

Thesis Work: Part 2

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Question

How can we get more variability of LST in the zip codes by category?

In an attempt to answer this question, I completed three separate groups of visualizations:

1. Attempted to identify heat wave days and only capture the dLST for those heat wave days as defined by the 95th percentile
2. Plotted LST per zip code over time
3. Calculated dLST during hot days (June-September)

Process

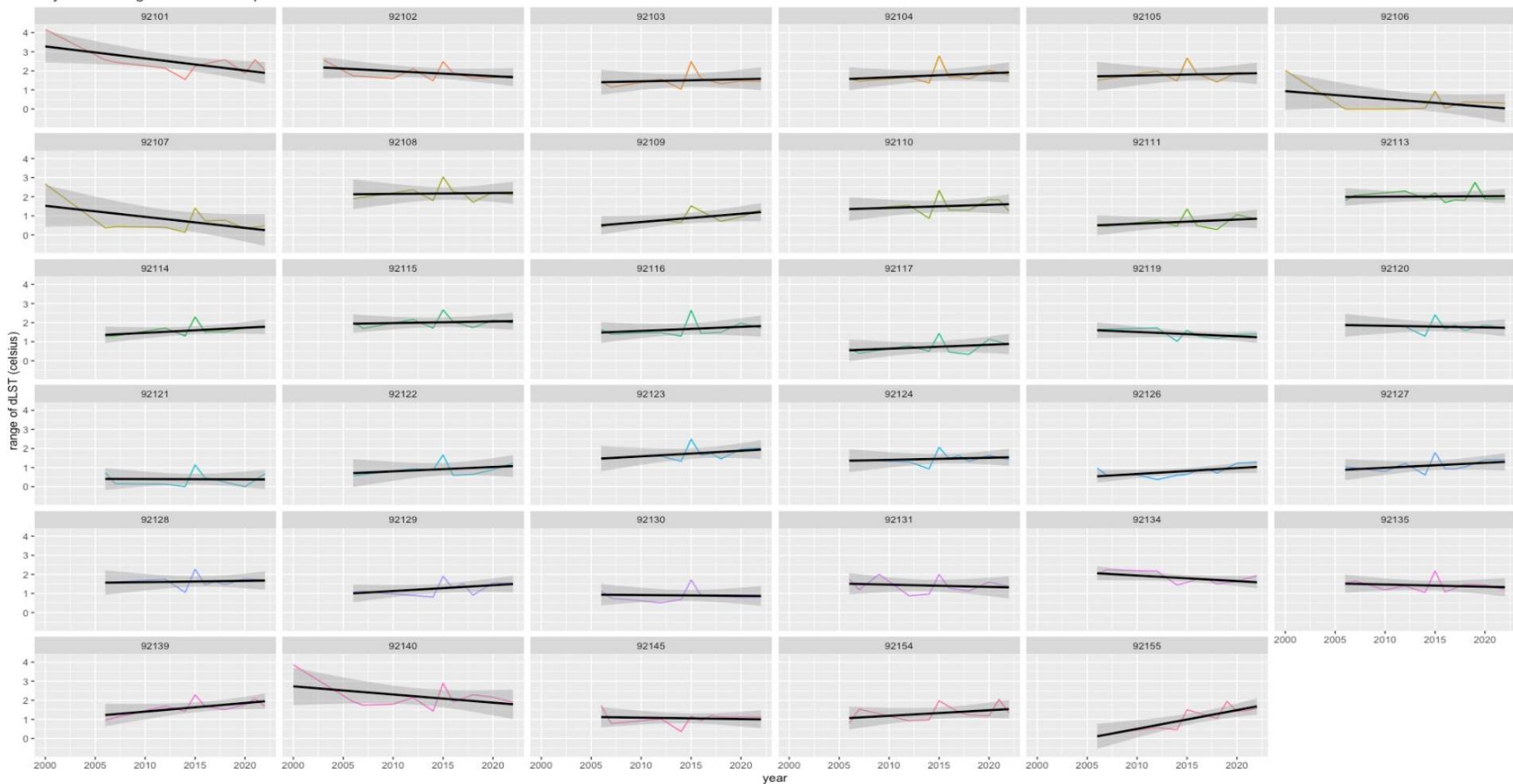
To identify 95th percentile per zip code, I relied on the quantile() function in R

Each percentile grouping was based on the 95th percentile of that specific zip code using the group_by() and summarize() functions

Method 1: To calculate dLST, I used the LSTzipcode - minLSTregion by the same date (month, year)

$$\text{Ex: } 06/2015 \text{ LST}_{\text{zipcodeA}} 20.1 - 06/2015 \text{ LST}_{\text{min}} 18.1 = 2.0 \text{ dLST}_{\text{zipcodeA}}$$

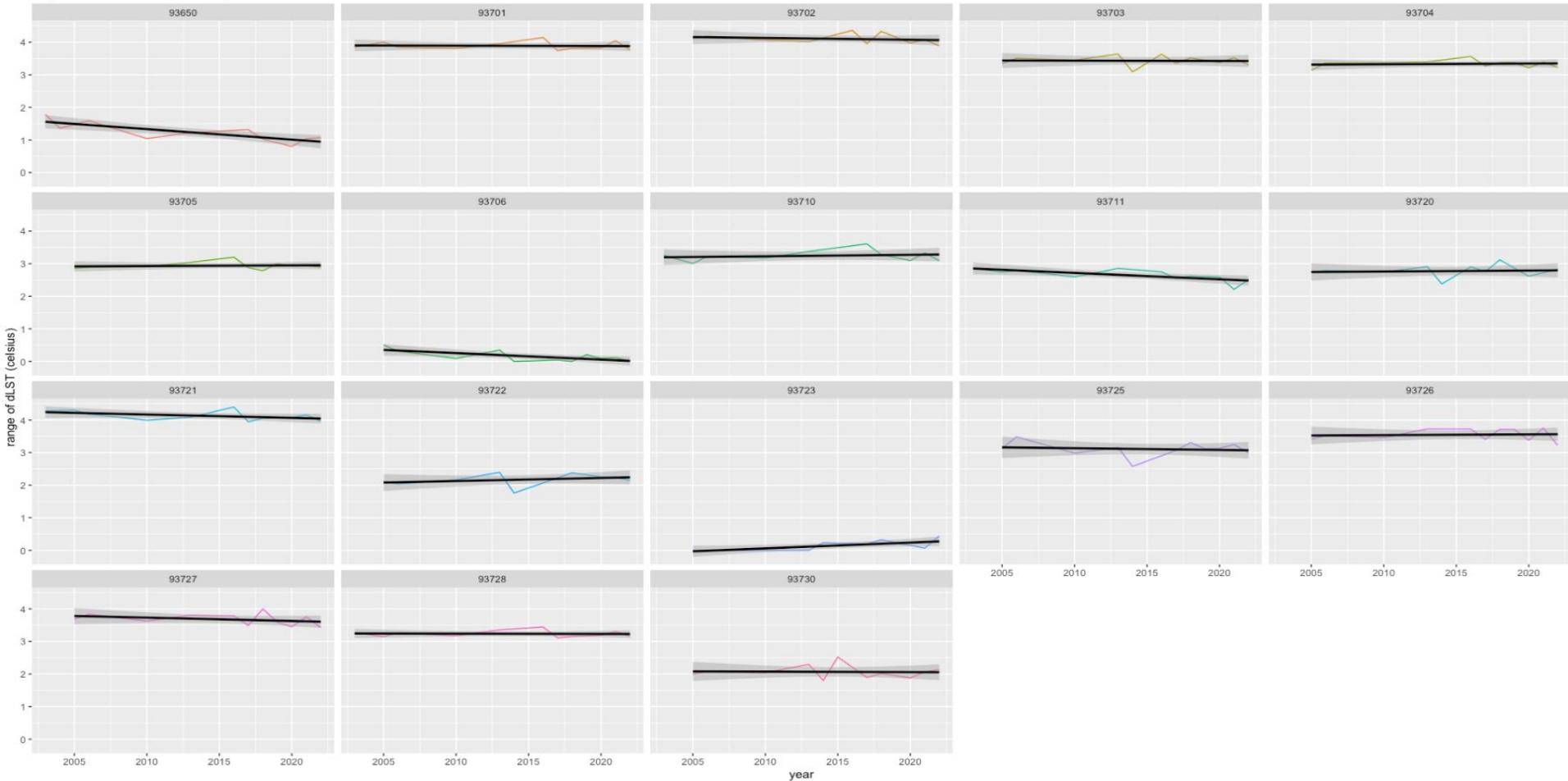
City of San Diego dLST for 95th percentile



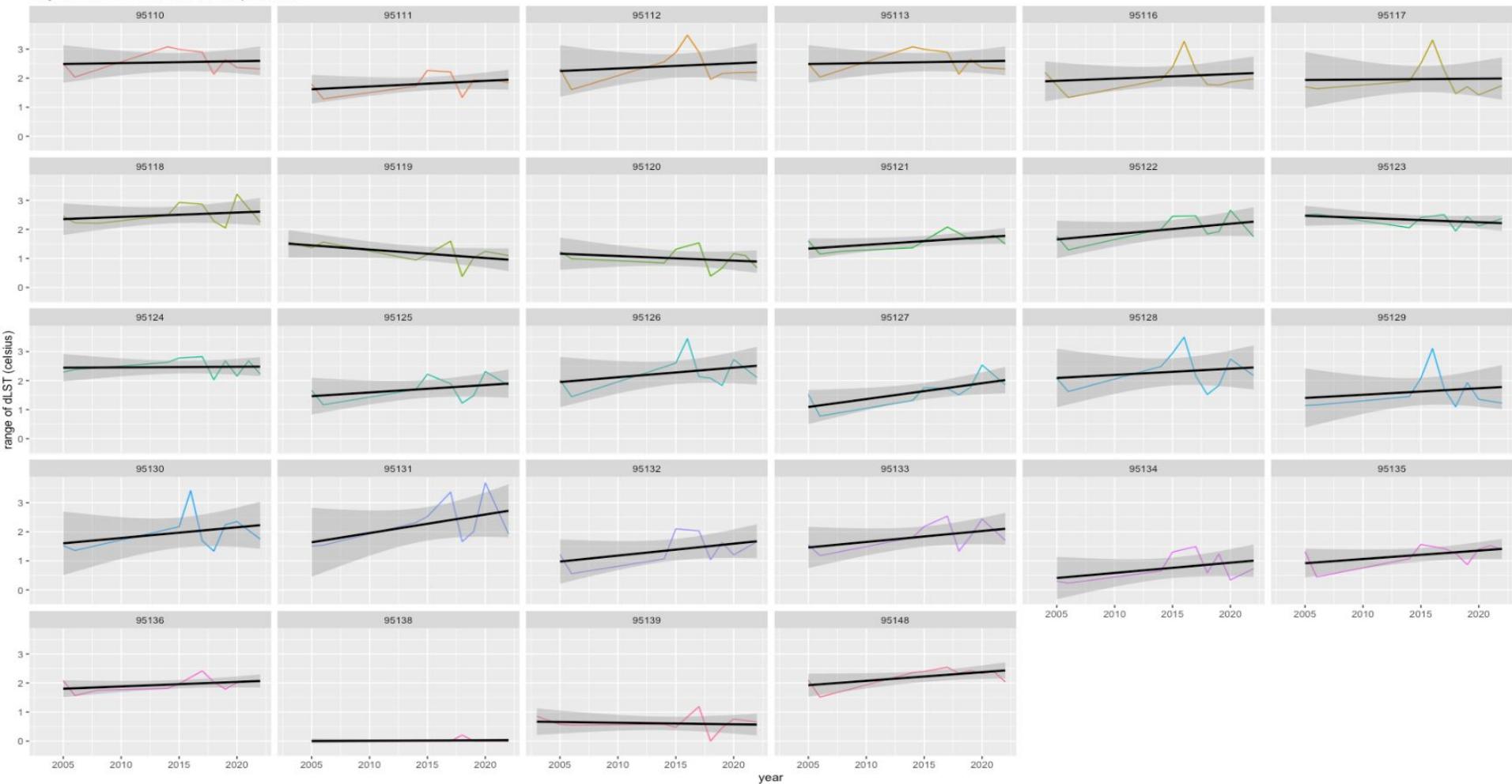
City of Los Angeles dLST for 95th percentile



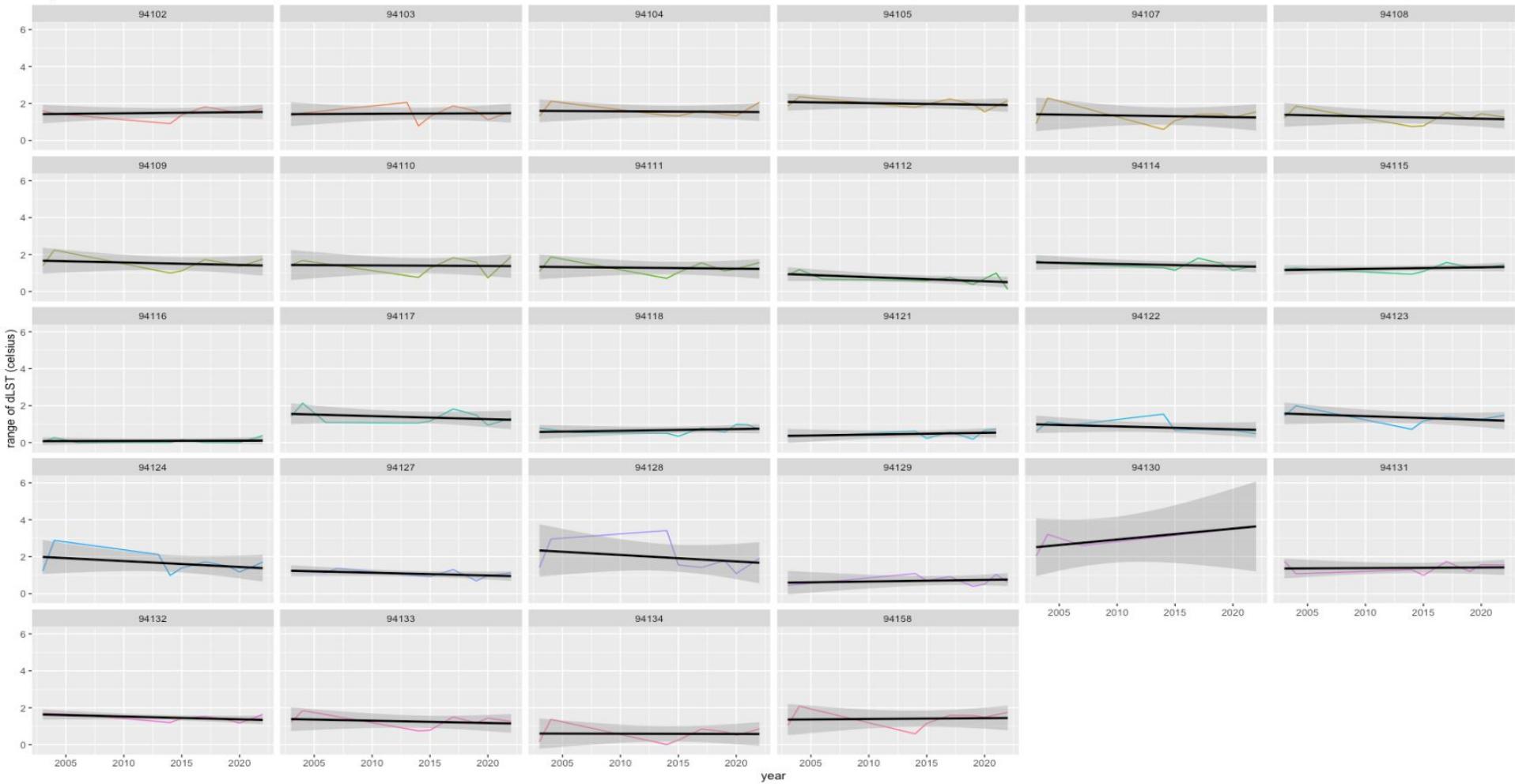
City of Fresno dLST for 95th percentile



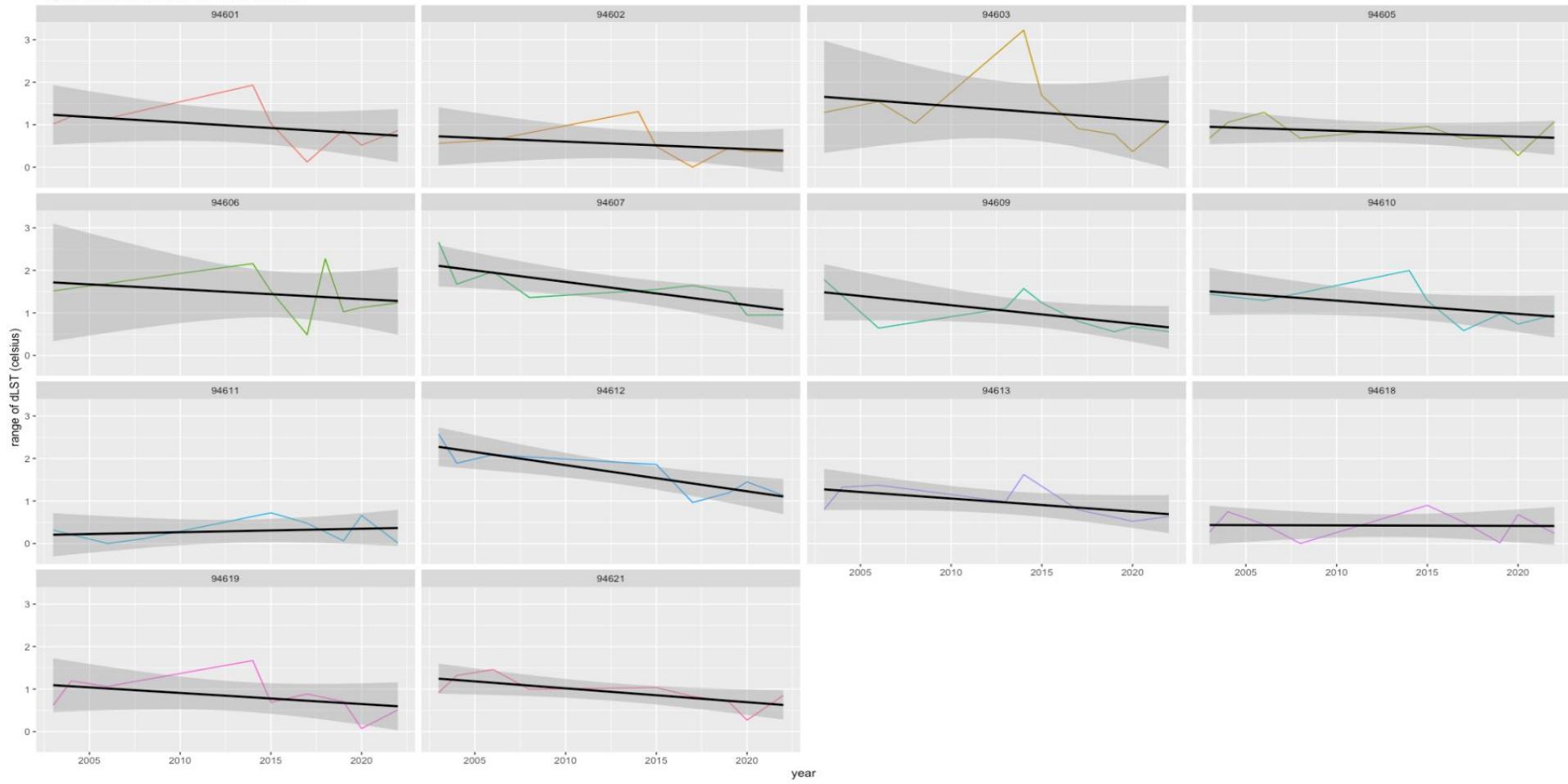
City of San Jose dlST for 95th percentile



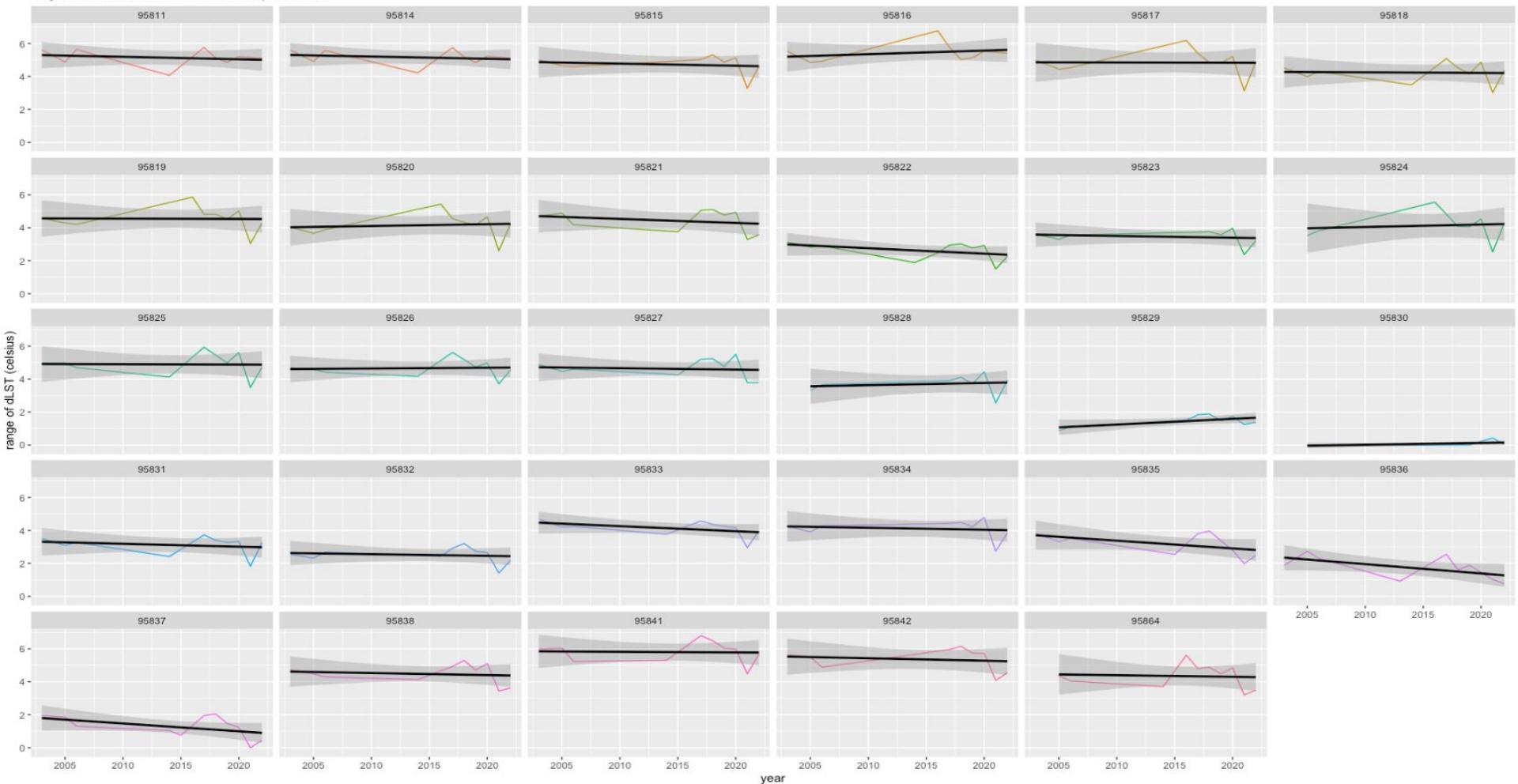
City of San Francisco dLST for 95th percentile



City of Oakland dLST for 95th percentile



City of Sacramento dlST for 95th percentile



Discussion of Visualization

It seems there are upward trends for some cities and downward trends for others

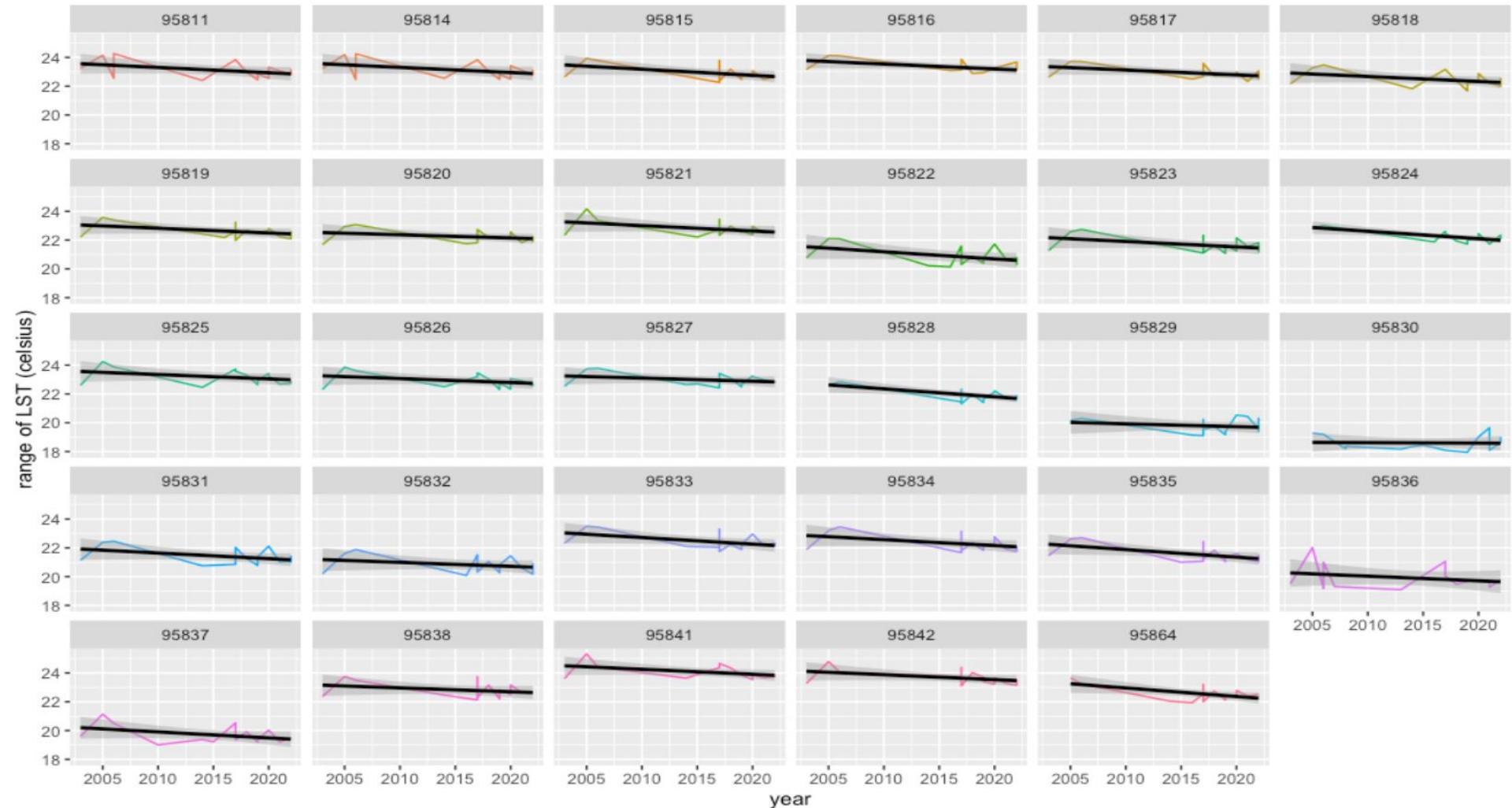
Why might this be?

LST trends over time per zip code

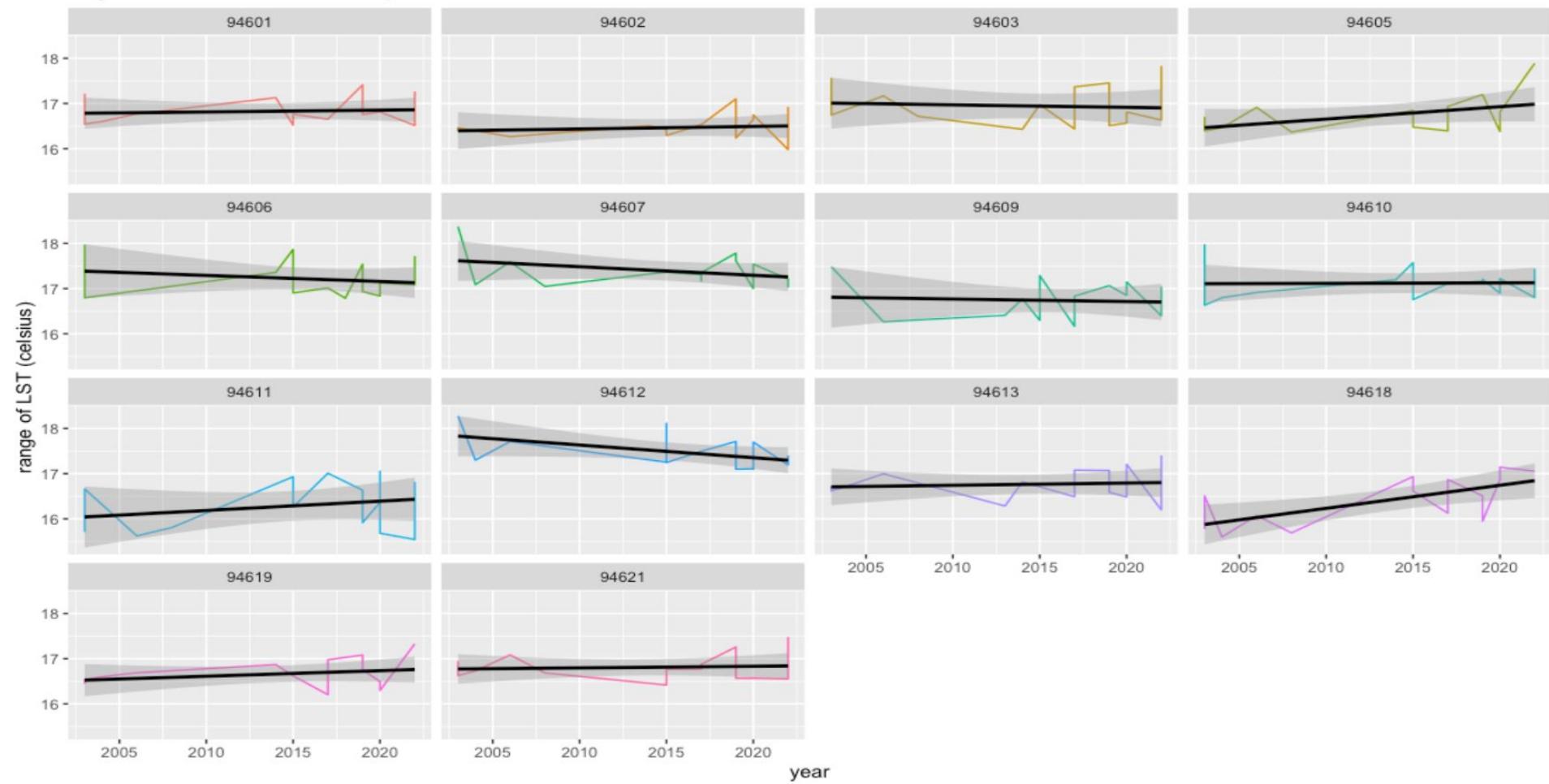
Instead of calculating the dLST by $\text{LST}_{\text{zipcode}} - \text{minLST}_{\text{region}}$, I have plotted the 95th percentile LST per zip code in each region (averaged to the year) to identify trends

Ex: $\text{LST}_{\text{zipcode}}/\text{time}$

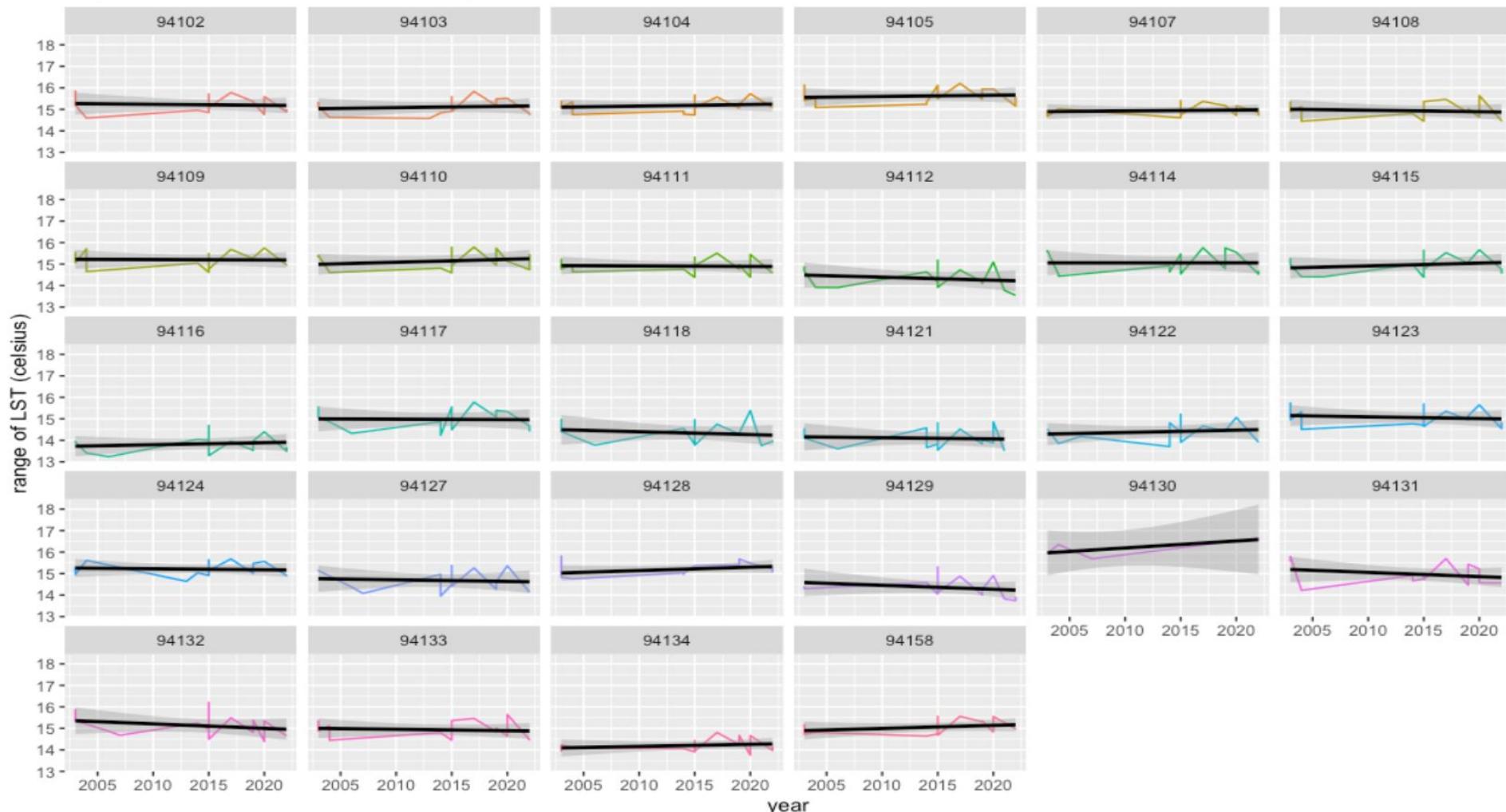
City of Sacramento LST for 95th percentile



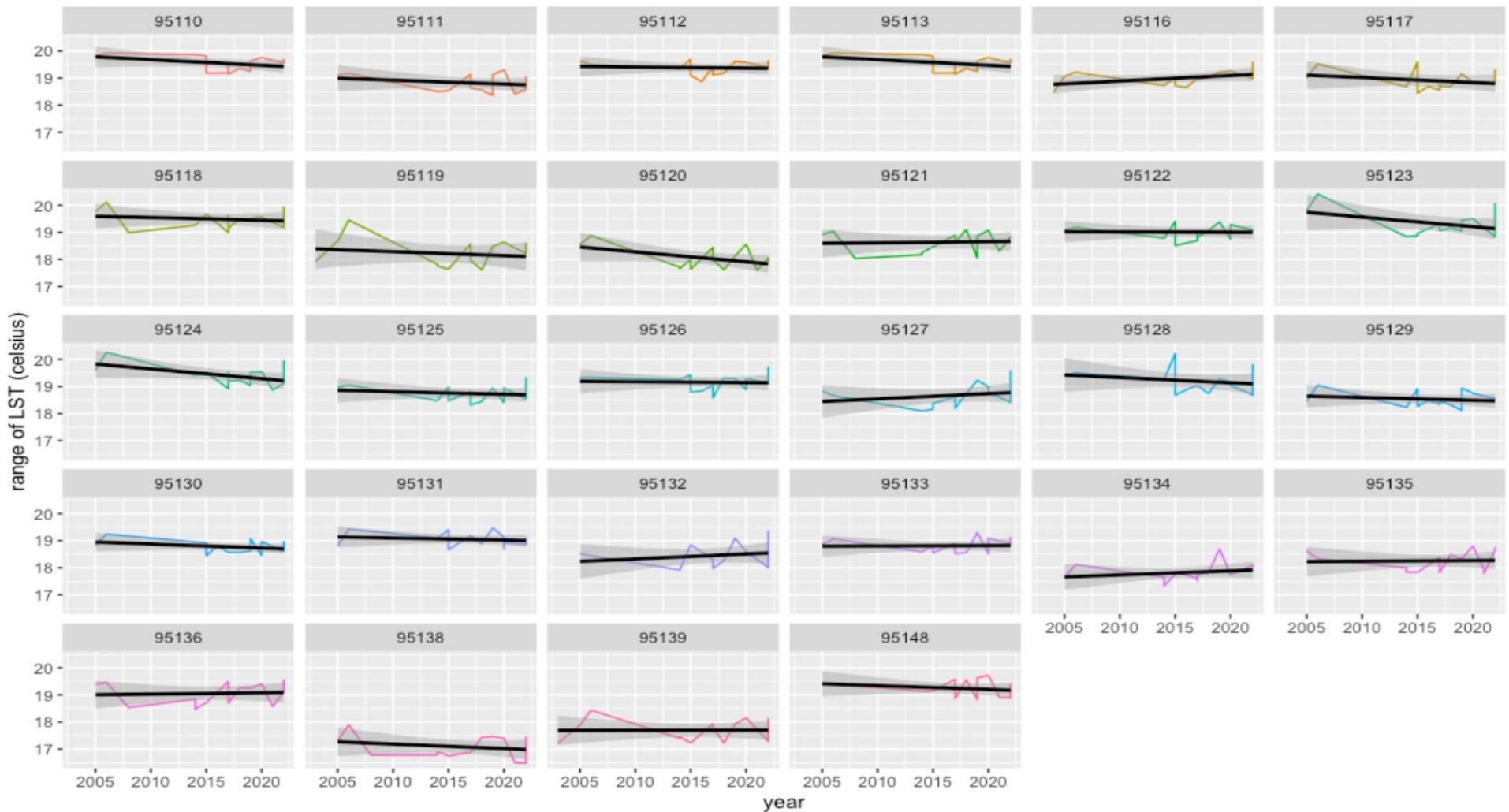
City of Oakland LST for 95th percentile



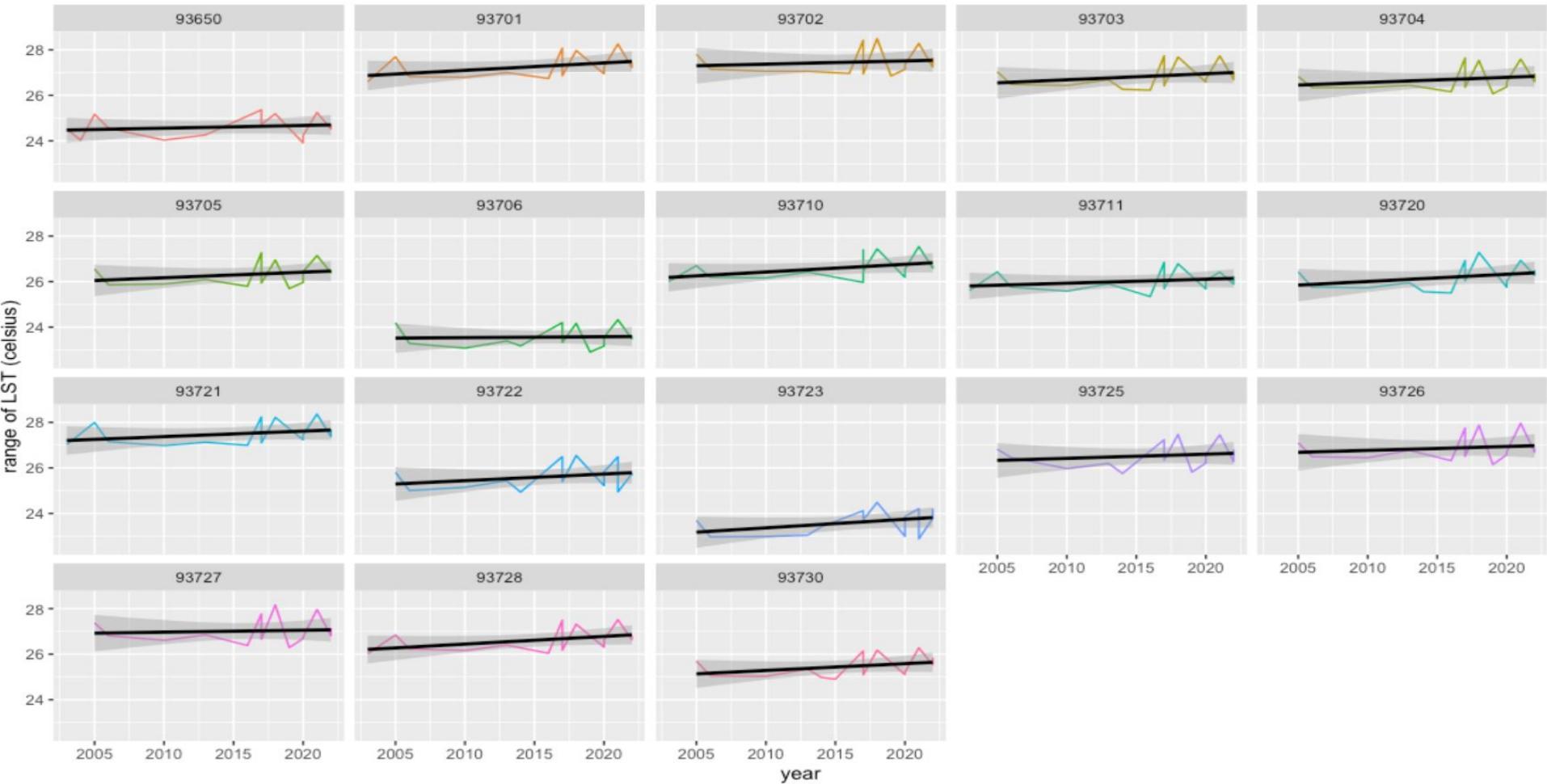
City of San Francisco LST for 95th percentile



City of San Jose LST for 95th percentile



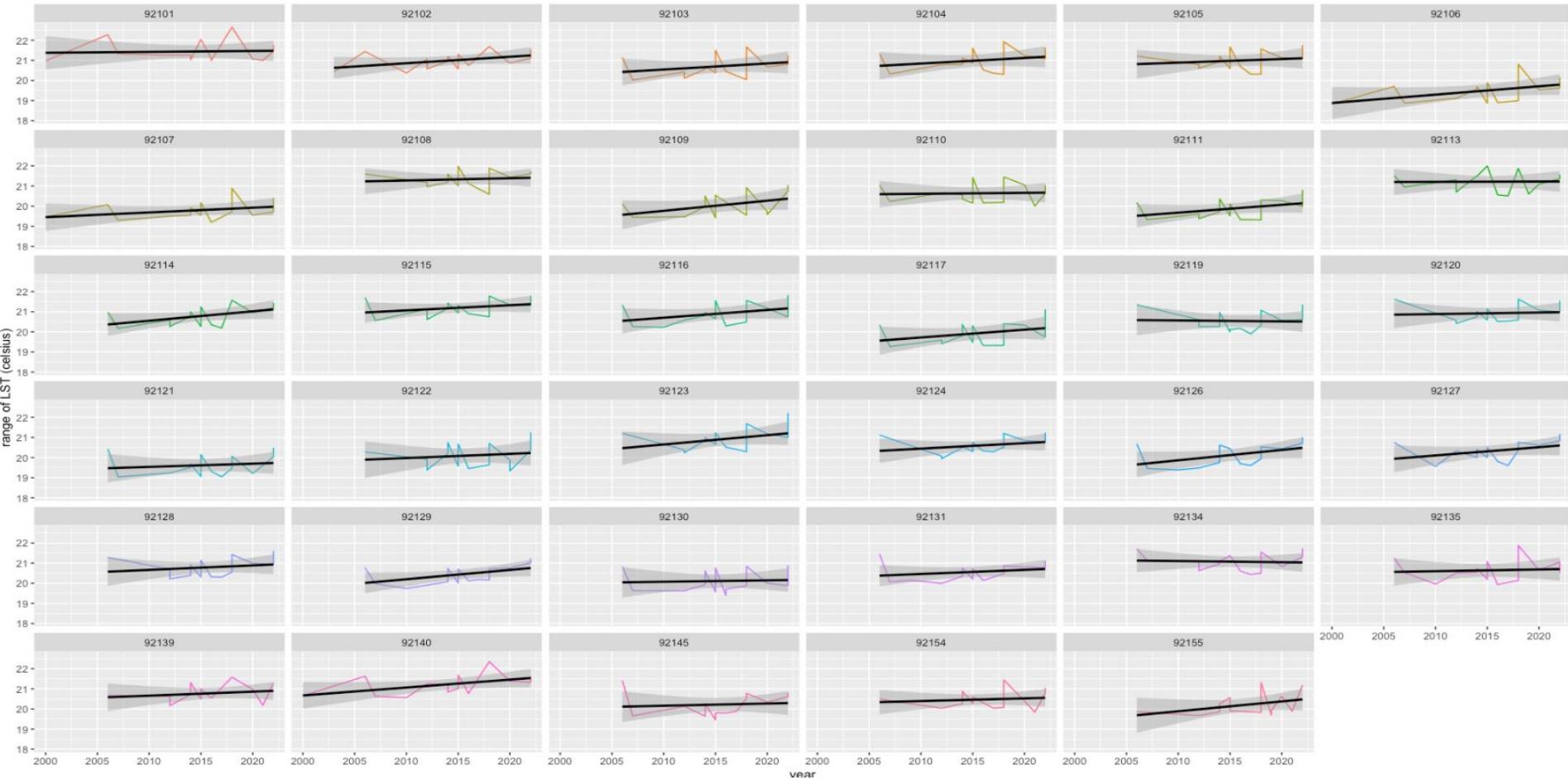
City of Fresno LST for 95th percentile



City of Los Angeles dLST for 95th percentile



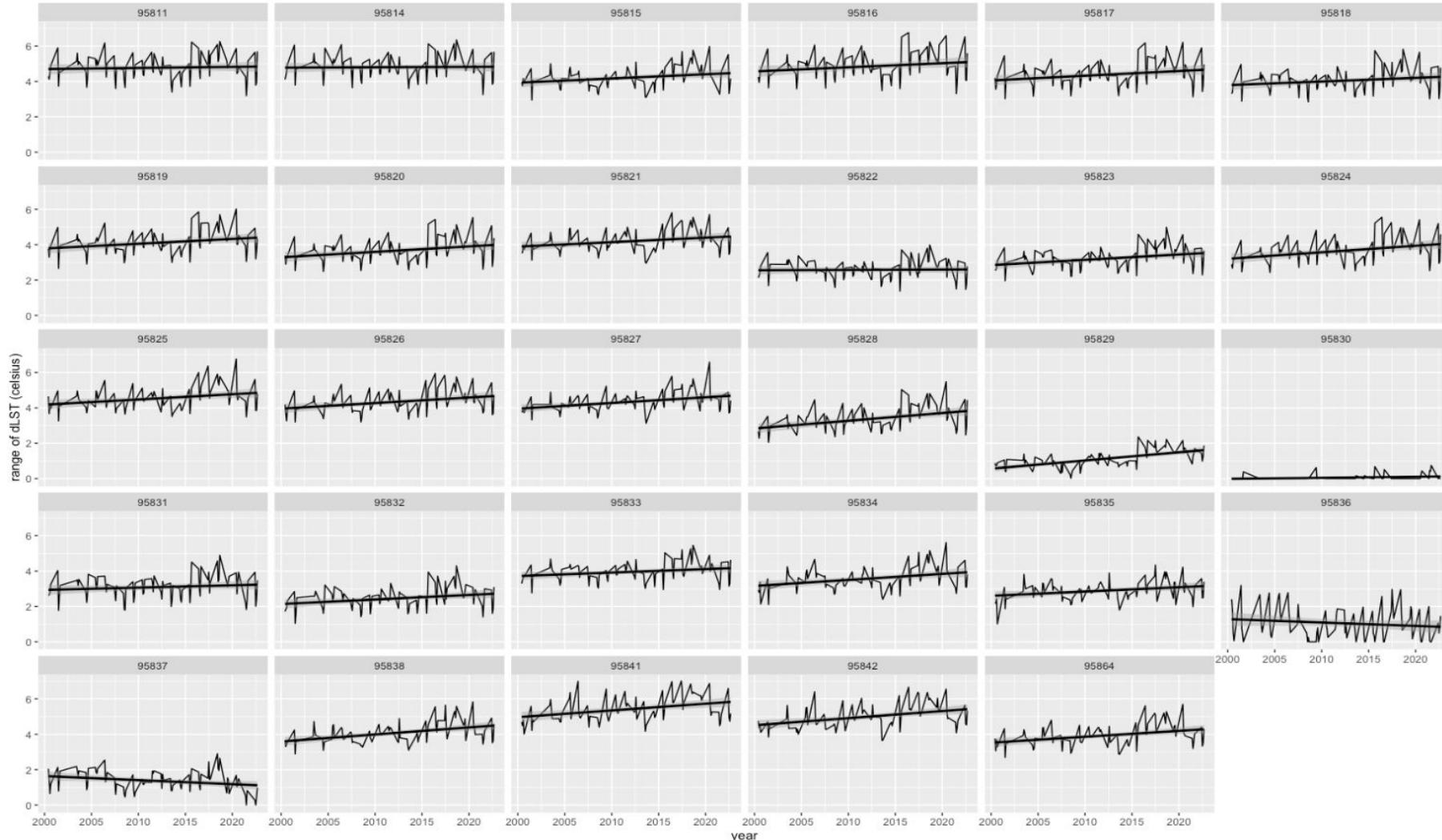
City of San Diego LST for 95th percentile



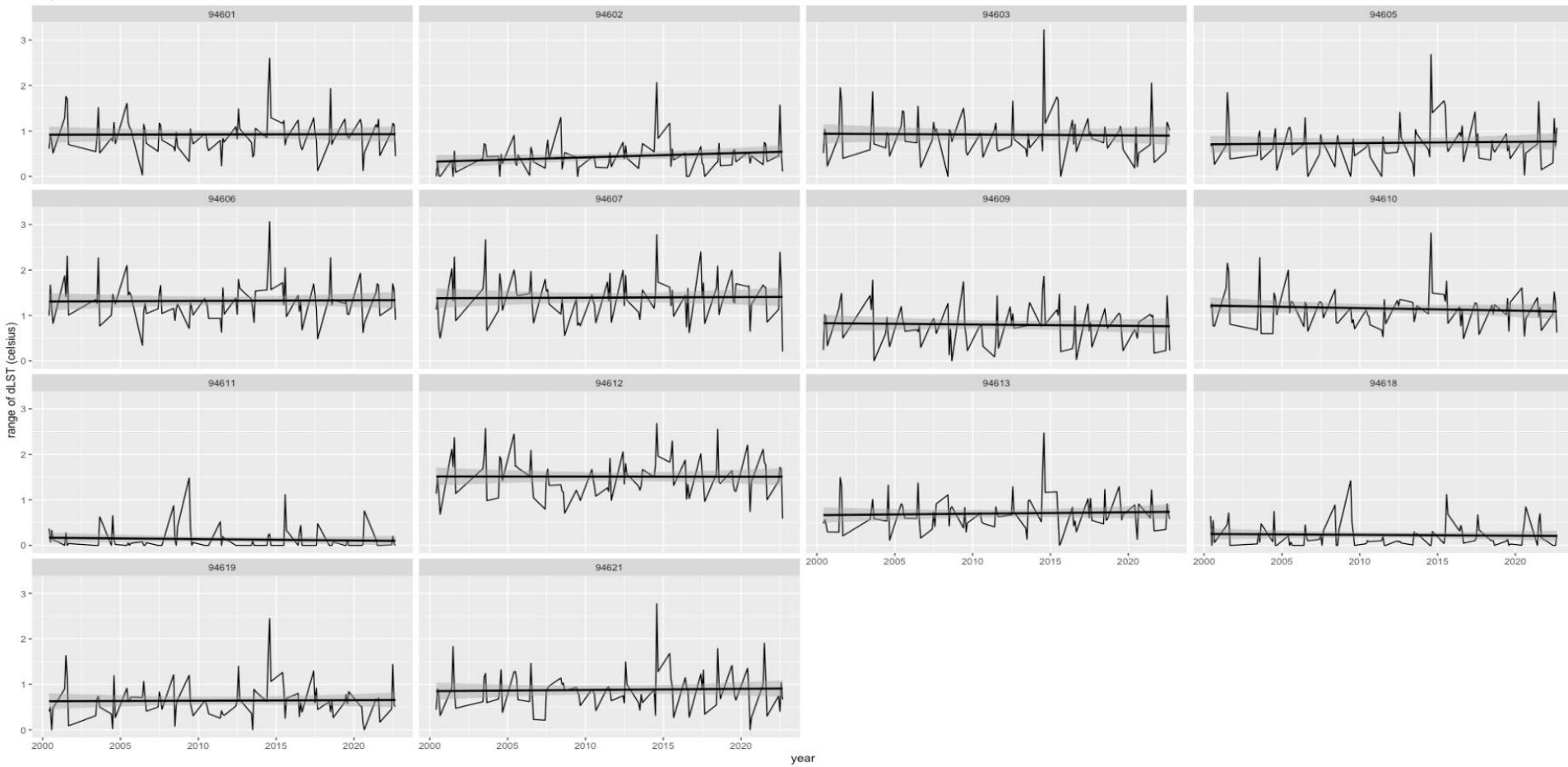
LST of hot days only

I isolated dates that fall within June, July, August, and September and calculated the mean dLST per year per zip code

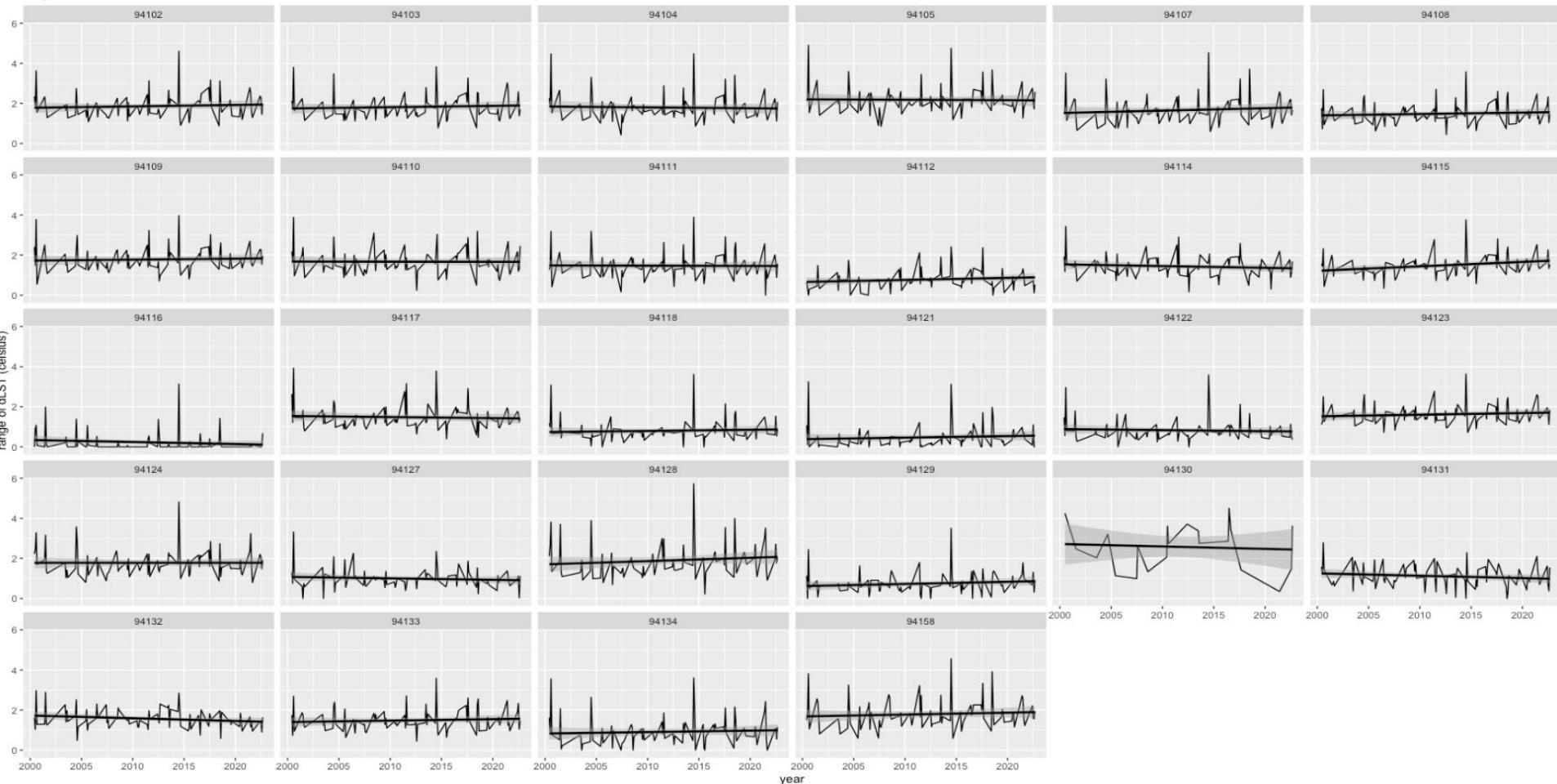
City of Sacramento Values Summer Months



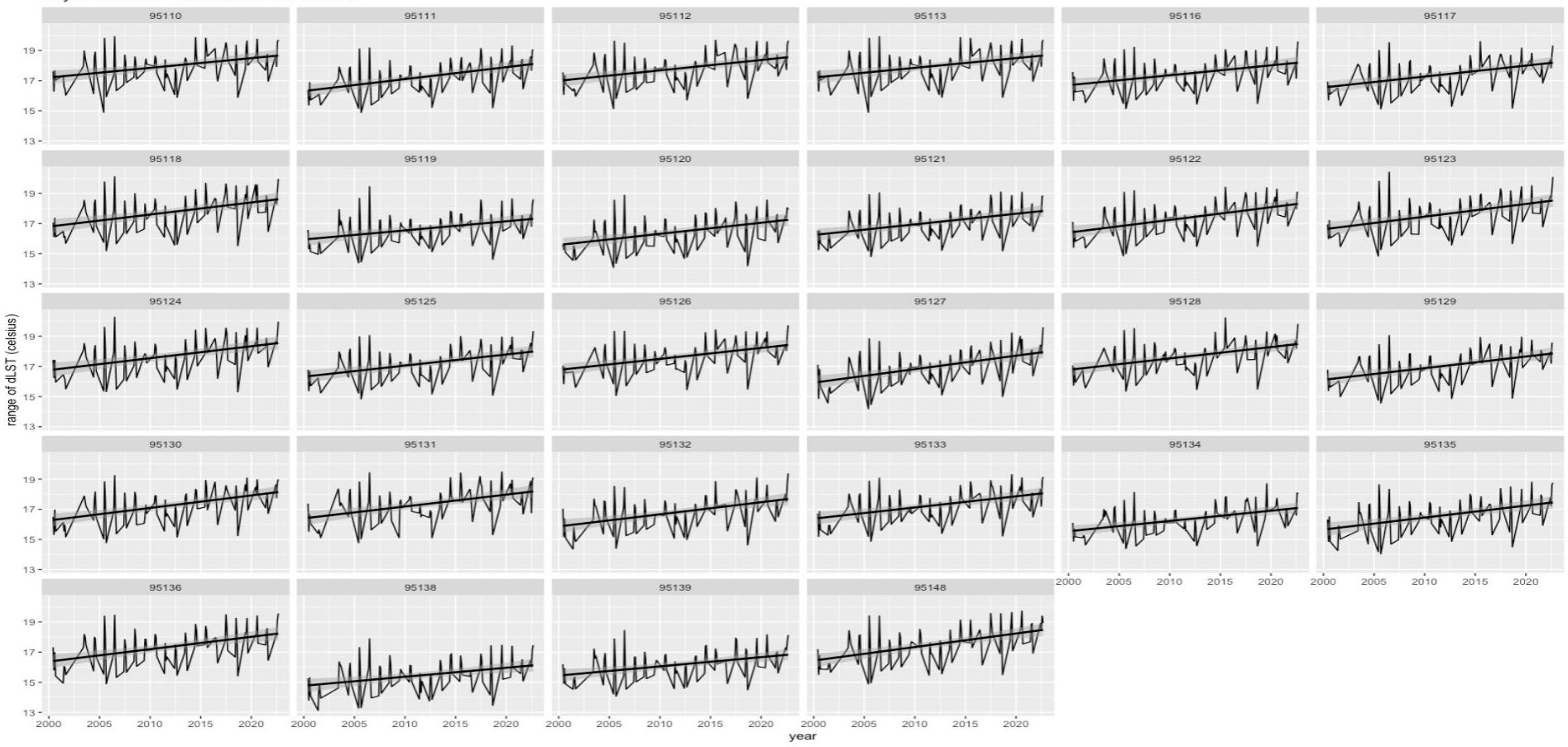
City of Oakland Values Summer Months



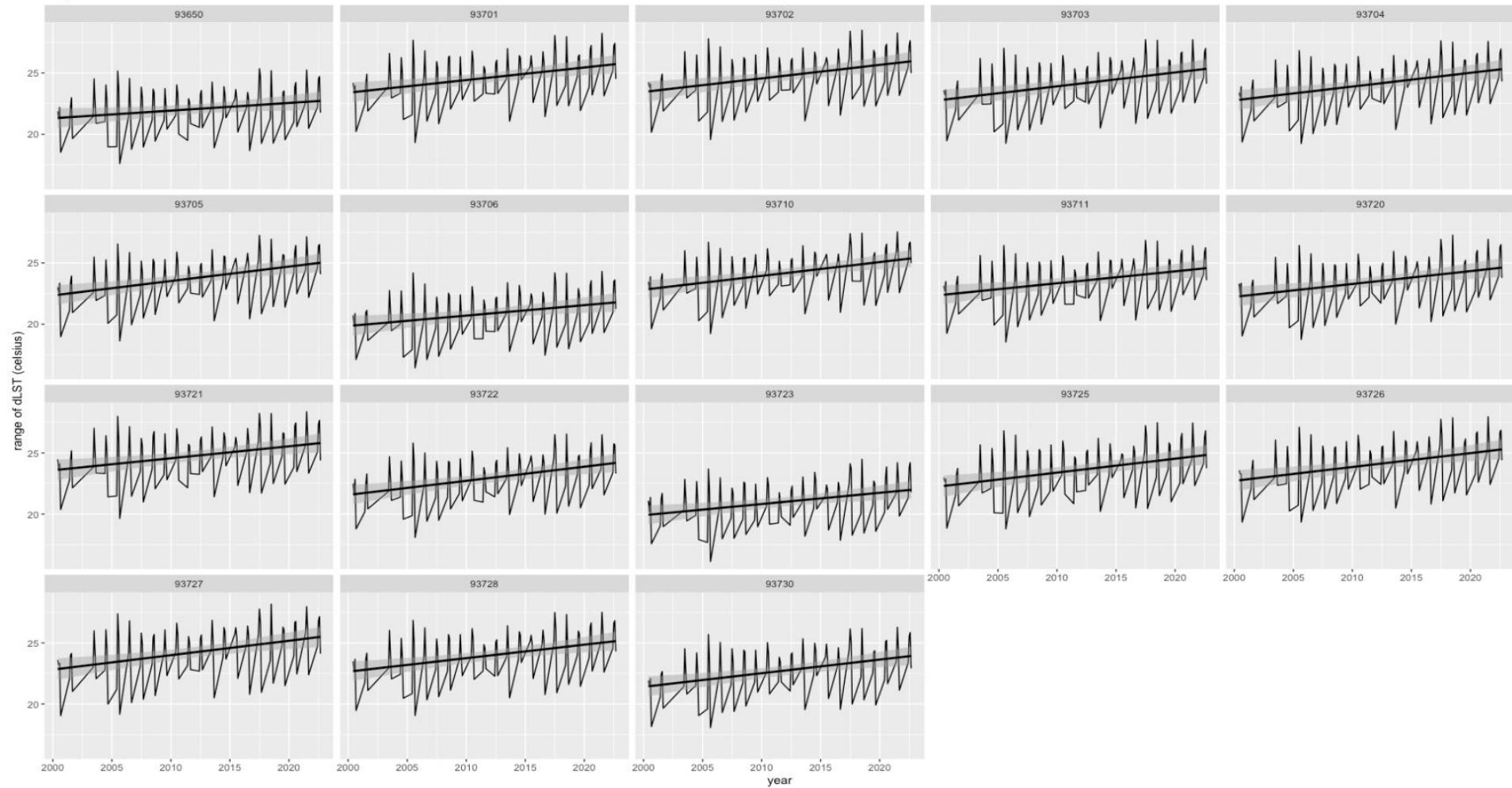
City of San Francisco Values Summer Months



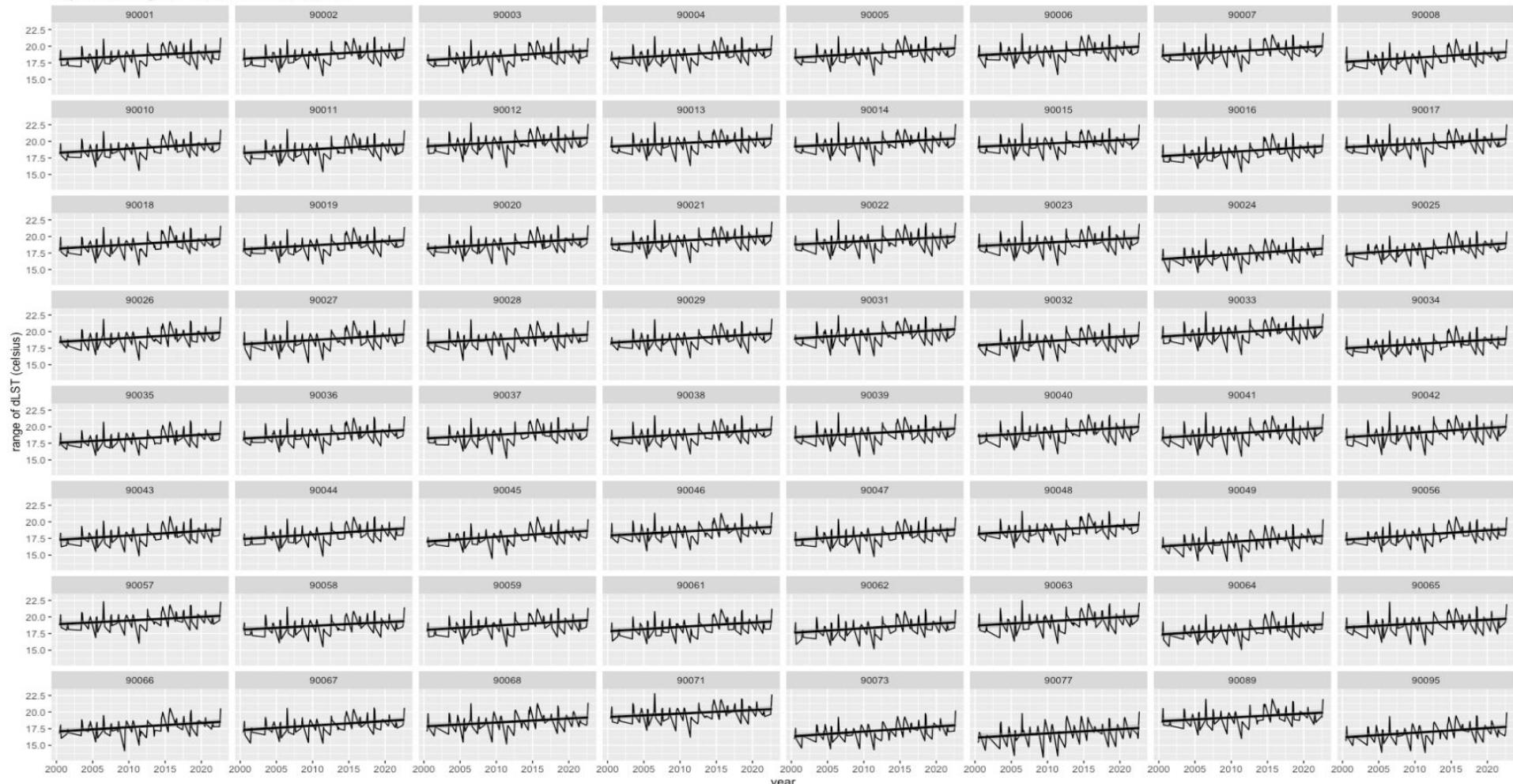
City of San Jose Values Summer Months



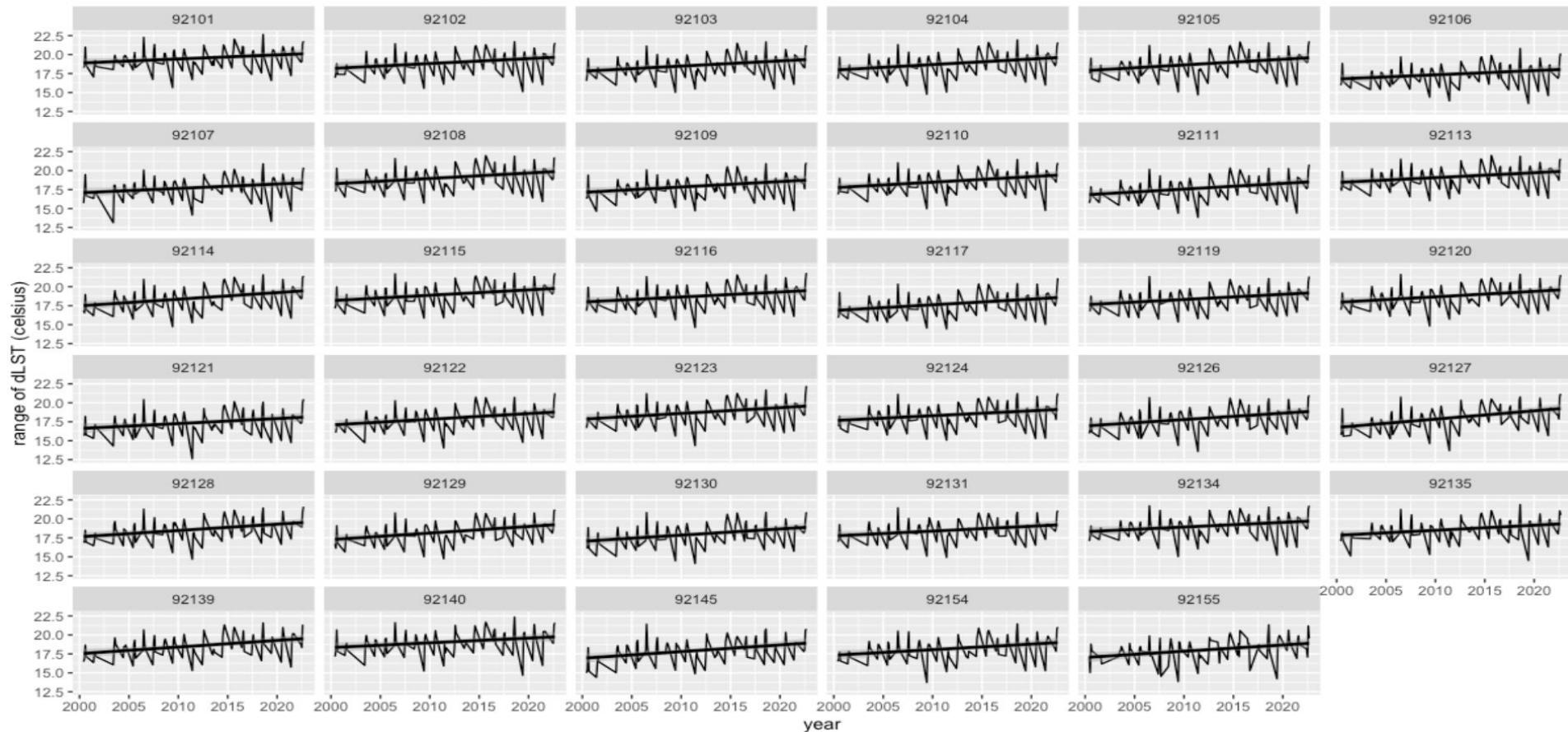
City of Fresno Values Summer Months



City of Los Angeles Values Summer Months



City of San Diego Values Summer Months



Extra:

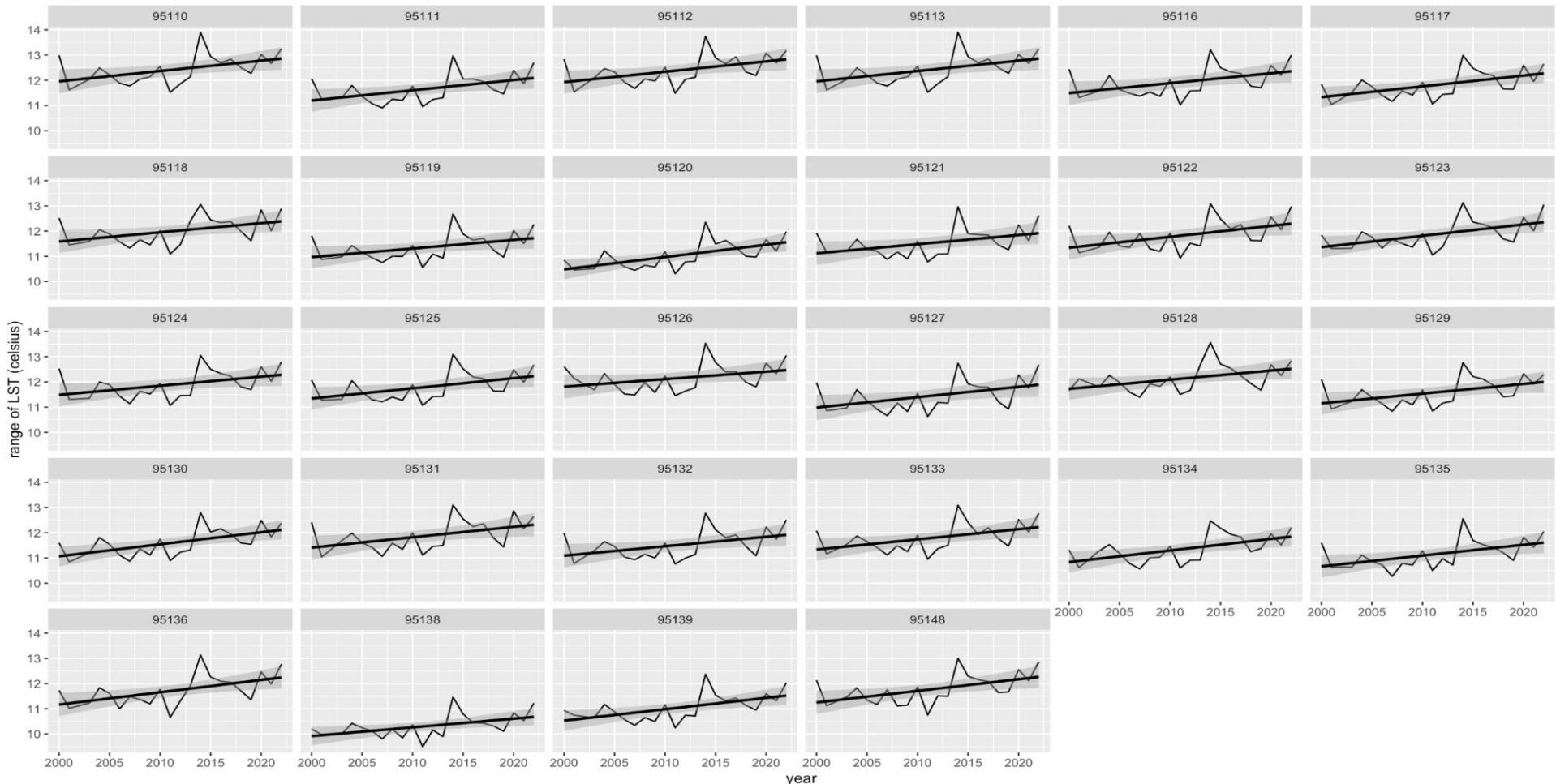
Trends when using 95th percentile based on dLST

When looking at dLST over the 22 year period for the 95th percentile per zip code, it appears that there is a potential climate change phenomenon occurring for some areas

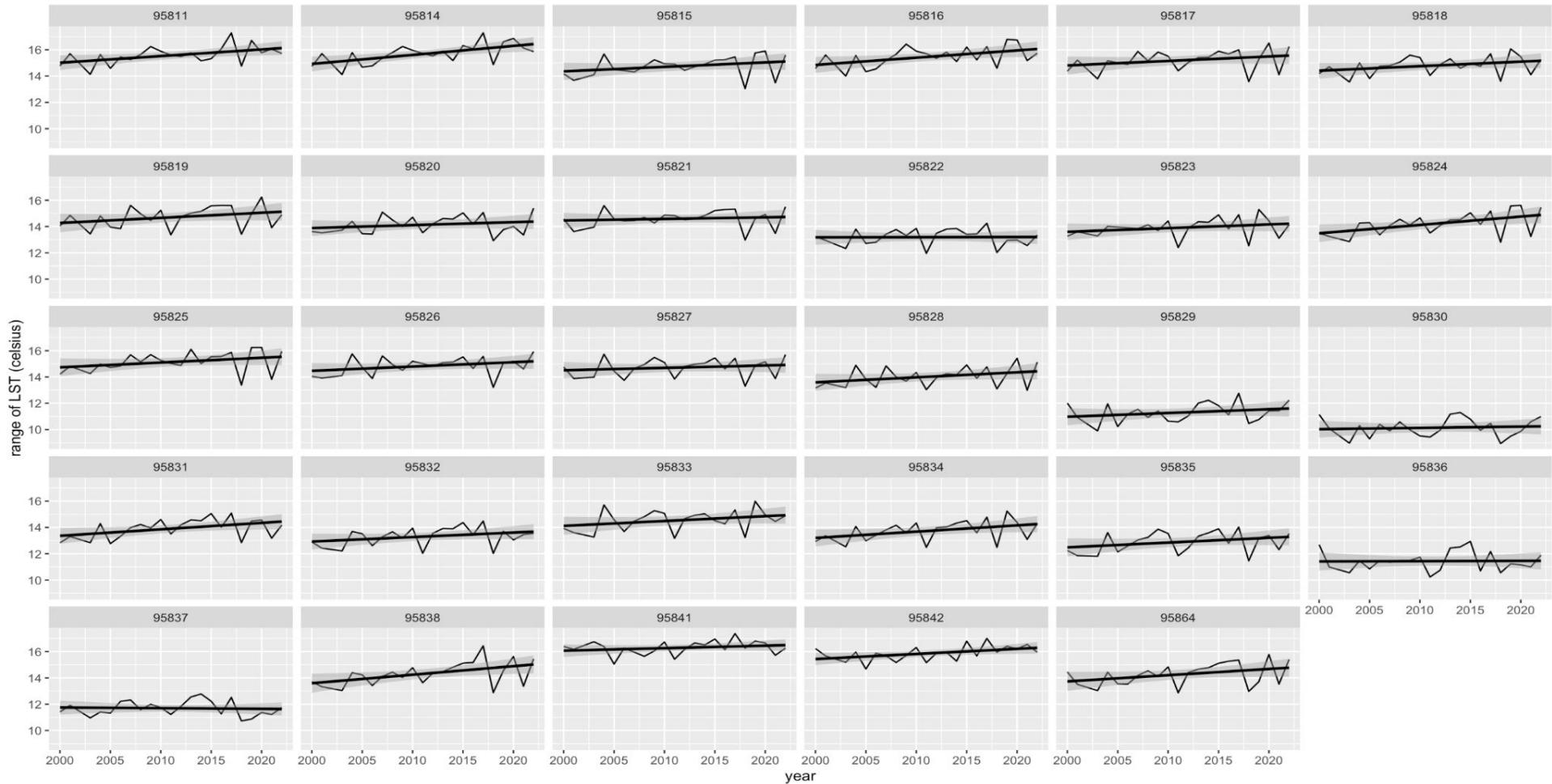
By finding the 95th percentile of dLST per zip code, we are then able to observe the change in LST over time for each zip code as it compares to the min LST per city

This calculation uses celsius - dLST, therefore is not showing what we want

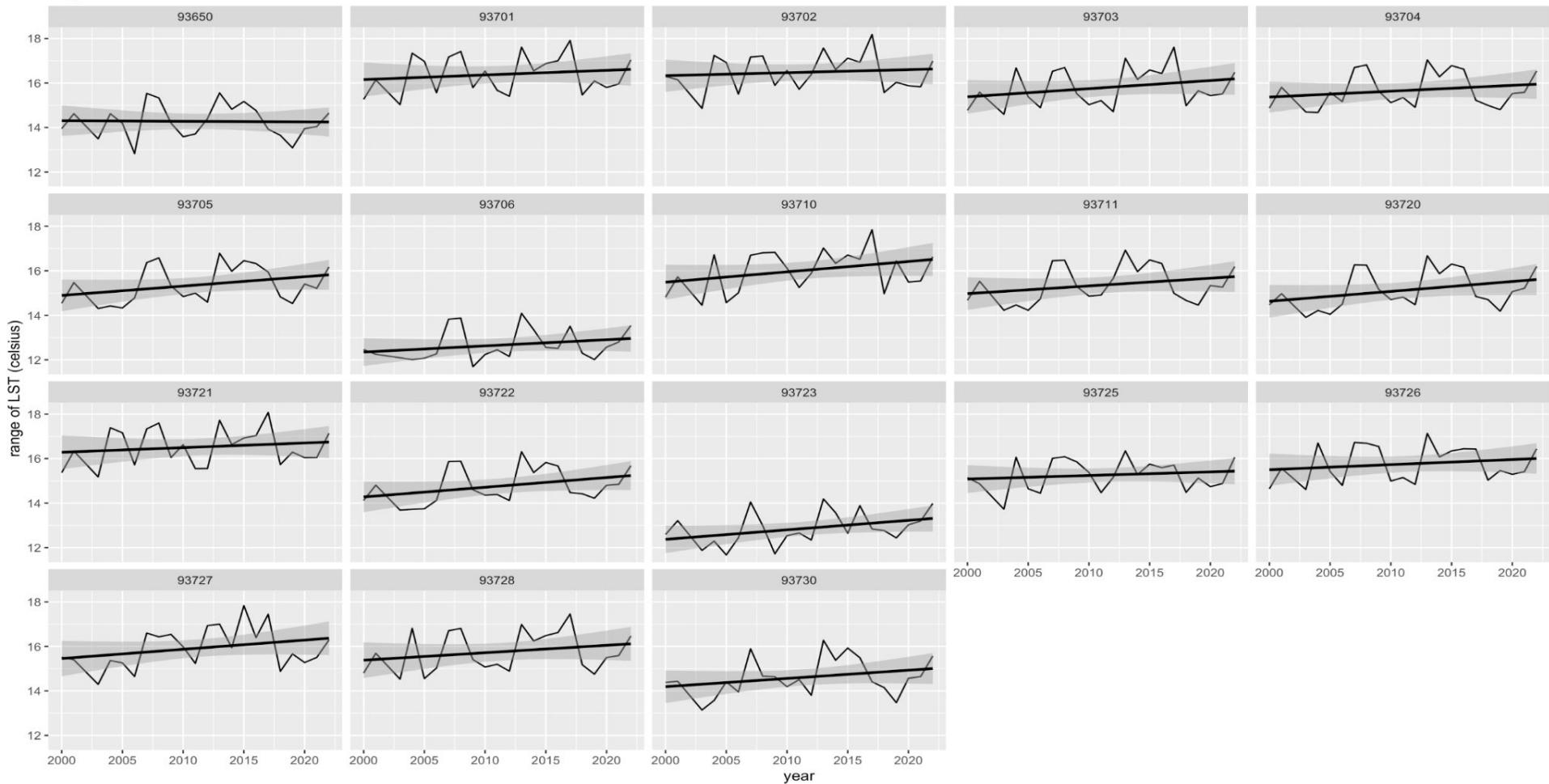
City of San Jose Values Above dLST 95th Percentile



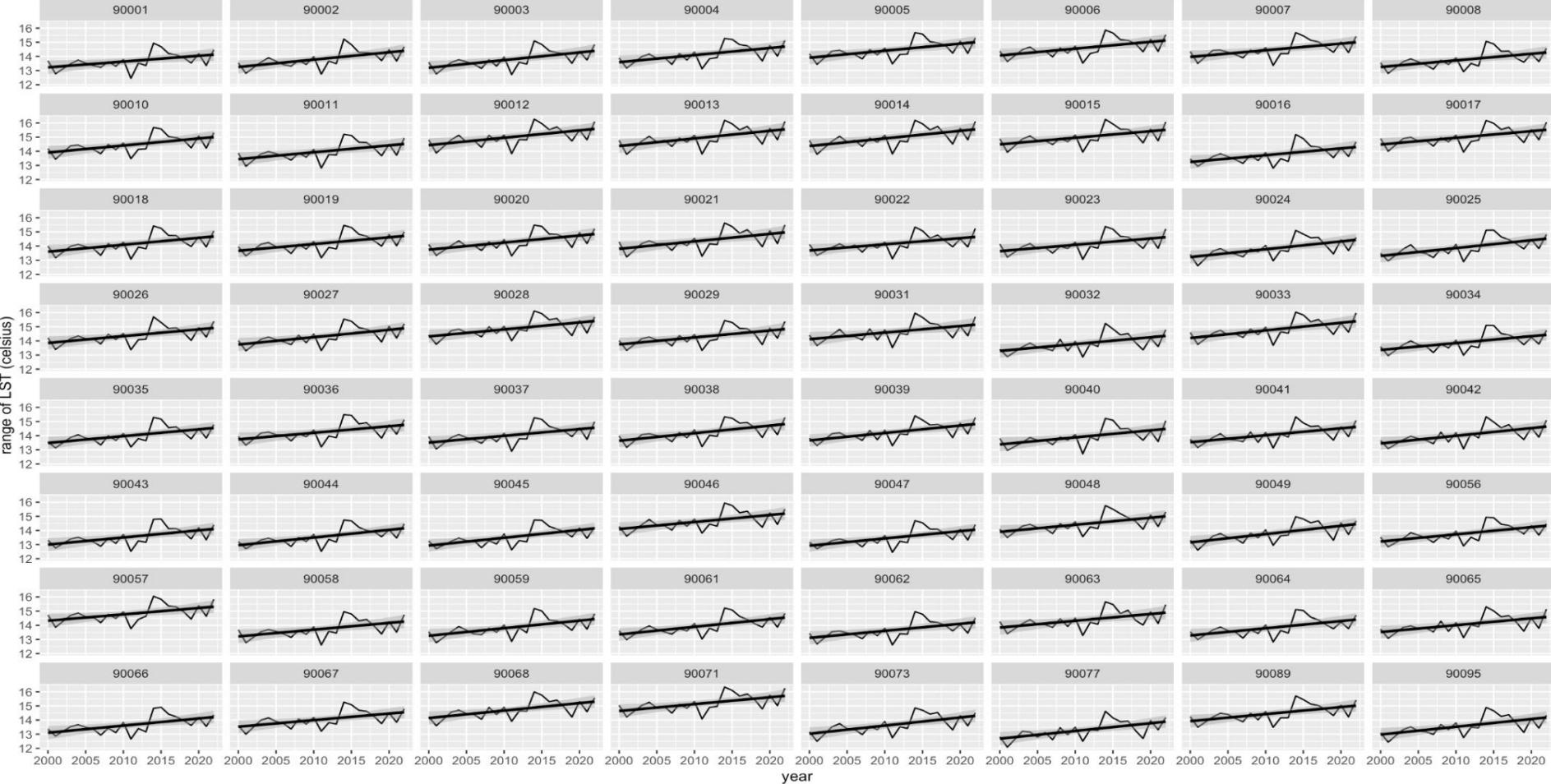
City of Sacramento Values Above dLST 95th Percentile



City of Fresno Values Above dLST 95th Percentile



City of Los Angeles Values Above dLST 95th Percentile



City of San Diego Values Above dLST 95th Percentile

