Investigating Surface PM2.5 Pollution in the US

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Refer to the file `PM_viz.R` for raw R code.

The main function from this code, `PMviz()`, visualizes particulate matter data collected by the Atmosphere Composition Analysis Group. Click the link to view a detailed breakdown of the data and how it was collected.

Annual datasets are provided for $PM_{2.5}$ from 2000 to 2018. There are also annual datasets for compositional estimates of SO_4^{2+} (sulfate), NO_3^- (nitrate), NH_4^+ (ammonium), organic matter, black carbon, mineral dust, and sea salt. These compositional estimates have annual datasets from 2000 to 2017.

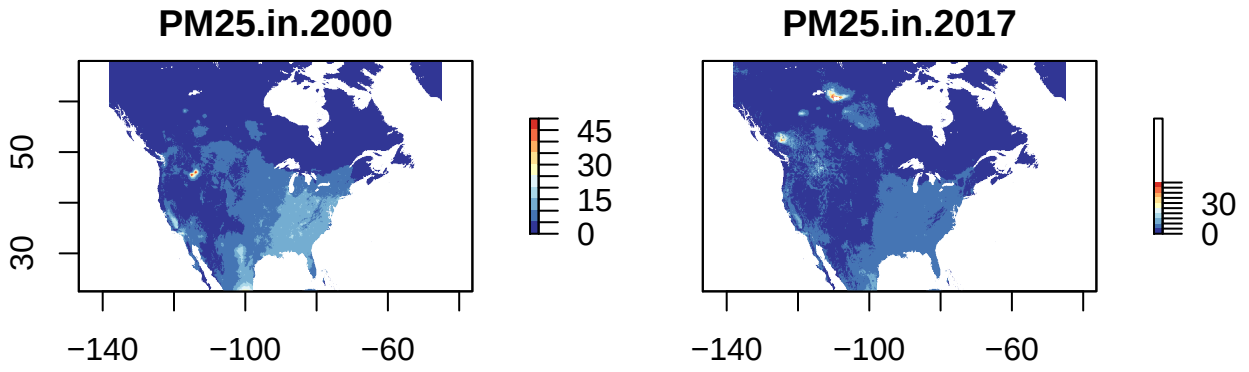
The PMviz function can be used to visualize this data for the continent of North America in a simple spatial plot. The main argument is `type`, which is the desired pollutant (must be passed in as the exact code specified on the website, i.e. "PM25" for particulate matter). The `years` argument should be a vector of all the years you want plotted. This could be a single year, a range of years, or several distinct years with no particular pattern.

Once the pollutant and dates have been specified, the relevant data is gathered, and the range of mass concentrations is calculated based on the maximum concentration in that specific set of data. This was done so that charts which are printed together may be easily compared. Currently, the function only visualizes one pollutant type at a time, though I want to add functionality to plot multiple in the same function call so the plots can be compared.

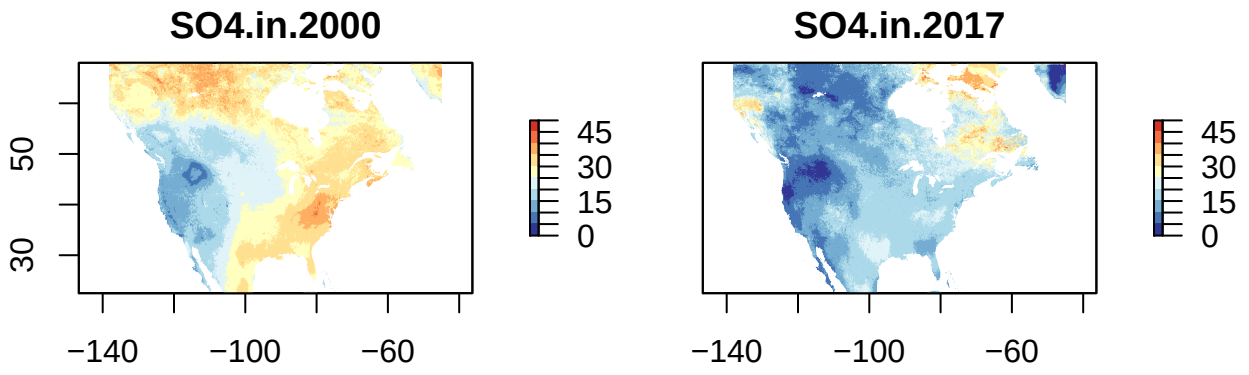
To view the code for this PMviz function, refer to the R file mentioned above.

Let's look at years 2000 and 2017 for every "type."

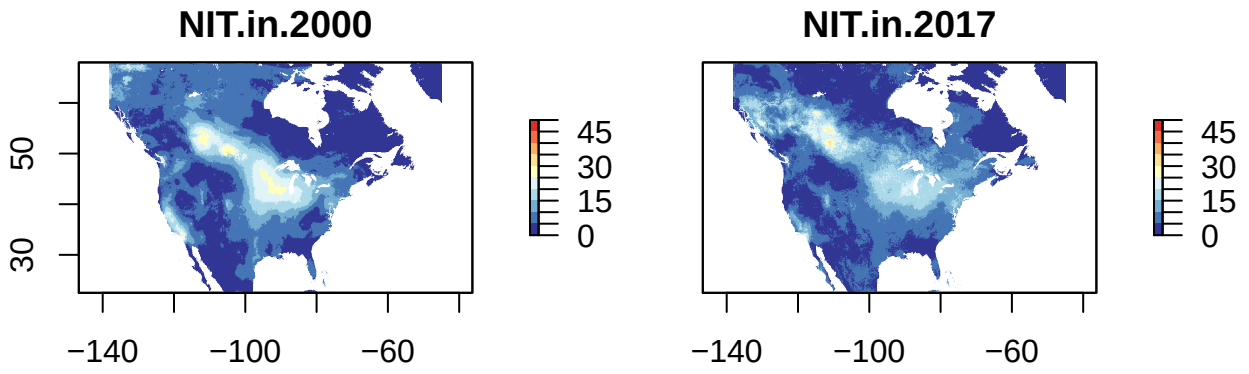
```
PMviz("PM25", c(2000,2017))
```



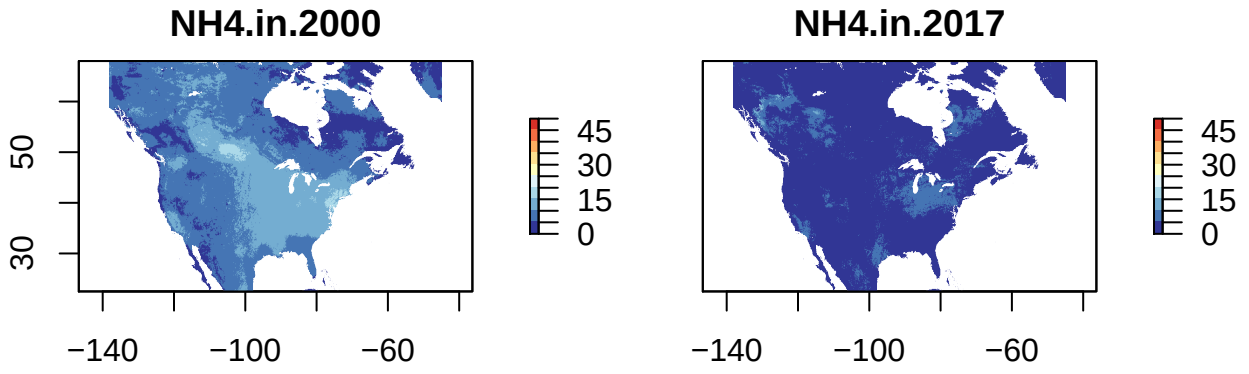

```
PMviz("SO4", c(2000,2017))
```



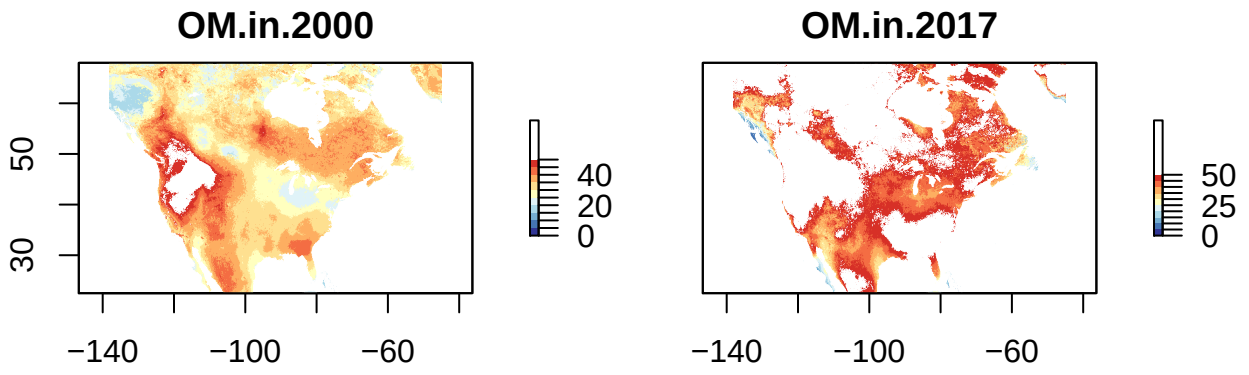

```
PMviz("NIT", c(2000,2017))
```



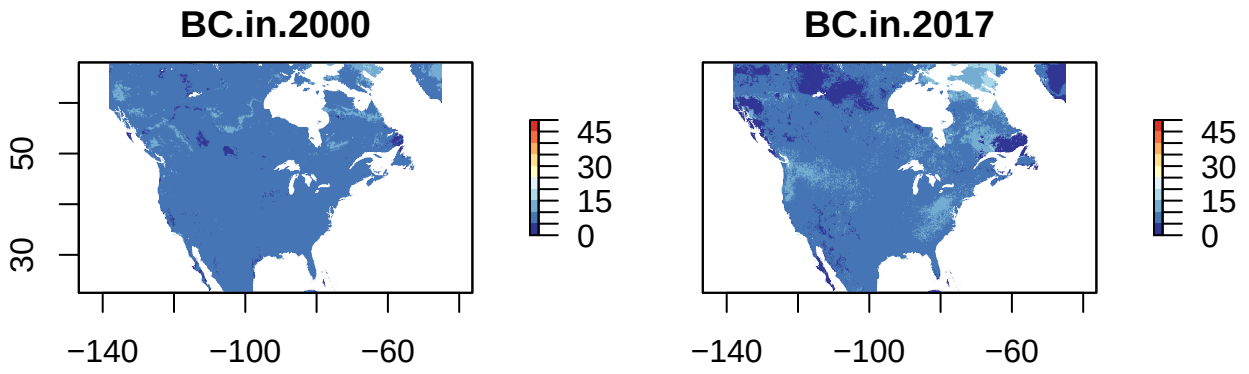

```
PMviz("NH4", c(2000,2017))
```



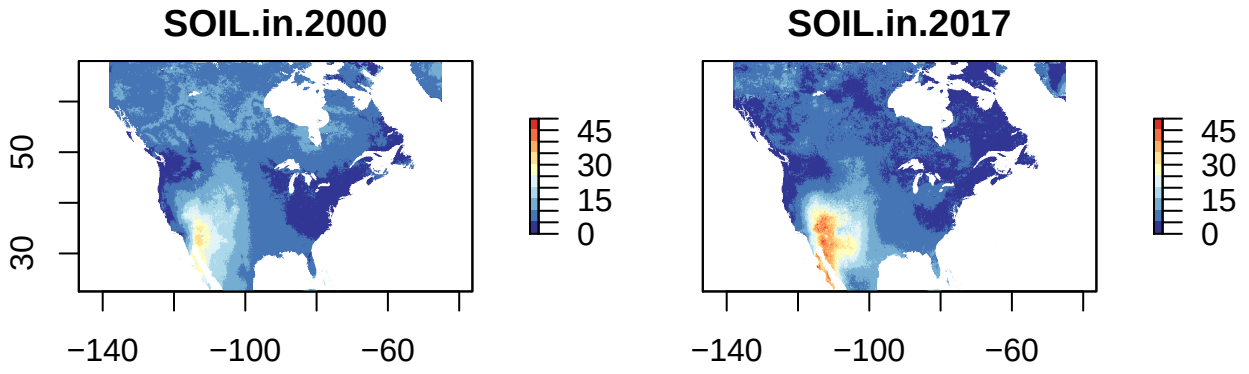

```
PMviz("OM", c(2000,2017))
```



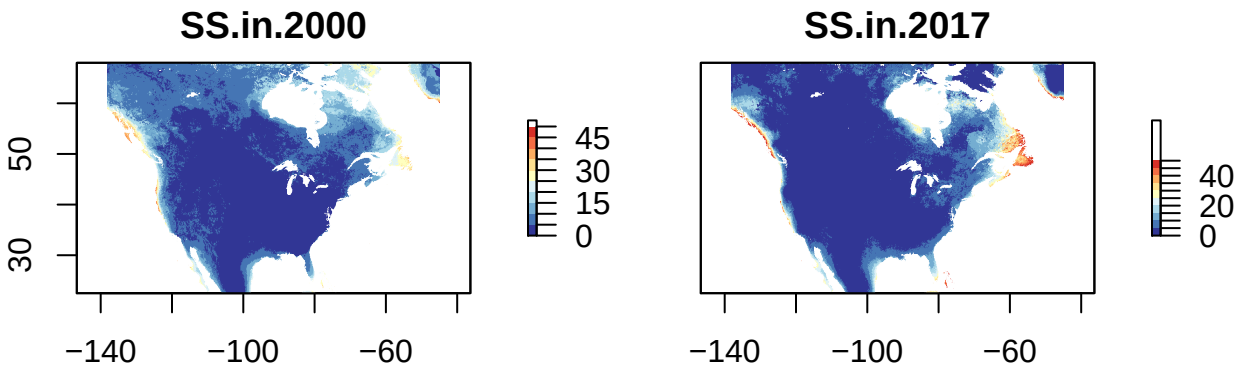

```
PMviz("BC", c(2000,2017))
```




```
PMviz("SOIL", c(2000,2017))
```




```
PMviz("SS", c(2000,2017))
```


SS.in.2000
50
30
−140
−100
−60
45
30
15
0
SS.in.2017
−140
−100
−60
40
20
0