Original time series ($X$) (Log-transformed)

Baseline ($X_{BL}$)

Climatological seasonal cycle of $X_{BL}$ ($X_{BL}^{clm}$) and Low-pass filter ($KZ(365,3)$ filter)

$$X_{BL} = KZ(365,3)X$$

$$X_{LT} = X_{BL}^{clm} + \varepsilon$$

$$X_{SN} = X_{BL} - X_{LT}$$

Short-term component ($X_{ST}$)

Seasonal component ($X_{SN}$)

Low-pass filter ($KZ(15,5)$ filter)

$$X_{ST} = X - X_{BL}$$

$$X_{BT} = KZ(15,5)X$$

Emission-related $X_{LT}$ ($X_{LT}^{emis}$)

Meteorology-related $X_{LT}$ ($X_{LT}^{met}$)

Multiple linear regression model and Low-pass filter ($KZ(365,3)$ filter)

$$MET_{BL} = [T_{BL}, P_{BL}, RH_{BL}, WS_{BL}, S_{BL}]$$

$$X_{BL} = a_0 + \sum a_i MET_{BL} + \varepsilon'$$

$$X_{LT}^{emis} = KZ(365,3)\varepsilon'$$

$$X_{LT}^{met} = X_{LT} - X_{LT}^{emis}$$