

# Temperature Changes in Key West, Florida for the 20th century

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## Abstract

This report uses data from Key West, Florida as example, and explores the way to calculate p-value for successive years' temperature changes.

## 1 Methods

**greatestAre temperatures of one year significantly correlated with the next year (successive years), across years in a given location?** Standard p-value calculated for a correlation coefficient is not suitable to answer this question(not independent). Implementing the temperature data in Key West, Florida for the 20th century, the correlation coefficient is calculated and compared with a distribution of 10,000 randomly generated time-series correlations. The alternative and appropriate p-value was calculated by dividing the number of random sample correlations larger than the real value of West Key by the entire sample size, which is 10,000.

## 2 Methods

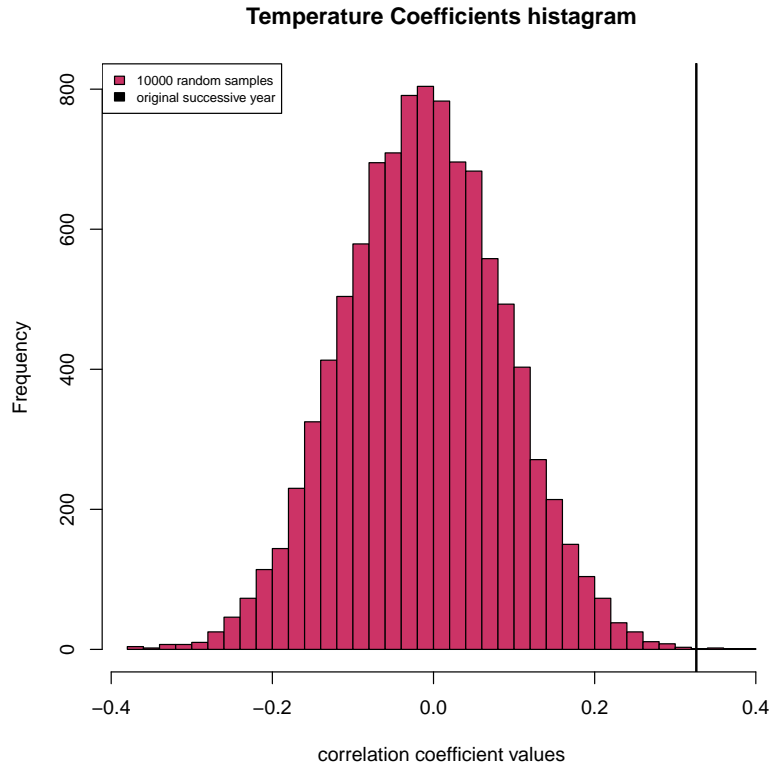


Figure 1: Temperature Coefficient Compared between Successive Years and Random Years in Key West, Florida from 1901-2000.

Figure above shows that the dataset for West Key, Florida has a correlation coefficients of 0.33 between successive years, which was calculated using `cor()` in R. Only 4 correlation coefficient values from the 10,000-entry random sample set are greater than that, resulting a p-value of 0.0004. This means it is extremely unlikely that the result is caused by chance, and can potentially indicate that one year's temperature is indicative of the subsequent year's.