R for Climate Change Analytics

How many classes: 4+7+10+9+3 = 33

1. Introduction
   1. Why climate change analytics
      1. What is this book, what will you learn, what’s the goal
      2. Who is it for, people with
         1. Some background in climate change, or
         2. Some background in R
   2. Why R
   3. Why climate change

1. Causes
   1. Chapter: GHG emissions
      1. Types of emissions
      2. Inventories (US and GA)
      3. Emission coefficients
      4. Transportation emissions
      5. Transportation activity (calculate a drive emissions)
   2. Chapter: electricity, refer to EIA electricity
   3. Lab a1: egrid plants, R, RStudio, dplyr,
   4. Lab a2: egrid plants, dplyr, filter, select, mutate,
   5. Lab a3: egrid plants, group\_by, summarize, pivot
   6. Chapter: GIS
      1. vector data
      2. spatial data frames
   7. Lab a4: egrid plants (maybe flight), tmap
   8. Lab a5: SEDS, ggplot, bars, points, lines
2. Impacts
   1. Chapter: climate models
      1. RCPs
      2. SSPs
      3. GCM outputs
   2. Chapter: GIS raster data
   3. Lab b1: NCA LOCA
      1. x,y,z data
      2. netcdf
   4. Lab b2: NCA LOCA
      1. Aggregate to polygons
      2. Mask, crop
      3. Map algebra
   5. Lab b3: Hsiang
   6. Lab b4: CEJST
   7. Lab b5: sea level rise
3. Solutions
   1. Chapter: Adaptation vs. mitigation
   2. Lab c1: sea level rise adaptation (infrastructure damage)
   3. Chapter: GIS spatial analysis
      1. Overlay
      2. Buffer
      3. Map algebra
      4. Raster calculator
   4. Lab c2: raster and sf spatial analysis basics for utility-solar suitability
   5. Lab c3: population access & transmission line buffers
   6. Lab c4: ghi, dems, slope, aspect
   7. Lab c5: map algebra, polygon overlay, solar suitability
   8. Lab c6: possible lab on ranking sites
4. Action items
   1. Jonathan: knit labs with bookdown
   2. Bill: compare outline to syllabus and lecture slides to determine what we may be missing