

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

Yuchen Yang

Oct. 2019

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 Method

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 Result

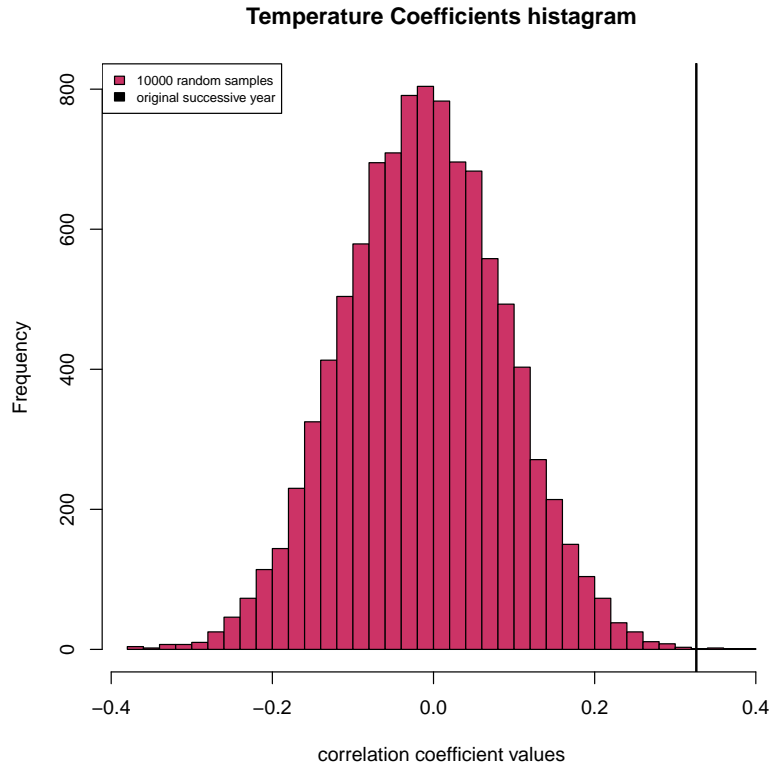


Figure 1: Temperature Coefficient Compared between Successive Years and Random Years in Key West, Florida from 1901-2000.

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.