

Basic statistics: **variation analysis**

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❑ What statistics do represent the variation?

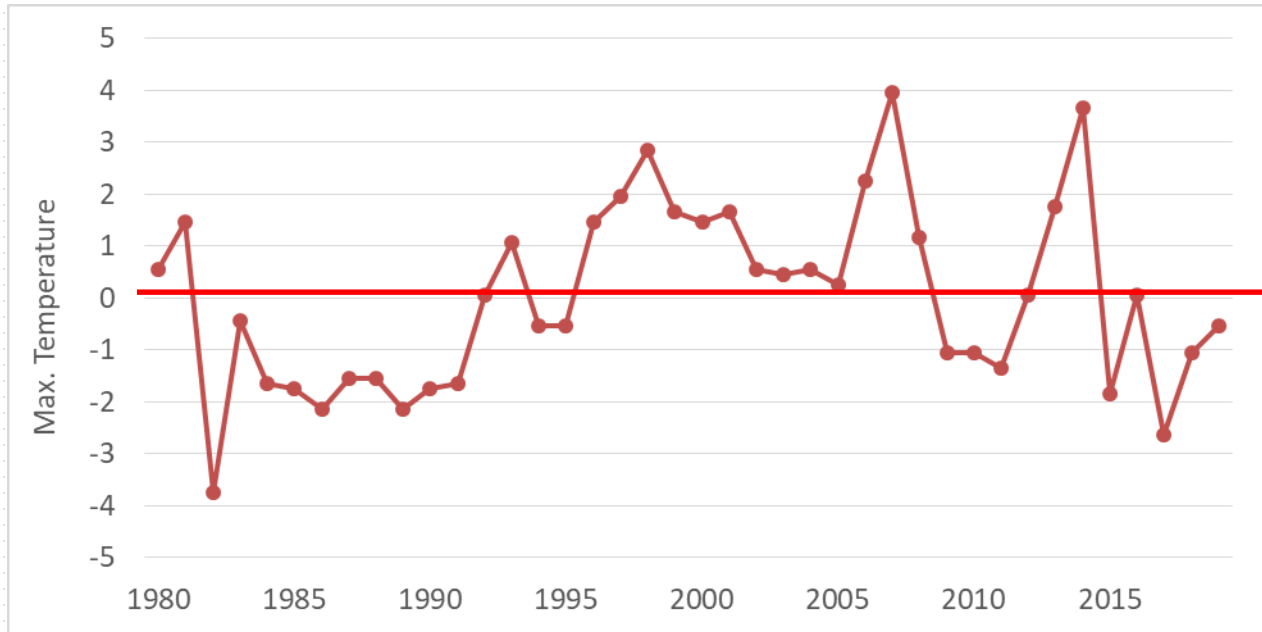
- ✓ Departure or Anomaly
- ✓ Variance
- ✓ Standard deviation
- ✓ Minimum
- ✓ Maximum
- ✓ Range

□ Departure or Anomaly

$$\mathbf{x}_{dt} = x_t - \bar{x} \quad t = 1, 2, \dots, n$$

Reflect the **deviation** of data from the average and is often called **anomaly**.

□ Departure or Anomaly

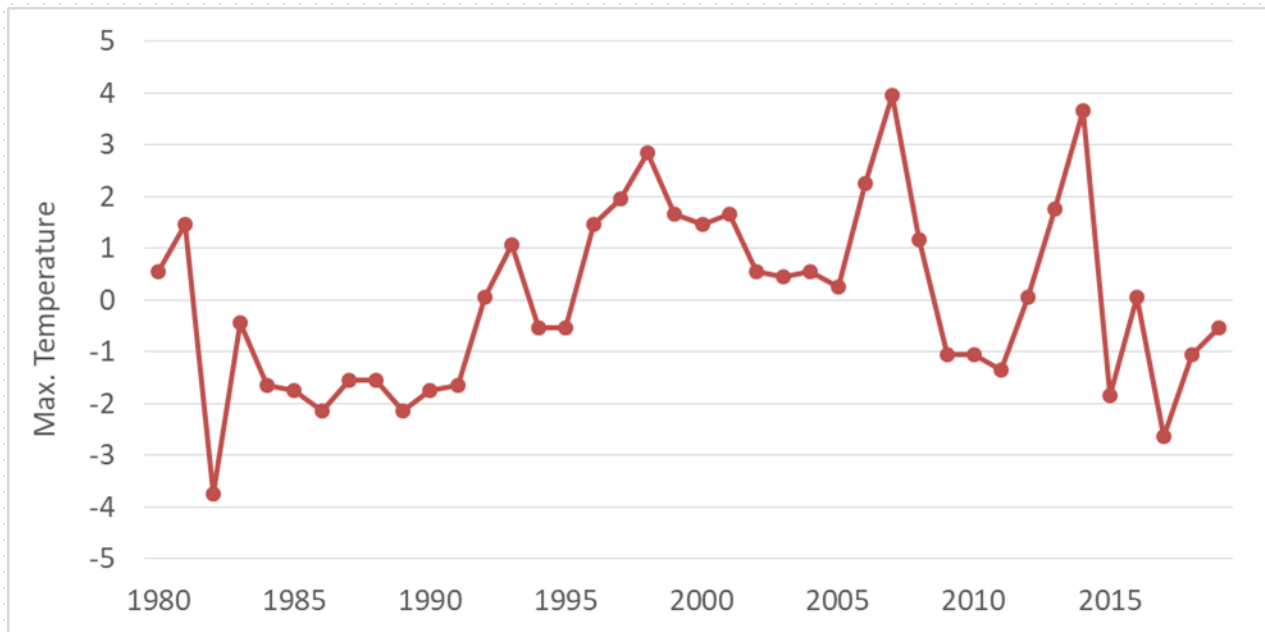


Variation of maximum temperature in Barisal

Adapted from [Md. Jalal Uddin](#)

❑ What is the centralization of data? Why does the data need to be centralized?

When the seasonal or annual variation of the element is removed, the time series is centralized.



□ Variance

$$S_x^2 = \frac{1}{n} \sum_{t=1}^n (x_t - \bar{x})^2 \quad t = 1, 2, \dots, n$$

The variance reflects the mean state of the difference between the element values and sample average.

□ Standard deviation

$$s_x = \sqrt{\frac{1}{n} \sum_{t=1}^n (x_t - \bar{x})^2} \quad t = 1, 2, \dots, n$$

The standard deviation is the **square root** of the **variance**.

□ **Min, Max, Range**

Min

smallest observed value

Max

largest observed value

Range

difference between maximum and minimum value