

Exploring the South African school's directory with R

Megan Beckett

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satRday 2019



Multilayered, multicultural and multicoloured



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

My aims



Every child is a national asset...



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SCHOOL MASTERLIST DATA

Quarter 4 of 2016: March 2017

Title	Size	
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My aims

NatEmis	DataYear	ProvinceCD	Province	Institution Name	Status	Sector	Type DoE	Phase	Specialization	OwnerLand	OwnerBuild	Ownership	ExDept	P
200300002	2017	2 EC	A.M.BAM JP SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	PRIMARY SUBJECTS	PUBLIC	.	STATE	TRANSKEI	24	
200300003	2017	2 EC	AMABELE SS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	TRANSKEI	24	
200300717	2017	2 EC	AMAMBALU JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300006	2017	2 EC	ANTA PJ SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300007	2017	2 EC	B.SANDILE SP SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	PRIMARY SUBJECTS	PUBLIC	.	STATE	TRANSKEI	24	
200300012	2017	2 EC	BAWA JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	TRANSKEI	24	
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200300016	2017	2 EC	BEKINKOSI JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300018	2017	2 EC	BELENI JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	COMBINED SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	EDUCATION AND TRAINING(DET)	24	
200300019	2017	2 EC	BENAI SILINGA SP SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	PRIMARY SUBJECTS	PUBLIC	.	STATE	TRANSKEI	24	
200300869	2017	2 EC	BETHEL COLLEGE	OPEN	INDEPENDENT	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	INDEPENDENT	PRIVATE	.	.	.	
200300763	2017	2 EC	BETHEL JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300022	2017	2 EC	BIYANA JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300793	2017	2 EC	BLUE-SKY JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	COMBINED SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300024	2017	2 EC	BLYTHSWOOD HIGH SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	TRANSKEI	24	
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200300033	2017	2 EC	BONGOLETHU HIGH SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	NEW EDUCATION DEPARTMENT	24	
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200300742	2017	2 EC	BULUBE'S JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	TRANSKEI	24	
200300721	2017	2 EC	BURU JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300038	2017	2 EC	BUSILA JS SCHOOL BUSY BEES JUNIOR PRIMARY SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24	
200300863	2017	2 EC	BUTTERWORTH HIGH SCHOOL	OPEN	INDEPENDENT	ORDINARY SCHOOL	INTERMEDIATE SCHOOL	PRIMARY SUBJECTS	INDEPENDENT	PRIVATE	.	NEW EDUCATION DEPARTMENT REPRESENTATIVES(HOR)	24	
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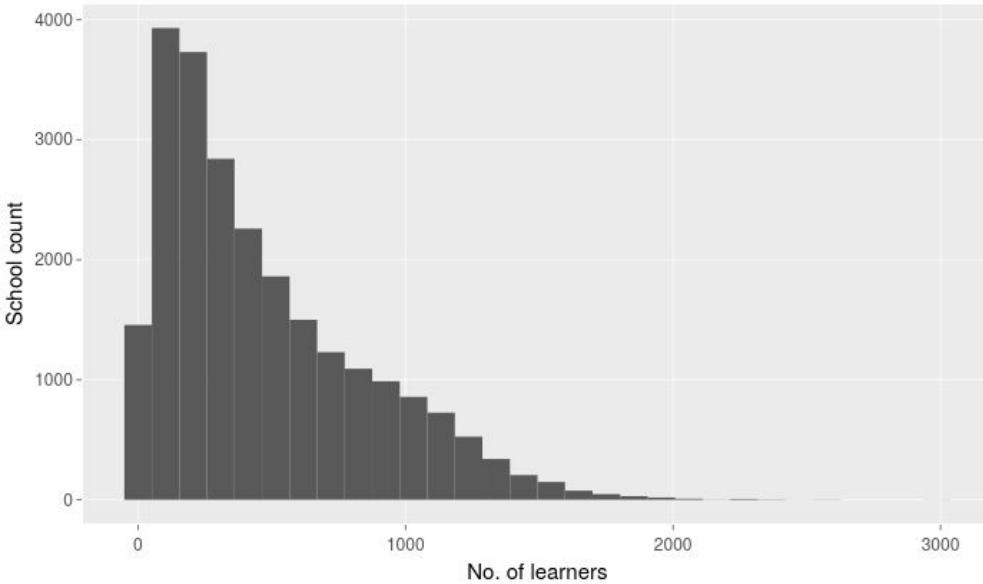
My aims

- Learner and educator number
- Quintile
- Sector
- Phase
- Rural or urban

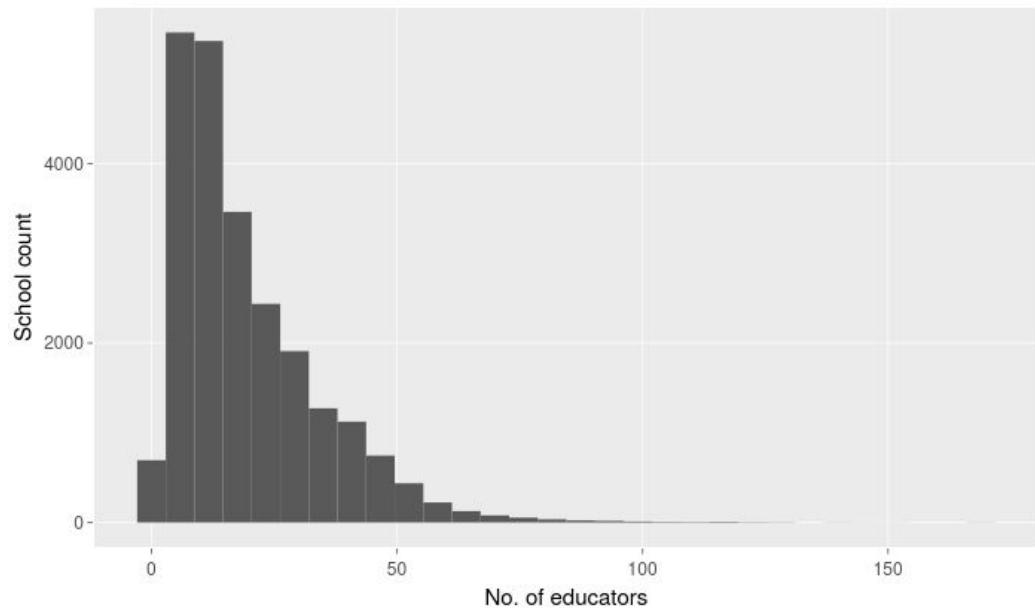
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Data exploration - size of schools

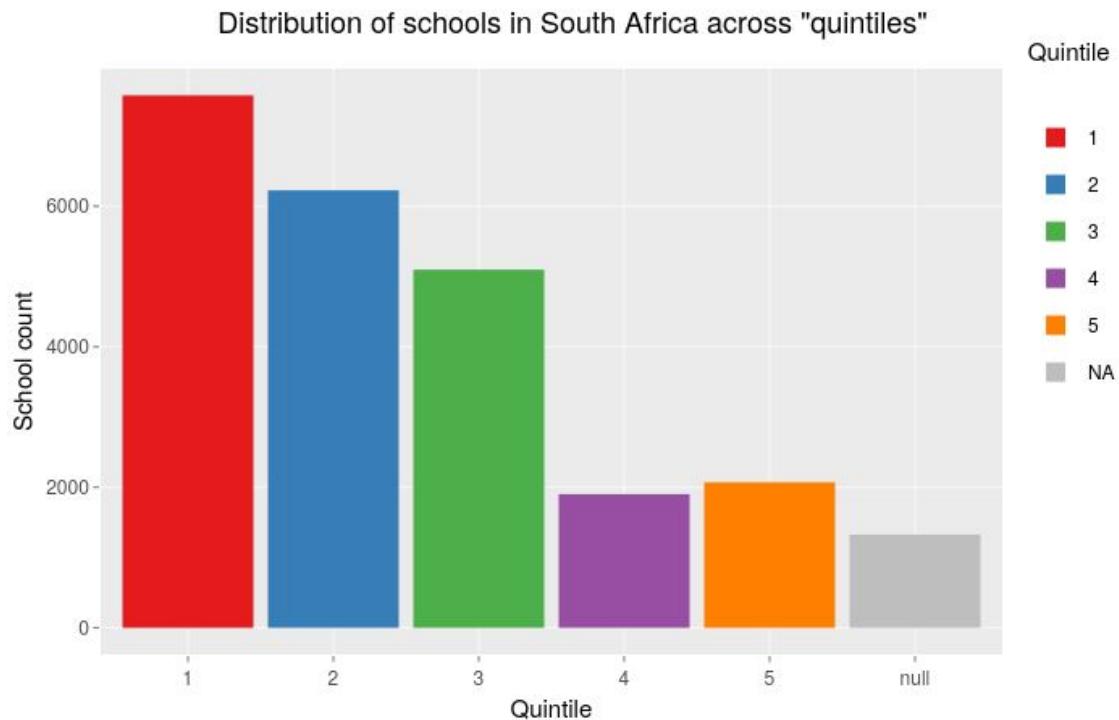
Histogram of no. of learners



Histogram of no. of educators

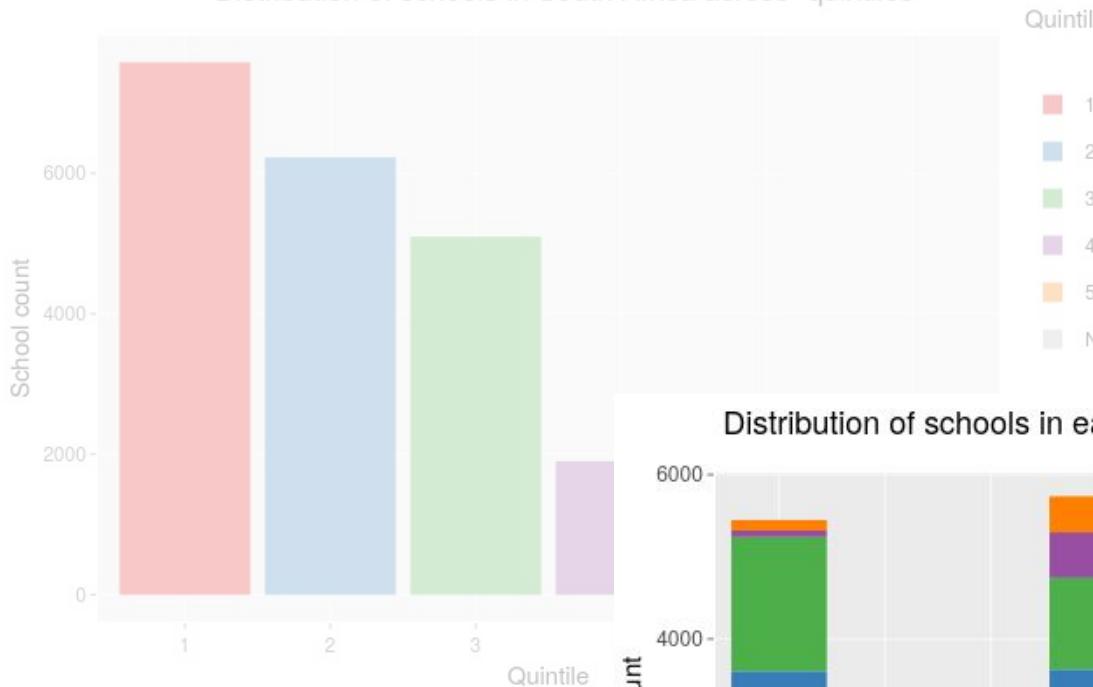


Data exploration - quintiles

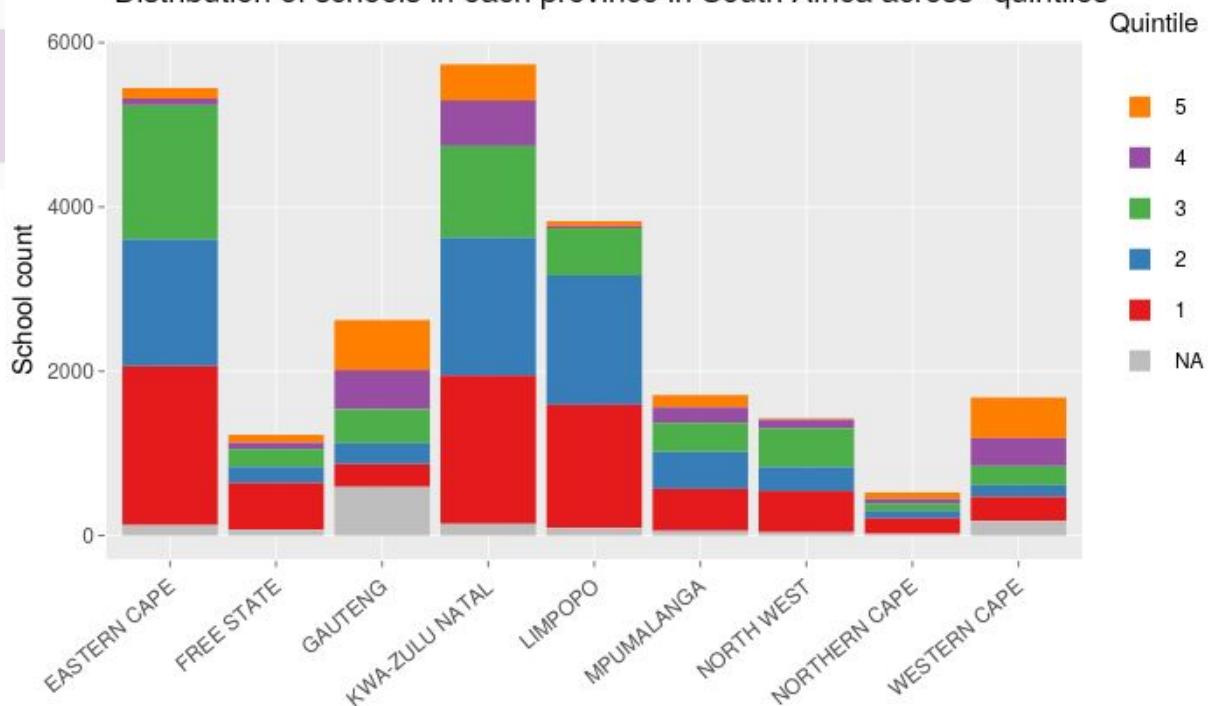


Data exploration - quintiles

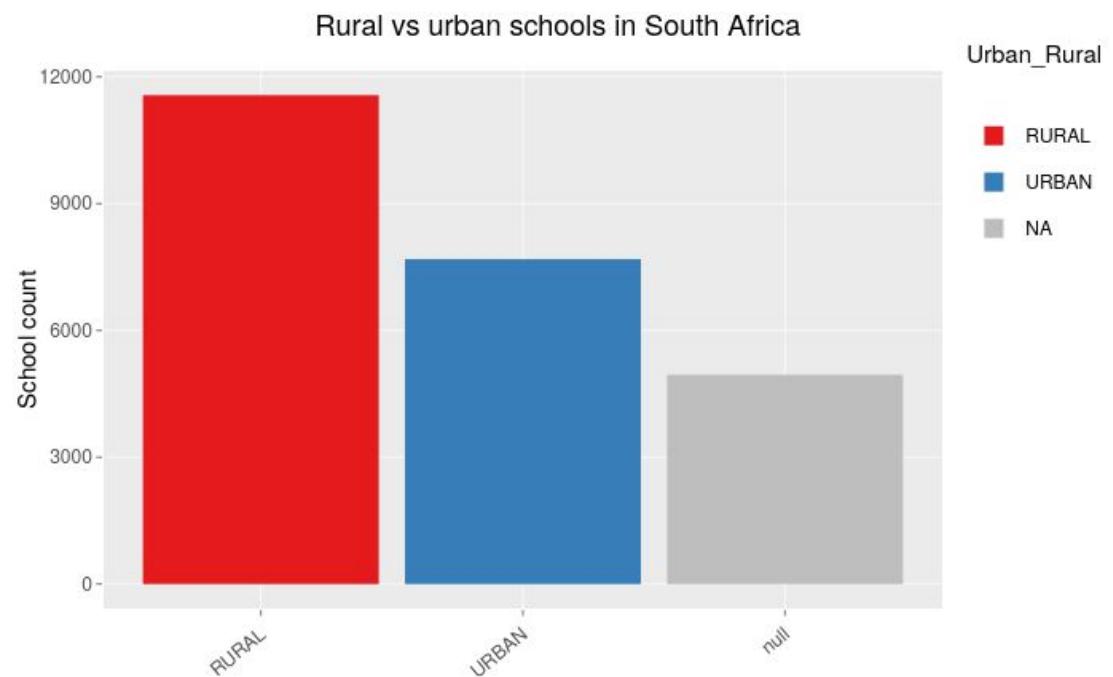
Distribution of schools in South Africa across "quintiles"



Distribution of schools in each province in South Africa across "quintiles"

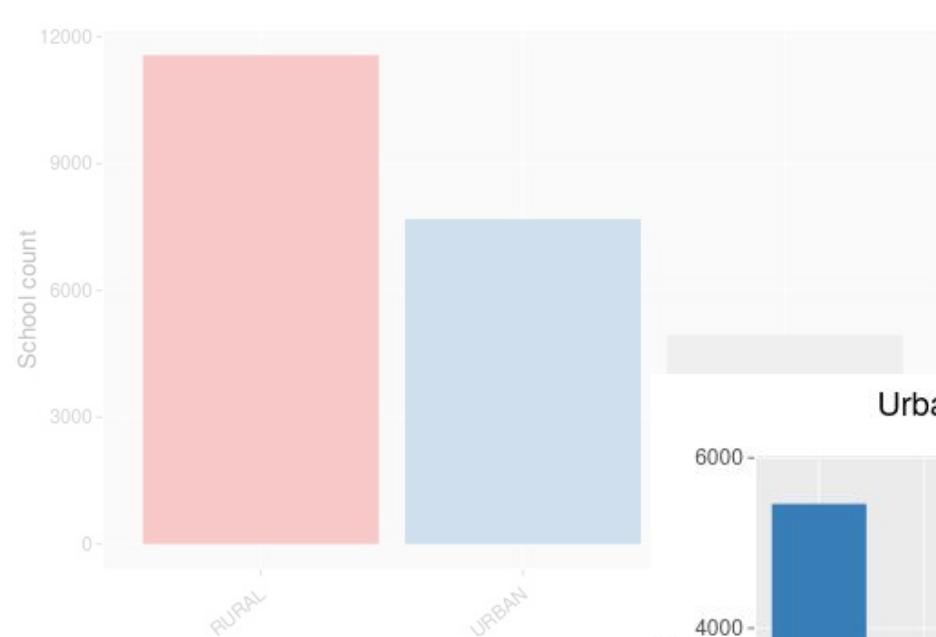


Data exploration - rural or urban



Data exploration - rural or urban

Rural vs urban schools in South Africa



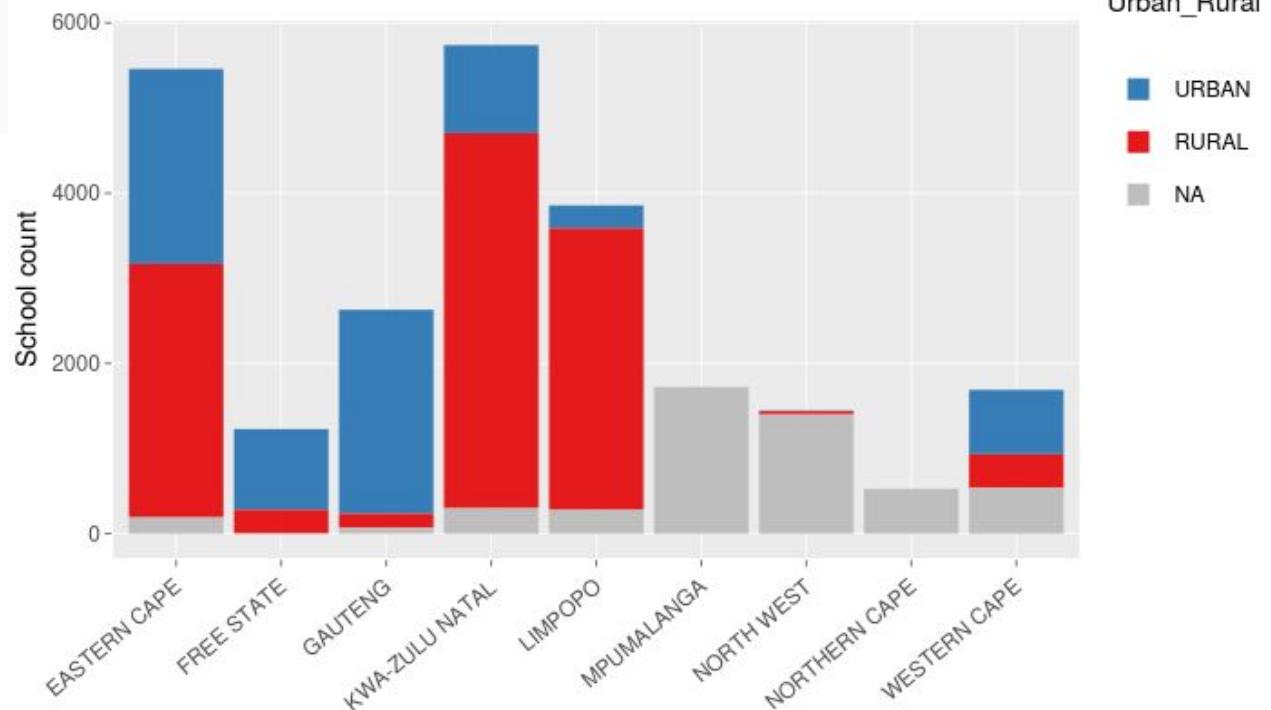
Urban_Rural

RURAL

URBAN

NA

Urban vs Rural schools in each province in South Africa"



Urban_Rural

URBAN

RURAL

NA

Putting schools on the map



Putting schools on the map

Geospatial data

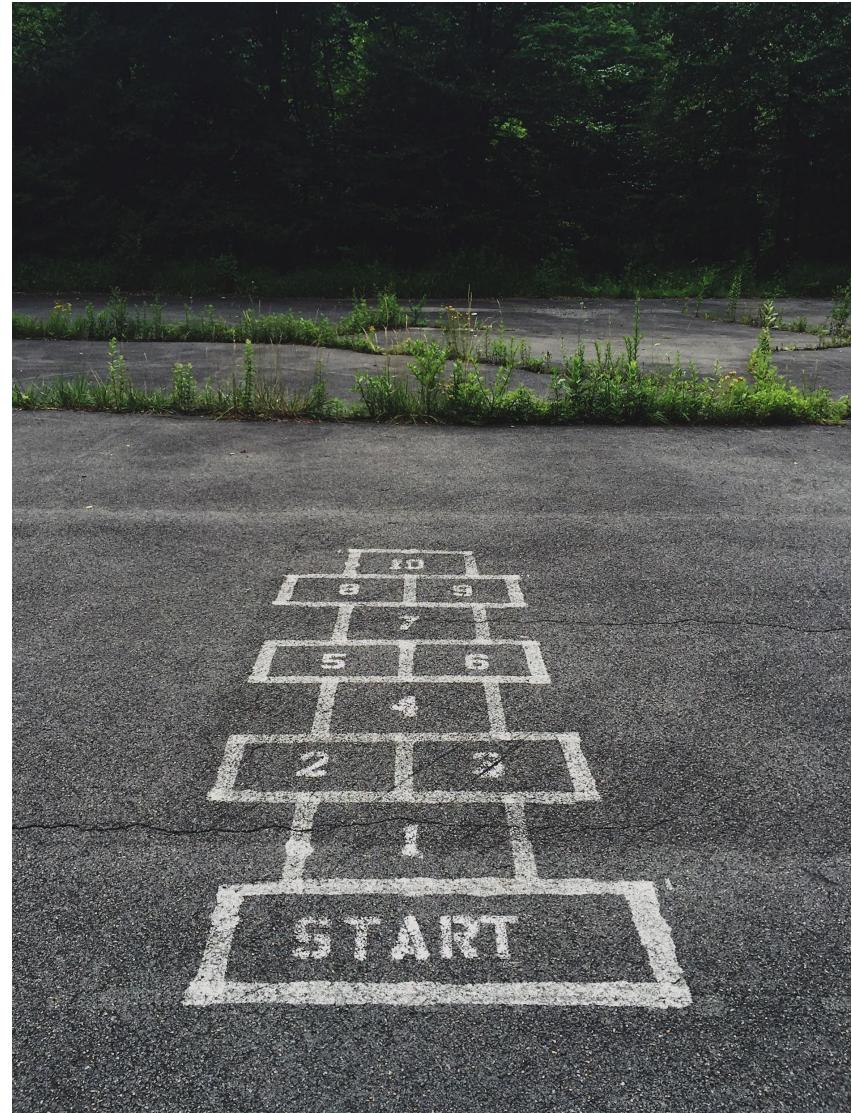
Geocoding

1. Google

```
library(ggmap)  
  
geocode( )
```

2. Open Street Maps

```
library(tmap)  
  
geocode_OSM( )
```



Putting schools on the map



“Behind Zamimpilo Market next to Khonzela Store”

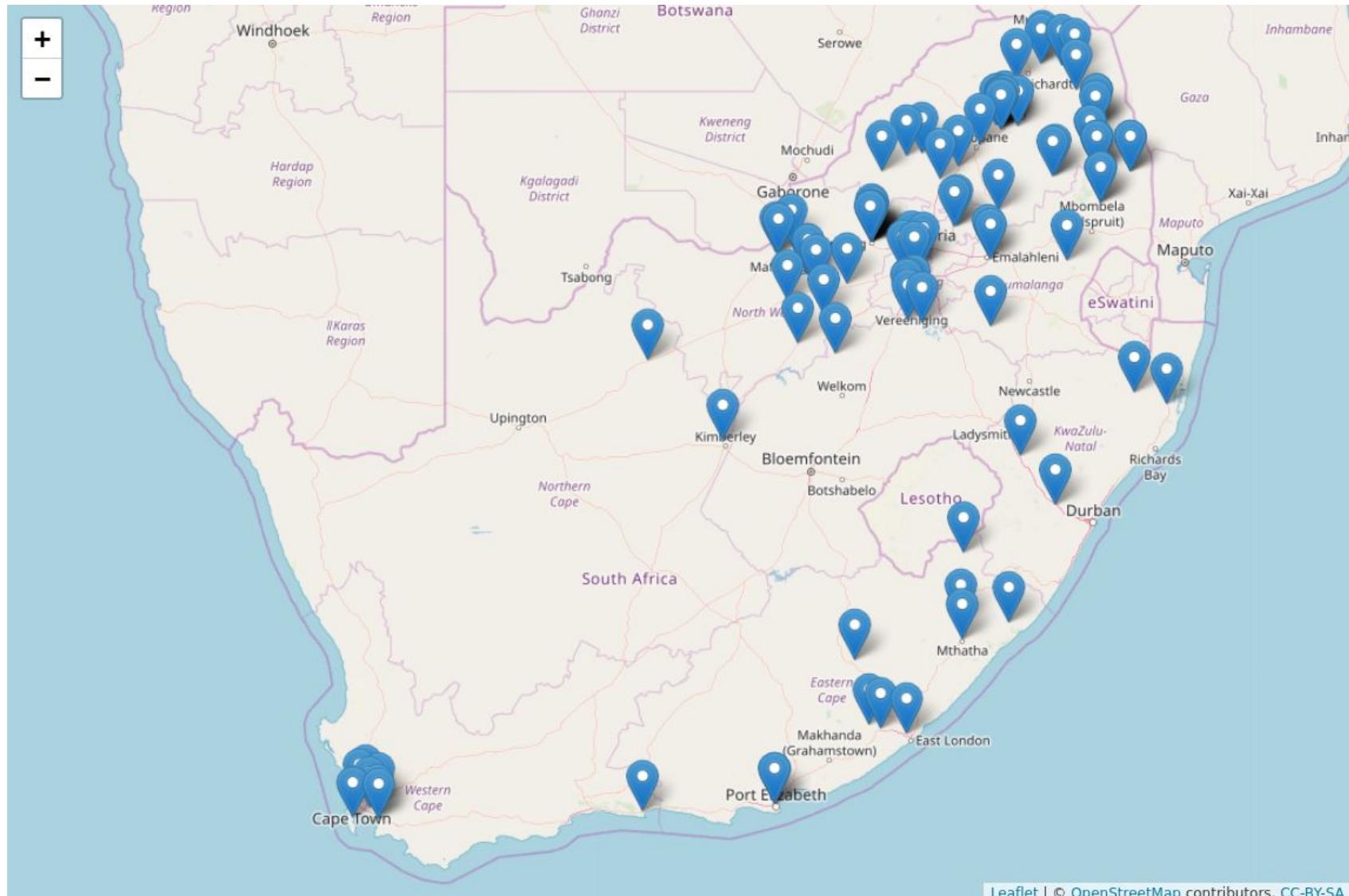
“NEXT TO XIMHUNGWE POST OFFICE”



Putting schools on the map



Putting schools on the map



Creating an interactive map



“Leaflet is the leading open-source JavaScript library for mobile-friendly interactive maps.”

The R package makes it easy to integrate and control Leaflet maps in R.

Creating an interactive map



“Leaflet is the leading open-source JavaScript library for mobile-friendly interactive maps.”



The R package makes it easy to integrate and control Leaflet maps in R.

Really easy and convenient to integrate with Shiny.

```
# UI  
plotOutput() ---> leafletOutput()  
  
# SERVER  
renderPlot() ---> renderLeaflet()
```

Creating an interactive map



To modify a map that's already running in the page, you use the `leafletProxy()` function in place of the `leaflet()` call, inside an `observe()` function.

```
server <- function(input, output) {

  # Create the base map that won't change
  output$map <- renderLeaflet({
    leaflet() %>%
      addTiles()
  })

  # Define the aspects that can change within an observer
  observe({
    size_by <- input$size
    radius <- sa_schools[[size_by]]

    leafletProxy("map", data = sa_schools) %>%
      clearShapes() %>%
      addCircles(~longitude, ~latitude, radius=radius)
  })
}
```

Creating an interactive map



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  })
```

Design decisions:

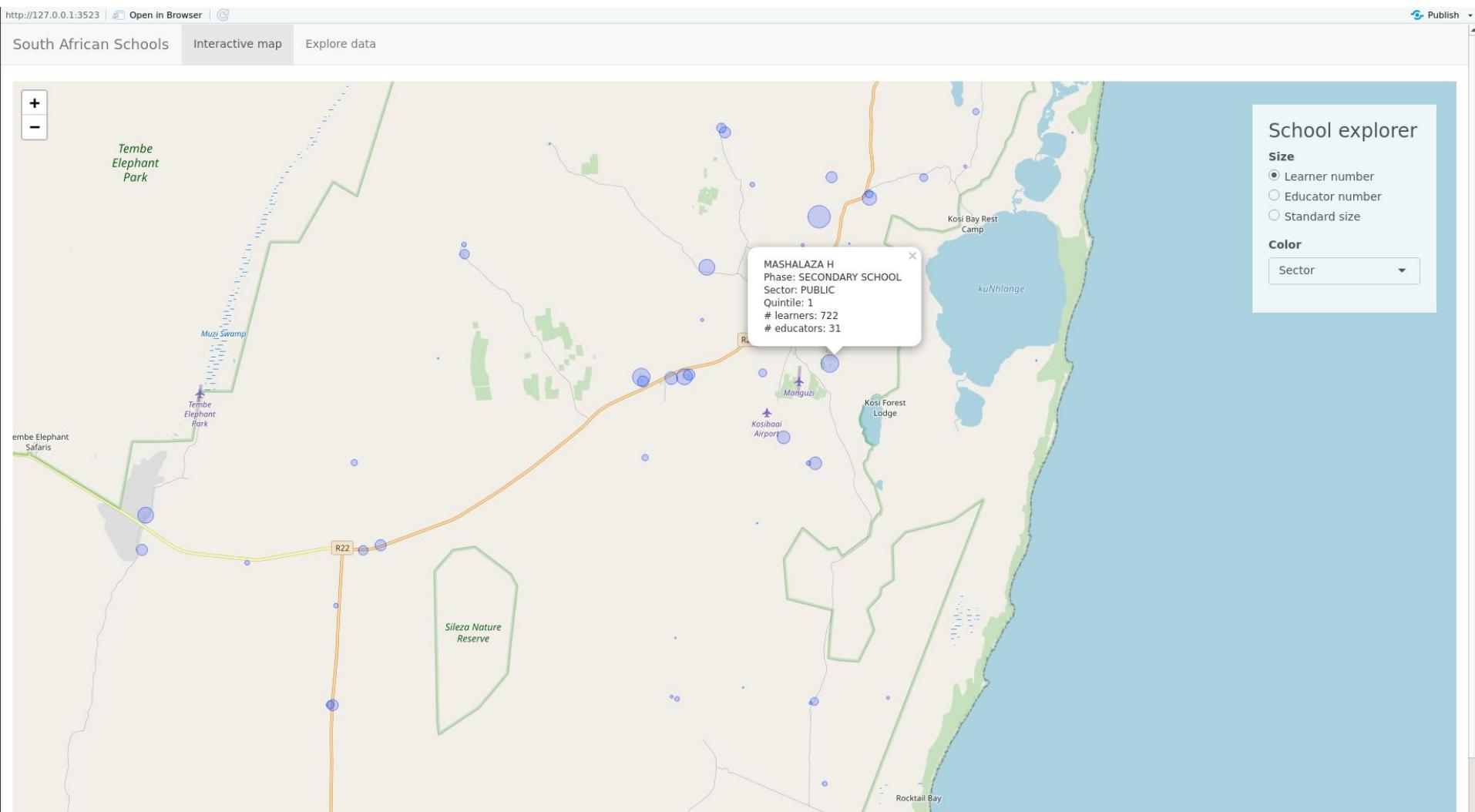
Size by:

- Learner number
- Educator number

Colour by:

- Quintile
- Phase
- Sector
- Rural or urban

Starting simple



Starting simple

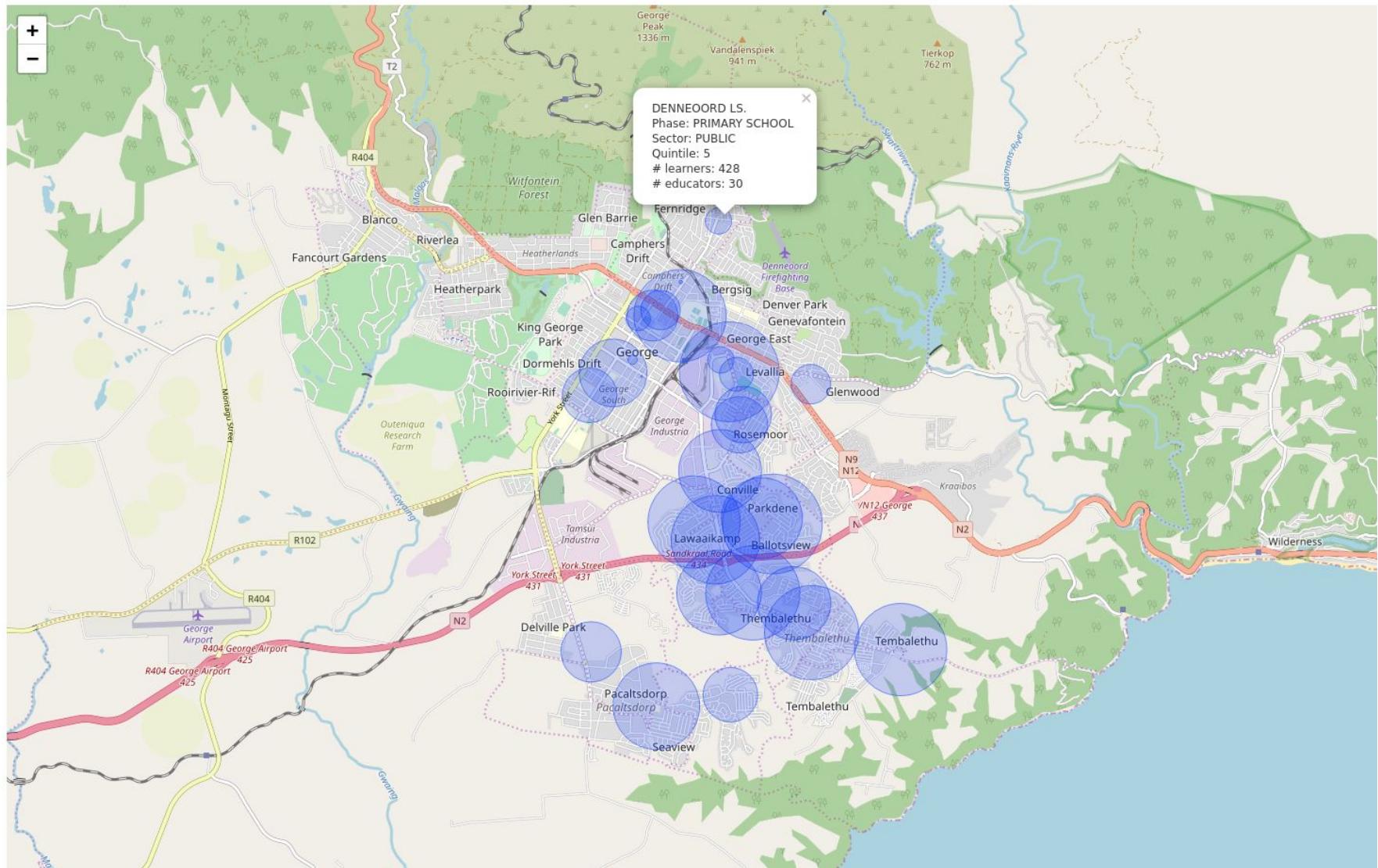


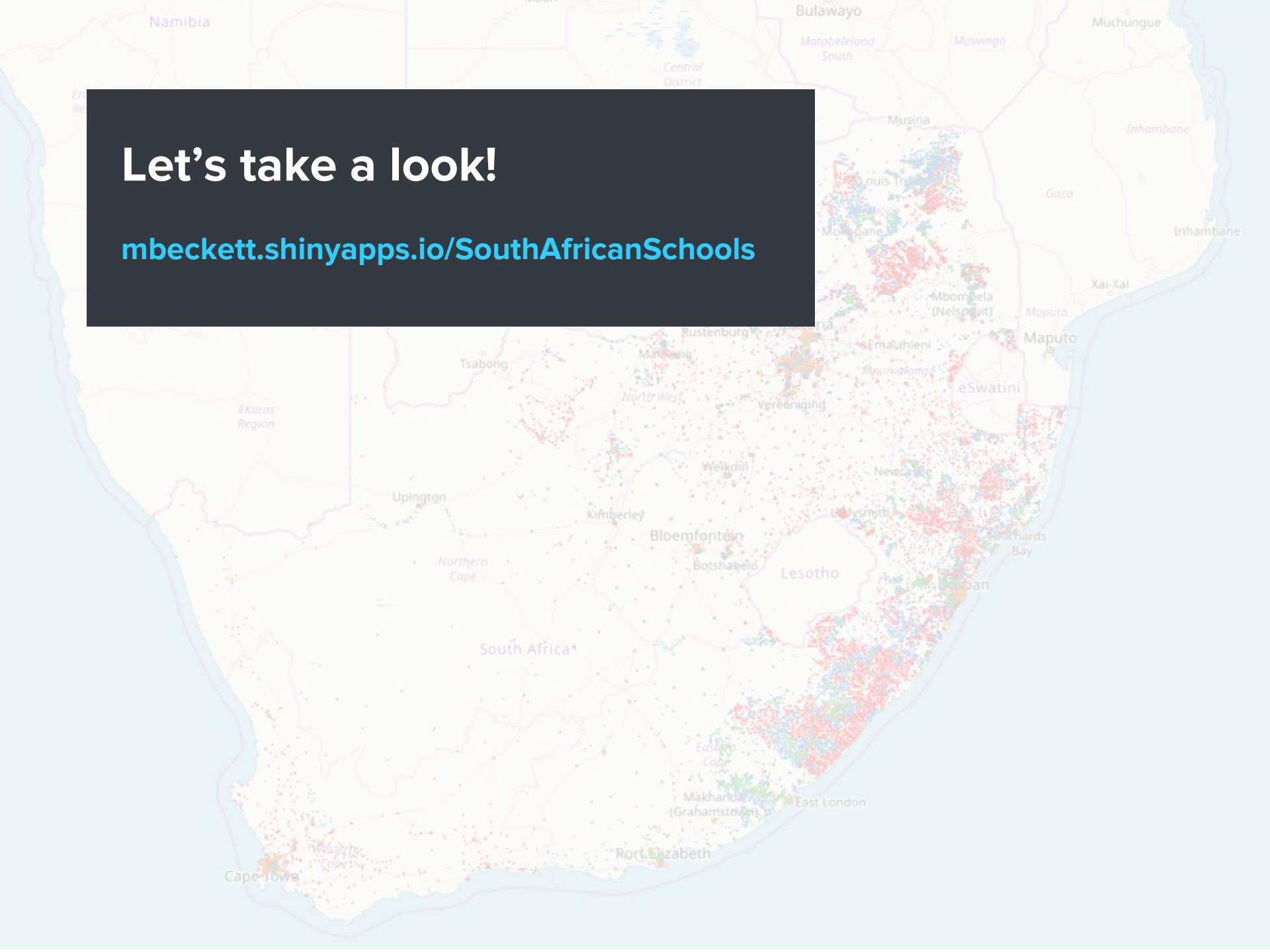
http://127.0.0.1:3523 | [Open in Browser](#) | [GitHub](#)

South African Schools

Interactive map

Explore data



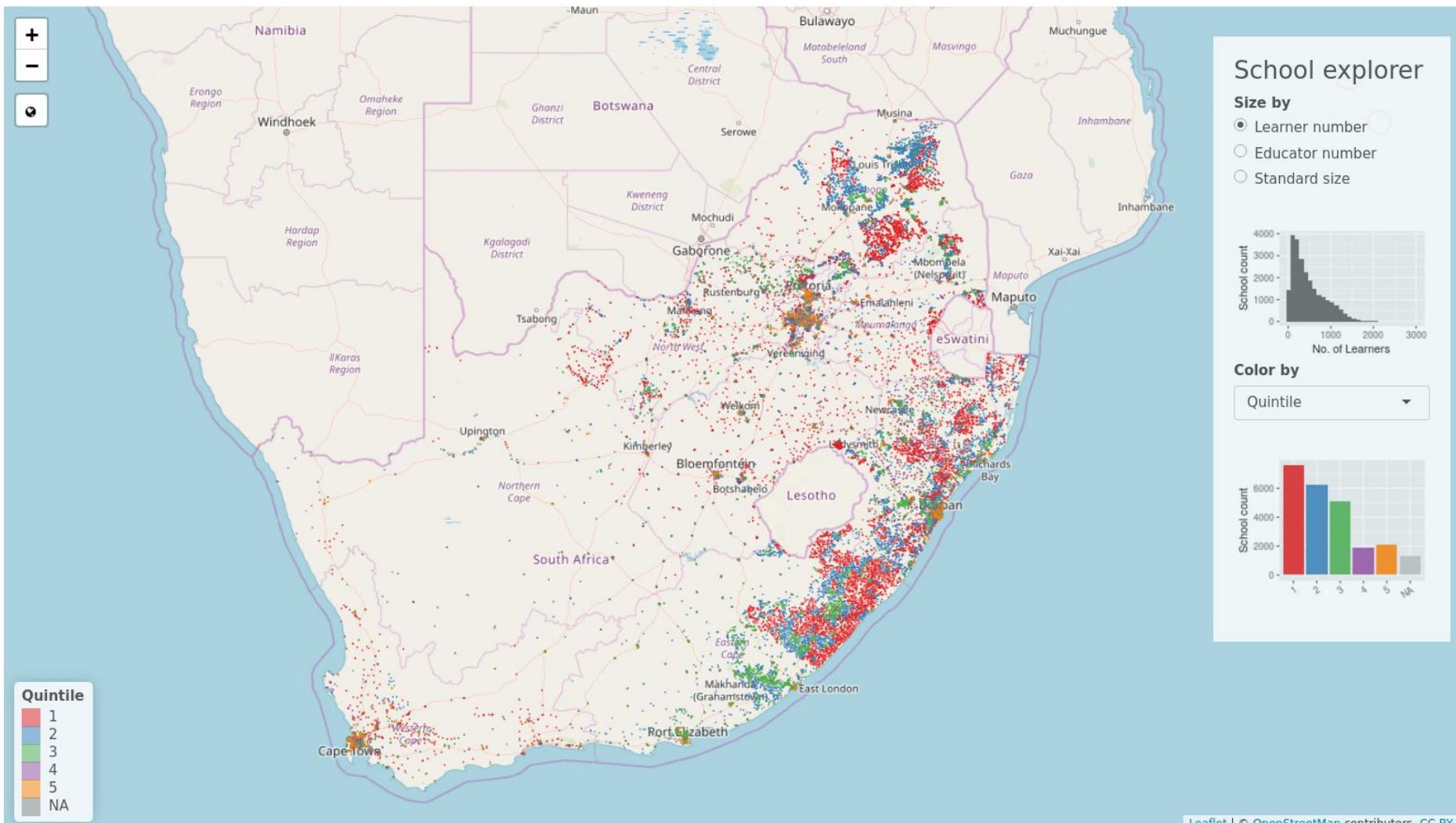


Let's take a look!

mbeckett.shinyapps.io/SouthAfricanSchools

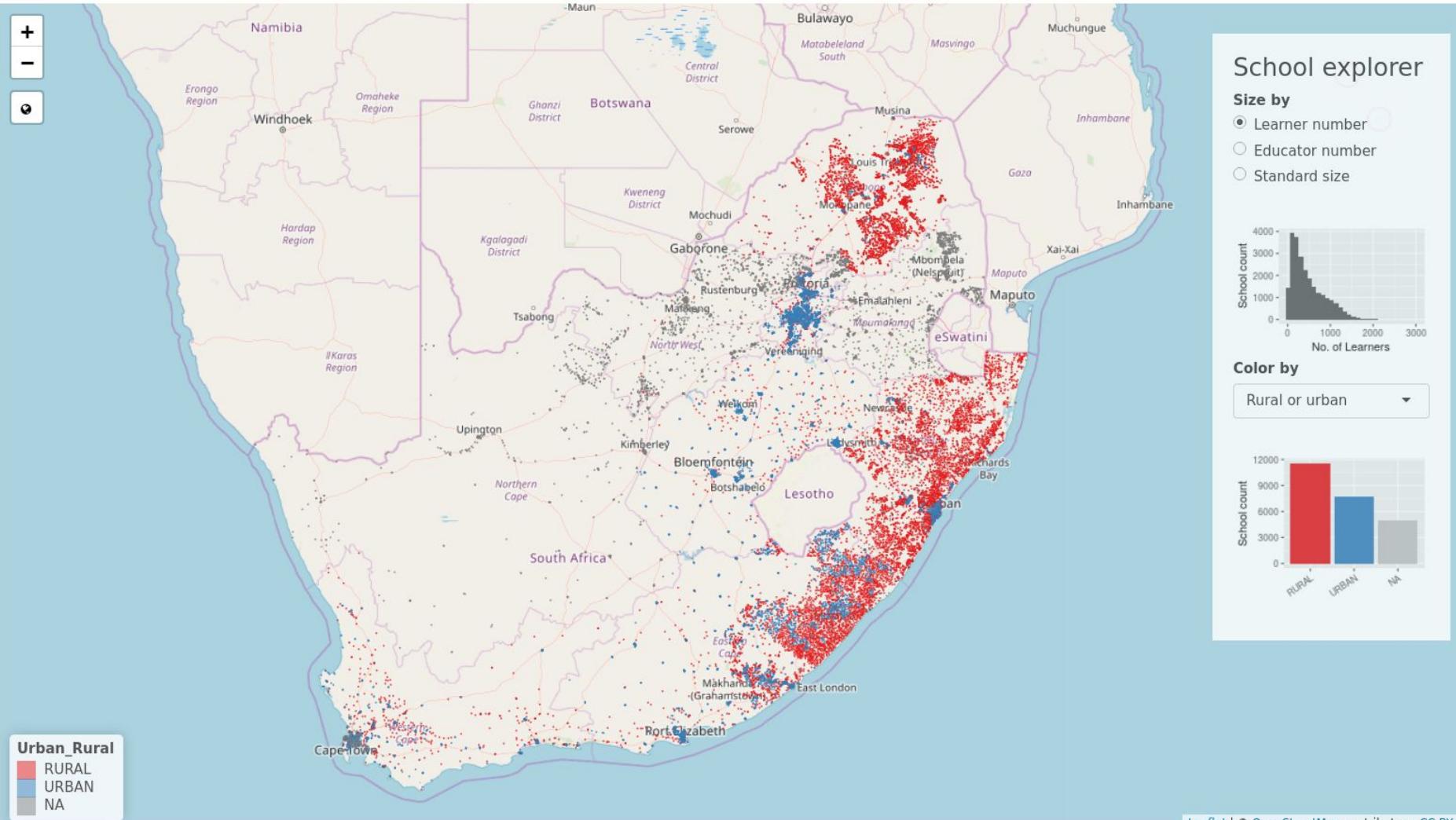
Visualising quintiles

South African Schools Interactive map School directory About



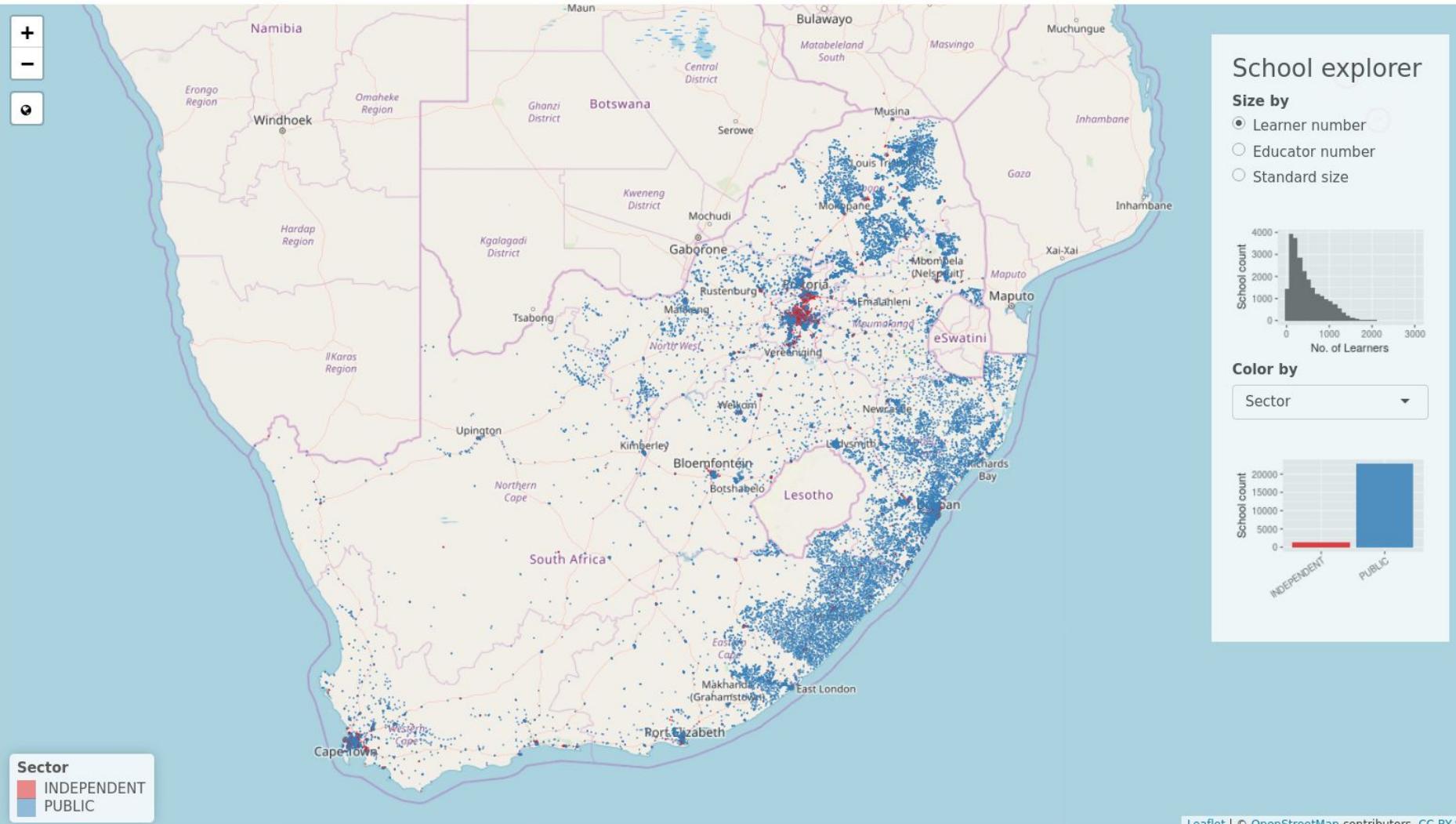
Rural vs urban

South African Schools Interactive map School directory About



School sector

South African Schools Interactive map School directory About



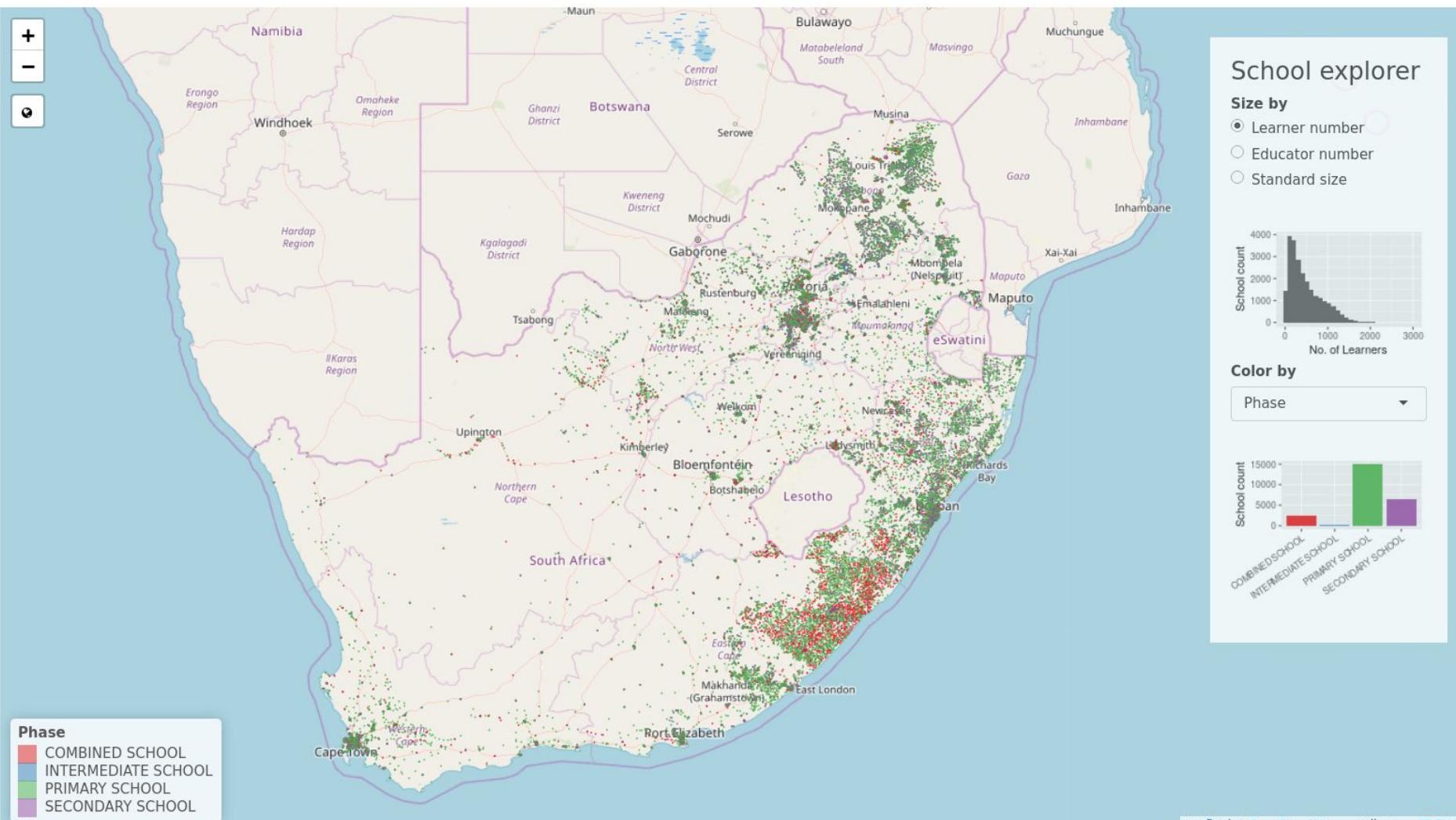
School phase

South African Schools

Interactive map

School directory

About

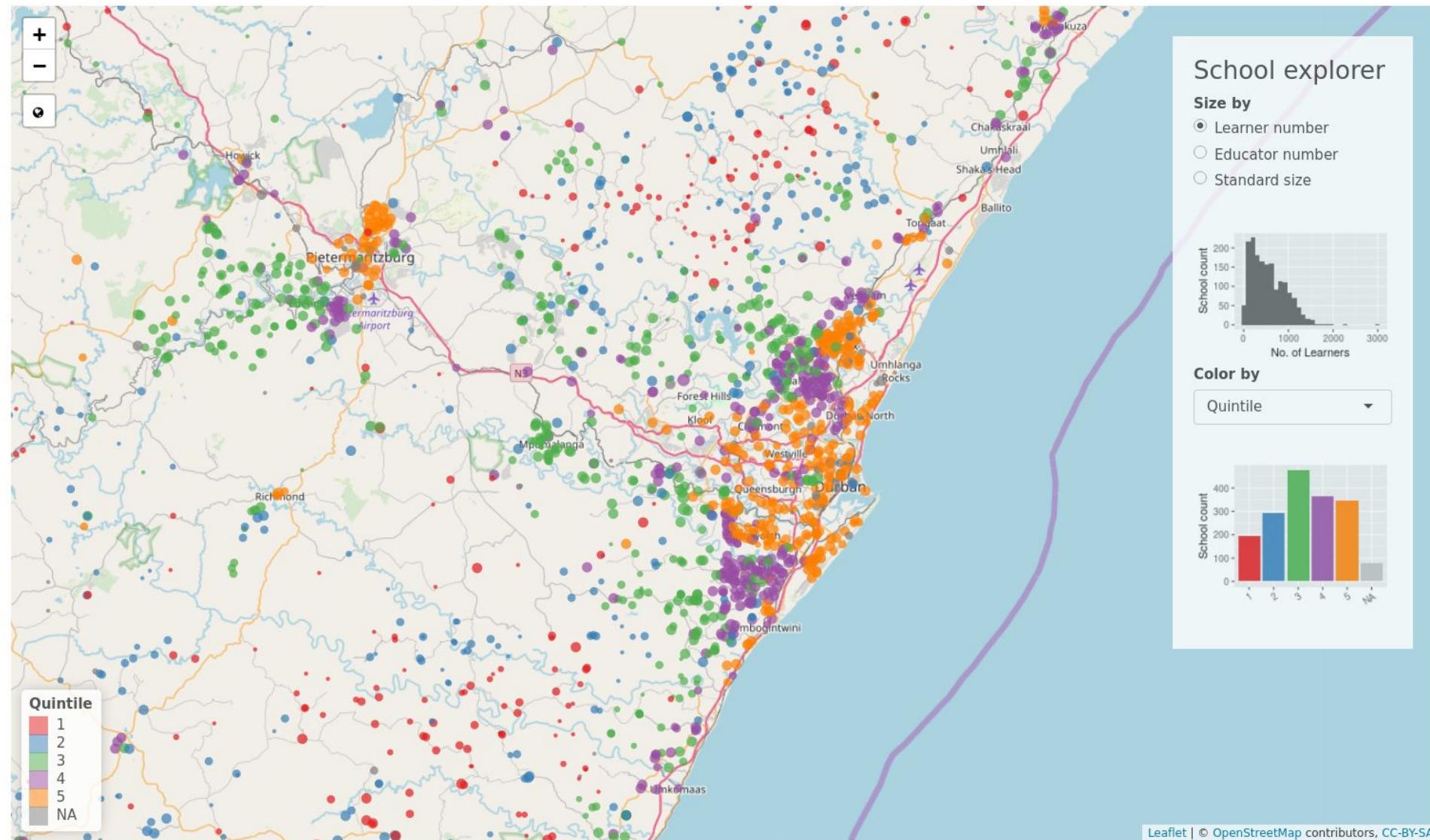


Phase

- COMBINED SCHOOL
- INTERMEDIATE SCHOOL
- PRIMARY SCHOOL
- SECONDARY SCHOOL

Exploring - reactive plots

South African Schools Interactive map School directory About



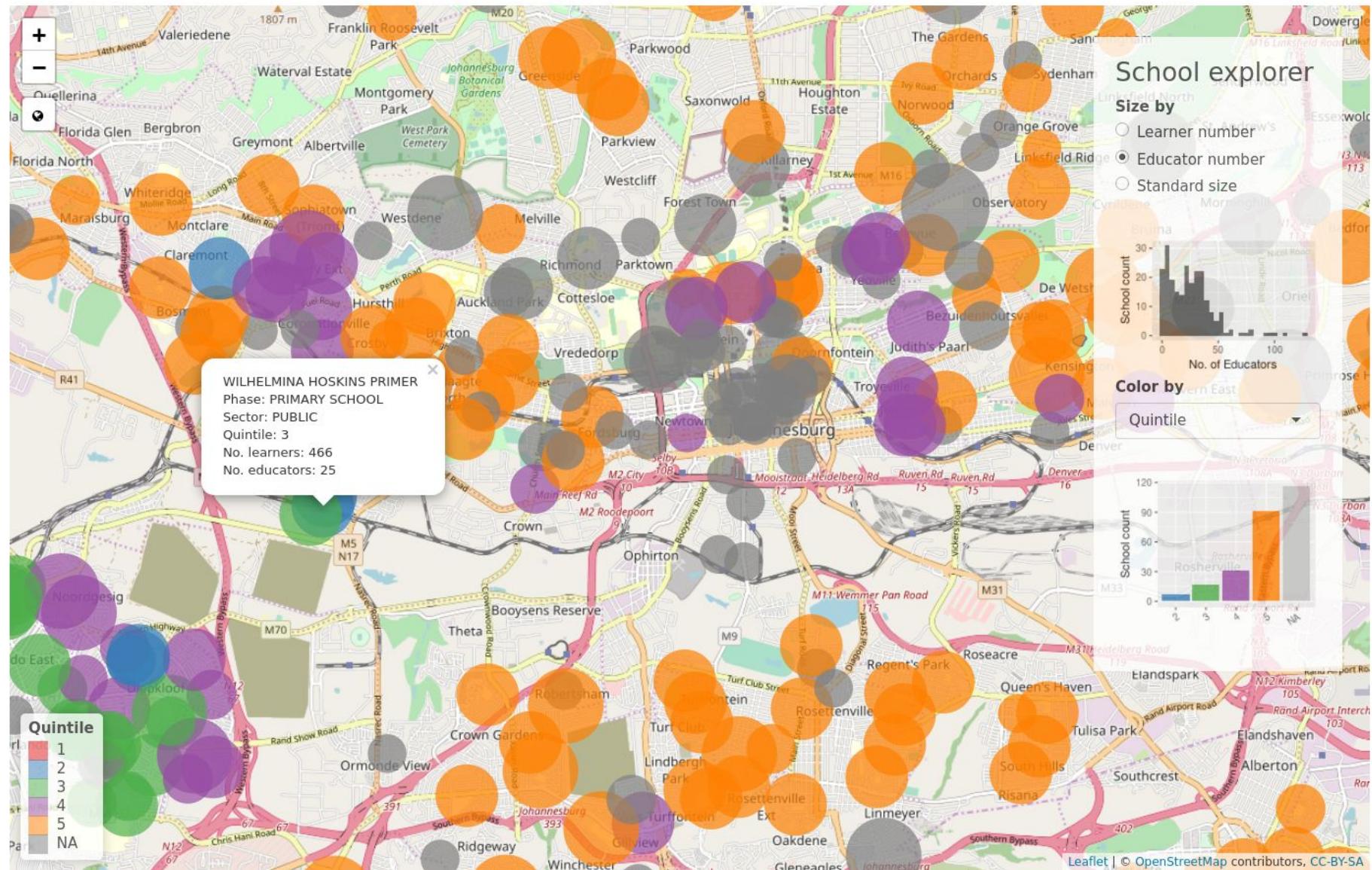
Exploring - “zones” of missing data

South African Schools

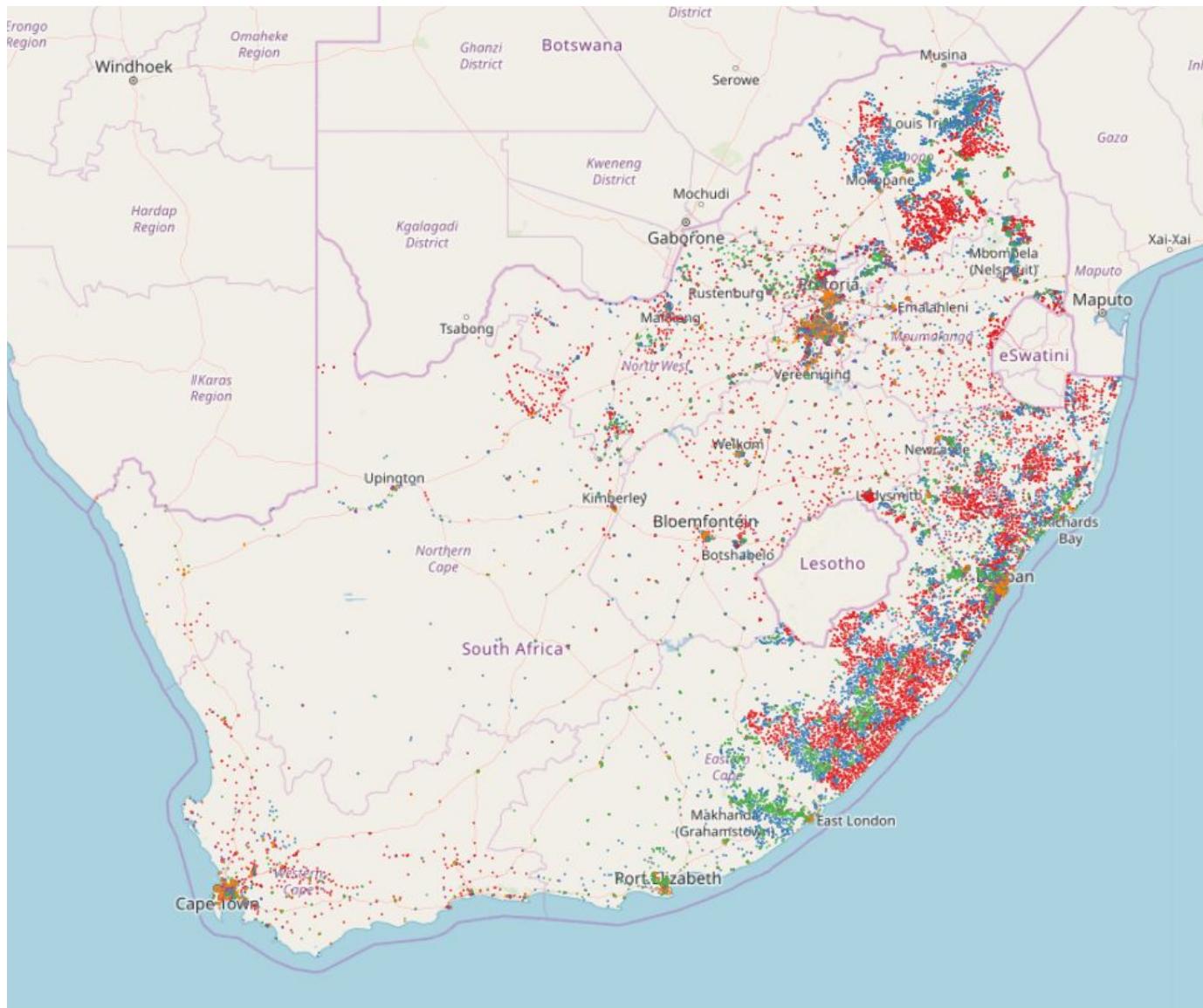
Interactive map

School directory

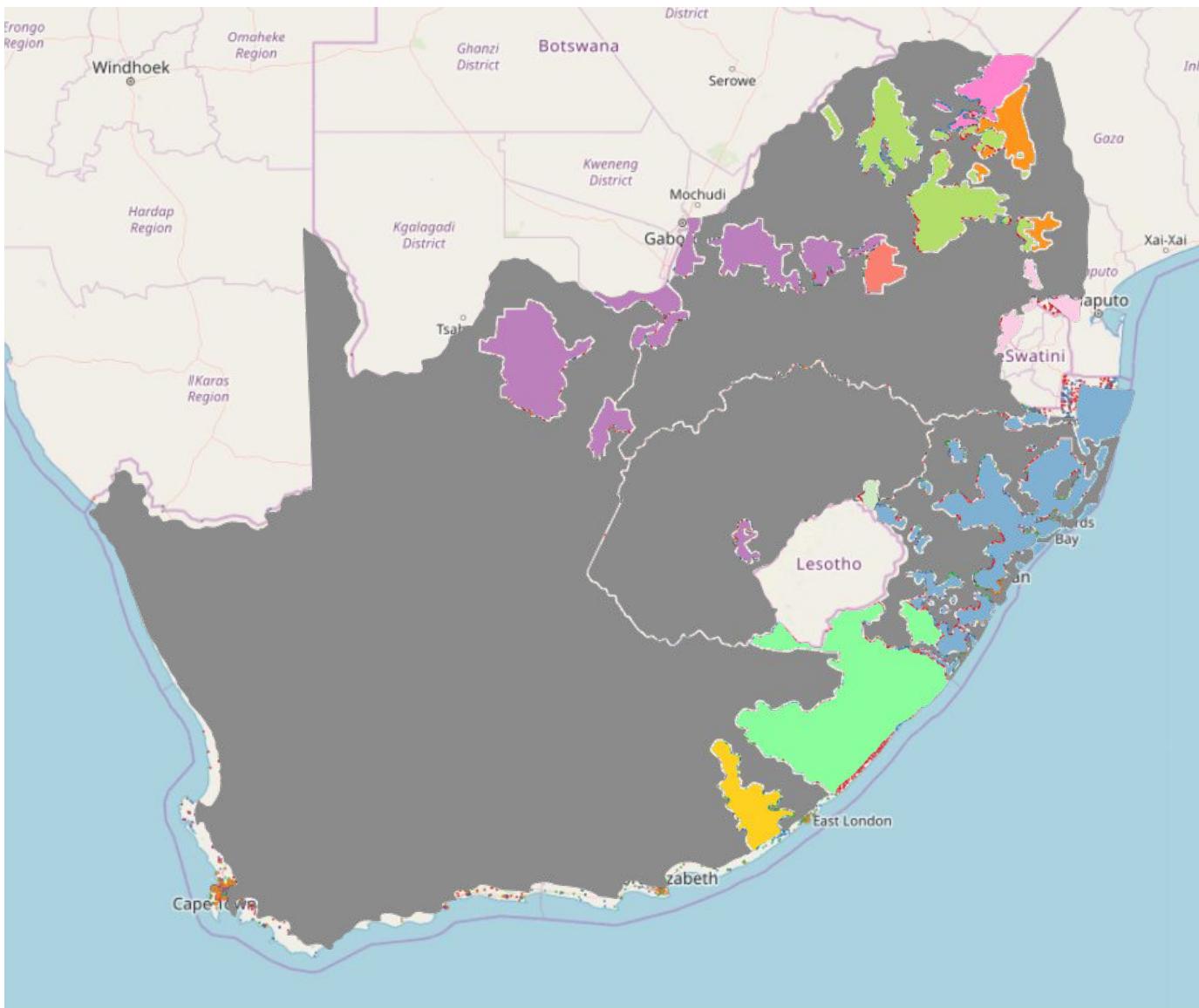
About



Exploring - echoes from Apartheid



Exploring - echoes from Apartheid



Thank you! Questions?

mbeckett.shinyapps.io/SouthAfricanSchools

Please do take a look!

@mbeckett_za

