

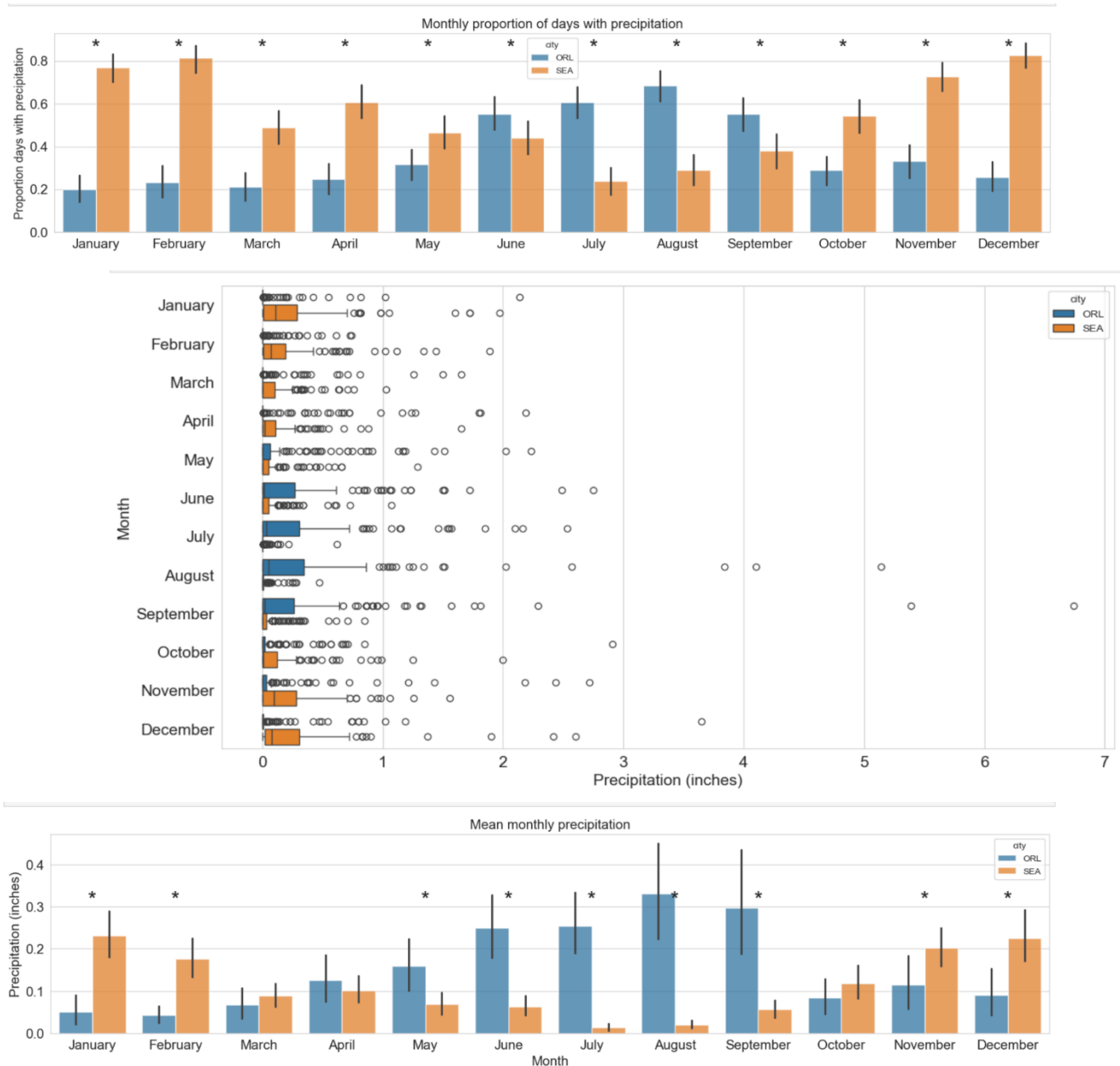
Rainfall is one of the defining features of Seattle's climate and reputation. A common assumption is that Seattle receives more rainfall than most U.S. cities. To check this perception, I compared precipitation patterns between Seattle and Orlando using five years of daily precipitation data.

Daily precipitation data were obtained for both Seattle and Orlando from NOAA, covering a five-year period from 2018 to 2022. Each dataset was cleaned, inspected for completeness, and reformatted into a tidy structure. Non-precipitation related columns were removed and dates were standardized to a better format for analysis. Missing values were handled by averaging each day that did have data over the 5 years and inputting that value when it was missing for both cities. The two datasets were then joined on the date column, producing a single dataset with daily precipitation values and city identifiers in long format. A new variable was derived to indicate whether each day had any measurable precipitation (> 0 inches), which allowed for analysis of the proportion of days with precipitation.

Two types of comparisons were performed. For each month, a two-sample t-test compared the mean daily precipitation between Seattle and Orlando. This tested whether the amount of precipitation on rainy days differed significantly by city for each month. A two-sample z-test was done for proportion of days with precipitation. This compared the frequency of days with any precipitation between the two cities for each month. These tests used a significance level of $p = 0.05$. Months with significant differences were marked with asterisks on the graphs. All analyses and visualizations were done in Python.

Seattle consistently exhibits a higher proportion of rainy days than Orlando from October through April, with significant differences across most months. Orlando on the other hand is concentrated in the months of June through September when the proportion of rainy days surpasses Seattle's. While Seattle experiences rain more frequently, Orlando typically receives heavier rainfall on days it does rain. This is most apparent between June and September, when Orlando's monthly mean precipitation significantly exceeds Seattle's. Daily distributions reveal that Orlando has more extreme precipitation days, with several days exceeding 3–5 inches, whereas Seattle's daily precipitation tends to be lighter but more consistent. The boxplots show Orlando's higher variability compared to Seattle's steadier

rainfall.



The analysis shows that Orlando overall receives more precipitation than Seattle, but on a day-to-day basis, Seattle is more likely to be experiencing rain than Orlando. Seattle has more frequent rainy days, particularly during the fall and winter, but Orlando experiences heavier rainfall when it does rain in the summer. Statistically significant differences in both frequency and amount are observed in nearly every month but the direction of these differences depends on the season. Seattle's rain is persistent, while Orlando's is much more variable.