

Stationarity in Practice

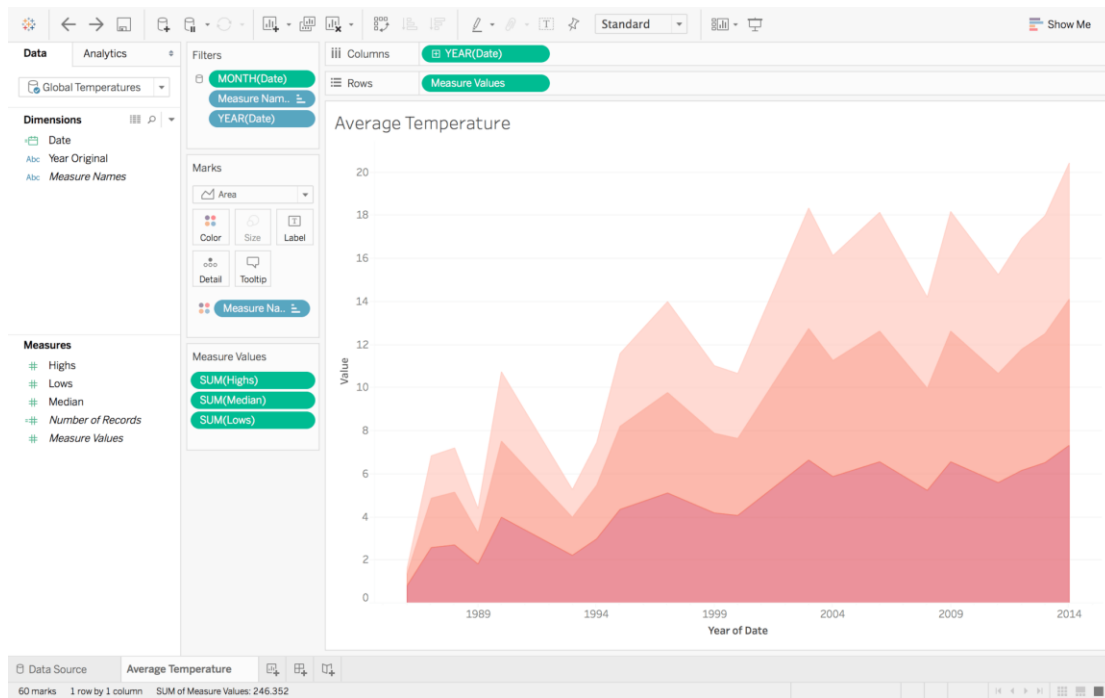
- *Task*: Find examples from research papers or industry blogs where stationarity (or lack of it) influenced model choice.
- *Deliverable*: Summarize why stationarity matters and how practitioners test & fix it.

Energy – Electricity Consumption

- **Problem**: Forecasting monthly electricity sales (Indonesia, 2008–2017). The raw data exhibited both trend and seasonality, so stationarity needed to be checked.
- **Models**: The authors employed a SARIMA model. Non stationarity can invalidate ARIMA/SARIMA, so they planned to difference both non-seasonally and seasonally if needed.
- **Detection**: The time series plot showed clear upward trend and increasing variance, “not meeting mean and variance stationarity. They concluded the series was non-stationary in both mean and variance. (They did not explicitly quote an ADF test result, but the diagnostics implied unit roots.)
- **Addressing Non-Stationarity**: They applied differencing: one regular difference ($d=1$) and one seasonal difference ($D=1$ with seasonal period $s=12$). After these transformations the series became approximately stationary. The best-fitting model was found to be $SARIMA(1,1,0)(0,1,1)_{12}$ (i.e. $ARIMA(1,1,0)$ with seasonal $(0,1,1)$ and $s=12$). (They used Python 3 in Google Colab for analysis and verified model residuals by Ljung–Box and normality tests.)

Visualization Best Practices

- *Task*: Search for examples of effective time series visualizations used in finance, healthcare, or climate studies.
- *Deliverable*: Present screenshots (with citations) and explain why those visuals work better than plain line plots.



Plain plots treat the data points as independent without temporal ordering

In time series, the order of the data matters

Time series reveals trends, seasonality, cyclics, and Irregularities

Time series visualizations let you check stationarity visually

Time series visualizations allow decomposition

We see all of that in the above picture