

Speak for Tree - Environment

Environment Group

2021-11-22

Data source:

PM2.5:

Temperature:

Census Tracks(2020):

Exploratory Data Analysis

Using QGIS

We generate the plots which relate the canopy to pollution(PM2.5) and surface heat (temperature)

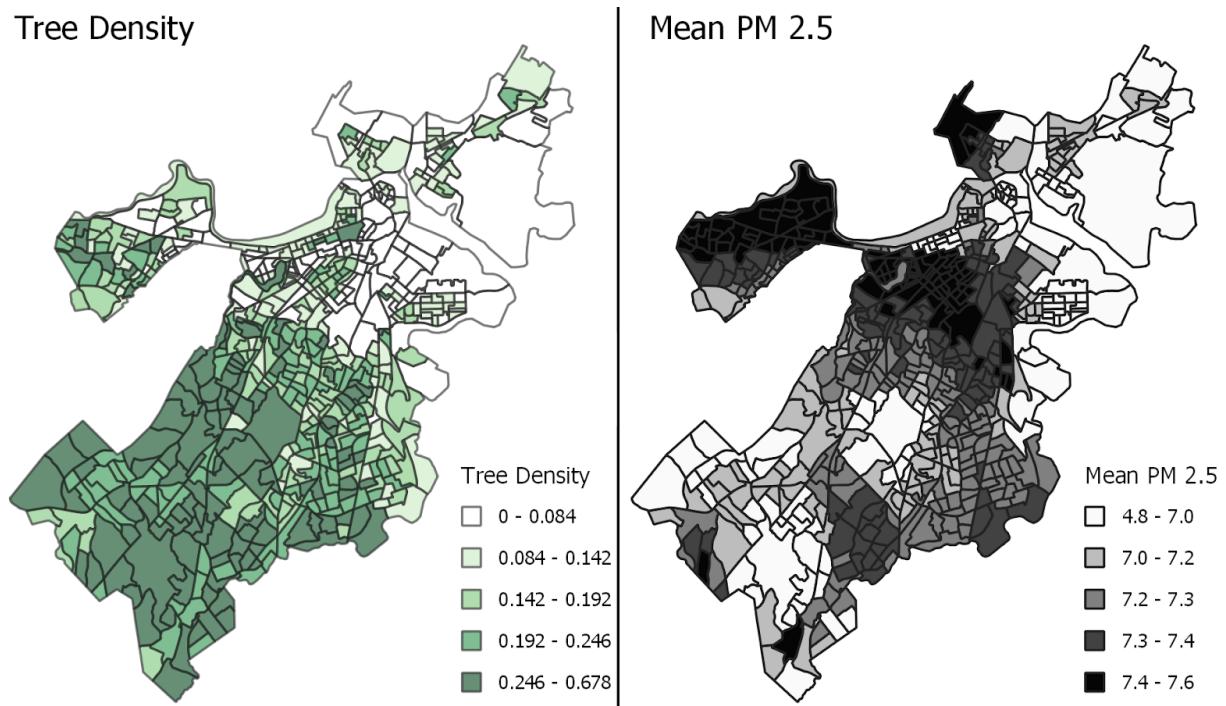


Figure 1: The PM2.5 Situation in Boston

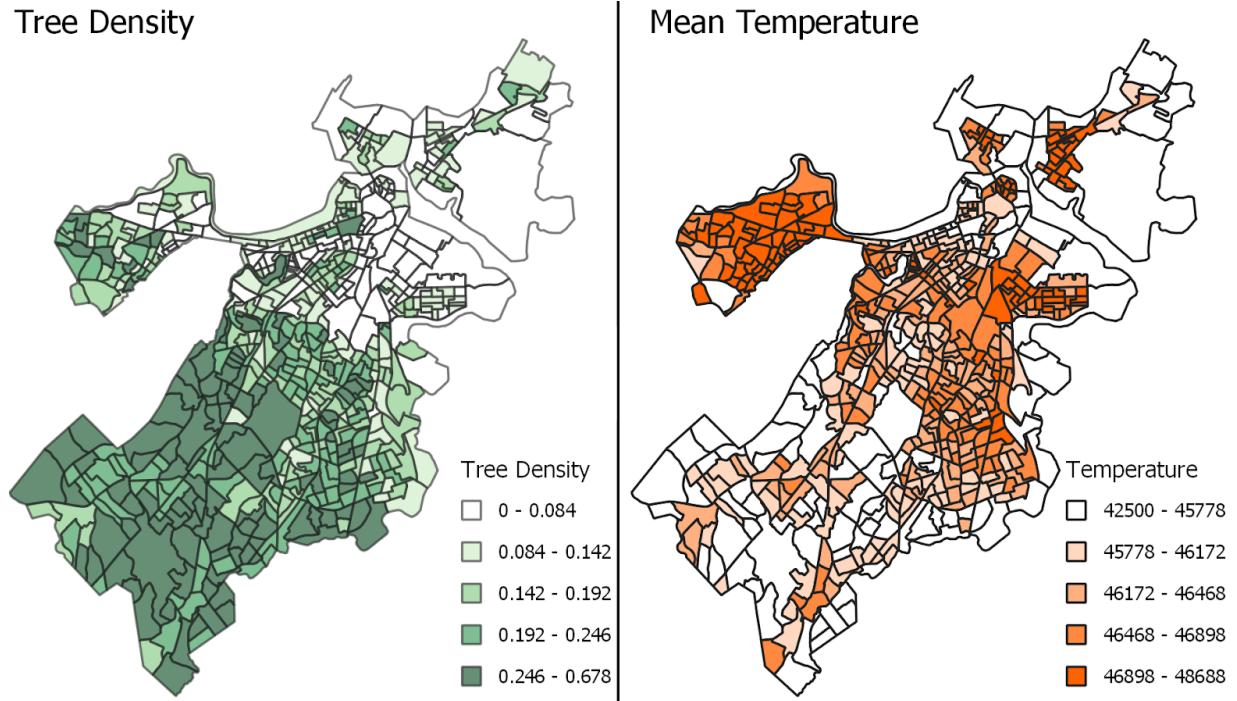


Figure 2: The Temperature Situation in Boston

Using R

We combine the PM2.5 and temperature data to the Census2020_Tracts data, which allow us to do more exploration in R, and use kriging to avoid spacial confounding of our data.

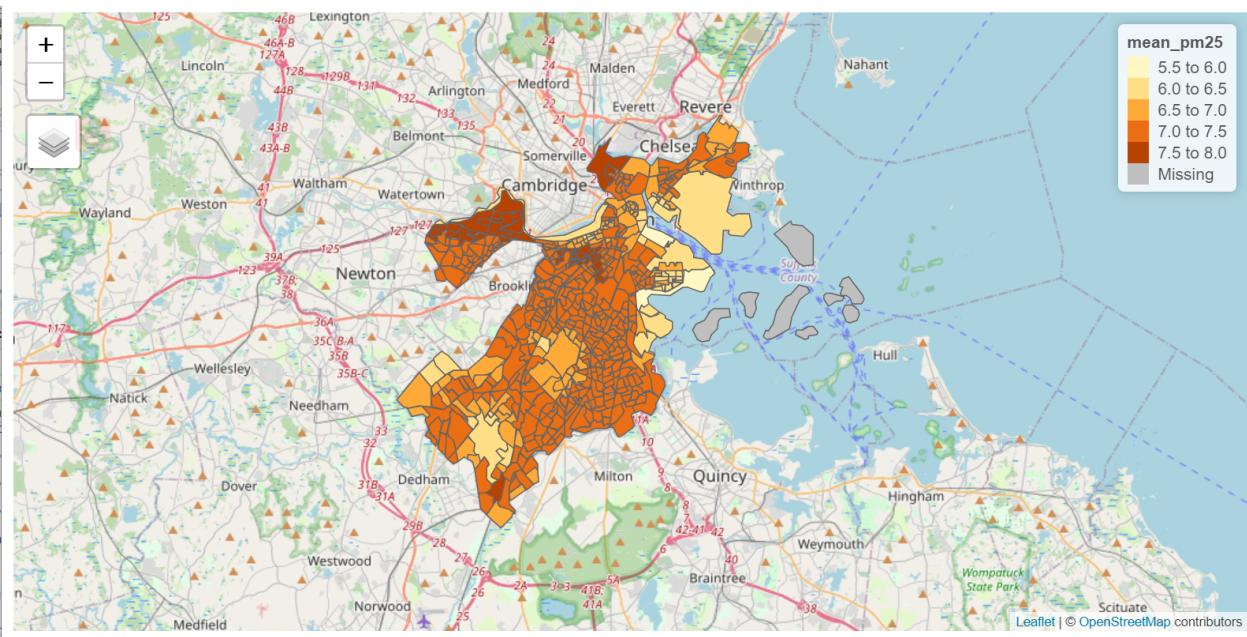
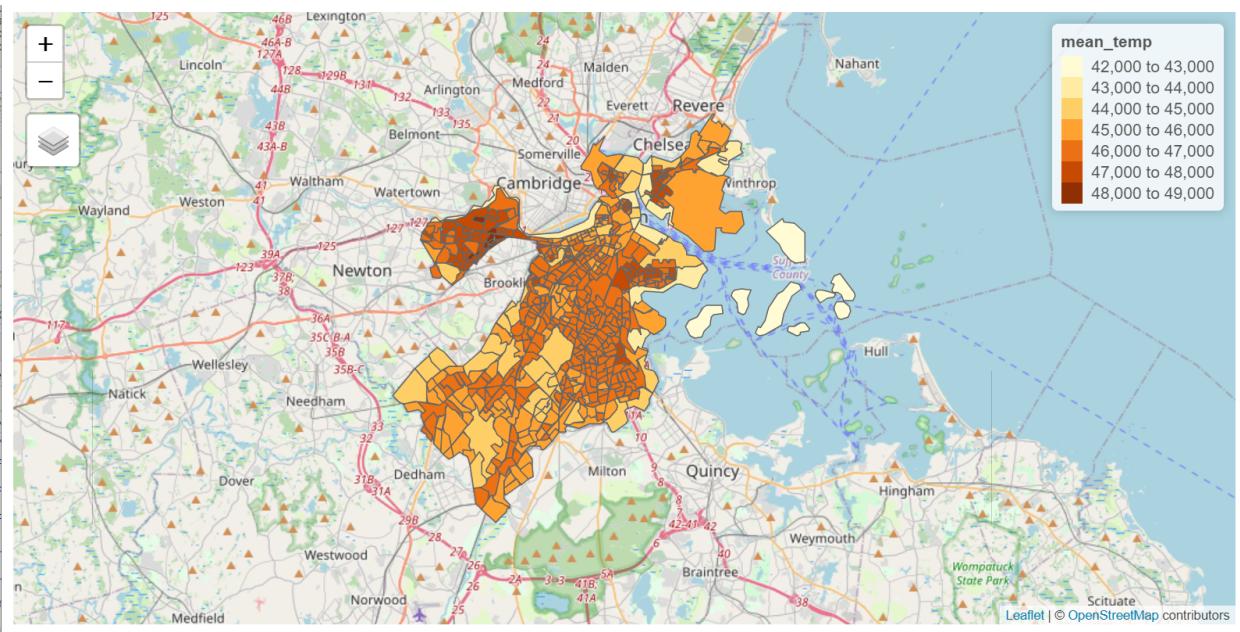
```

Reading layer `env' from data source
`D:\675 practicum\Tree\SpeakfortheTrees_Environment\env.shp'
using driver `ESRI Shapefile'
Simple feature collection with 207 features and 17 fields
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: 739715.8 ymin: 2908294 xmax: 812981.4 ymax: 2972975
Projected CRS: NAD83 / Massachusetts Mainland (ftUS)

Reading layer `DemographicsSmoothed' from data source
`D:\675 practicum\Tree\SpeakfortheTrees_Environment\Demographics_Smoothed\Demographics_Smoothed\Demog
using driver `ESRI Shapefile'
Simple feature collection with 194 features and 29 fields
Geometry type: POLYGON
Dimension:     XY
Bounding box:  xmin: -71.19125 ymin: 42.22791 xmax: -70.98527 ymax: 42.3974
Geodetic CRS:  WGS 84

```

Plot the mean temp and PM2.5 situation for each census tract



Bubble Plots with centroid data

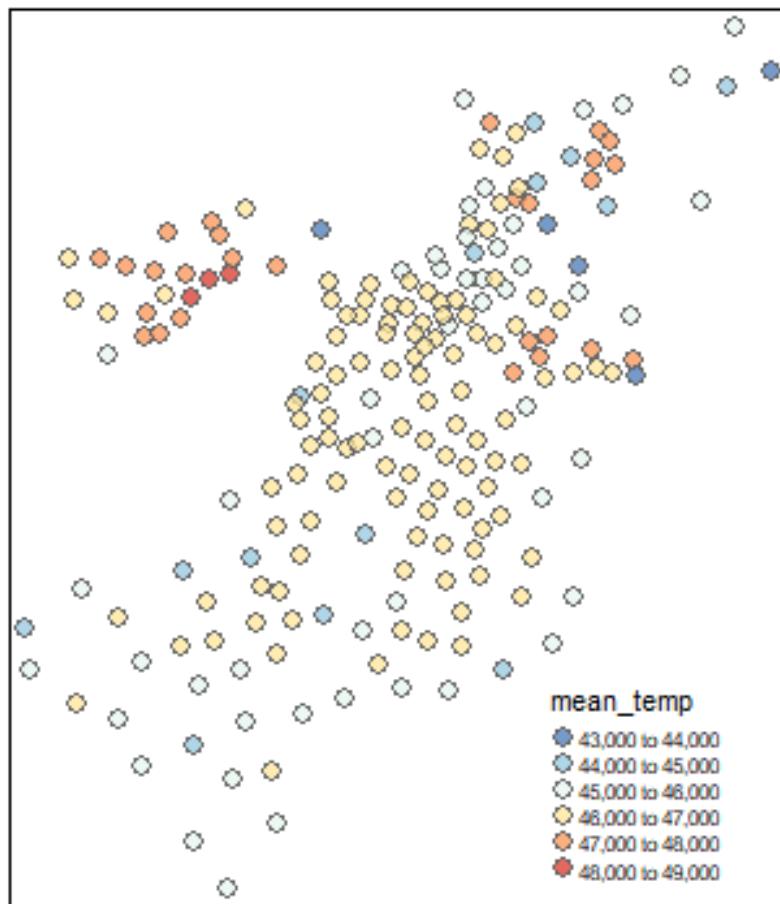


Figure 3: Bubble Plots for temp/PM2.5

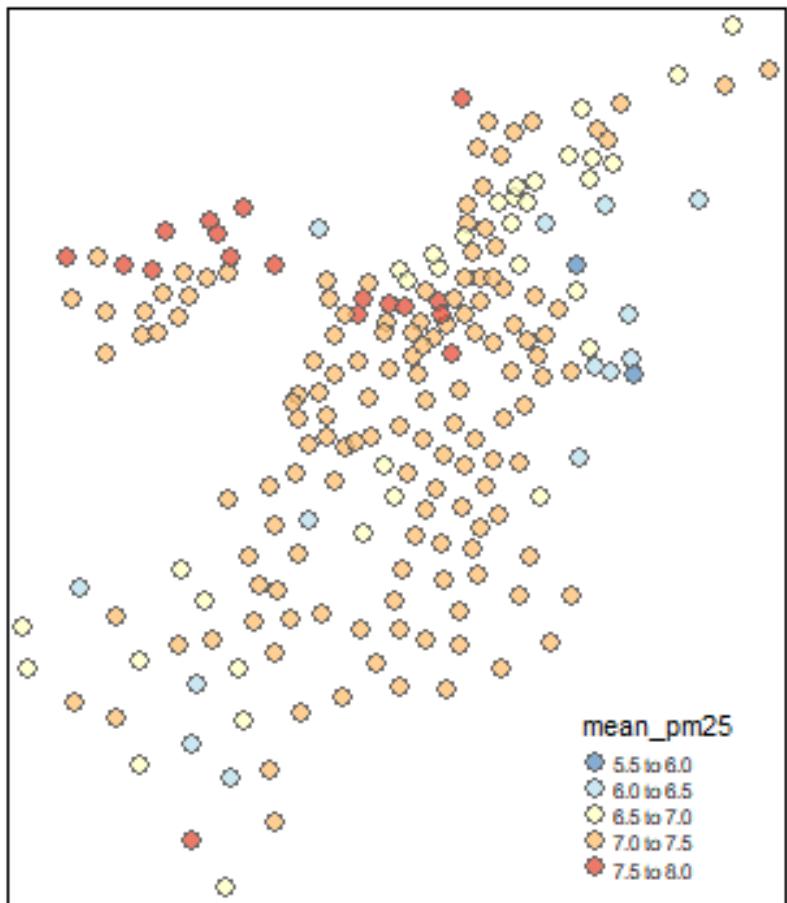
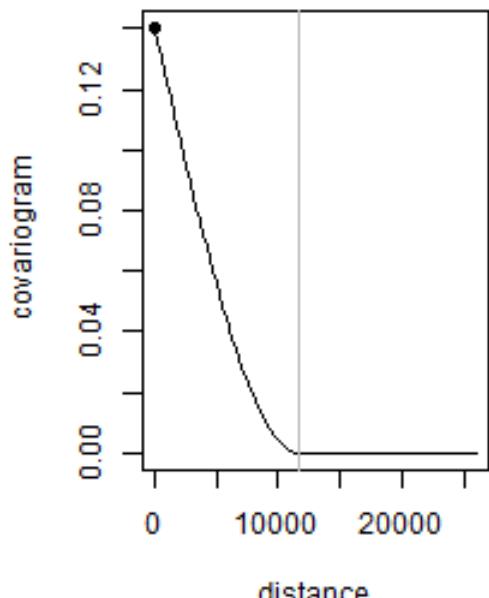
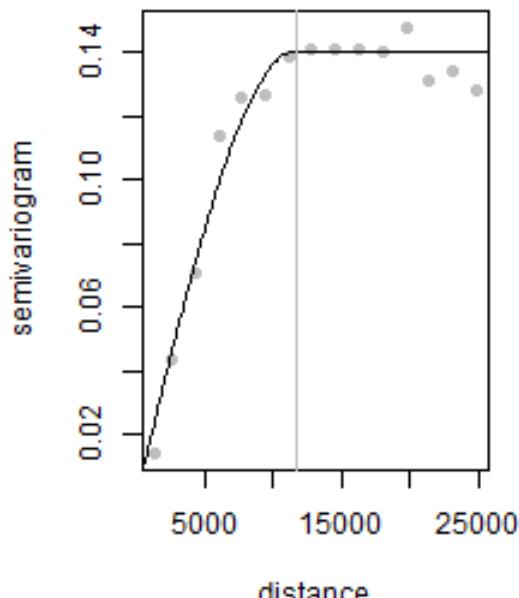


Figure 4: Bubble Plots for temp/PM2.5

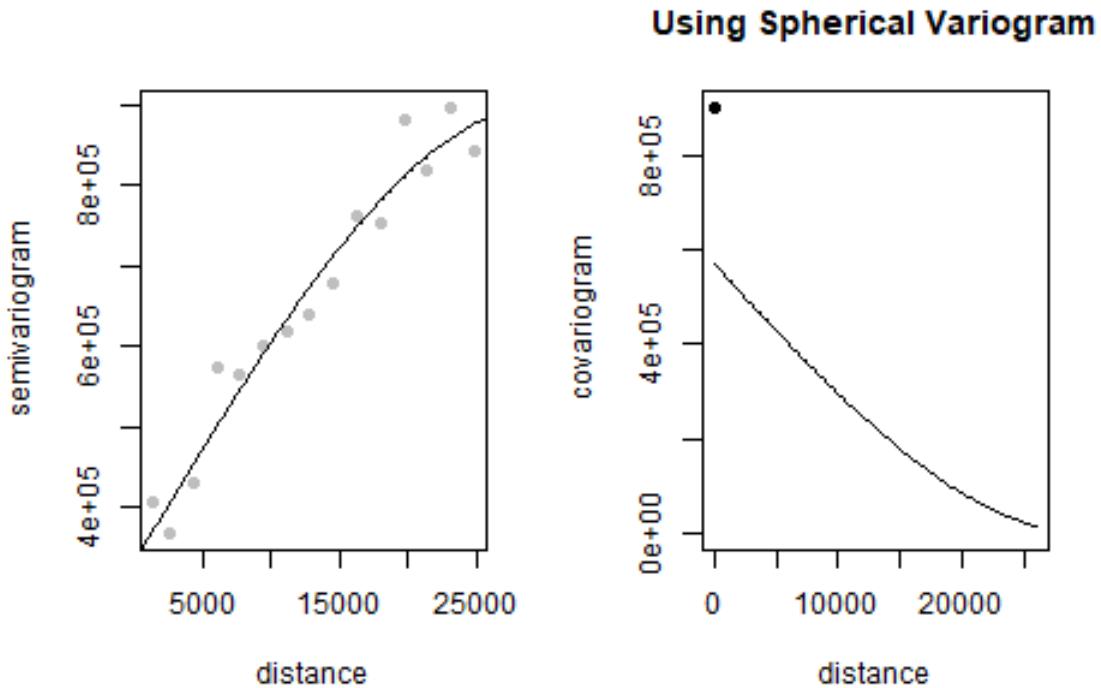
Kriging for spacial mixed effects

PM2.5: check variogram and covariance

Using Spherical Variogram



Temperature: check variogram and covariance



Citation

<https://stackoverflow.com/questions/49032217/inner-joining-two-sf-objects-by-non-sf-column>

https://www.youtube.com/watch?v=J-IB4_QL7Oc

<http://www.goldensoftware.com/variogramTutorial.pdf>