Is Florida Getting Warmer?

Background and Hypothesis

The following describes a permutation analysis that was conducted on a dataset containing mean yearly temperature data and their respective years (ranging from 1900-2000) from Key West, Florida to answer the following questions:

- Is there a positive correlation between year and temperature?
- If so, is this correlation statistically significant?

Statistical Analyses and results

In R version (version 4.3.3, 2024-02-29), a simple Pearson correlation coefficient was calculated using the cor() function. This resulted in a moderate positive correlation coefficient of 0.533. To calculate an approximate asymptotic p-value, the temperature data was shuffled, retested, and recorded 10000 times. Then a function was written to calculate the fraction of results that were greater than the initial result, which was interpreted as a p-value. The P-value was found to be 0 indicating a statistically significant correlation between year and temperature result. A linear regression was also fitted between temperature and year with a y intercept of 7.5516 when year is 0 and a slope of 0.0071 increase in temperature year on year.

Figure

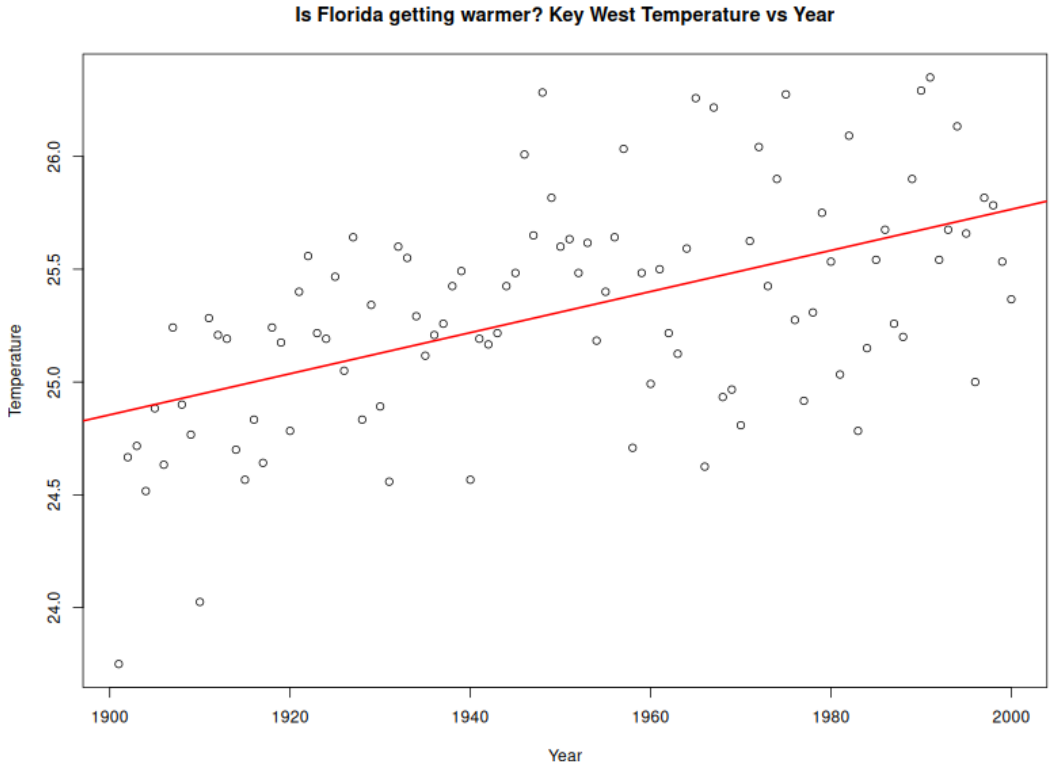

Figure 1: This figure shows the relationship between year and temperature in Key West, Florida. The red line represents the fitted linear regression model, indicating a statistically significant positive correlation between year and temperature (Pearson correlation = 0.533).