Feeling the Burn: Is Florida Getting Warmer?

Results

I accessed data on Key West Annual Mean Temperature from the TMQB GitHub on the 3rd November 2024. The data had 100 observations spanning from the year 1901-2000. The mean temperature was 25.31 degrees (SD 0.5, range 23.75-26.35). I found a positive, statistically significant correlation between year and temperature (Figure 1). This result was confirmed with the application of a non-parametric permutation test which validated the observed temperature trend.

Pearson Correlation

A correlation was found between temperature and year ($t = 6.2$, $df = 98$, p-value $= 1.123 \times 10^{-8}$). The correlation coefficient was 0.5331.

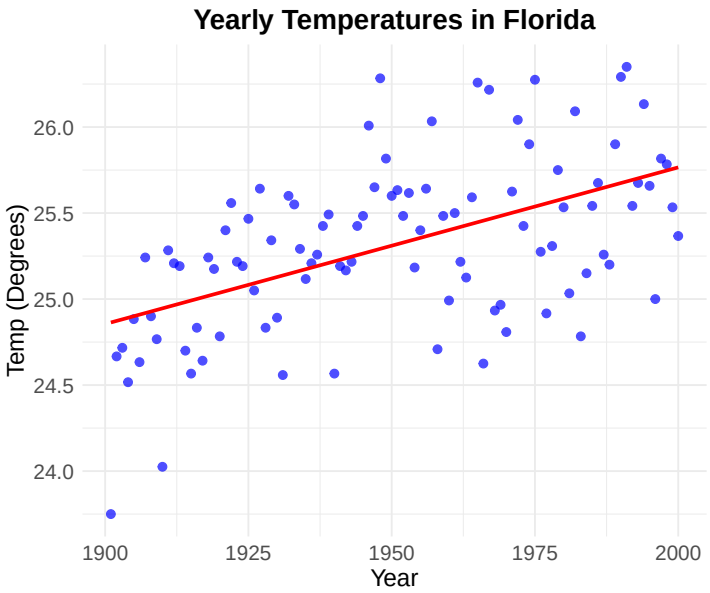

Figure 1: The correlation between temperature and the years 1900-2000.

Permutation Analysis

I performed 1000 permutations shuffling temperature data. No random correlation permutations had a higher correlation coefficient than 0.5331. I calculated the p-value by dividing the number of results higher than the observed correlation. The p-value was 0. The mean correlation coefficient of the null distribution was close to 0 (mean = -0.008, SD = 0.10), indicating no correlation when temperature data were randomized. Therefore, the likelihood of obtaining a correlation of 0.5331 or higher by chance alone is extremely low. This suggests that the correlation between temperature and year is likely not a result of a random pattern.