

# NHITS 24-hour Forecast Report - 金子

$$\mathbf{x}_t \in \mathbb{R}^L \text{ (input window)}$$

$$\theta^{(b)} = f_{\text{MLP}}^{(b)}(\mathbf{x}_t)$$

$$\hat{\mathbf{y}}^{(b)} = P^{(b)}\theta^{(b)}$$

$$\hat{\mathbf{y}} = \sum_{b=1}^B \hat{\mathbf{y}}^{(b)}$$

$$\mathcal{L} = \frac{1}{N} \sum_{i=1}^N |y_i - \hat{y}_i|$$

$\mathbf{x}_t$ : input lookback window (L=720 hours)  
 $f_{\text{MLP}}^{(b)}$ : block-specific multi-layer perceptron  
 $\theta^{(b)}$ : basis coefficients estimated by block  $b$   
 $P^{(b)}$ : hierarchical interpolation operator  
 $\hat{\mathbf{y}}$ : 24-hour direct multi-step forecast  
 $\mathcal{L}$ : Mean Absolute Error minimized during training

The N-HiTS model is configured using historical exogenous variables (NO, NO2 concentrations and wind components U, V).

These variables are provided only from past observations and allow the model to learn dynamic interactions between atmospheric

No manual lag engineering is applied, as the model directly processes a 720-hour historical window.

Prefecture code	38
Station code	38205010
Station name	金子
Target item	Ox(ppm)
Model	NHITS (Fixed, Rolling stride=1)
Forecast horizon	24
Input size	720
Historical exogenous	solar_elevation, NO(ppm), NO2(ppm)
Training samples	2160
Test samples	720
Elapsed time	12 min 43 sec

## Features used for prediction

solar\_elevation

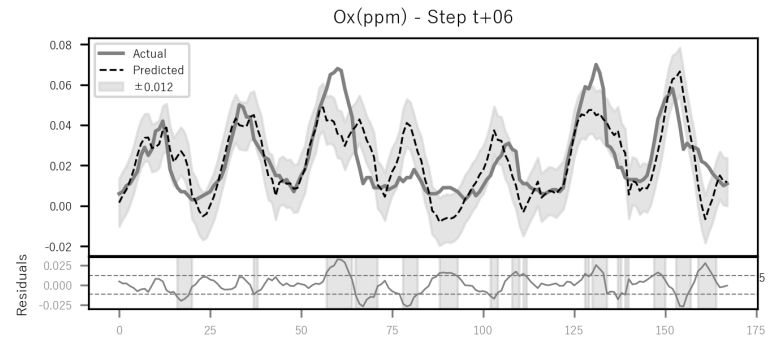
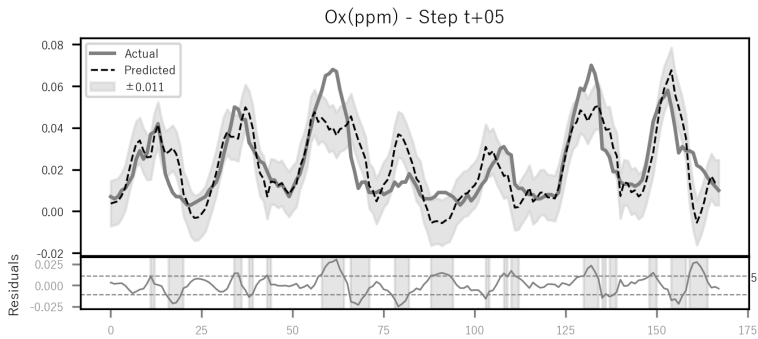
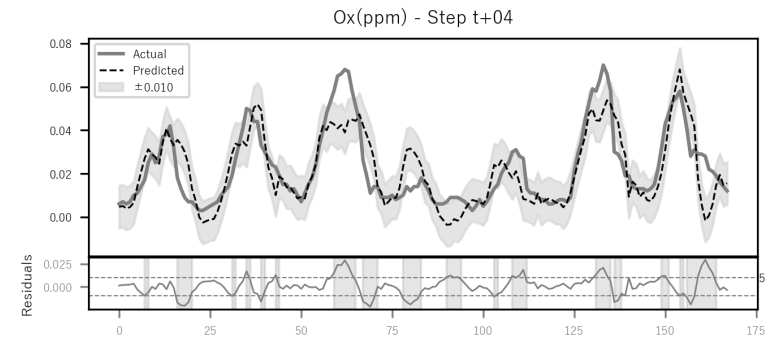
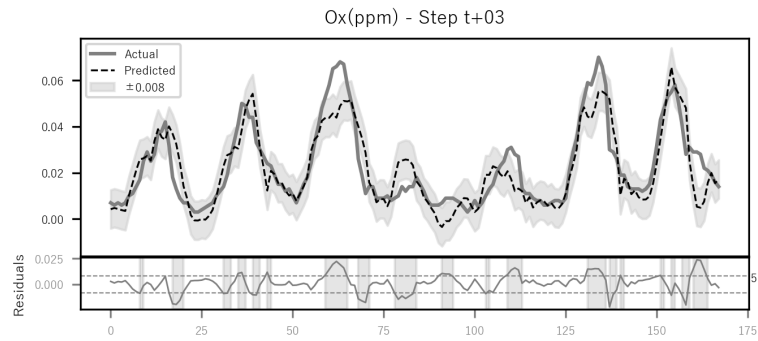
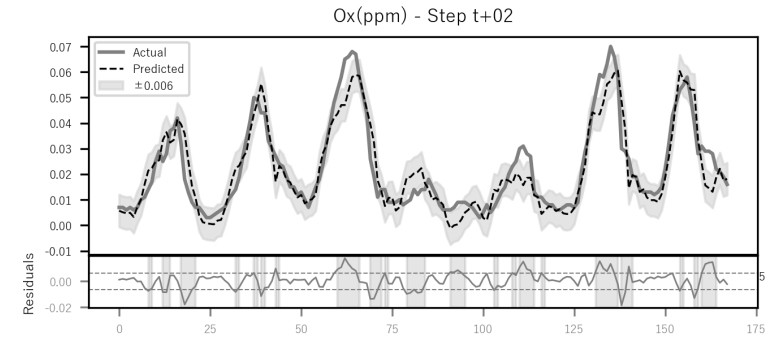
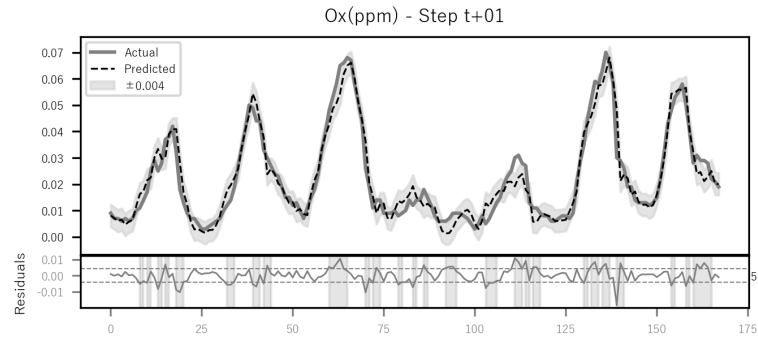
NO(ppm)

NO2(ppm)

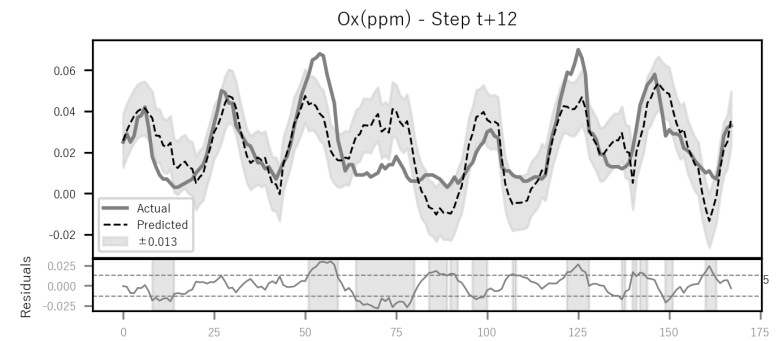
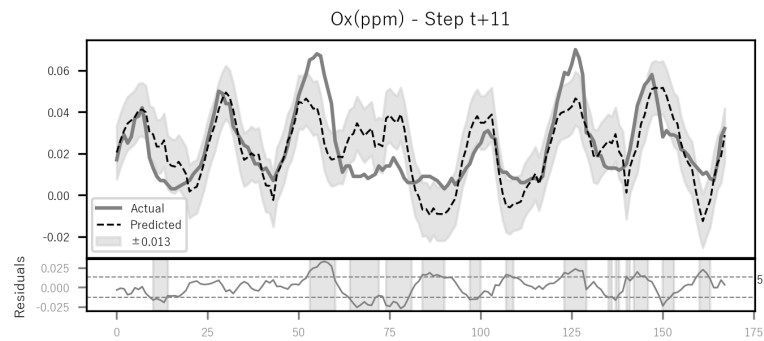
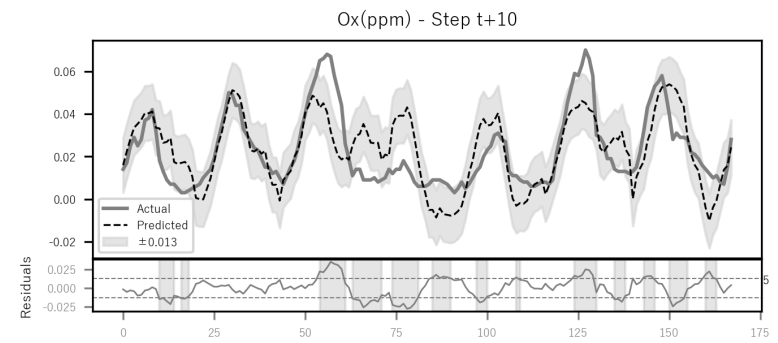
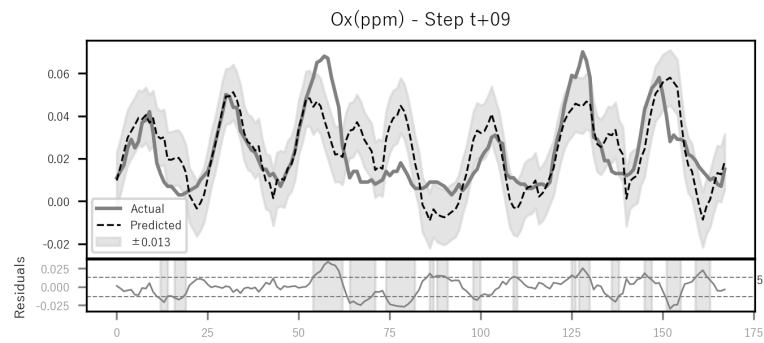
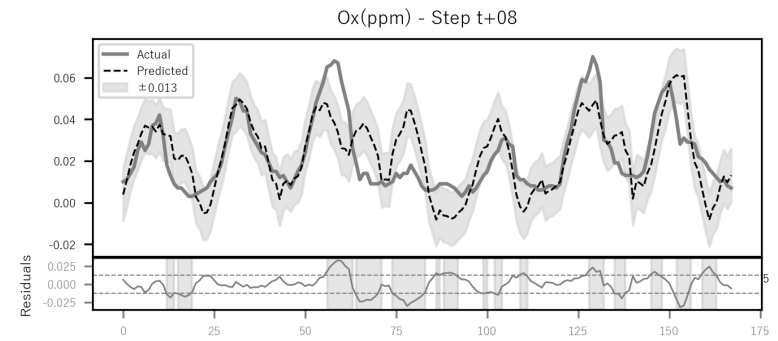
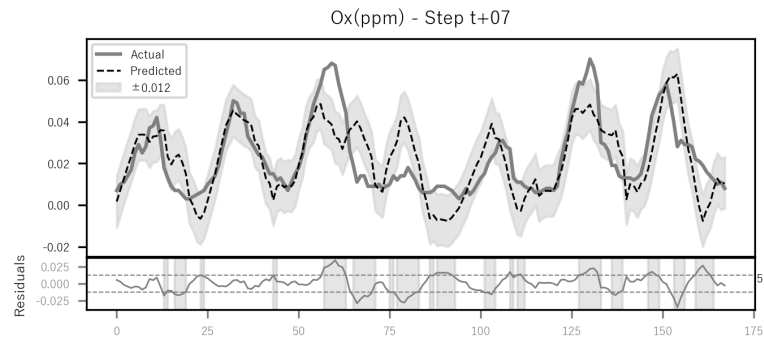
## Model accuracy

Target	R <sup>2</sup>	MAE	RMSE
t+01	0.9050	0.0036	0.0047
t+02	0.8044	0.0052	0.0068
t+03	0.7025	0.0062	0.0084
t+04	0.6173	0.0070	0.0095
t+05	0.5470	0.0077	0.0103
t+06	0.4796	0.0082	0.0110
t+07	0.4492	0.0085	0.0113
t+08	0.4292	0.0087	0.0115
t+09	0.4147	0.0088	0.0116
t+10	0.4005	0.0090	0.0118
t+11	0.3901	0.0092	0.0119
t+12	0.4079	0.0091	0.0117
t+13	0.4214	0.0090	0.0116
t+14	0.4290	0.0090	0.0116
t+15	0.4367	0.0090	0.0115
t+16	0.4012	0.0093	0.0119
t+17	0.3997	0.0093	0.0120
t+18	0.3821	0.0094	0.0122
t+19	0.3539	0.0096	0.0124
t+20	0.3450	0.0097	0.0125
t+21	0.3569	0.0095	0.0124
t+22	0.3633	0.0093	0.0123
t+23	0.3156	0.0096	0.0128
t+24	0.3137	0.0095	0.0128

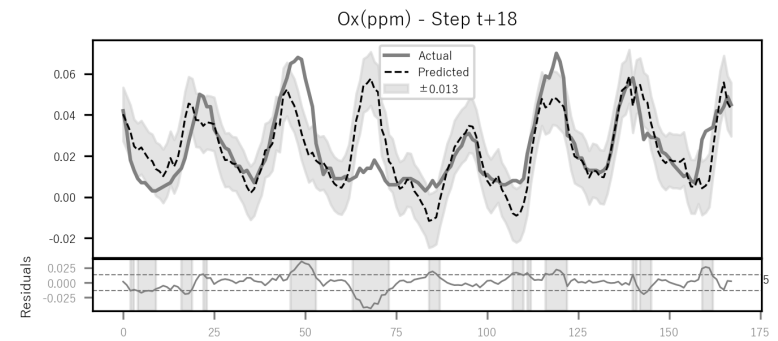
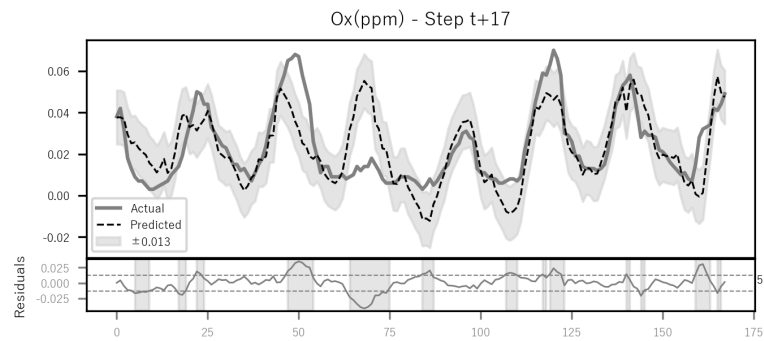
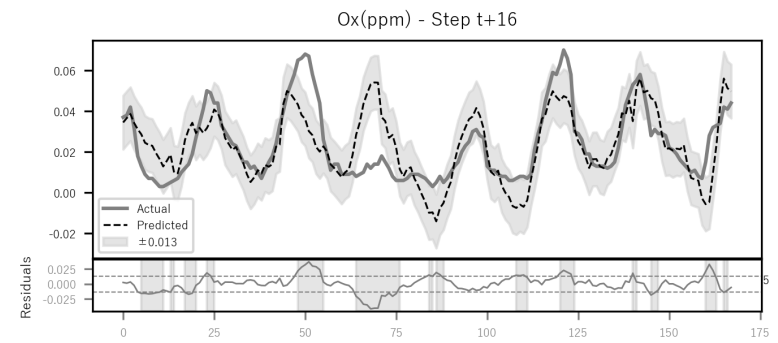
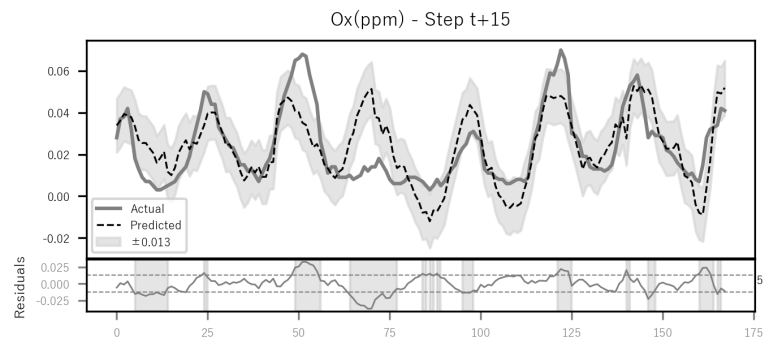
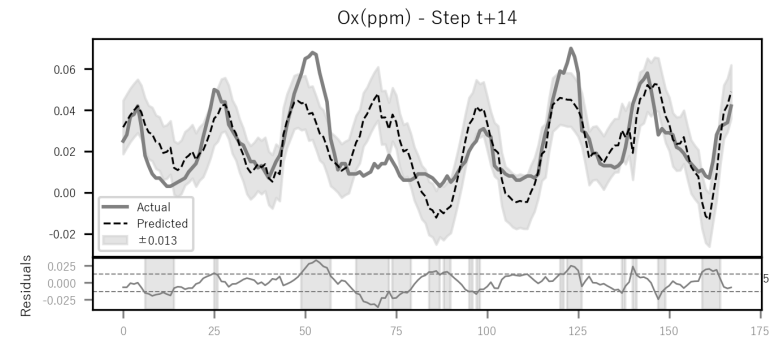
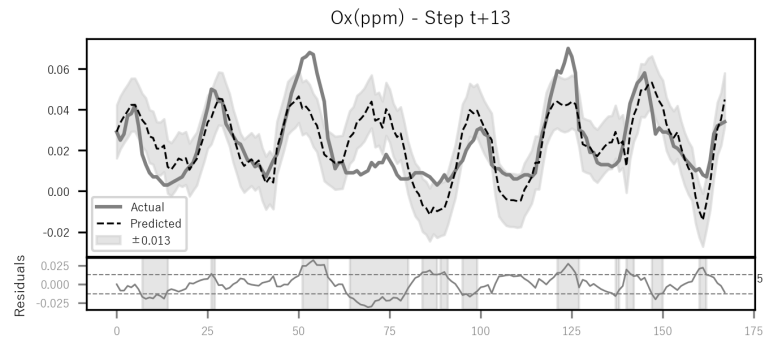
Comparison between actual and predicted values  
with  $\pm$  Standard Deviation Bands



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