Map making Practice (EDS223-HW1)

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0.1 Exploring environmental (in)justice

Air quality plays a crucial role in human health and often reflects patterns of environmental injustice, especially in communities exposed to high levels of airborne toxins. In this activity, we will explore air toxic cancer risk and the distribution of air toxins across Los Angeles County.

Objective: Practice using `tmap` package to create two maps that communicant an environmental justice issue in California and Los Angeles County.

0.1.0.1 Load packages and read in geodatabase

```
library(tidyverse)
library(sf)
library(stars)
library(tmap)
library(here)
library(tinytex)
```

```r
# read in geodatabase of EJScreen data at the Census Block Group level
ejscreen <- sf::st_read(here::here(
  "data", "ejscreen","EJSCREEN_2023_BG_StatePct_with_AS_CNMI_GU_VI.gdb"))
```

```
Reading layer `EJSCREEN_StatePctiles_with_AS_CNMI_GU_VI' from data source
  `C:\Users\Donaji\Documents\MEDS\EDS-223\HomeWork\EDS223-HW1\data\ejscreen\EJSCREEN_2023_BG
  using driver `OpenFileGDB'
Simple feature collection with 243021 features and 223 fields
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: -19951910 ymin: -1617130 xmax: 16259830 ymax: 11554350
Projected CRS: WGS 84 / Pseudo-Mercator
```

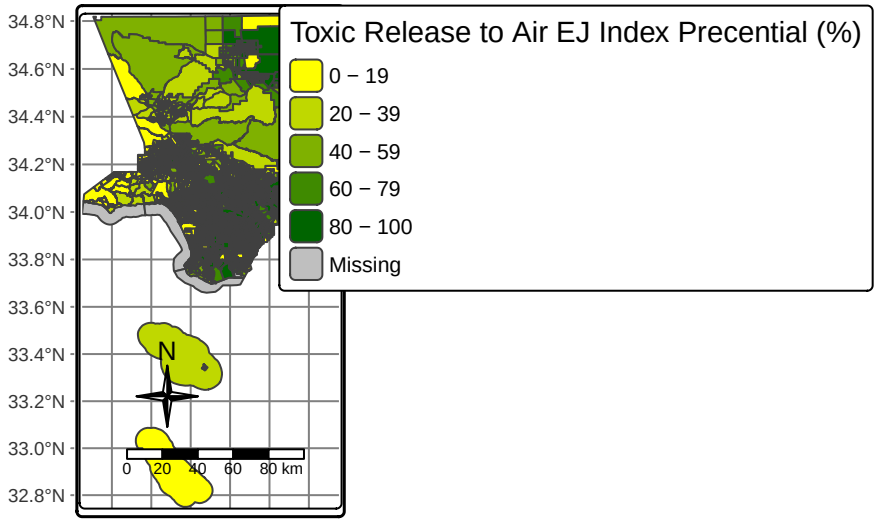
```r
# filter to a state you are interested in
california <- ejscreen %>%
  dplyr::filter(ST_ABBREV == "CA")

# filter to a county you are interested in
Los_Angeles <- ejscreen %>%
  dplyr::filter(CNTY_NAME %in% c("Los Angeles County"))

# find the average values for all variables within counties
california_counties <- aggregate(
  california, by = list(california$CNTY_NAME), FUN = mean)
```

0.1.1 Visualize data

0.2 Map one displays the precentile for Toxic Release to Air EJ Index in LA County.

```r
# Map one
tm_shape(Los_Angeles) +
  tm_graticules() +
  tm_polygons("P_D2_RSEI_AIR", fill.legend = tm_legend(title = "Toxic Release to Air EJ Inde
tm_compass(type = "4star", size = 2, position = c("RIGHT", "bottom")) +

tm_scalebar(position = c("RIGHT", "bottom")) +

tm_title("Precential of Toxic Release across LA county", size = 1) +
  tm_layout(component.autoscale = FALSE, frame.double_line = TRUE)
```

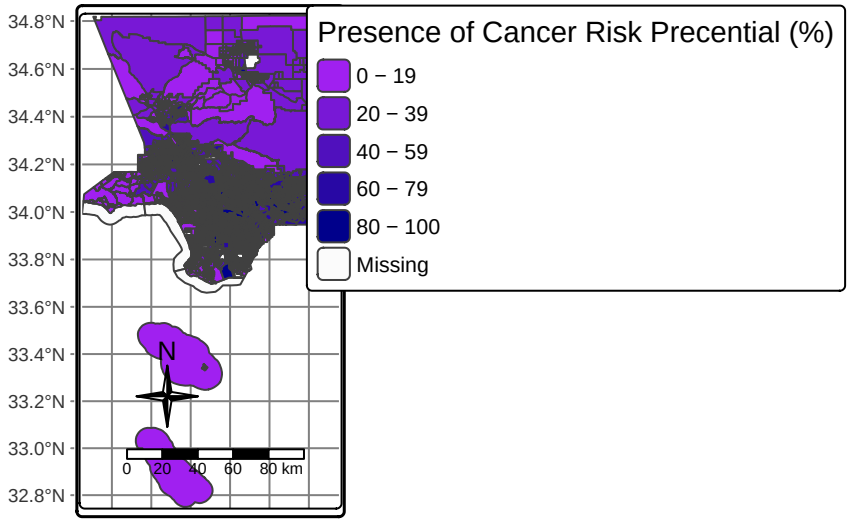
Precential of Toxic Release across LA county



Map two: Looks at the precential for Air toxics cancer risk

```
# Map 2
tmap_mode("plot") +
tm_shape(Los_Angeles) +
  tm_graticules() +
  tm_polygons(fill = "P_D2_CANCER",
              fill.scale = tm_scale(values = c("purple", "darkblue")),
              fill.legend = tm_legend(title = "Presence of Cancer Risk Precential (%)")) +

tm_compass(type = "4star", size = 2, position = c("RIGHT", "bottom")) +

tm_scalebar(position = c("RIGHT", "bottom")) +

tm_title("Where the Air is Most Toxic: Cancer Risk Across LA County", size = 1) +
  tm_layout(component.autoscale = FALSE, frame.double_line = TRUE)
```

e the Air is Most Toxic: Cancer Risk Across LA County

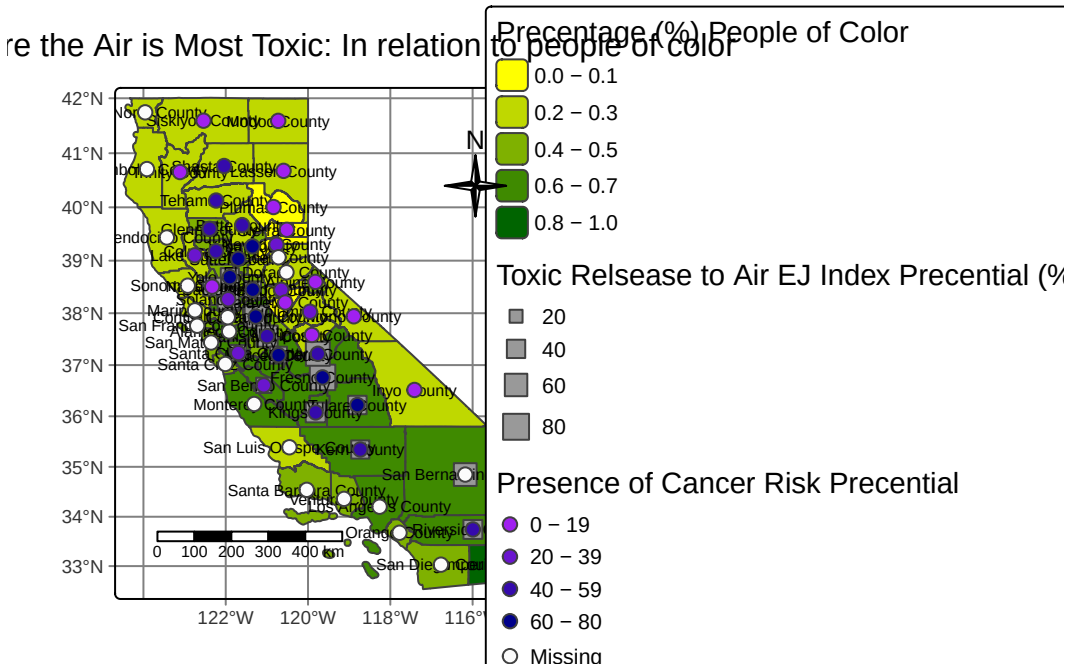


0.2.1 Map made for fun to explore relationships of air toxin release, cancer risk and demographics.

The following map is just looking at the variables above within California in regards to People of color in each county

```
tm_shape(california_counties) +
  tm_graticules() +
  tm_polygons(fill = "PEOPCOLORPCT",
              fill.legend = tm_legend("Precentage (%) People of Color"),
              fill.scale = tm_scale(values = c("yellow", "darkgreen"))) +

tm_shape(california_counties) +
  tm_symbols("P_D2_RSEI_AIR", shape = 22, size.legend = tm_legend("Toxic Relsease to Air EJ

  #tm_dots() +
  tm_text(text = "Group.1", size = 0.5) +

  tm_shape(california_counties) +
  tm_symbols(fill = "P_D2_CANCER", size = 0.5,
             fill.scale = tm_scale(values = c("purple", "darkblue")),
             fill.legend = tm_legend("Presence of Cancer Risk Precential")) +
```

```
  tm_compass(type = "4star", size = 2, position = c("right", "top")) +

  tm_scalebar(position = c("left", "bottom")) +

  tm_title("Where the Air is Most Toxic: In relation to people of color", size = 1) +
  tm_layout(component.autoscale = FALSE) # to avoid auto scaling to graph.
```



0.2.2 Data Citations

Here is the tool