

ARIMA parameter selection Report - 西条

ARIMA(p, d, q) :

$$(1 - \sum_{i=1}^p \phi_i L^i)(1 - L)^d y_t = c + (1 + \sum_{i=1}^q \theta_i L^i) \varepsilon_t$$
$$\hat{y}_t = c + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{j=1}^q \theta_j \varepsilon_{t-j}$$

y_t : observed value at time t

\hat{y}_t : predicted (fitted) value at time t

ϕ_i : autoregressive (AR) coefficients, capturing dependence on past values

θ_j : moving average (MA) coefficients, capturing dependence on past errors

d : differencing order for stationarity (number of times data are differenced)

L : lag operator ($Ly_t = y_{t-1}$)

ε_t : white noise (random shock) at time t

c : constant or drift term

Model objective = minimize residual variance σ_ε^2 to fit observed series.

Prefecture code	38
Station code	38206050
Station name	西条
Target item	Ox(ppm)
Number of training samples	15768
Number of testing samples	6758
Model	ARIMA
ARIMA order	(2, 1, 1)
Parameter Grid (tested) p	[1, 2, 3]
Parameter Grid (tested) d	[0, 1]
Parameter Grid (tested) q	[0, 1, 2]
Best Parameters (found)	p=2, d=1, q=1
Predictions mean	0.03434205448793288
Predictions std	9.032569207659665e-05
Real mean	0.03427160402485943
Real std	0.018249610182089367
Ljung-Box residuals autocorrelation, Prob(Q)	0.0
Residuals skew	0.5707125391271004
Residuals kurtosis	2.963070318930282

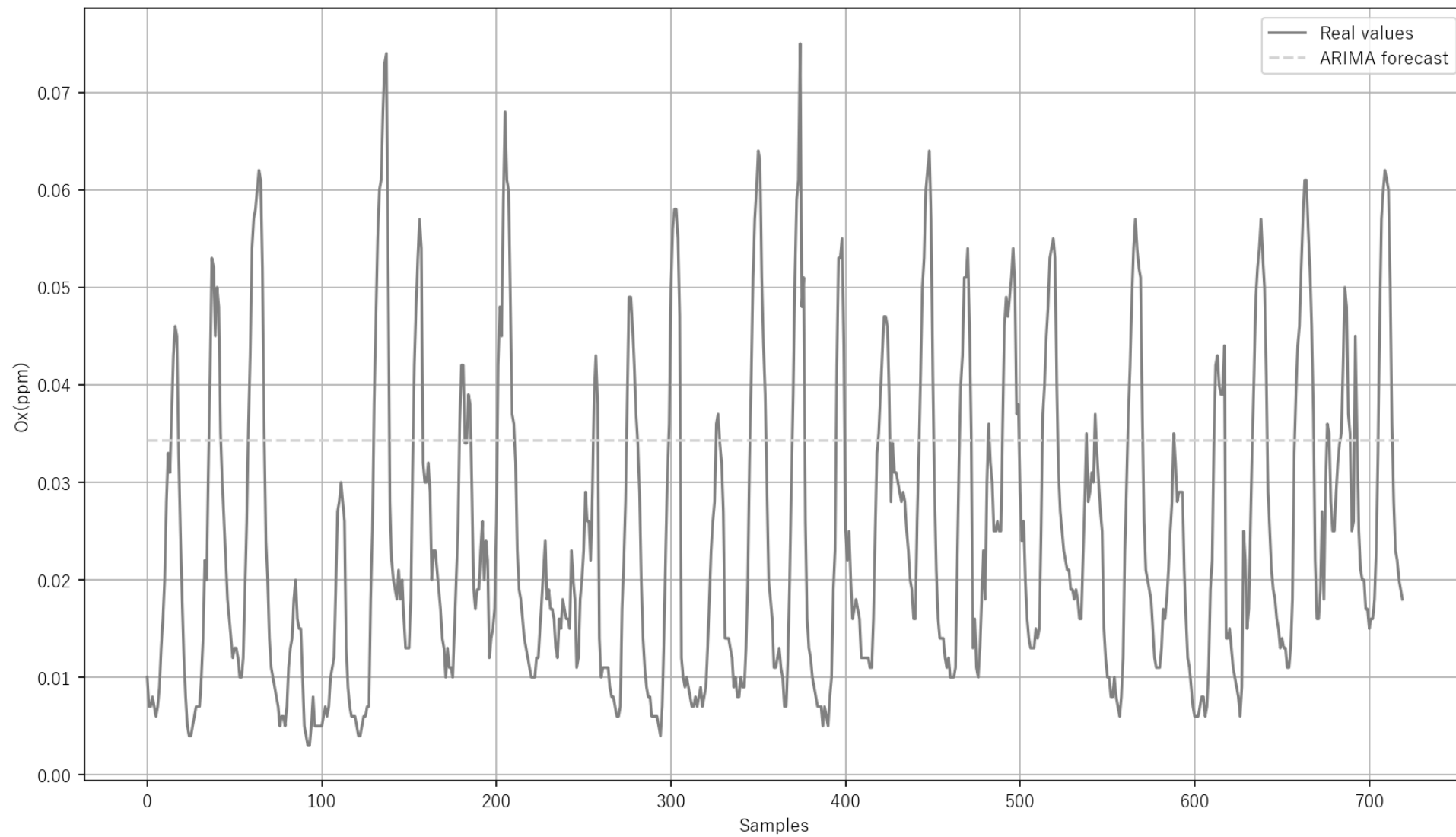
Features used for prediction

Ox(ppm)

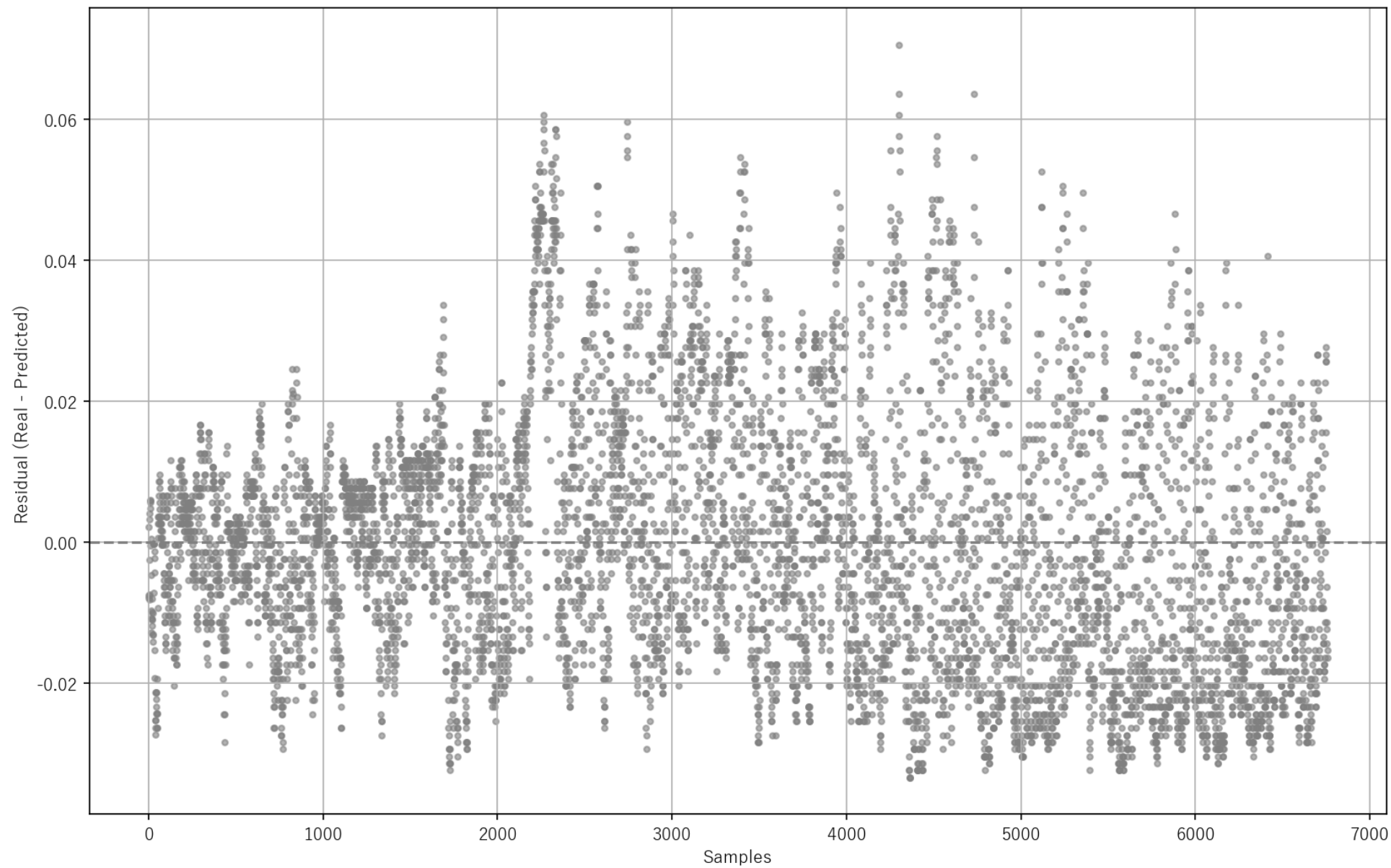
Model accuracy

Target	R ²	MAE	RMSE
Ox(ppm)	0.0001	0.0147	0.0182

ARIMA(2, 1, 1)
 $R^2: 0.00011$



Residuals



Histogram of Residuals – Distribution & Central Tendency

