RMSE: 0.0118
Ox(ppm)_t+24 - R^2: 0.4401, MAE: 0.0089, RMSE: 0.0118

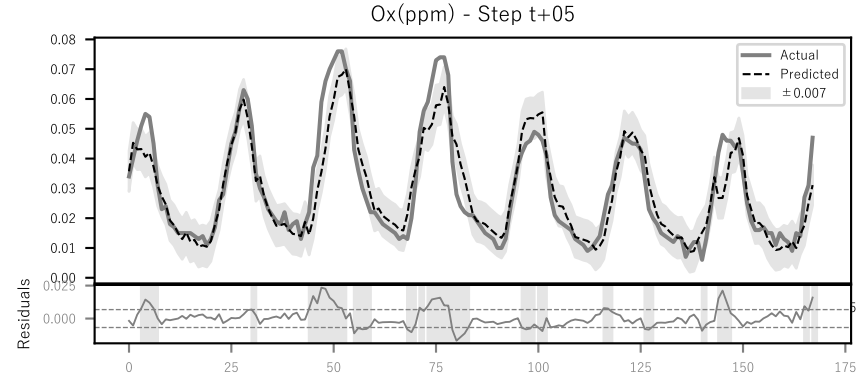
Comparison between actual and predicted values
with ± Standard Deviation Bands

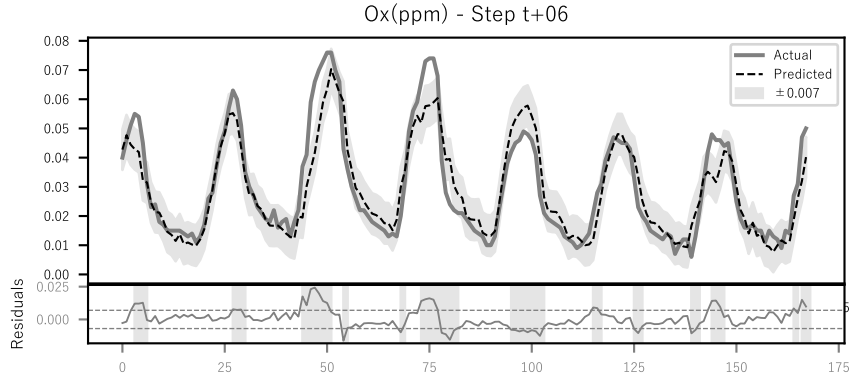




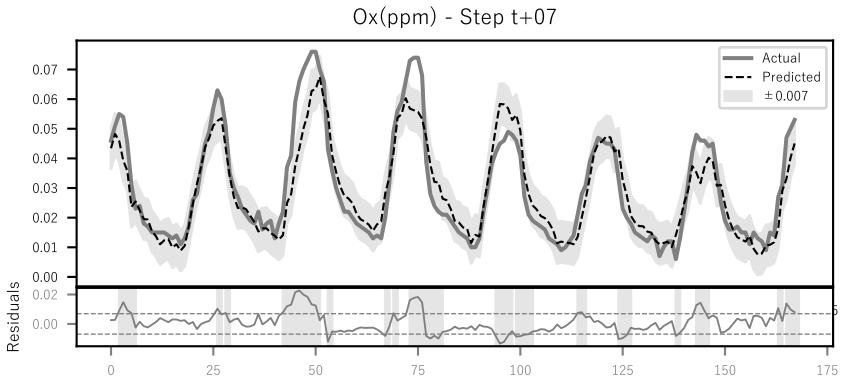


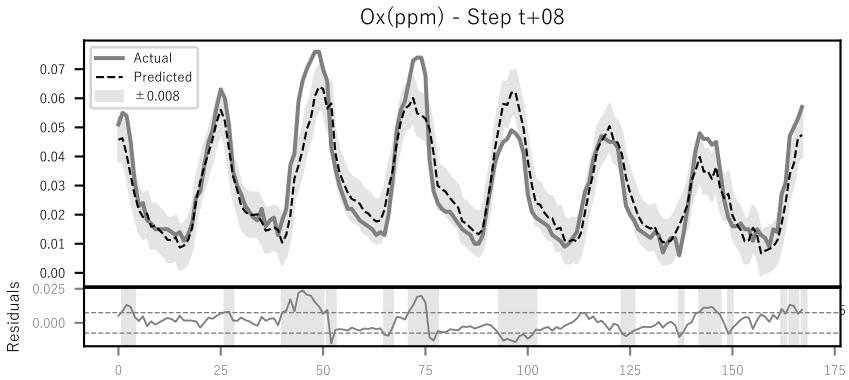


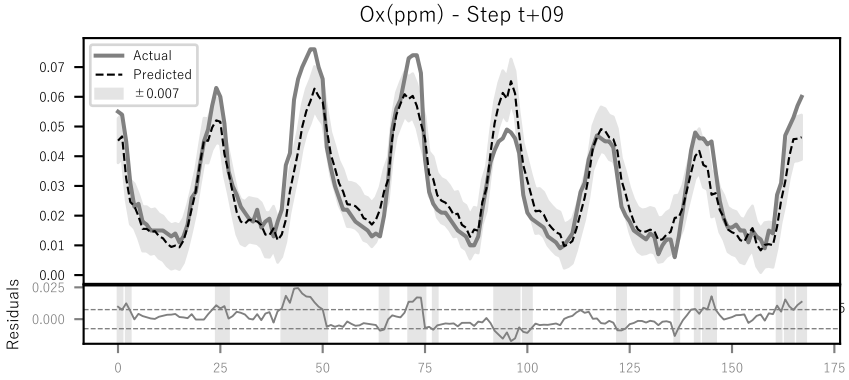


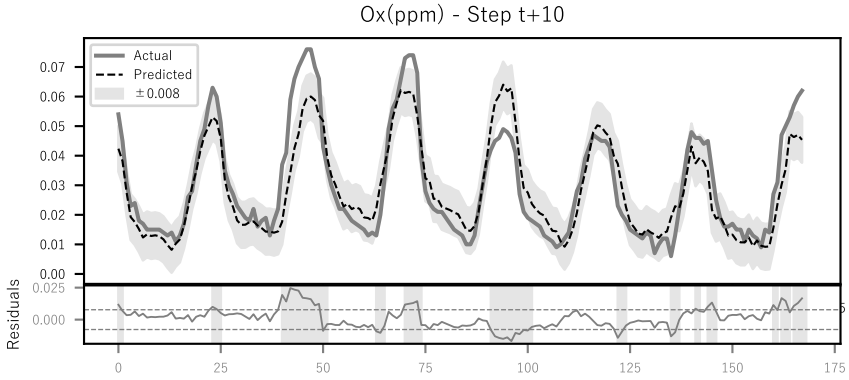


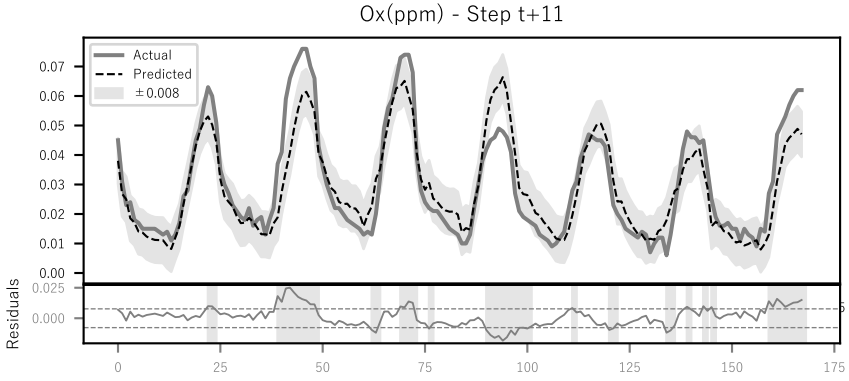
Comparison between actual and predicted values
with ± Standard Deviation Bands

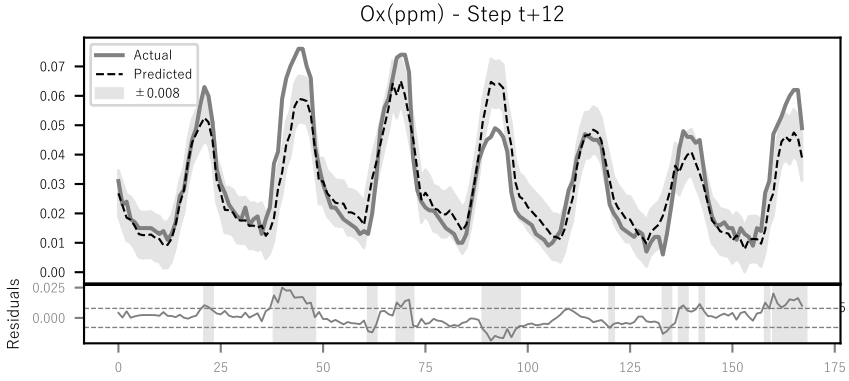




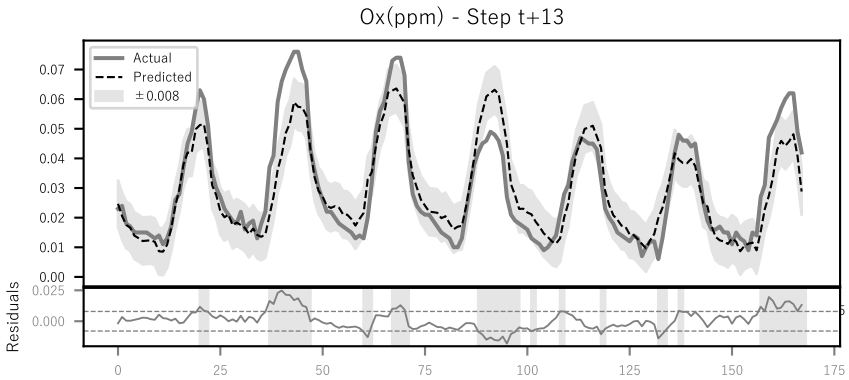


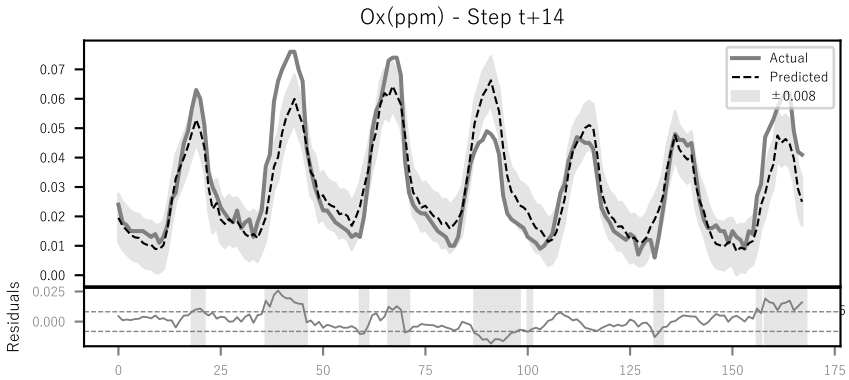


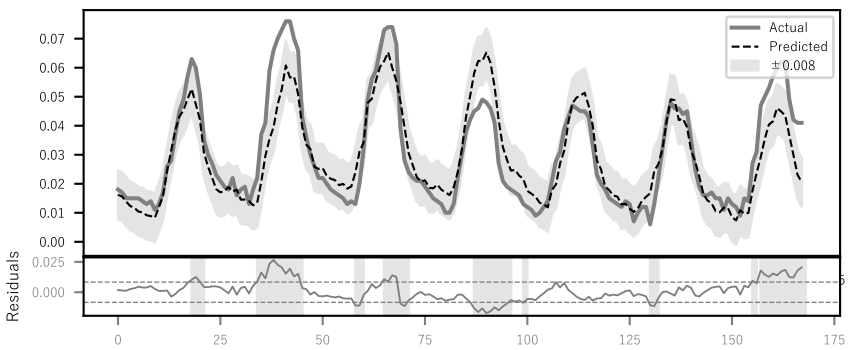


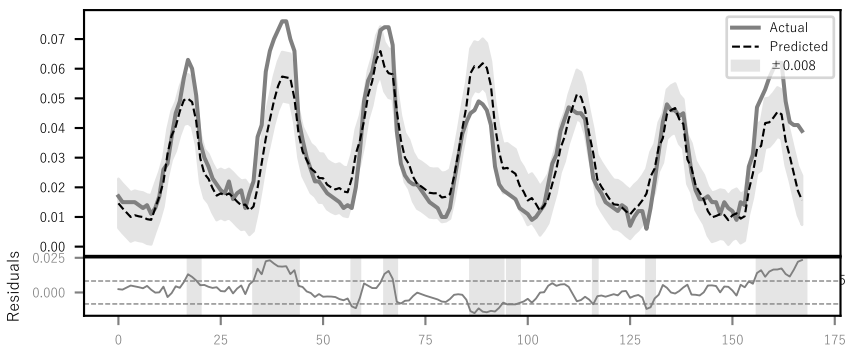


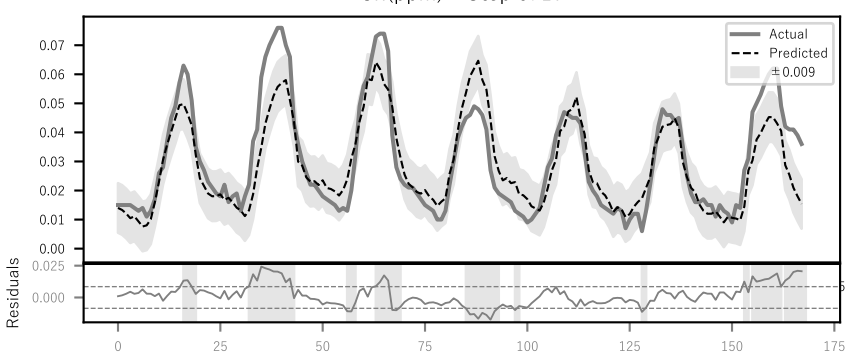
Comparison between actual and predicted values
with ± Standard Deviation Bands

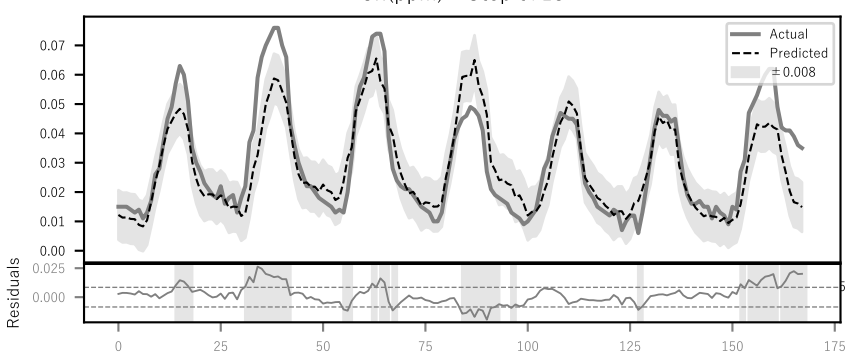




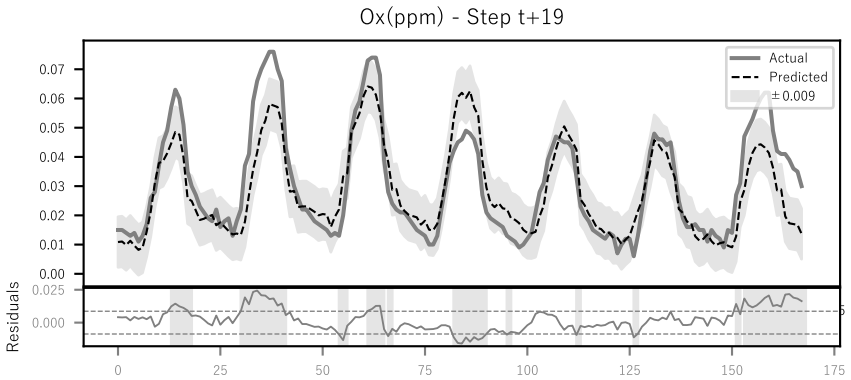


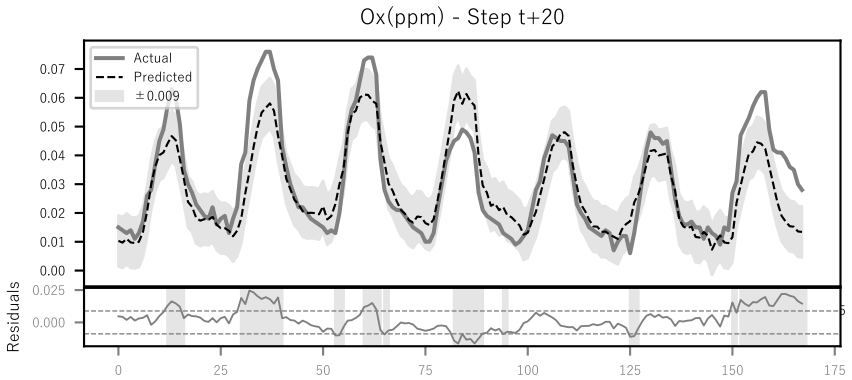


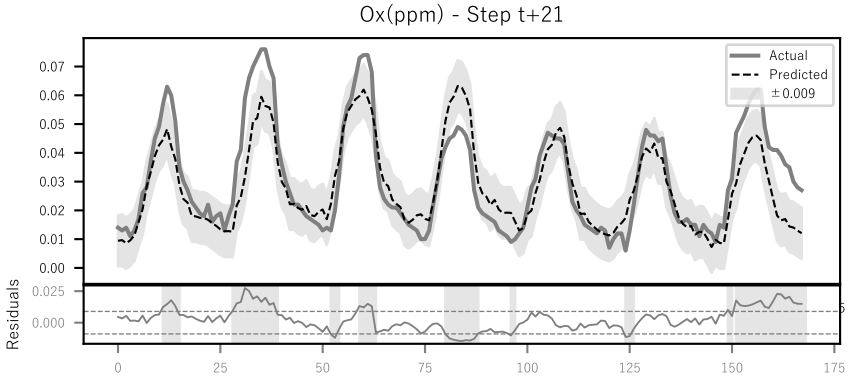


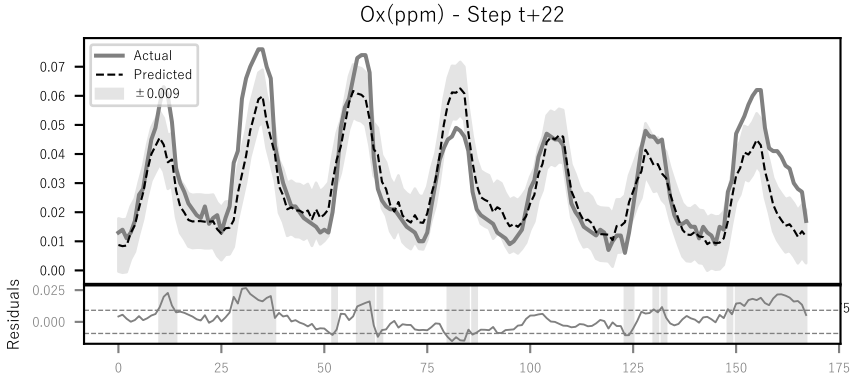


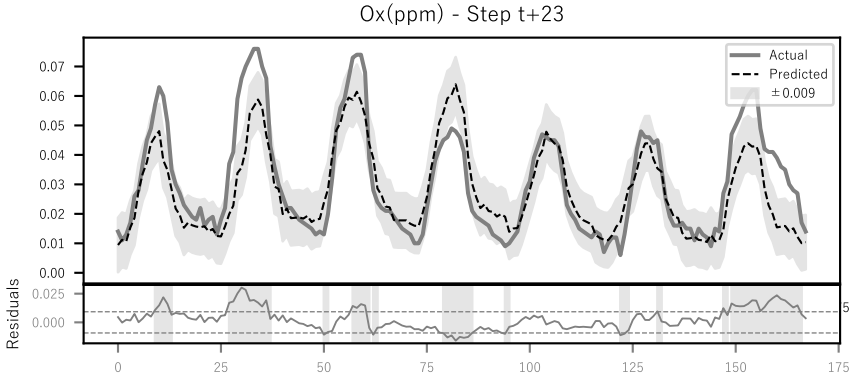
Comparison between actual and predicted values
with ± Standard Deviation Bands

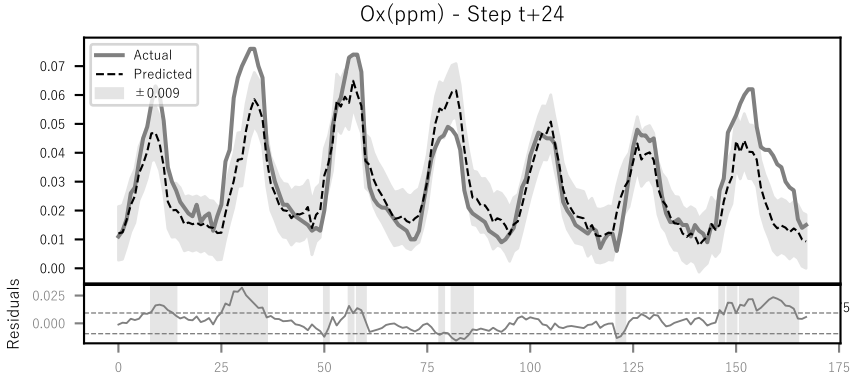


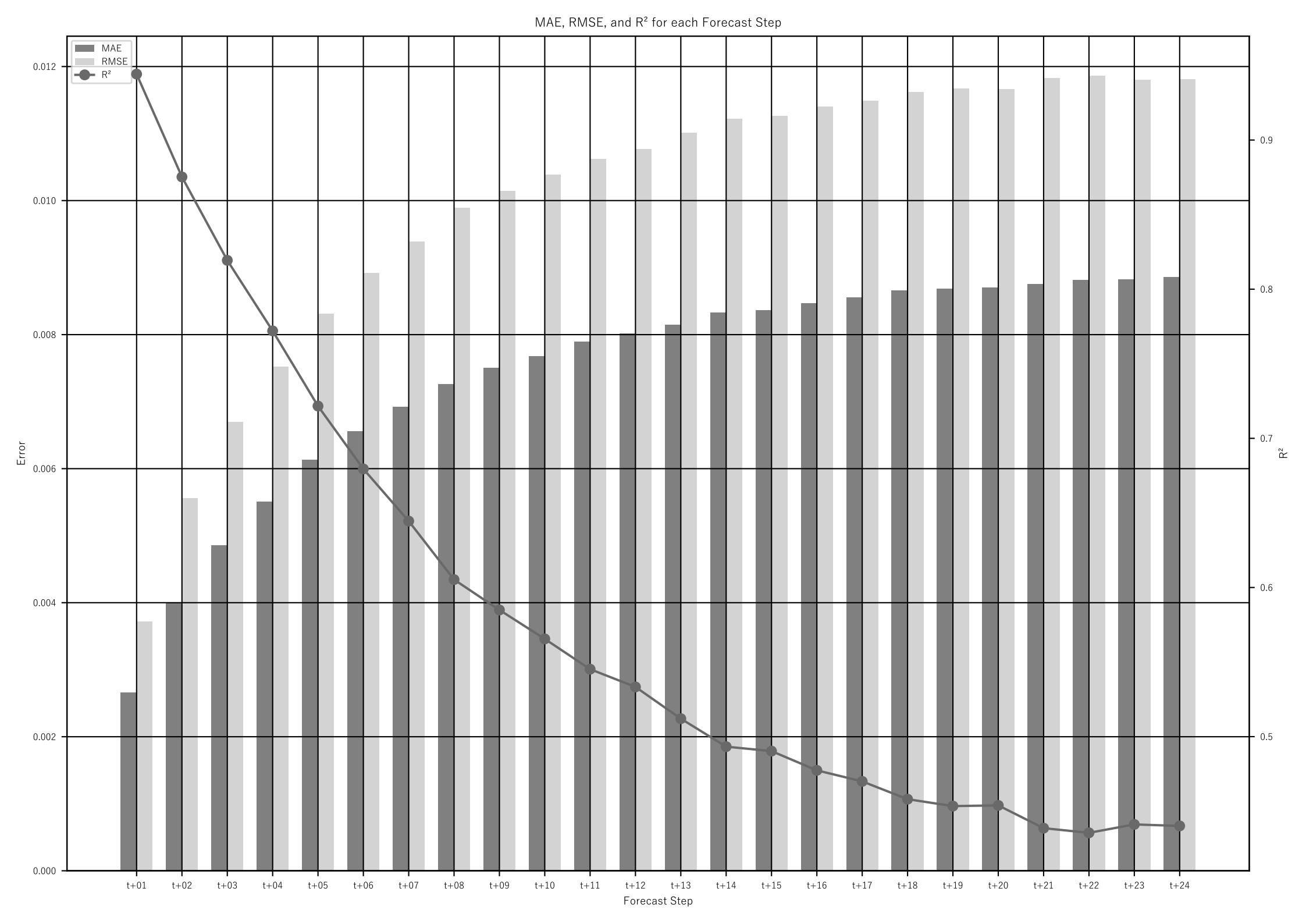


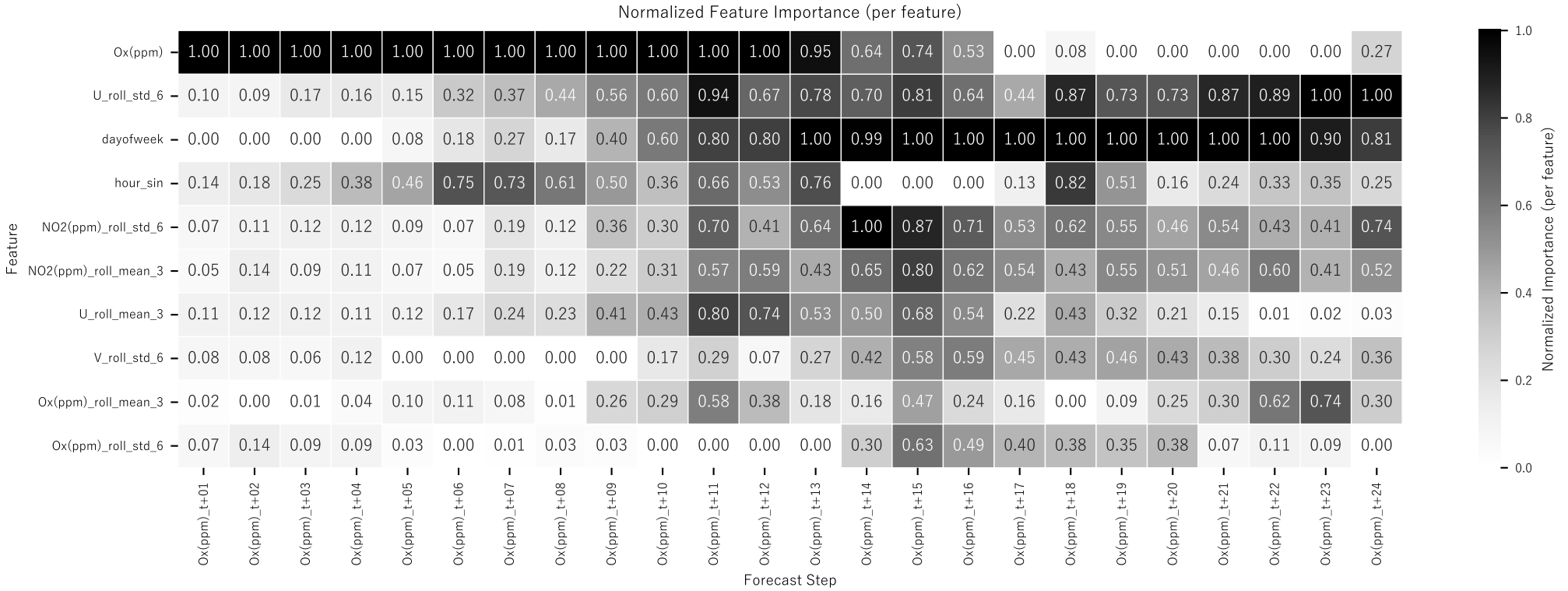


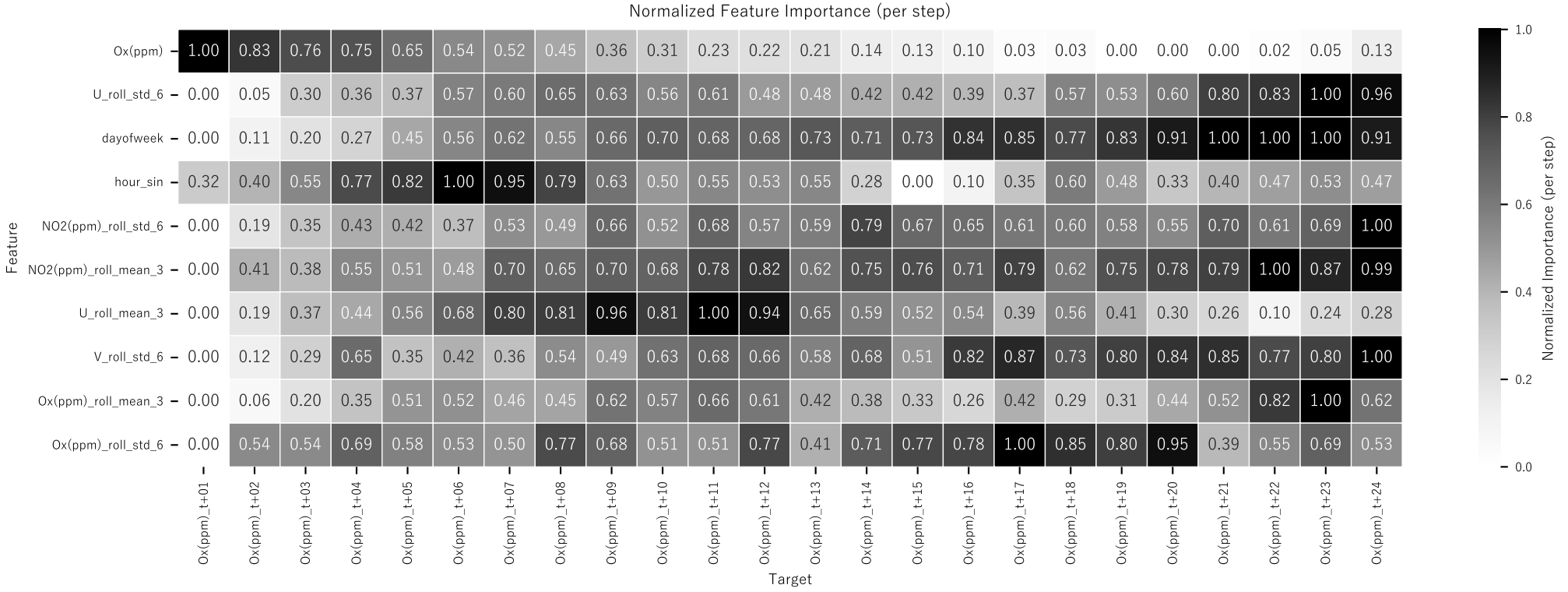







MAE, RMSE, and R² for each Forecast Step
MAE
RMSE
R²
Error
R²
Forecast Step
0.000
0.002
0.004
0.006
0.008
0.010
0.012
0.5
0.6
0.7
0.8
0.9
t+01
t+02
t+03
t+04
t+05
t+06
t+07
t+08
t+09
t+10
t+11
t+12
t+13
t+14
t+15
t+16
t+17
t+18
t+19
t+20
t+21
t+22
t+23
t+24


Normalized Feature Importance (per feature)
Feature
Ox(ppm)
U_roll_std_6
dayofweek
hour_sin
NO2(ppm)_roll_std_6
NO2(ppm)_roll_mean_3
U_roll_mean_3
V_roll_std_6
Ox(ppm)_roll_mean_3
Ox(ppm)_roll_std_6
Ox(ppm)_t+01
Ox(ppm)_t+02
Ox(ppm)_t+03
Ox(ppm)_t+04
Ox(ppm)_t+05
Ox(ppm)_t+06
Ox(ppm)_t+07
Ox(ppm)_t+08
Ox(ppm)_t+09
Ox(ppm)_t+10
Ox(ppm)_t+11
Ox(ppm)_t+12
Ox(ppm)_t+13
Ox(ppm)_t+14
Ox(ppm)_t+15
Ox(ppm)_t+16
Ox(ppm)_t+17
Ox(ppm)_t+18
Ox(ppm)_t+19
Ox(ppm)_t+20
Ox(ppm)_t+21
Ox(ppm)_t+22
Ox(ppm)_t+23
Ox(ppm)_t+24
Forecast Step
Normalized Importance (per feature)
1.0
0.8
0.6
0.4
0.2
0.0


Normalized Feature Importance (per step)
Feature
Ox(ppm)
U_roll_std_6
dayofweek
hour_sin
NO2(ppm)_roll_std_6
NO2(ppm)_roll_mean_3
U_roll_mean_3
V_roll_std_6
Ox(ppm)_roll_mean_3
Ox(ppm)_roll_std_6
Ox(ppm)_t+01
Ox(ppm)_t+02
Ox(ppm)_t+03
Ox(ppm)_t+04
Ox(ppm)_t+05
Ox(ppm)_t+06
Ox(ppm)_t+07
Ox(ppm)_t+08
Ox(ppm)_t+09
Ox(ppm)_t+10
Ox(ppm)_t+11
Ox(ppm)_t+12
Ox(ppm)_t+13
Ox(ppm)_t+14
Ox(ppm)_t+15
Ox(ppm)_t+16
Ox(ppm)_t+17
Ox(ppm)_t+18
Ox(ppm)_t+19
Ox(ppm)_t+20
Ox(ppm)_t+21
Ox(ppm)_t+22
Ox(ppm)_t+23
Ox(ppm)_t+24
Target
Normalized Importance (per step)
1.0
0.8
0.6
0.4
0.2
0.0