PM2.5 Emissions Data (summarySCC\_PM25.rds ): This file contains a data frame with all of the PM2.5 emissions data for 1999, 2002, 2005, and 2008. For each year, the table contains number of **tons** of PM2.5 emitted from a specific type of source for the entire year. Here are the first few rows.

## fips SCC Pollutant Emissions type year

## 4 09001 10100401 PM25-PRI 15.714 POINT 1999

## 8 09001 10100404 PM25-PRI 234.178 POINT 1999

## 12 09001 10100501 PM25-PRI 0.128 POINT 1999

## 16 09001 10200401 PM25-PRI 2.036 POINT 1999

## 20 09001 10200504 PM25-PRI 0.388 POINT 1999

## 24 09001 10200602 PM25-PRI 1.490 POINT 1999

* fips : A five-digit number (represented as a string) indicating the U.S. county
* SCC : The name of the source as indicated by a digit string (see source code classification table)
* Pollutant : A string indicating the pollutant
* Emissions : Amount of PM2.5 emitted, in tons
* type : The type of source (point, non-point, on-road, or non-road)
* year : The year of emissions recorded

Source Classification Code Table (Source\_Classification\_Code.rds ): This table provides a mapping from the SCC digit strings in the Emissions table to the actual name of the PM2.5 source. The sources are categorized in a few different ways from more general to more specific and you may choose to explore whatever categories you think are most useful. For example, source “10100101” is known as “Ext Comb /Electric Gen /Anthracite Coal /Pulverized Coal”.

You can read each of the two files using the readRDS() function in R. For example, reading in each file can be done with the following code:

## This first line will likely take a few seconds. Be patient!

NEI <- readRDS("summarySCC\_PM25.rds")

SCC <- readRDS("Source\_Classification\_Code.rds")

Have total emissions from PM2.5 decreased in the United States from 1999 to 2008? Using the **base** plotting system, make a plot showing the total PM2.5 emission from all sources for each of the years 1999, 2002, 2005, and 2008.

Have total emissions from PM2.5 decreased in the **Baltimore City**, Maryland (fips == "24510" ) from 1999 to 2008? Use the **base** plotting system to make a plot answering this question.

Of the four types of sources indicated by the type  (point, nonpoint, onroad, nonroad) variable, which of these four sources have seen decreases in emissions from 1999–2008 for **Baltimore City**? Which have seen increases in emissions from 1999–2008? Use the **ggplot2** plotting system to make a plot answer this question.

Across the United States, how have emissions from coal combustion-related sources changed from 1999–2008?

How have emissions from motor vehicle sources changed from 1999–2008 in **Baltimore City**?

Compare emissions from motor vehicle sources in Baltimore City with emissions from motor vehicle sources in **Los Angeles County**, California (fips == "06037" ). Which city has seen greater changes over time in motor vehicle emissions?v