ADF Stationarity Report - 西条

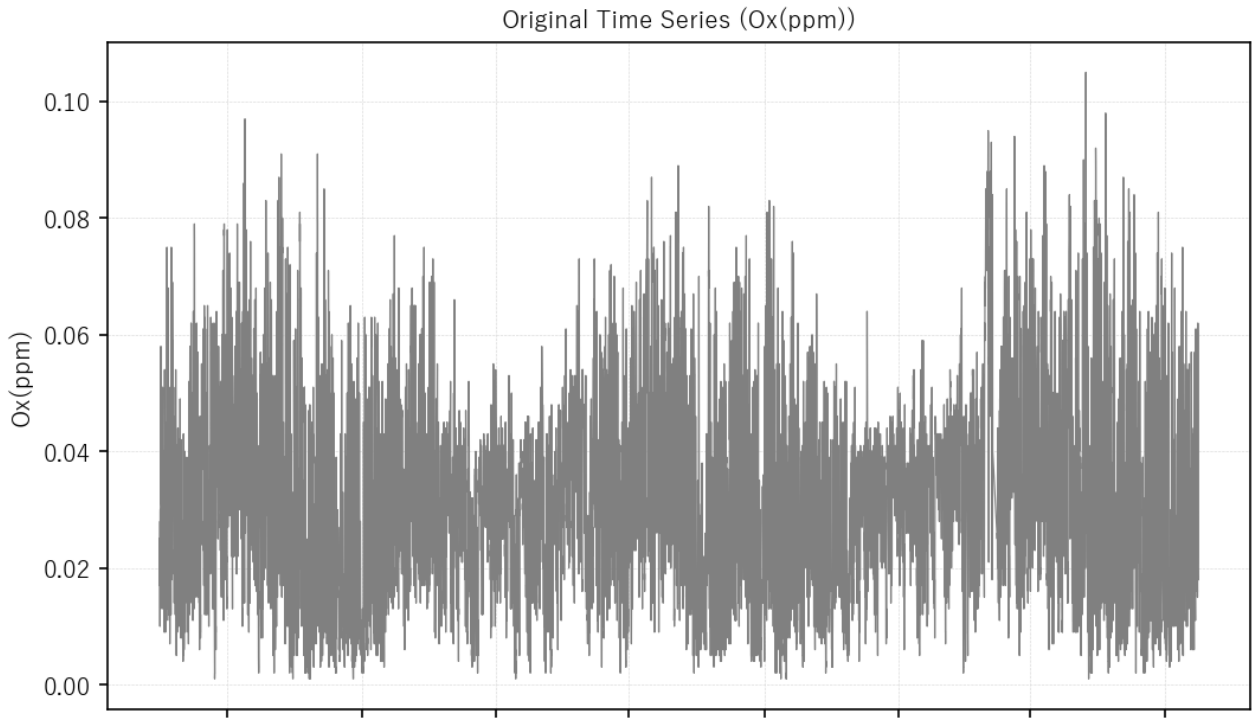
$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \sum_{i=1}^{p} \delta_i \Delta y_{t-i} + \varepsilon_t$$

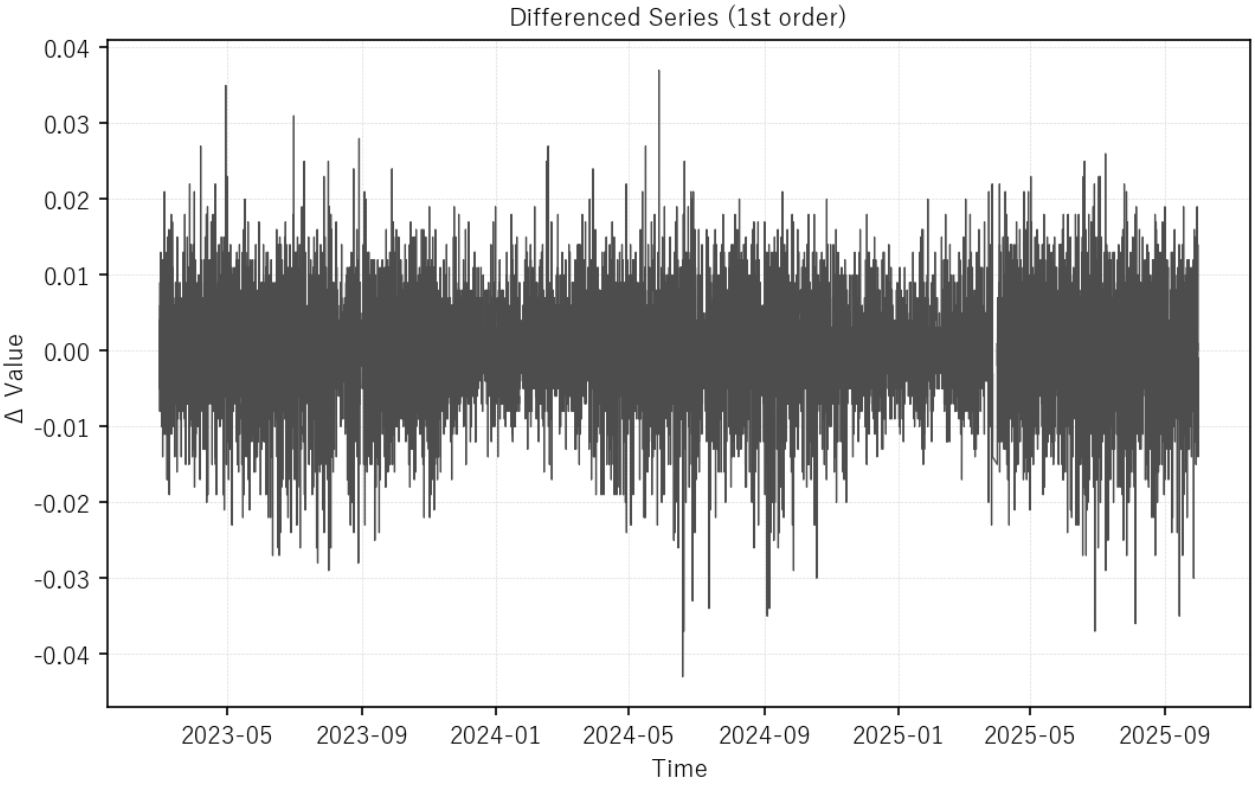
Δy_t: first difference of the series ($y_t - y_{t-1}$)
α: constant term (drift)
βt: deterministic trend component
γ: coefficient testing the presence of a unit root
δ_i: coefficients of lagged differences
ε_t: white noise error term

Null hypothesis H_0: the series has a unit root (non-stationary)
Alternative hypothesis H_1: the series is stationary

The Augmented Dickey-Fuller (ADF) test is used to check whether a time series is stationary — that is, whether its statistical properties such as mean and variance remain constant over time.
Mathematically, the test is based on an autoregressive (AR) model.
The decision is based on the p-value:
• A small p-value (typically < 0.05) suggests strong evidence against H_0, meaning the series is stationary.
• A large p-value indicates that H_0 cannot be rejected — the series is likely non-stationary.
In simple terms, the p-value measures how likely it is to observe the given data if the null hypothesis were true. Lower values mean the data are unlikely under H_0, strengthening the evidence that the series is stationary.

Prefecture code	38
Station code	38206050
Station name	西条
Target item	Ox(ppm)
ADF model	Augmented Dickey-Fuller Test
Series length	22526
Start date	2023-03-01 01:00:00
End date	2025-10-01 00:00:00
Original Series ADF Statistic	-10.90750648158351
Original Series p-value	1.1184168394113457e-19
Original Series Used Lags	47
Differenced Series ADF Statistic	-29.947567830589055
Differenced Series p-value	0.0
Differenced Series Used Lags	47


Original Time Series (Ox(ppm))
Ox(ppm)
0.10
0.08
0.06
0.04
0.02
0.00


Differenced Series (1st order)
Δ Value
0.04
0.03
0.02
0.01
0.00
-0.01
-0.02
-0.03
-0.04
2023-05
2023-09
2024-01
2024-05
2024-09
2025-01
2025-05
2025-09
Time