tallest-and-widest.R

cschmertmann

2021-11-15

```
#.............................................................
# Carl Schmertmann
# 15 Nov 2021
#
# find N-S and E-W extremes for countries
# at gadm.org (UC Davis)
# .............................................................

library(spData)
```

```
## To access larger datasets in this package, install the spDataLarge
## package with: `install.packages('spDataLarge',
## repos='https://nowosad.github.io/drat/', type='source')`
```

```
library(sf)
```

```
## Linking to GEOS 3.9.1, GDAL 3.2.1, PROJ 7.2.1
```

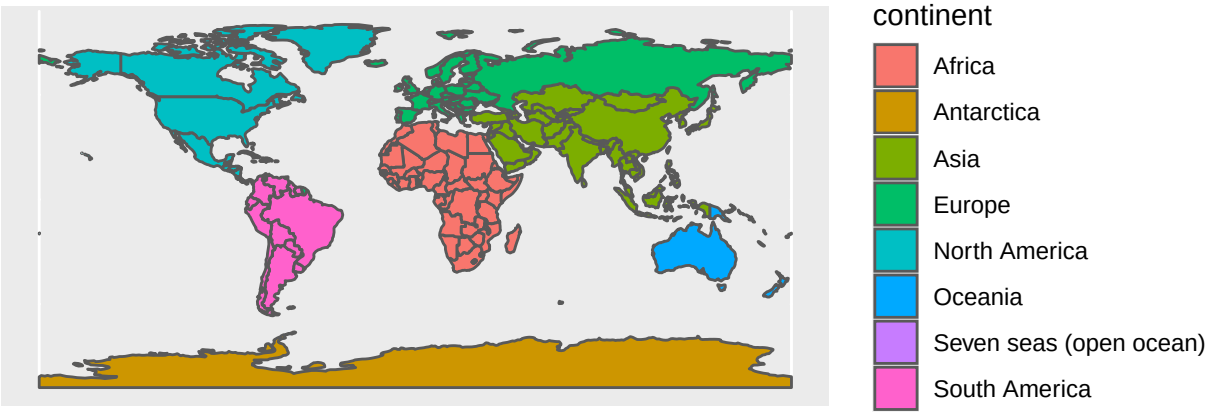
```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.4     v dplyr   1.0.7
## v tidyr   1.1.4     v stringr 1.4.0
## v readr   2.0.2     v forcats 0.5.1
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
# plot world map just to verify data
ggplot(data=world) +
  geom_sf(aes(fill=continent))
```




```
# break multi-polygon countries into polygons. For the "clump"
# countries we'll paste the single polygons back together.
# For all others we'll keep the LARGEST contiguous
# polygon only. This will
# chop off Svalbard, Alaska+Hawaii, Argentine Antarctica, etc...

clump = c('Chile','Japan','New Zealand', 'Australia', 'Indonesia', 'Philippines')

world2 = world %>%
          filter(type %in% c('Country','Sovereign country')) %>%
          st_cast(., 'POLYGON') %>%
          mutate(subarea = st_area(geom)) %>%
          arrange(name_long, -subarea) %>%
          group_by(name_long) %>%
          mutate(i=seq(name_long)) %>%
          filter( (i==1) | (name_long %in% clump)) %>%
          summarize(glued_back_together = TRUE)
```

```
## Warning in st_cast.sf(., "POLYGON"): repeating attributes for all sub-geometries
## for which they may not be constant
```

```
# calculate the bounding box for each (possibly chopped) country
box = sapply(world2$geom, st_bbox) %>%
       t() %>%
       as_tibble() %>%
       add_column(name = world2$name_long, .before = 1)
```

```
this_crs = st_crs(world)

# add the corners of the bounding boxes as variables
box$NW_corner = st_as_sf(box, coords=c('xmin', 'ymax'))$geometry
box$SW_corner = st_as_sf(box, coords=c('xmin', 'ymin'))$geometry
box$SE_corner = st_as_sf(box, coords=c('xmax', 'ymin'))$geometry
box$NE_corner = st_as_sf(box, coords=c('xmax', 'ymax'))$geometry

st_crs(box$NW_corner) = this_crs
st_crs(box$SW_corner) = this_crs
st_crs(box$SE_corner) = this_crs
st_crs(box$NE_corner) = this_crs


# calculate the "height" of each country in km
box_height = sapply(1:nrow(box), function(k) {
                    st_distance(box$SW_corner[k], box$NW_corner[k]) / 1000
                    })

names(box_height) = world2$name_long

# calculate the "width" of each country in km
box_width = sapply(1:nrow(box), function(k) {
  st_distance(box$SW_corner[k], box$SE_corner[k]) / 1000
})

names(box_width) = world2$name_long

# 20 tallest

tmp = box_height %>% sort() %>% rev() %>% head(20)

tibble( name=names(tmp), height_km = round(tmp))
```

```
## # A tibble: 20 x 2
##    name                              height_km
##    <chr>                                 <dbl>
##  1 Brazil                                 4338
##  2 Chile                                  4229
##  3 Russian Federation                     4064
##  4 China                                  3689
##  5 Australia                              3666
##  6 Argentina                              3393
##  7 Canada                                 3363
##  8 India                                  3061
##  9 United States                          2703
## 10 Greenland                              2625
## 11 Democratic Republic of the Congo       2059
## 12 Myanmar                                2046
## 13 Peru                                   2034
## 14 Mexico                                 2022
## 15 Algeria                                2008
## 16 Colombia                               1861
## 17 Mozambique                             1826
```

```
## 18 Chad                                    1778
## 19 Indonesia                               1761
## 20 Saudi Arabia                            1758
```

```
# 20 widest

tmp = box_width %>% sort() %>% rev() %>% head(20)

tibble( name=names(tmp), width_km = round(tmp))
```

```
## # A tibble: 20 x 2
##    name                              width_km
##    <chr>                                <dbl>
##  1 Russian Federation                   10459
##  2 Canada                                6762
##  3 China                                 6358
##  4 United States                         5765
##  5 Indonesia                             4999
##  6 Brazil                                3606
##  7 Kazakhstan                            3417
##  8 Greenland                             3270
##  9 Mexico                                3261
## 10 India                                 3218
## 11 Australia                             3205
## 12 Mongolia                              2647
## 13 Saudi Arabia                          2243
## 14 Algeria                               2173
## 15 Democratic Republic of the Congo      2055
## 16 Iran                                  1933
## 17 Sudan                                 1811
## 18 Mali                                  1800
## 19 Pakistan                              1726
## 20 Niger                                 1699
```

```
# Sweden, Chile, and Norway
tmp = box_height[c('Sweden','Norway','Chile','Finland')] %>% sort() %>% rev()

tibble( name=names(tmp), height_km = round(tmp))
```

```
## # A tibble: 4 x 2
##   name    height_km
##   <chr>       <dbl>
## 1 Chile        4229
## 2 Sweden       1528
## 3 Norway       1457
## 4 Finland      1147
```