

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



basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

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Quarter 4 of 2016: March 2017

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North West	488.30 KB	Download
Northern Cape	180.68 KB	Download
Western Cape	558.63 KB	Download

My aims

NatEmis	DataYear	ProvinceCD	Province	Institution Name	Status	Sector	Type DoE	Phase	Specialization	OwnerLand	OwnerBuild	Ownership	ExDept	Pt
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
200300013	2017	2	EC	BAWANA SP SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	PRIMARY SUBJECTS	PUBLIC	.	STATE	TRANSKEI	24
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	TRANSKEI	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	.	TRANSKEI	24
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
200300023	2017	2	EC	BLYTHSWOOD JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24
200300033	2017	2	EC	BONGOLETHU HIGH SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	PUBLIC	STATE	STATE	TRANSKEI	24
200300036	2017	2	EC	BOTTOMAN JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24
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	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24
200300863	2017	2	EC	BUSY BEES JUNIOR PRIMARY SCHOOL	OPEN	INDEPENDENT	ORDINARY SCHOOL	INTERMEDIATE SCHOOL	PRIMARY SUBJECTS	INDEPENDENT	PRIVATE	.	TRANSKEI	24
200300741	2017	2	EC	BUTTERWORTH HIGH SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	SECONDARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24

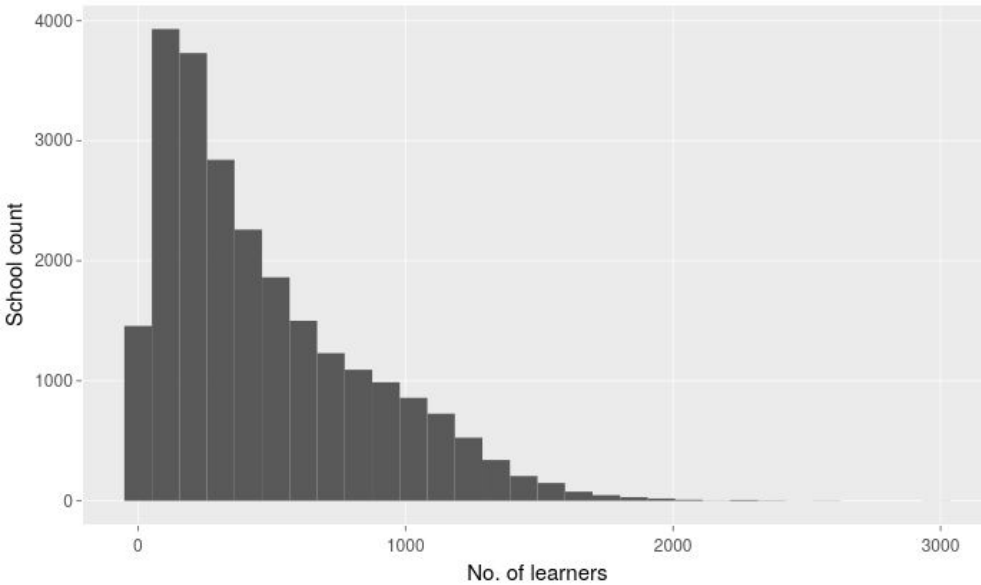
My aims

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200300717	2017	2	EC	AMAMBALU JS SCHOOL	OPEN	PUBLIC	ORDINARY SCHOOL	PRIMARY SCHOOL	ORDINARY SCHOOL	PUBLIC	.	STATE	TRANSKEI	24
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200300012	2017	2	EC	BAWA JS SCH	STATE	STATE	TRANSKEI	24
200300013	2017	2	EC	BAWANA SP S	STATE	TRANSKEI	24
200300016	2017	2	EC	BEKINKOSI JS	STATE	TRANSKEI	24
200300018	2017	2	EC	BELENI JS SC	STATE	TRANSKEI	24
200300019	2017	2	EC	BENAI SILING	STATE	TRANSKEI	24
200300869	2017	2	EC	BETHEL COLL	ENT	PRIVATE	.	.	.
200300763	2017	2	EC	BETHEL JS SC	STATE	TRANSKEI	24
200300022	2017	2	EC	BIYANA JS SC	STATE	TRANSKEI	24
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200300024	2017	2	EC	BLYTHSWOOD	STATE	STATE	TRANSKEI	24
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200300033	2017	2	EC	BONGOLETH	STATE	STATE	TRANSKEI	24
200300036	2017	2	EC	BOTTOMAN J	STATE	TRANSKEI	24
200300742	2017	2	EC	BULUBE'S JS	STATE	STATE	TRANSKEI	24
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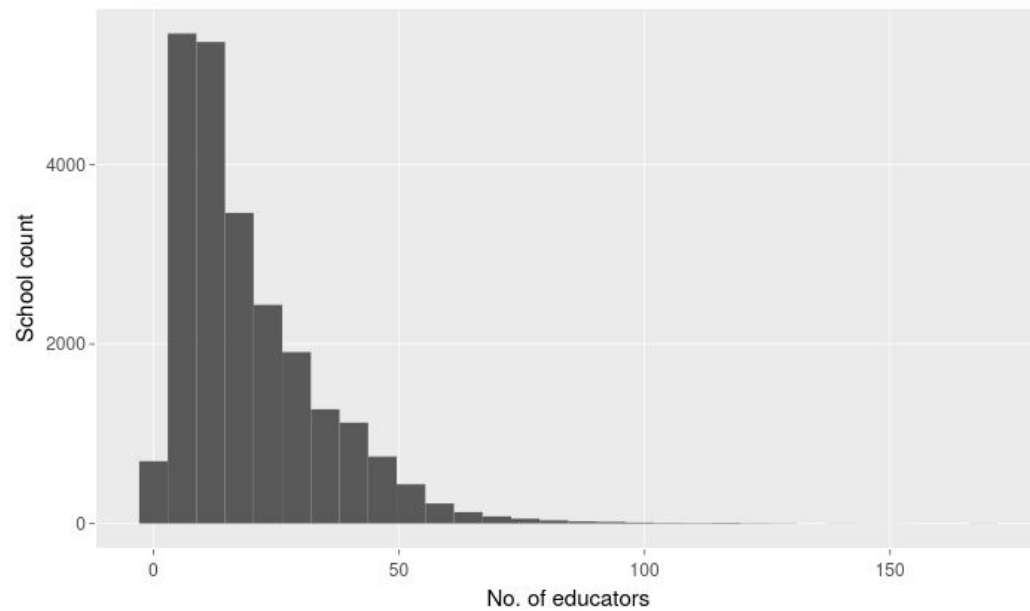
- Learner and educator number
- Quintile
- Sector
- Phase
- Rural or urban

Data exploration - size of schools

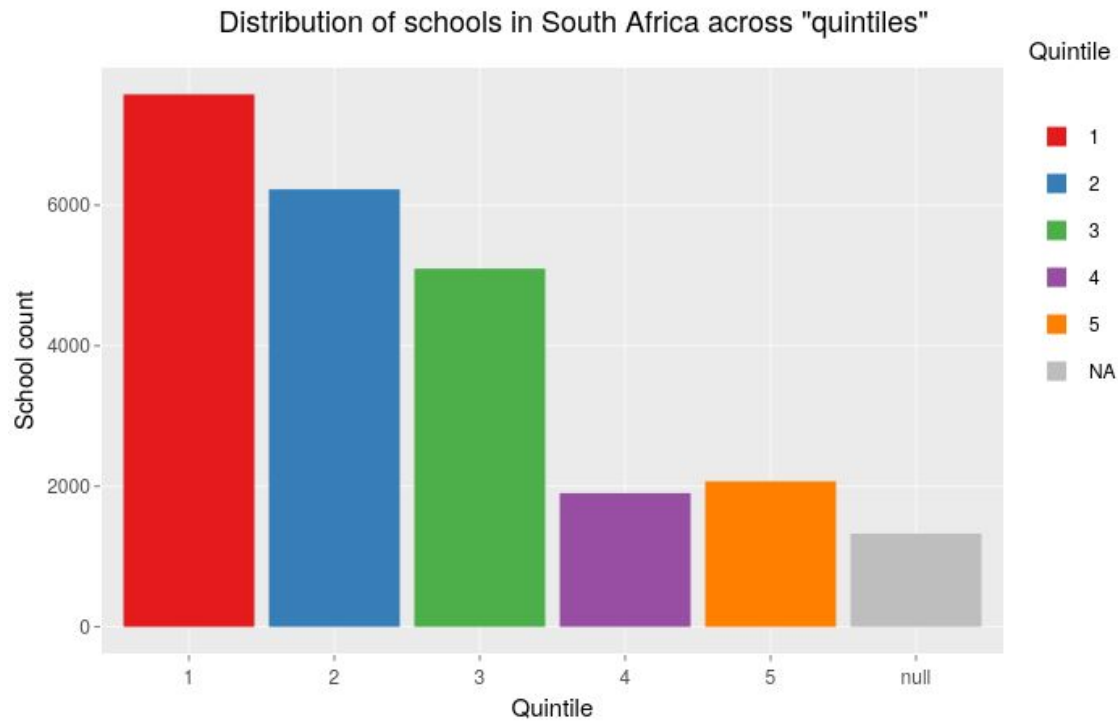
Histogram of no. of learners



Histogram of no. of educators

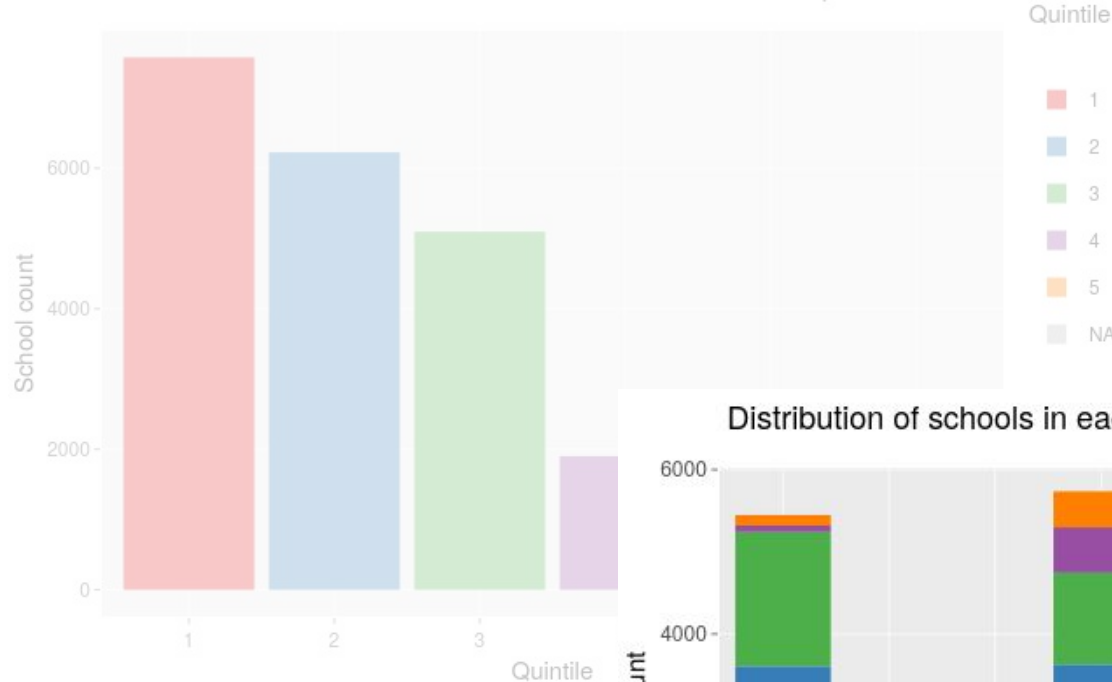


Data exploration - quintiles

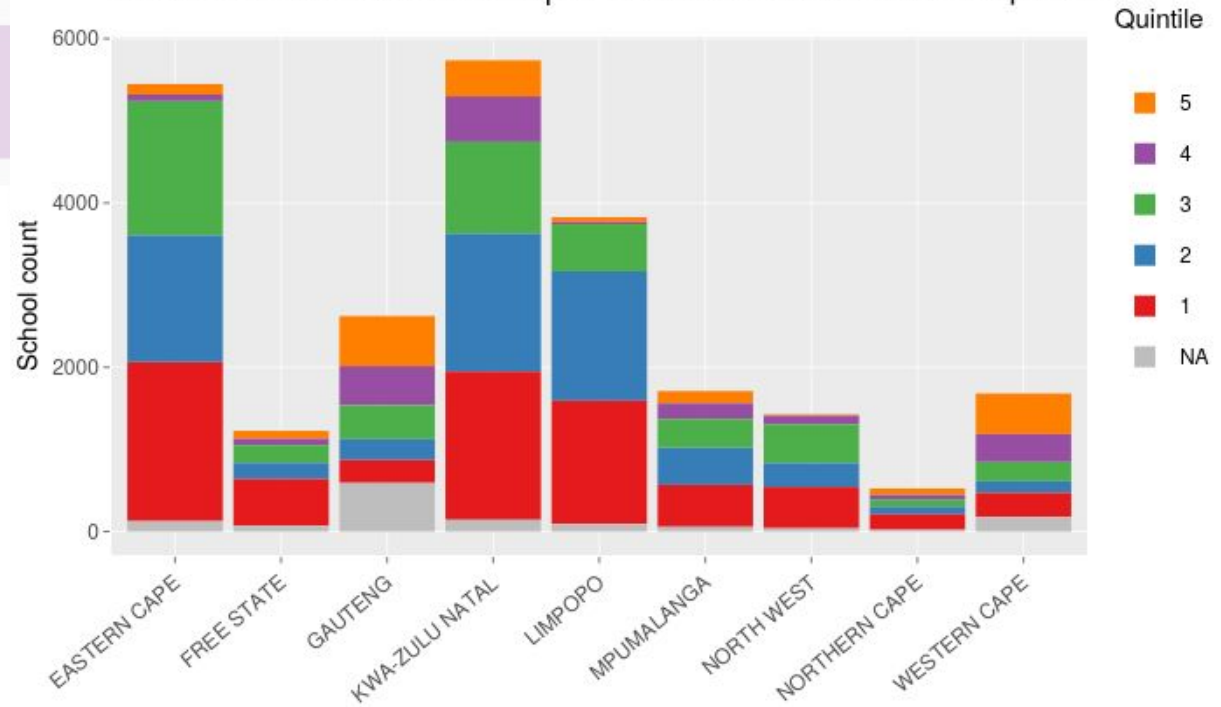


Data exploration - quintiles

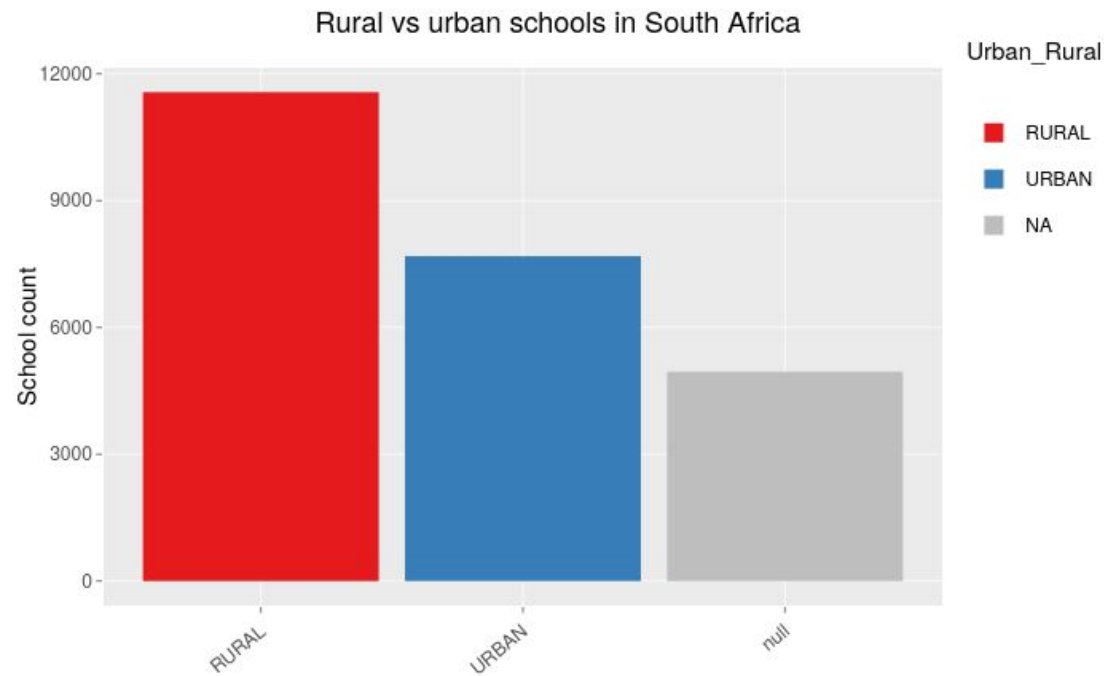
Distribution of schools in South Africa across "quintiles"



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

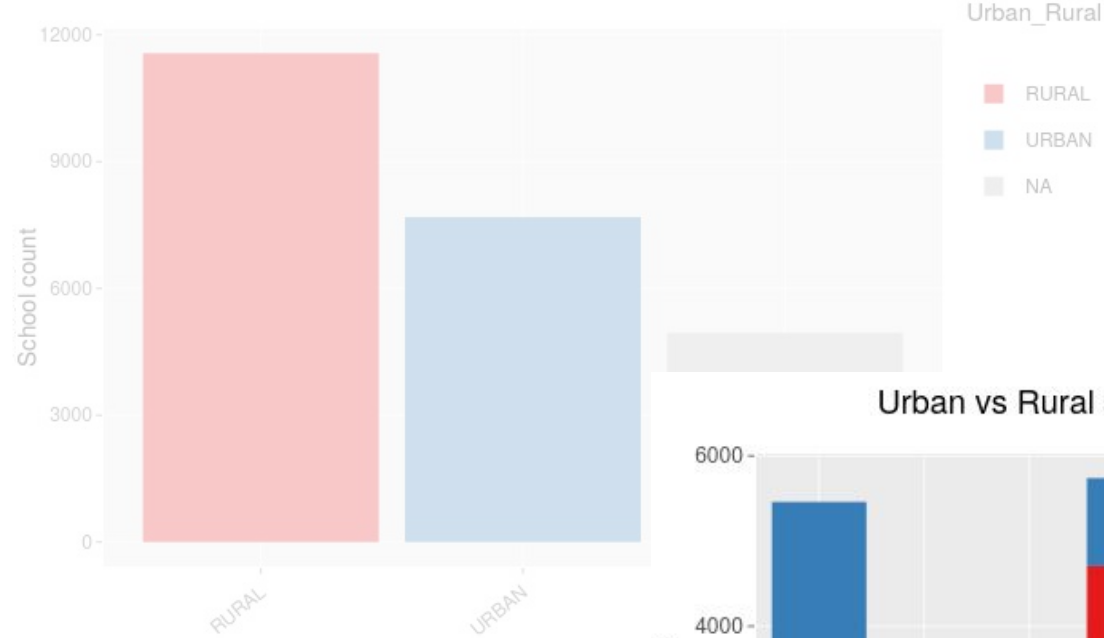


Data exploration - rural or urban

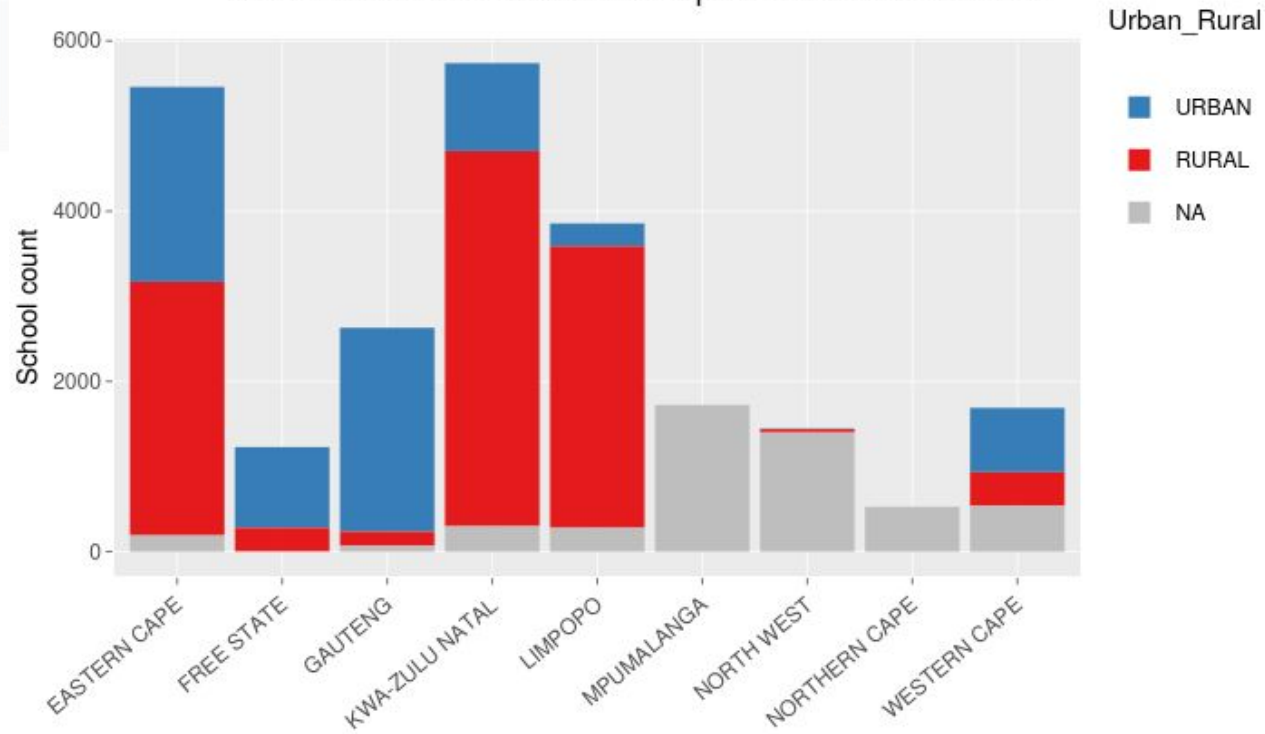


Data exploration - rural or urban

Rural vs urban schools in South Africa



Urban vs Rural schools in each province in South Africa"



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”

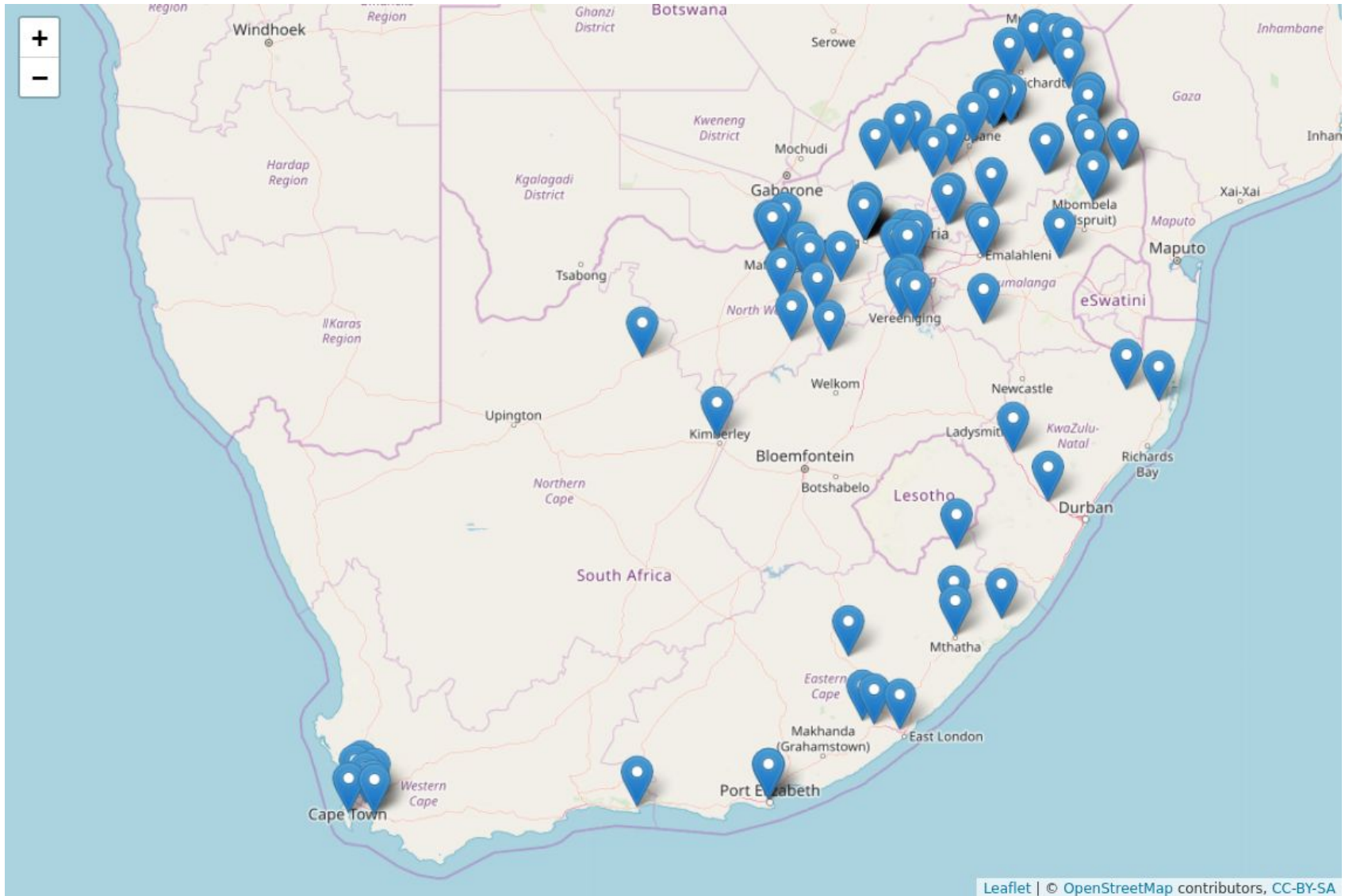
“NEXT TO XIMHUNGWE POST OFFICE”



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:

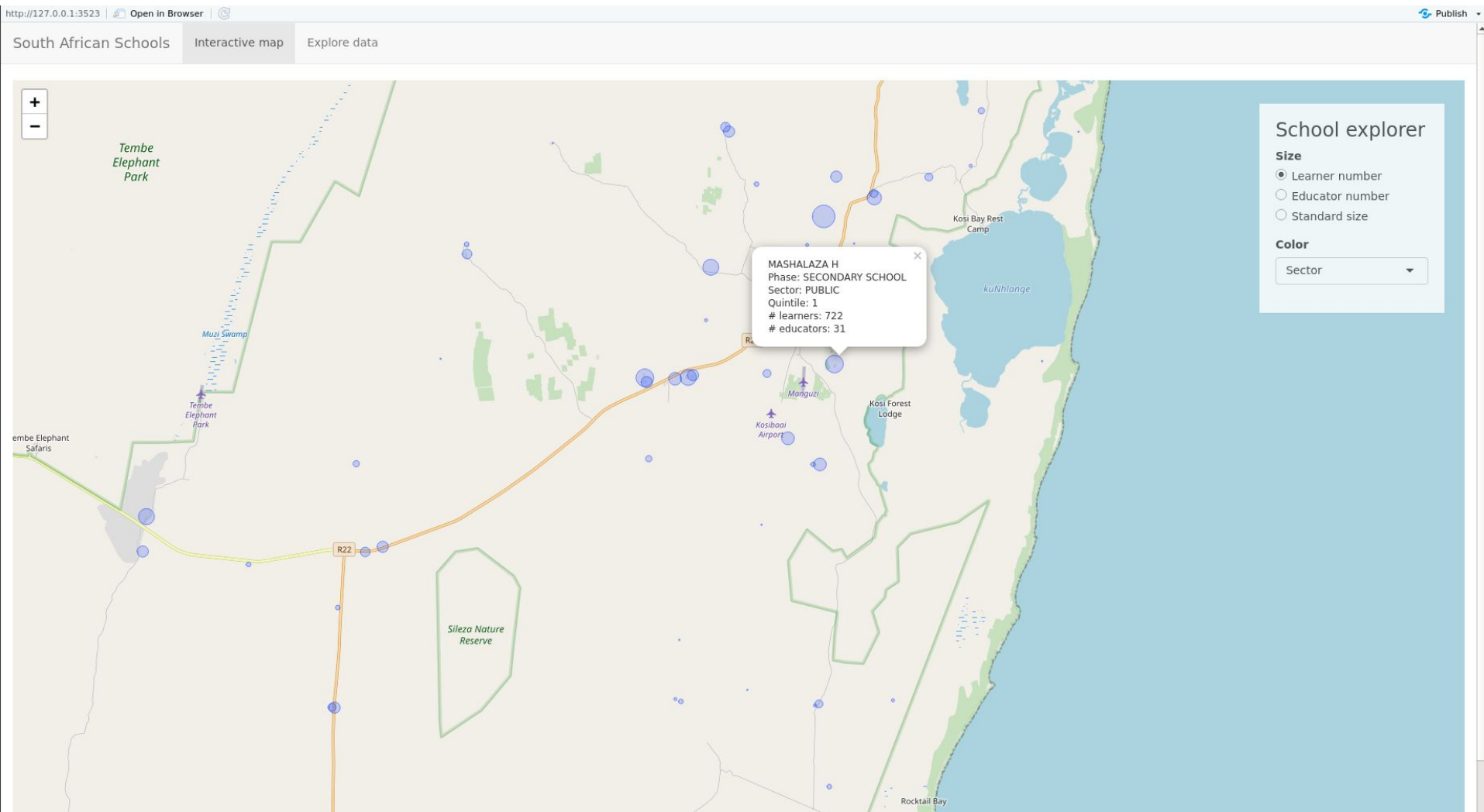
Size by:

- Learner number
- Educator number

Colour by:

- Quintile
- Phase
- Sector
- Rural or urban

Starting simple



Starting simple

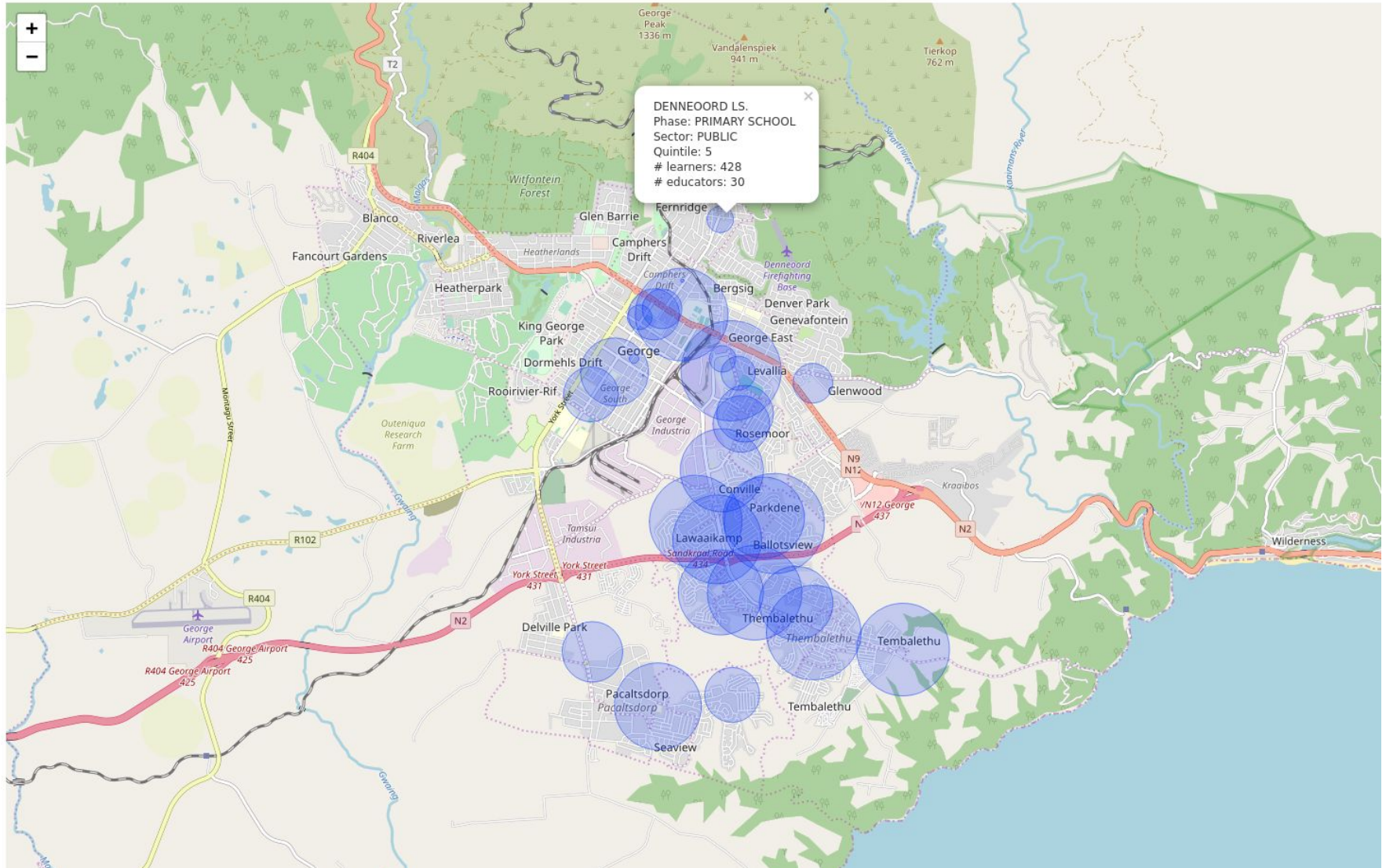


<http://127.0.0.1:3523> [Open in Browser](#) [G](#)

South African Schools

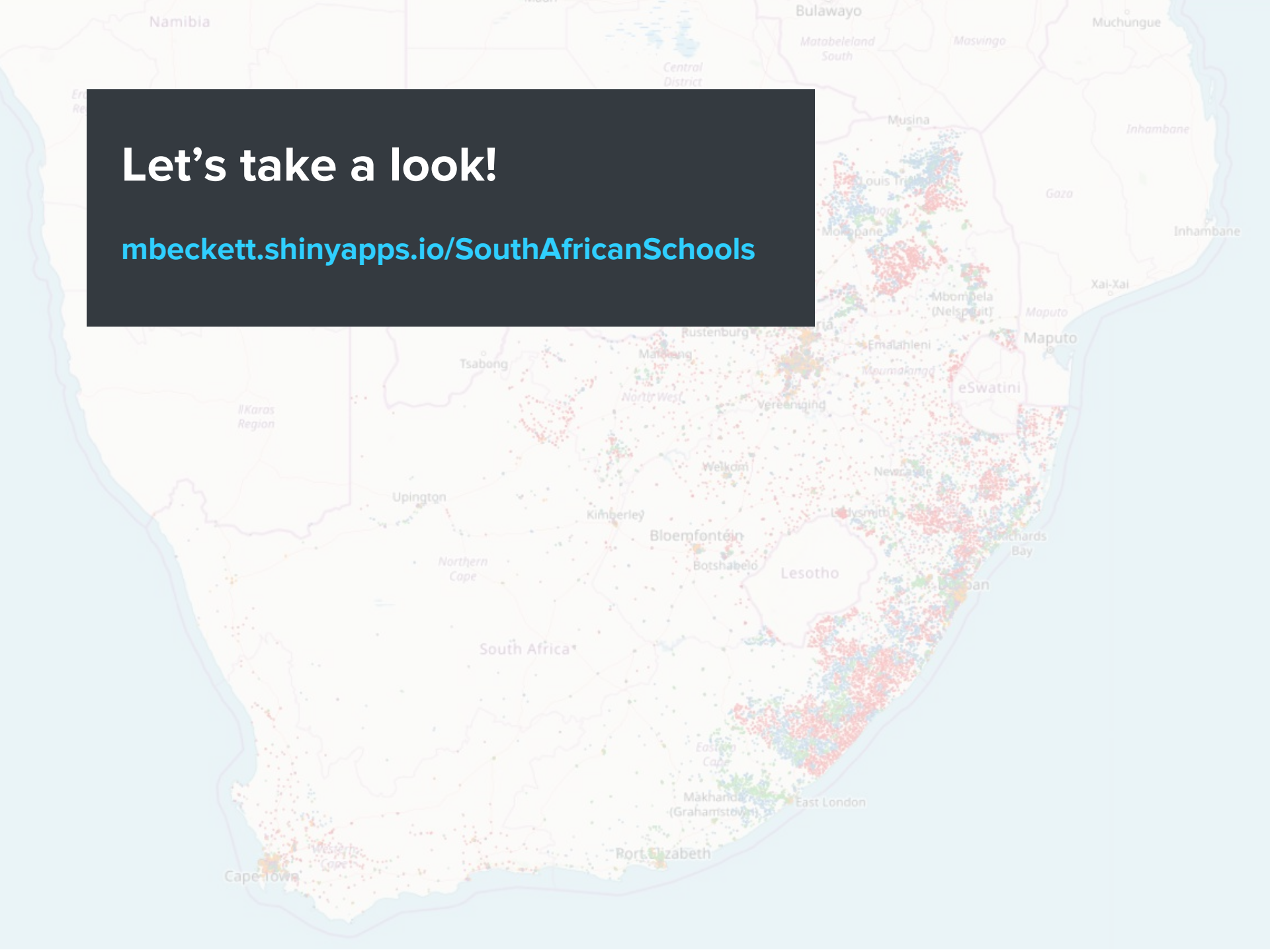
Interactive map

Explore data



Let's take a look!

mbeckett.shinyapps.io/SouthAfricanSchools



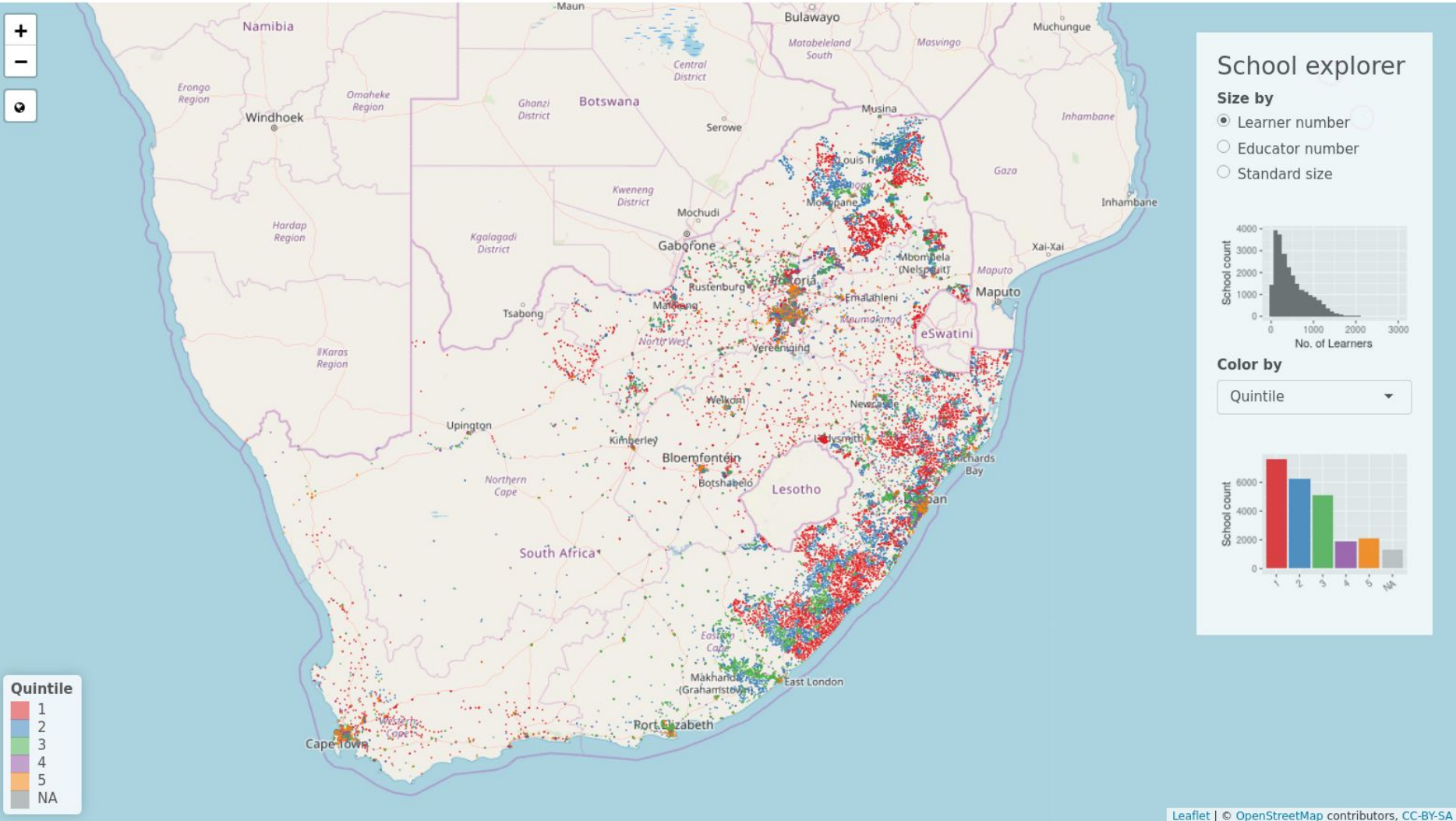
Visualising quintiles

South African Schools

Interactive map

School directory

About



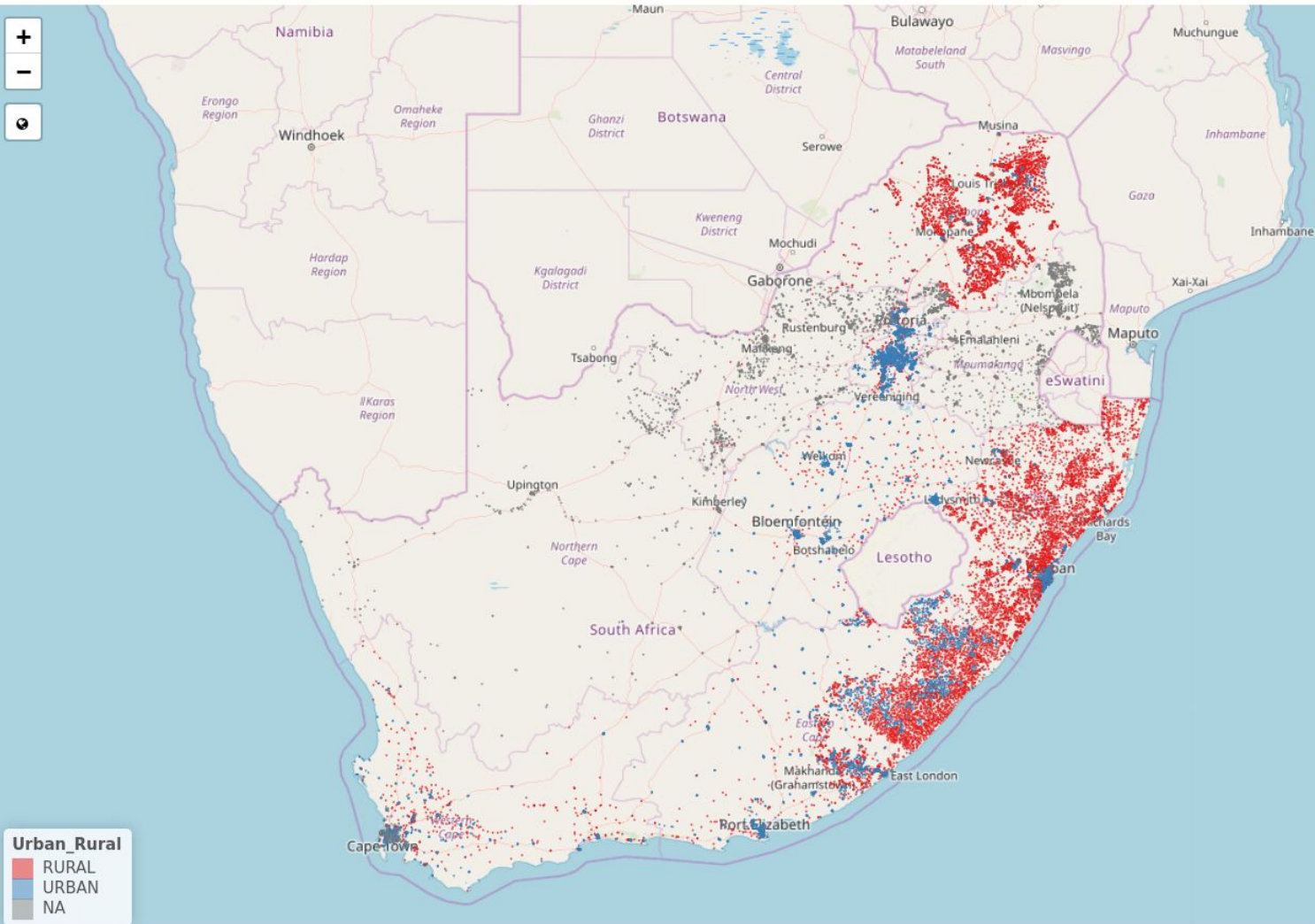
Rural vs urban

South African Schools

Interactive map

School directory

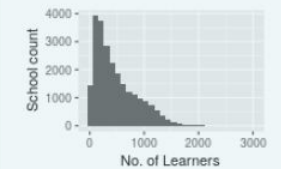
About



School explorer

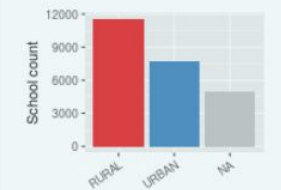
Size by

- ☒ Learner number
- ☐ Educator number
- ☐ Standard size



Color by

Rural or urban



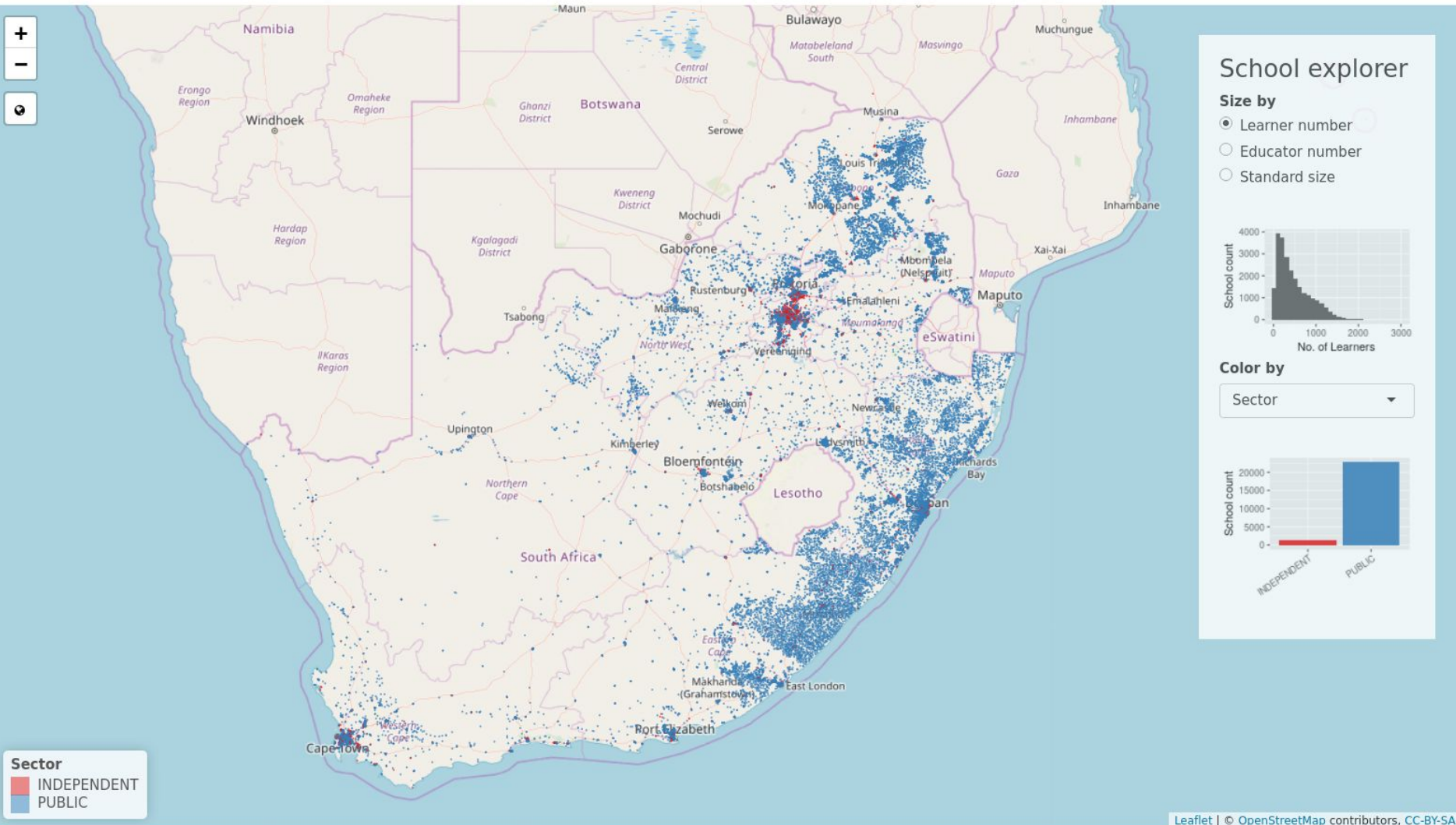
School sector

South African Schools

Interactive map

School directory

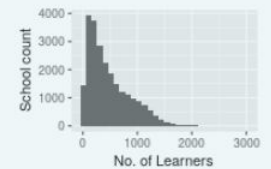
About



School explorer

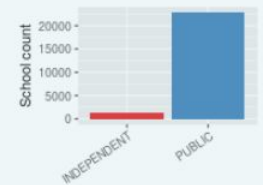
Size by

- ☒ Learner number
- ☐ Educator number
- ☐ Standard size



Color by

Sector



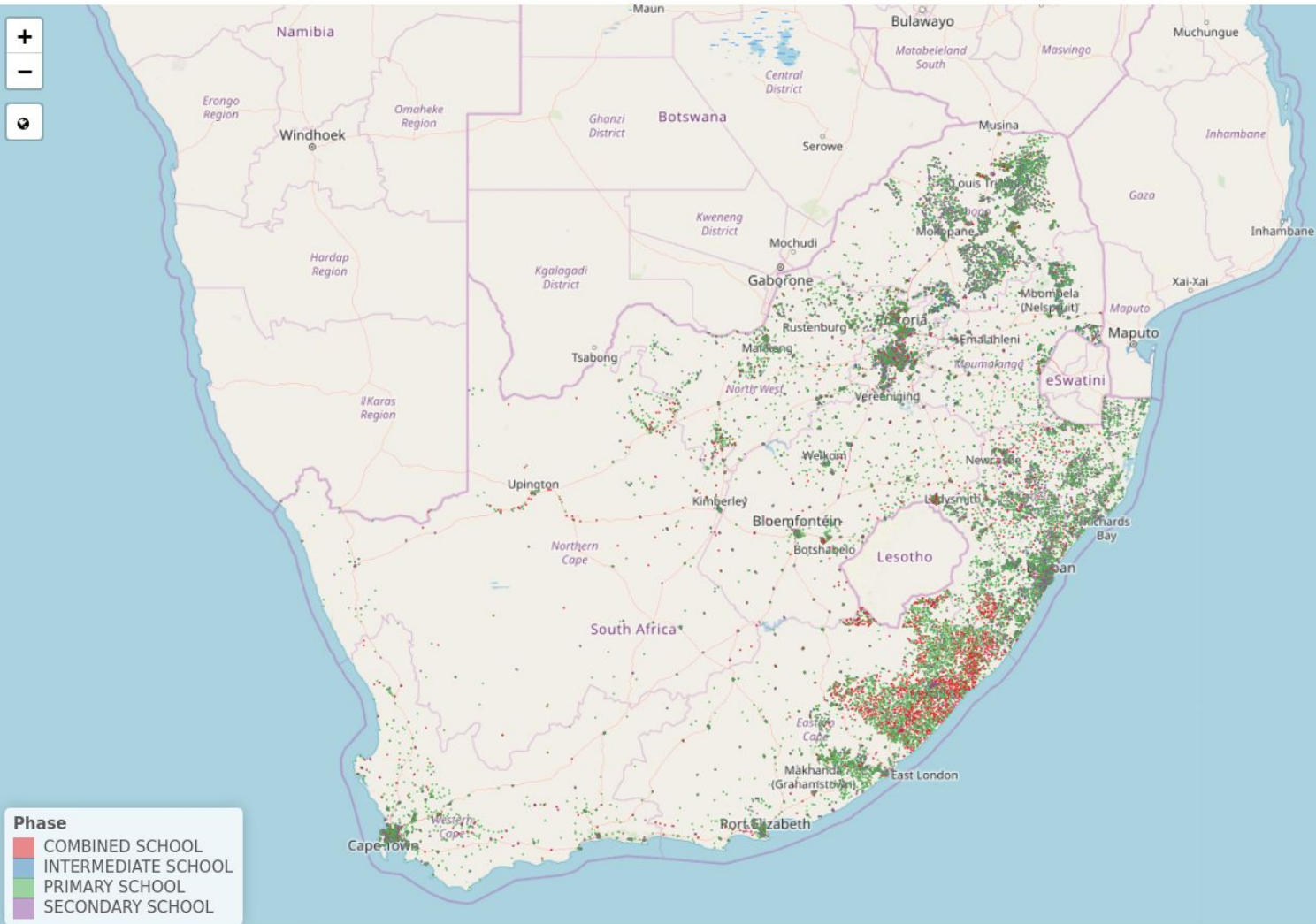
School phase

South African Schools

Interactive map

School directory

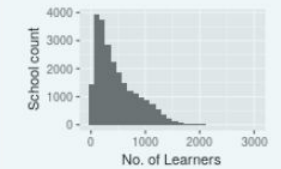
About



School explorer

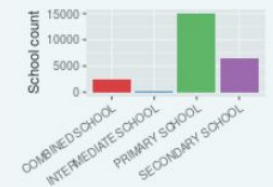
Size by

- ☒ Learner number
- ☐ Educator number
- ☐ Standard size



Color by

Phase



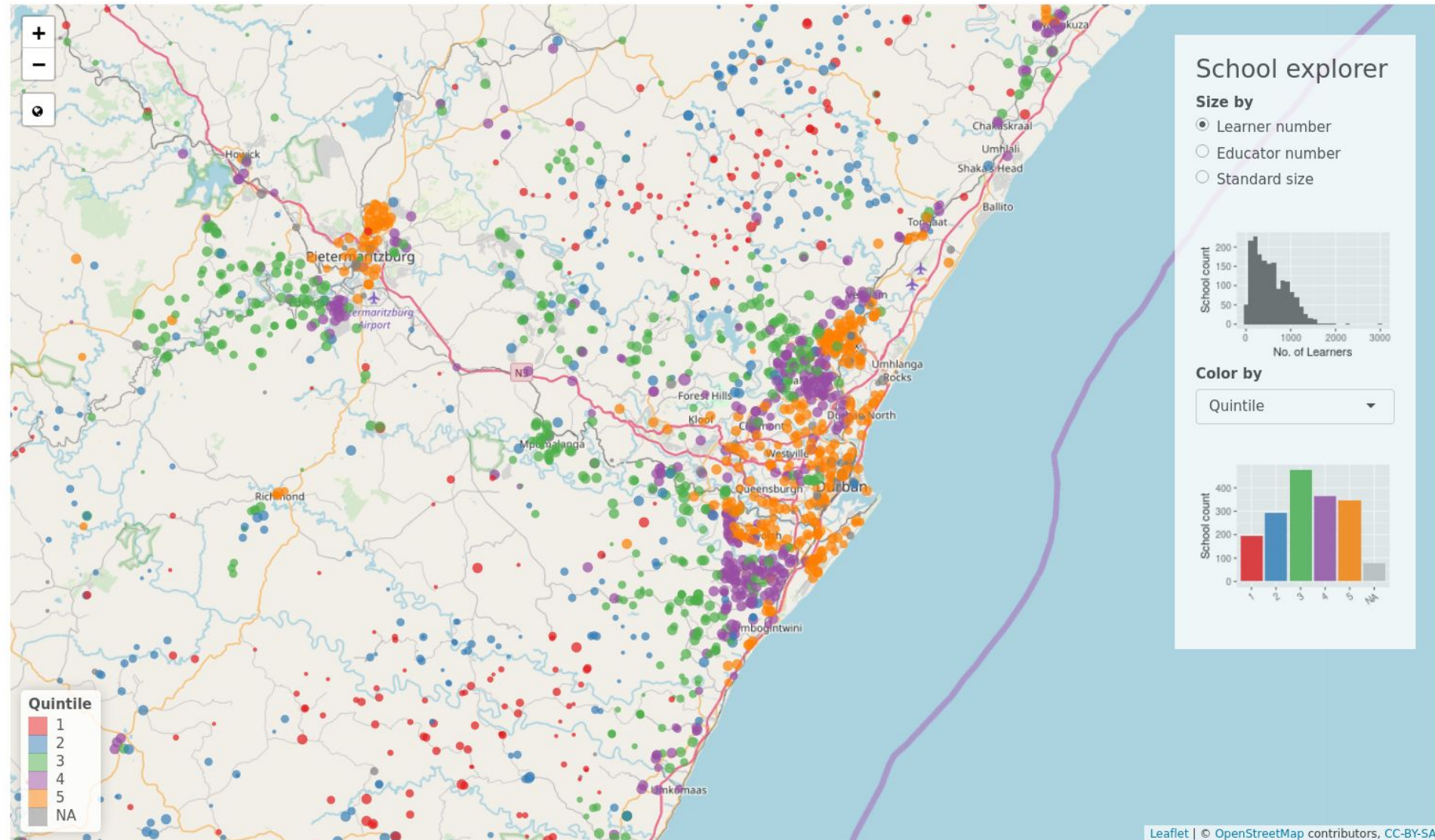
Exploring - reactive plots

South African Schools

Interactive map

School directory

About



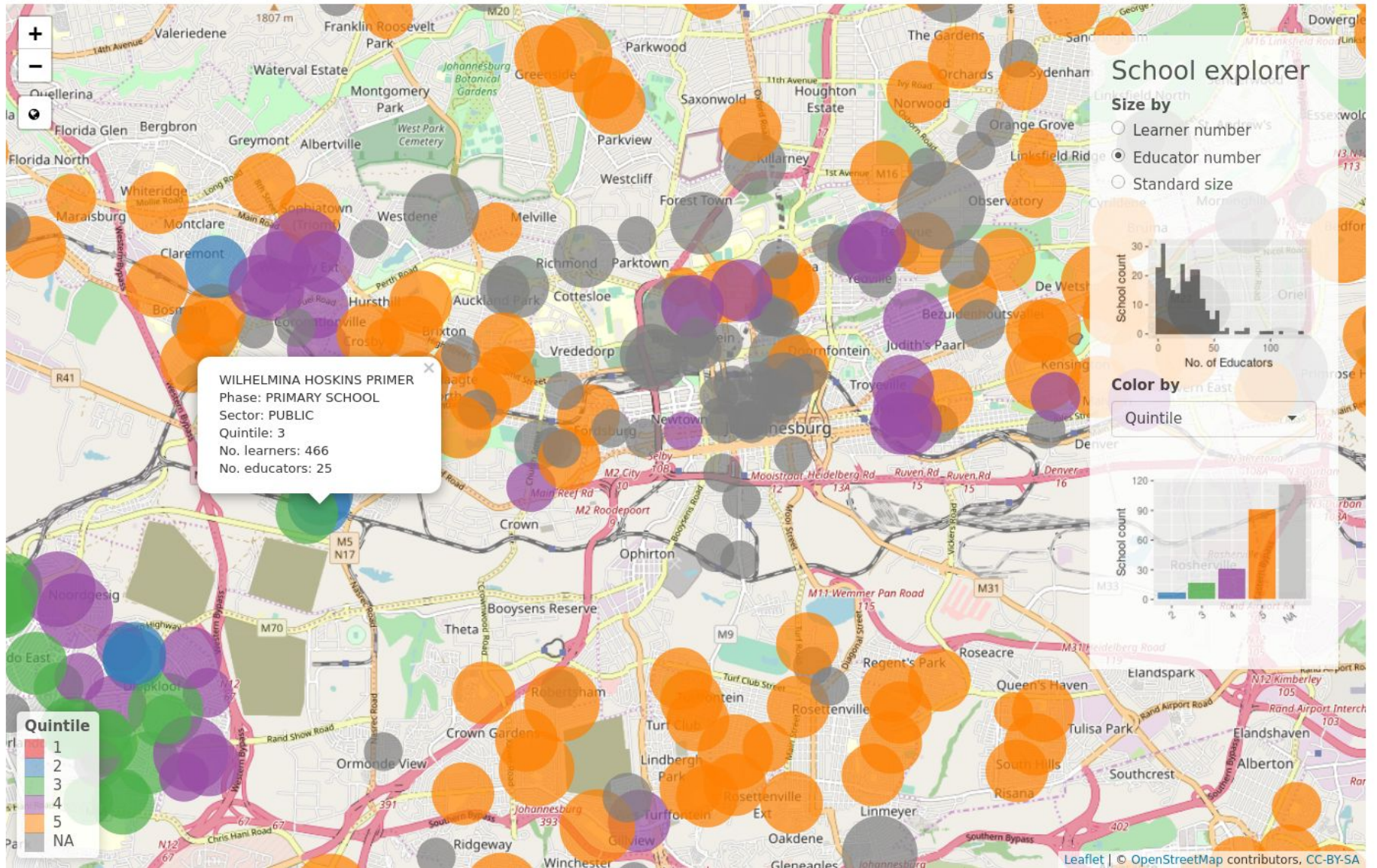
Exploring - “zones” of missing data

South African Schools

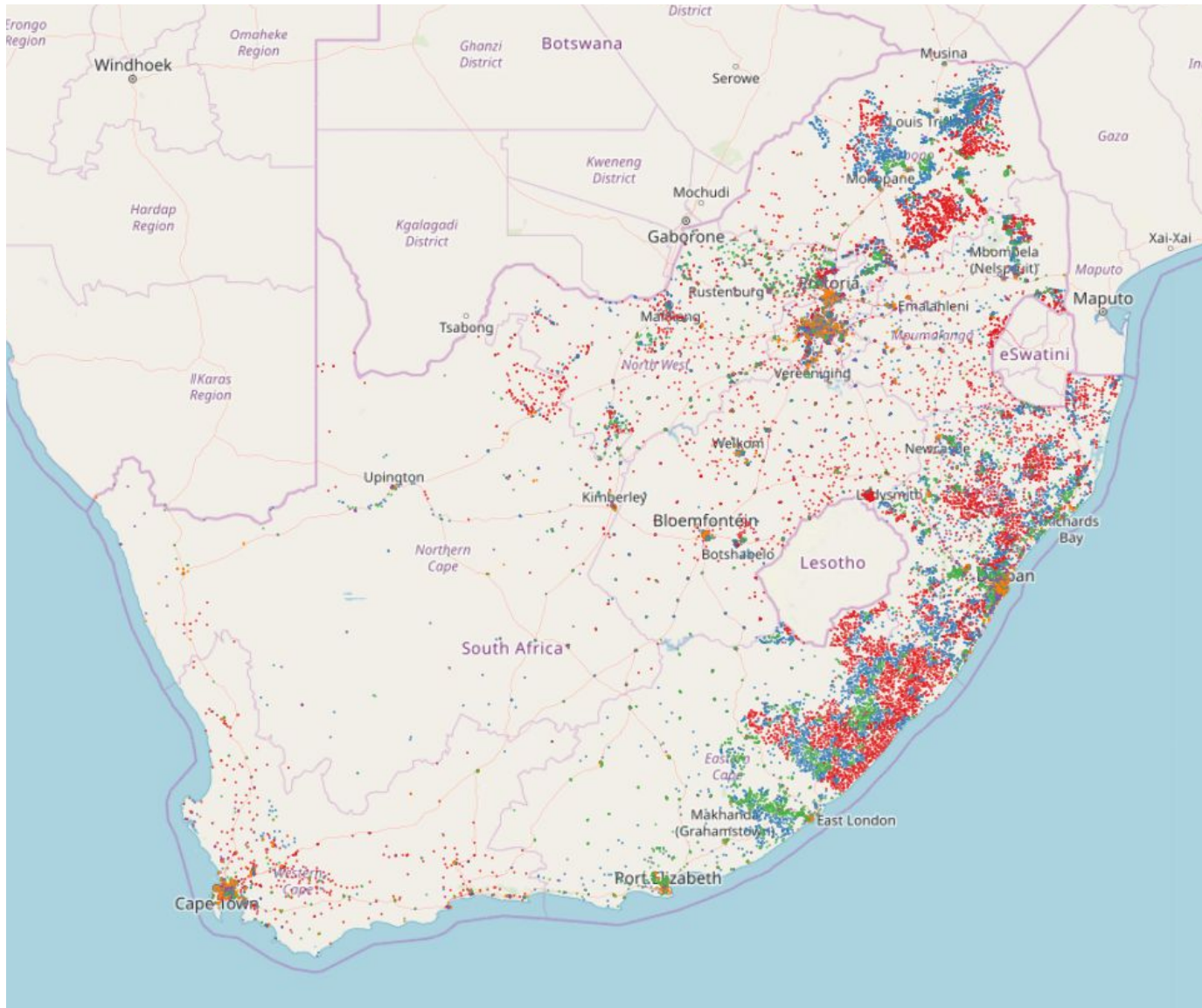
Interactive map

School directory

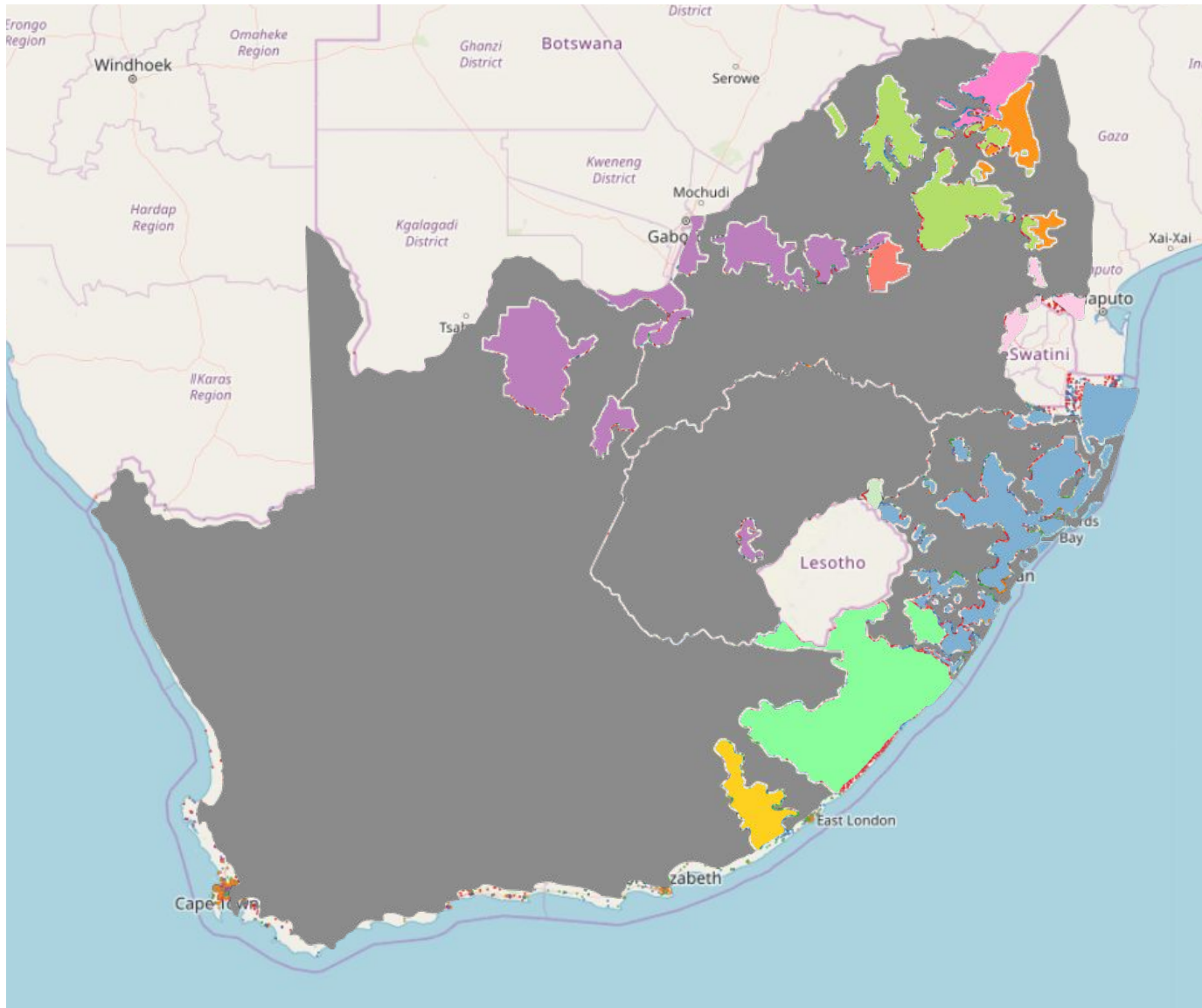
About



Exploring - echoes from Apartheid



Exploring - echoes from Apartheid



Thank you! Questions?

mbeckett.shinyapps.io/SouthAfricanSchools

Please do take a look!

@mbeckett_za

