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 (Neural Hierarchical Interpolation for Time Series) model is a deep neural forecasting architecture designed for multi-step time series prediction.

The model processes a long historical window (e.g.: 720 hours) through stacked MLP-based blocks operating at different temporal resolutions. Each block estimates a set of basis coefficients that are mapped to the forecast horizon through hierarchical interpolation operators. The final forecast is obtained by summing the contributions of all blocks. Unlike recursive models, N-HiTS produces 24-hour forecasts simultaneously using a direct multi-step approach, reducing error accumulation.

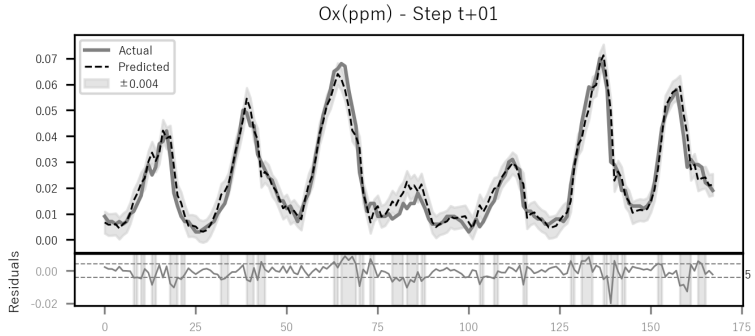
In this application, the model is trained by minimizing the Mean Absolute Error (MAE) between predicted and observed measurements.

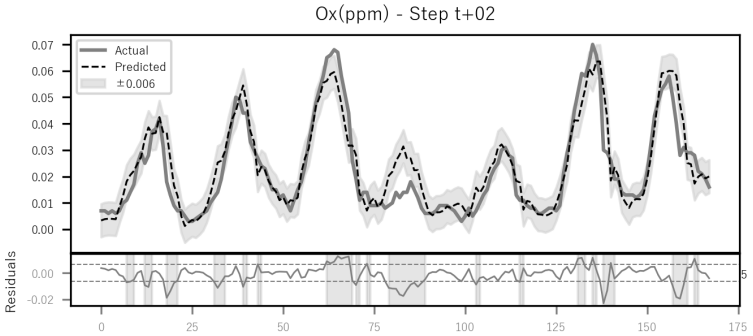
Prefecture code	38
Station code	38205010
Station name	金子
Target item	Ox(ppm)
Model	NHITS (Fixed, Rolling stride=1)
Forecast horizon	24
Input size	720
Training samples	2160
Test samples	720
Elapsed time	12 min 10 sec

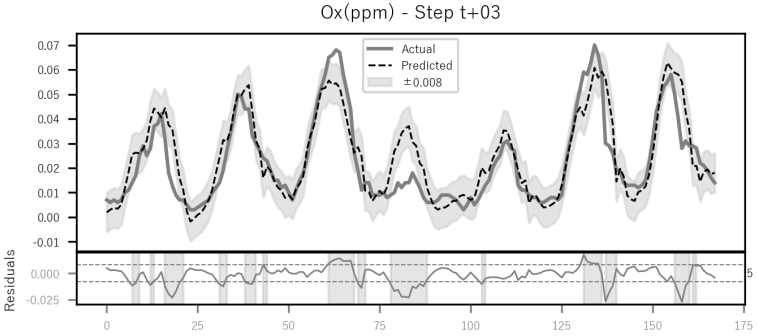
Model accuracy

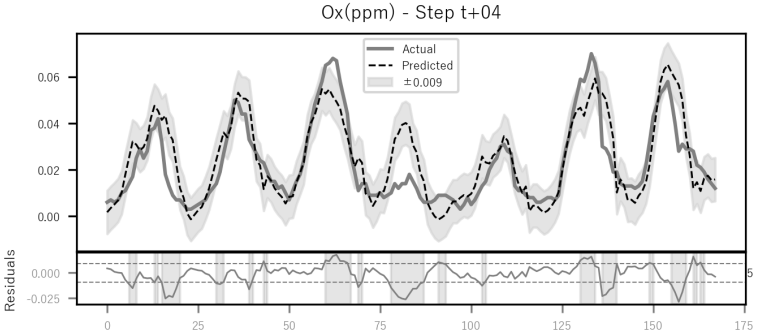
Target	R^2	MAE	RMSE
t+01	0.9092	0.0034	0.0046
t+02	0.7986	0.0052	0.0069
t+03	0.6801	0.0065	0.0087
t+04	0.5886	0.0075	0.0098
t+05	0.5024	0.0083	0.0108
t+06	0.4463	0.0087	0.0114
t+07	0.3808	0.0090	0.0120
t+08	0.3327	0.0092	0.0124
t+09	0.3140	0.0093	0.0126
t+10	0.3267	0.0093	0.0125
t+11	0.3321	0.0094	0.0124
t+12	0.3586	0.0093	0.0122
t+13	0.3673	0.0093	0.0122
t+14	0.3909	0.0092	0.0120
t+15	0.3787	0.0093	0.0121
t+16	0.3519	0.0094	0.0124
t+17	0.3354	0.0095	0.0126
t+18	0.3051	0.0098	0.0129
t+19	0.3200	0.0098	0.0127
t+20	0.3547	0.0097	0.0124
t+21	0.3712	0.0095	0.0123
t+22	0.3745	0.0096	0.0122
t+23	0.3467	0.0097	0.0125
t+24	0.3342	0.0096	0.0126

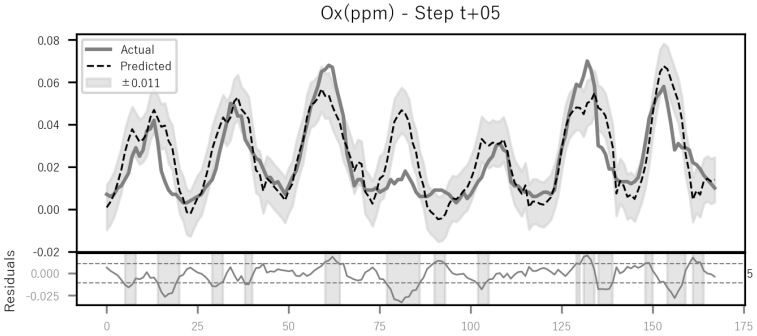
Comparison between actual and predicted values
with ± Standard Deviation Bands

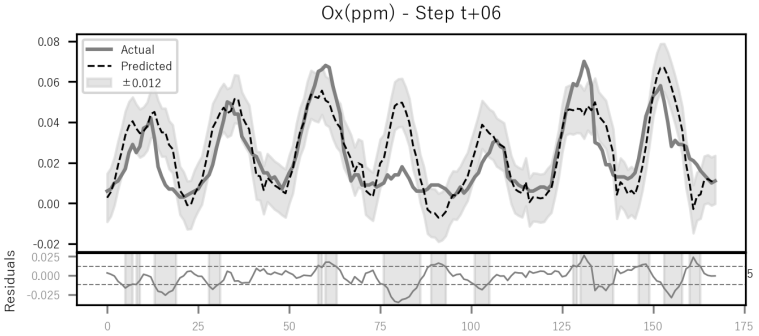












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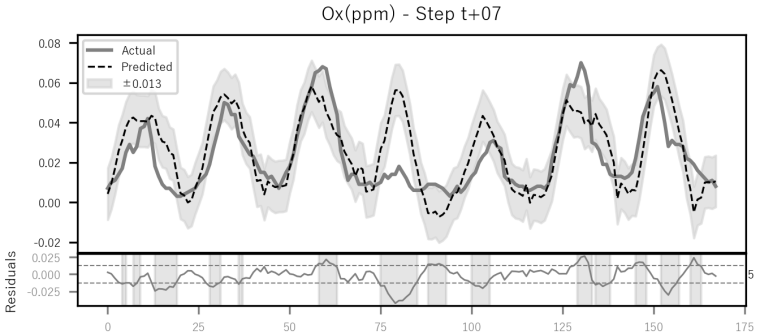

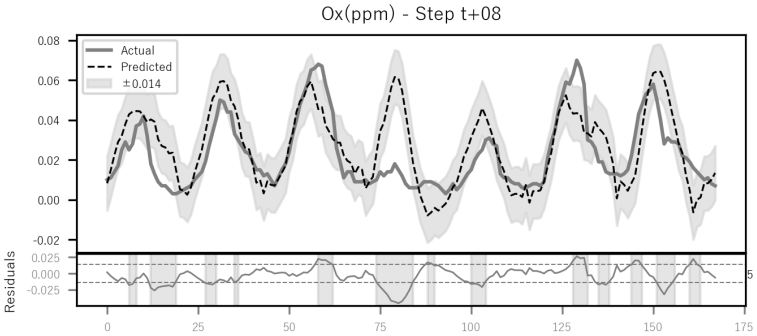

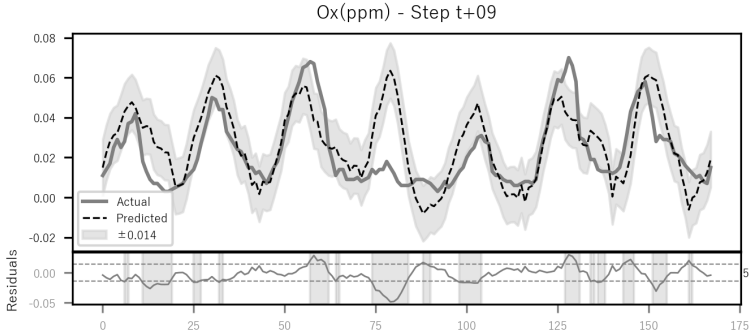

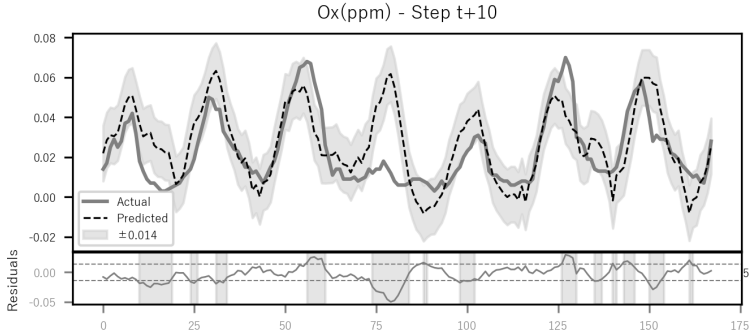

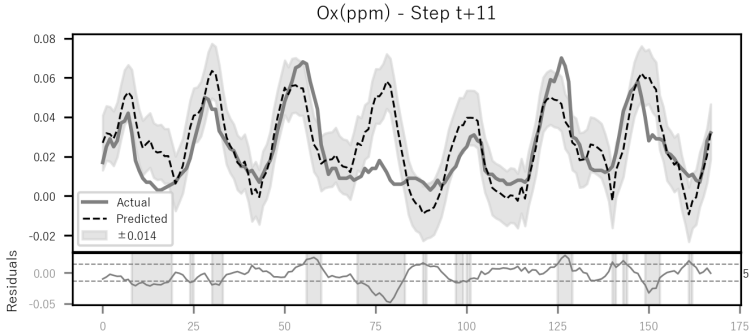

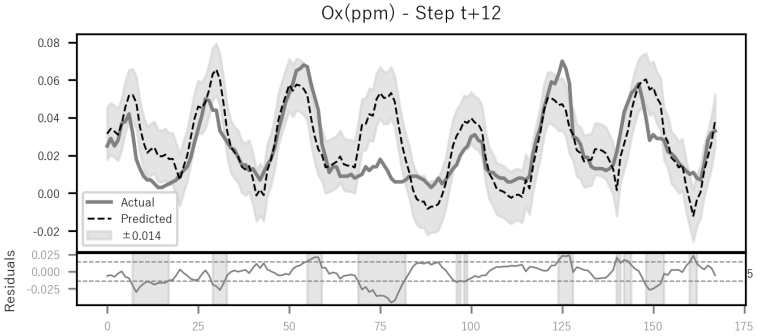

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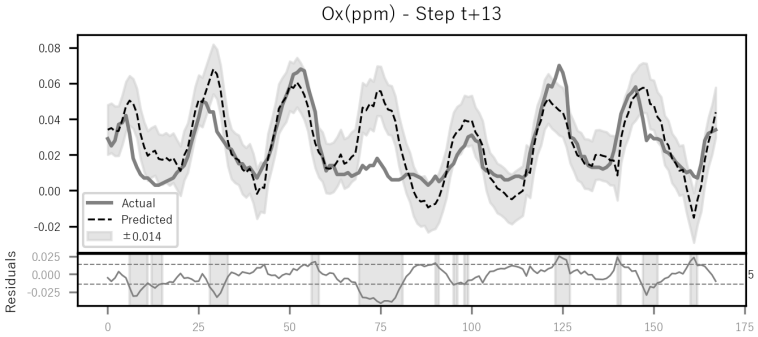

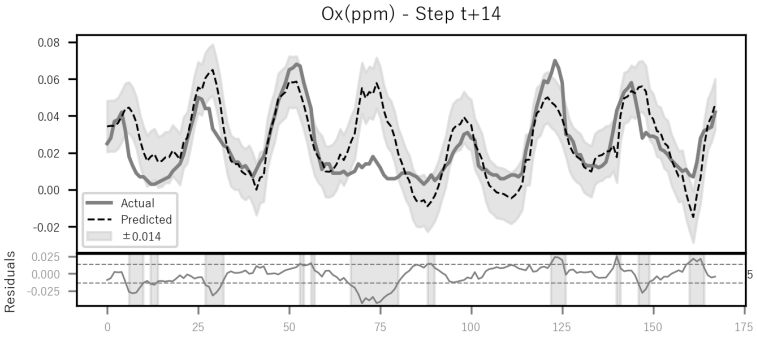

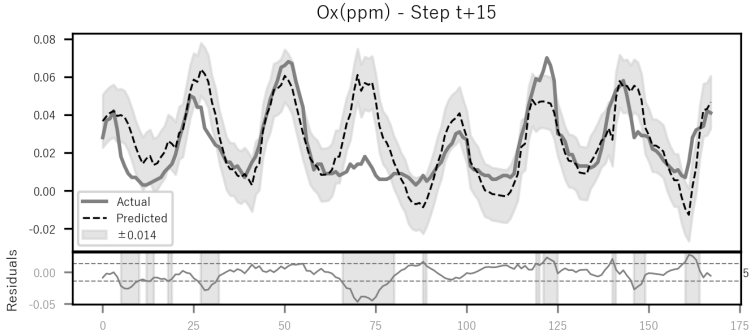

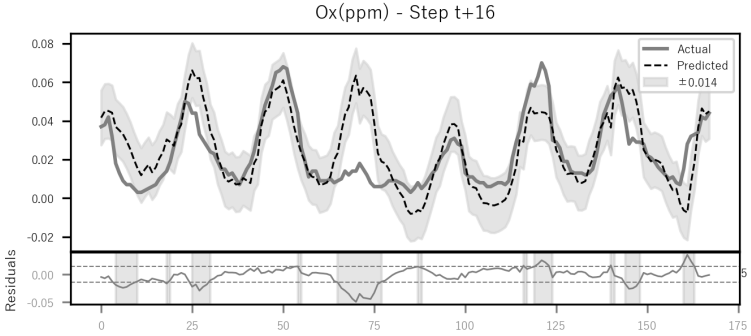

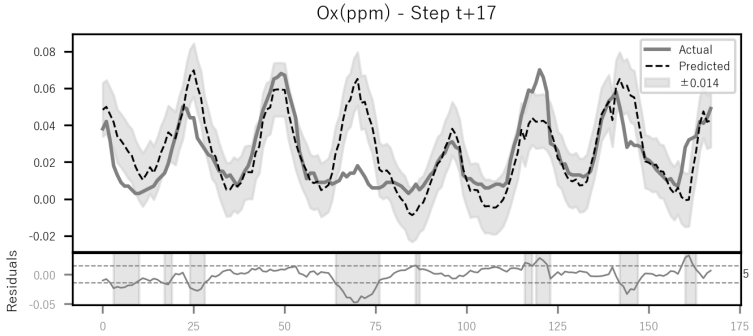

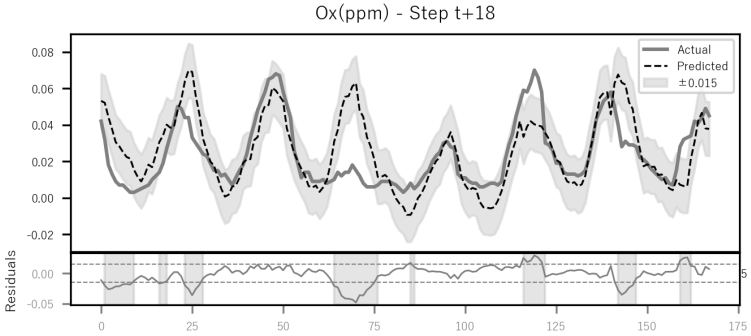

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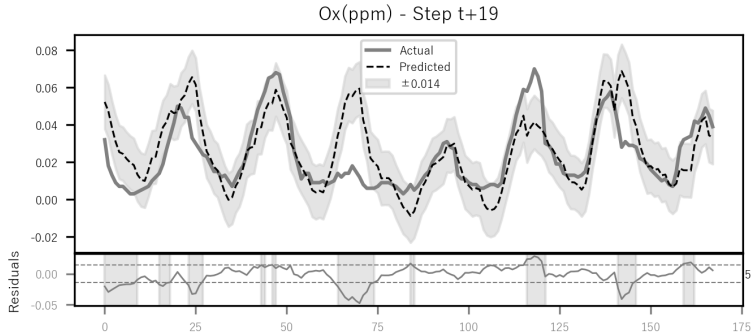

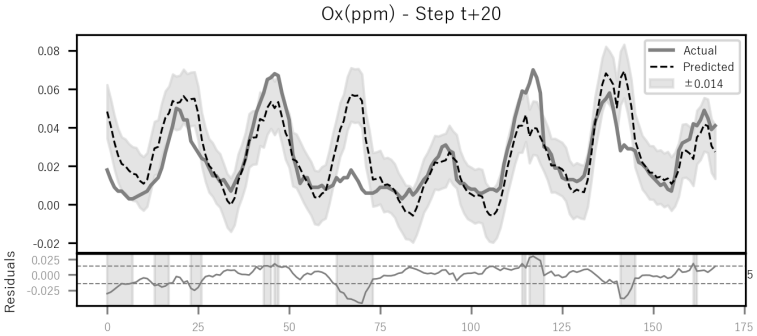

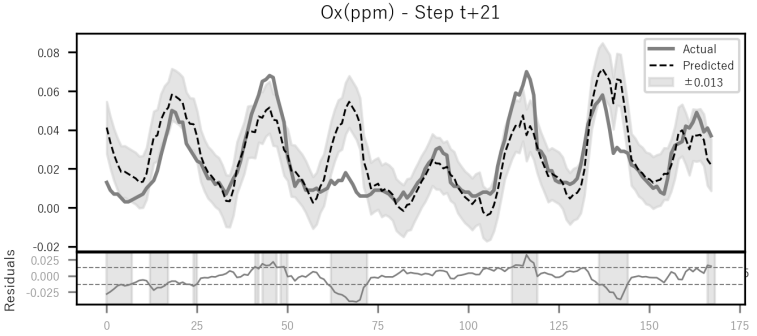

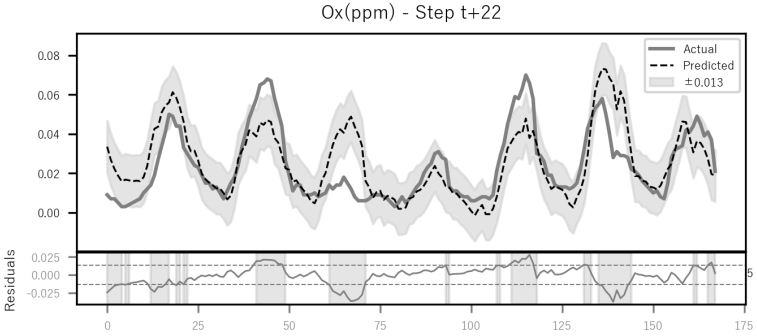

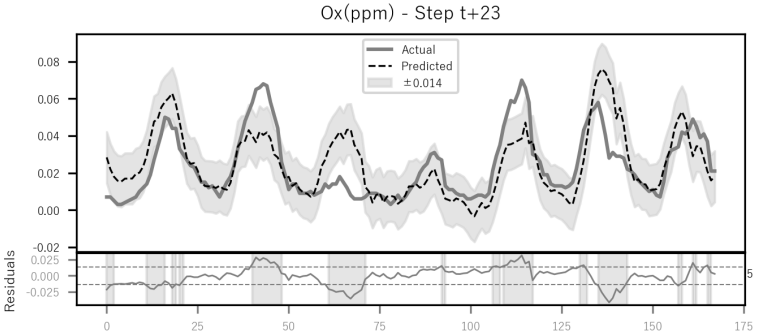

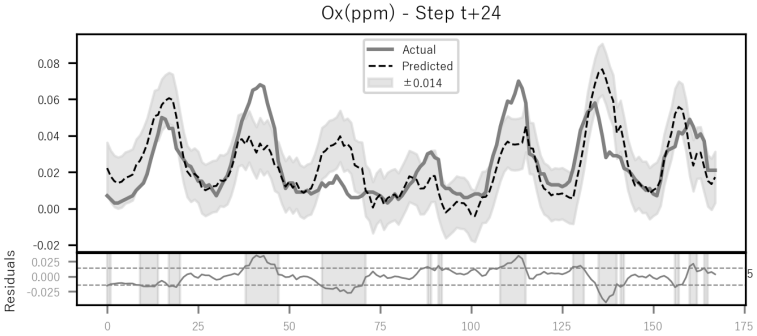

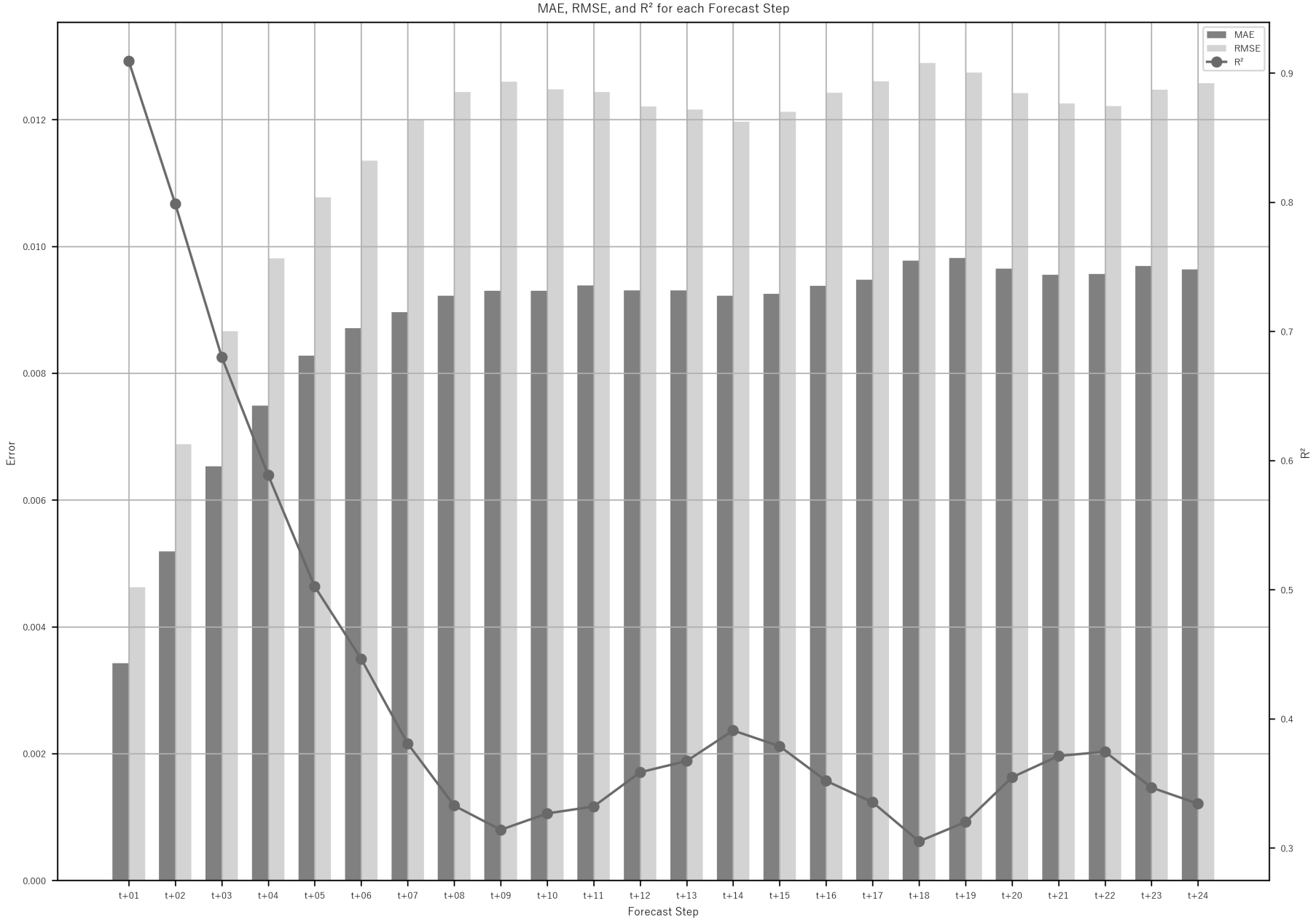
MAE, RMSE, and R² for each Forecast Step
MAE
RMSE
R²
Error
R²
Forecast Step
0.000
0.002
0.004
0.006
0.008
0.010
0.012
0.3
0.4
0.5
0.6
0.7
0.8
0.9
t+01
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