Data Visualisation Lab

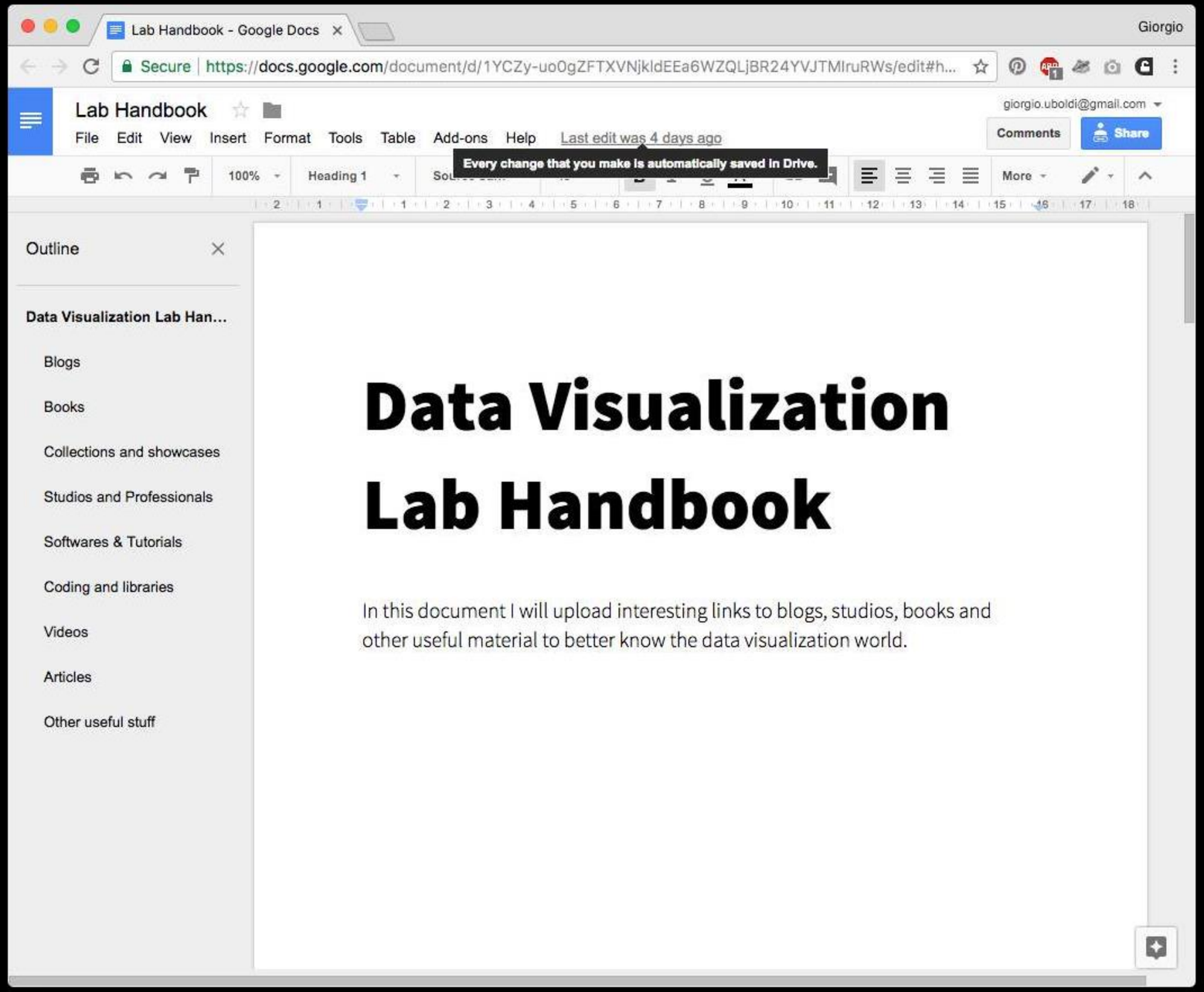
Andrea Seveso

Lesson01

Università Milano Bicocca 2020-2021

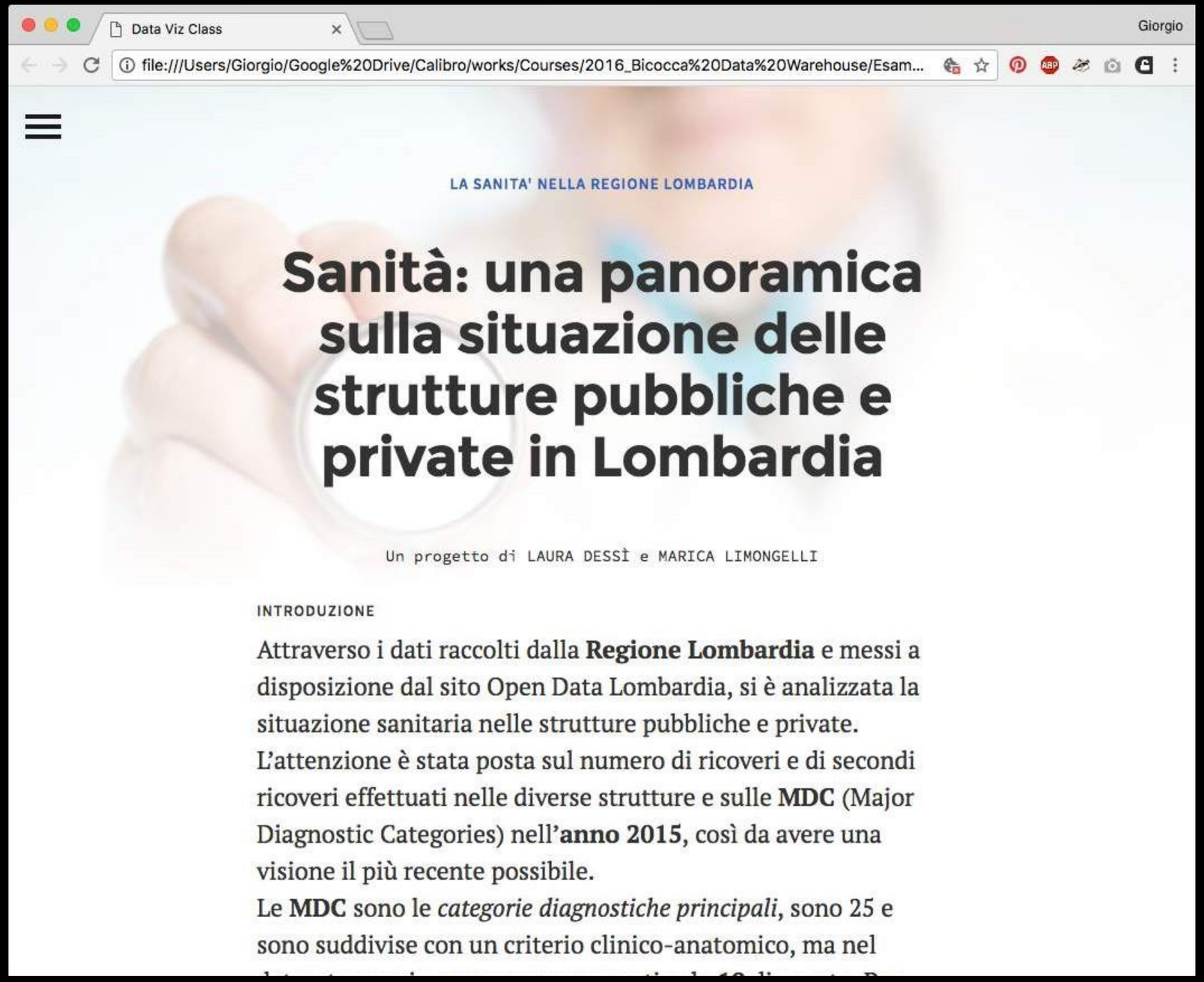
https://tinyurl.com/DataViz2021

download lesson01 folder



SOMETHING US E FUL

An ongoing collection of interesting and useful stuff for the lab.



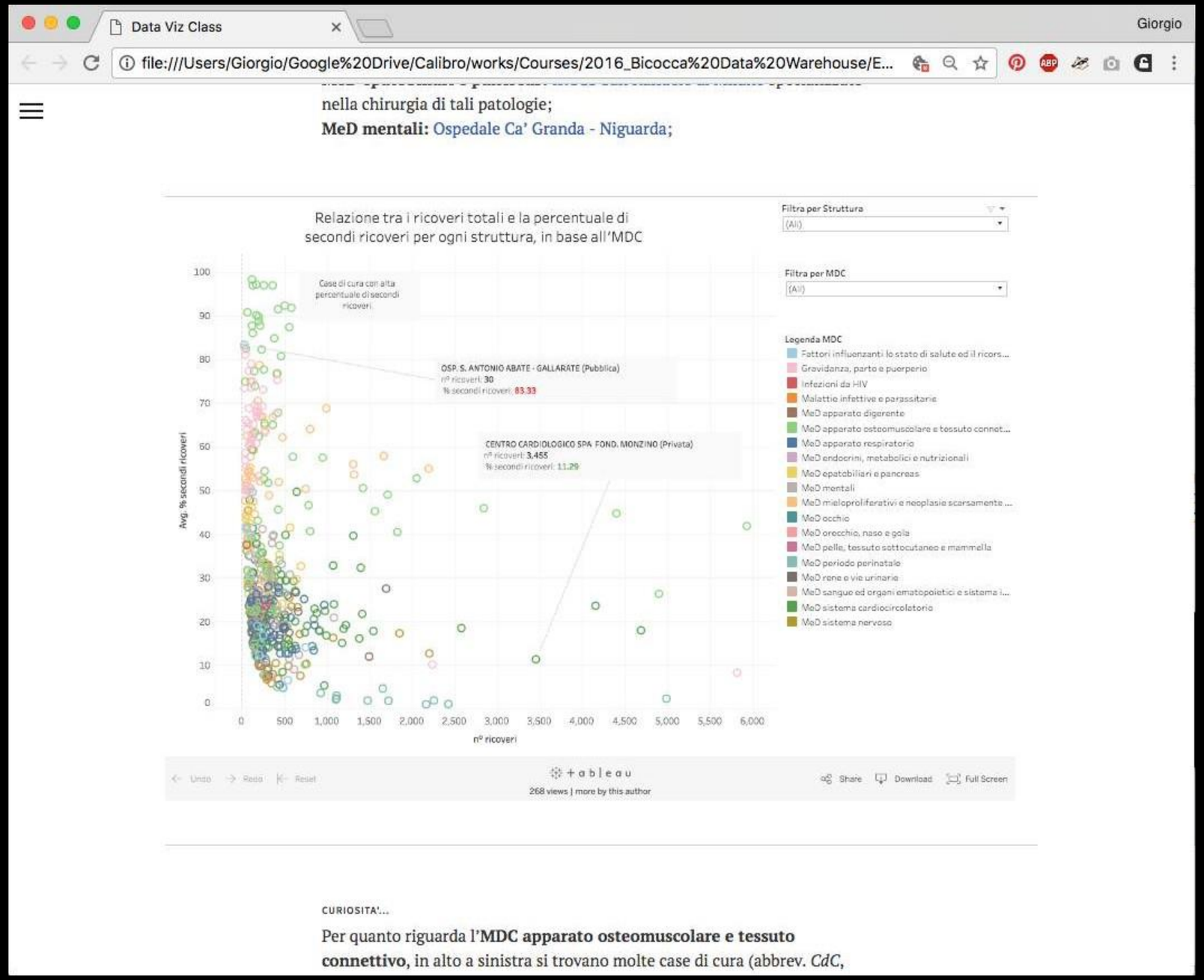
THE PROJECT

Find an interesting topic that can be explored through data.

Collect the data from official sources, open data platforms, scraping digital platforms, etc.

Create a data journalism article with at least 3 visualisations.

See instructions on unimib platform for groups.



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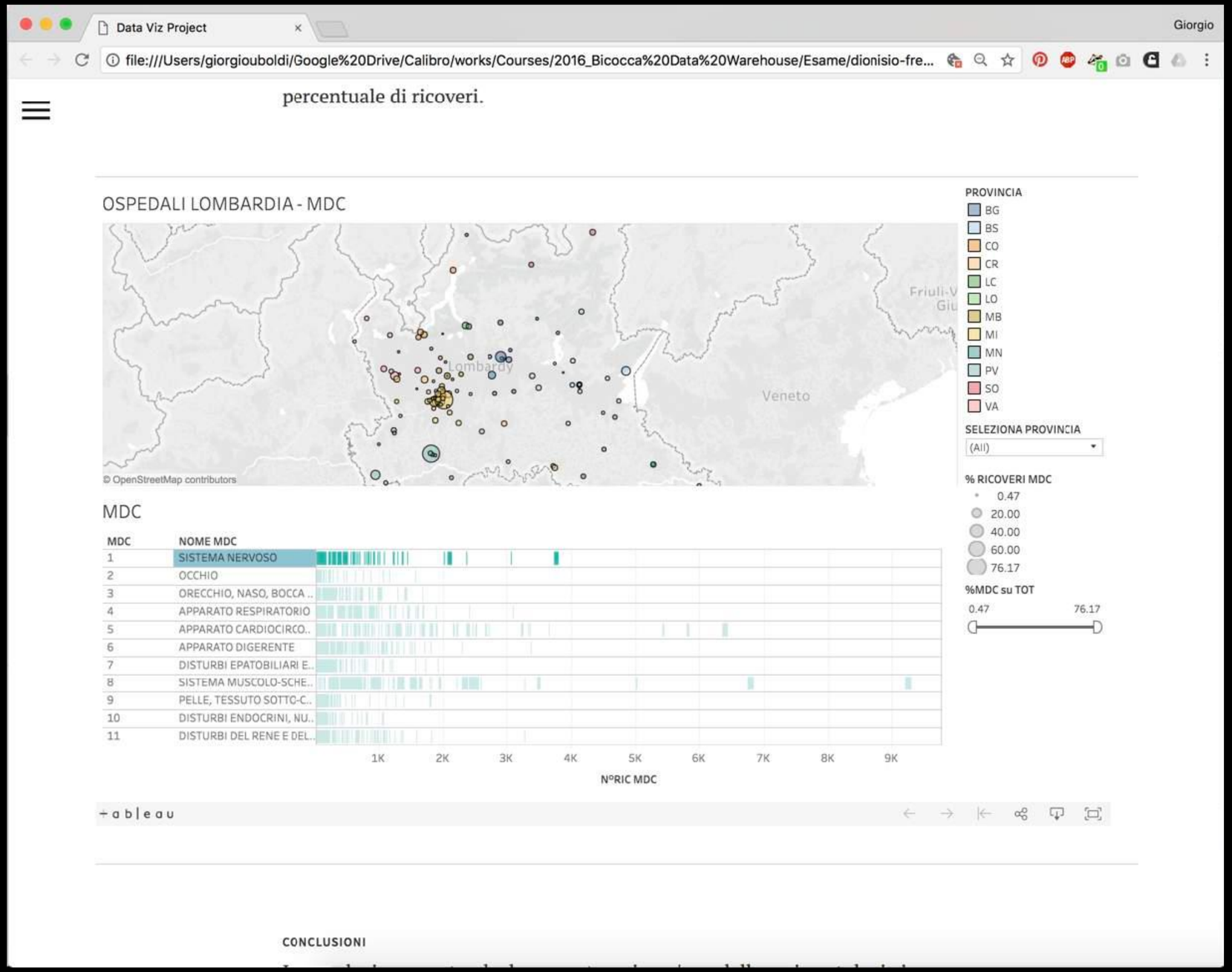
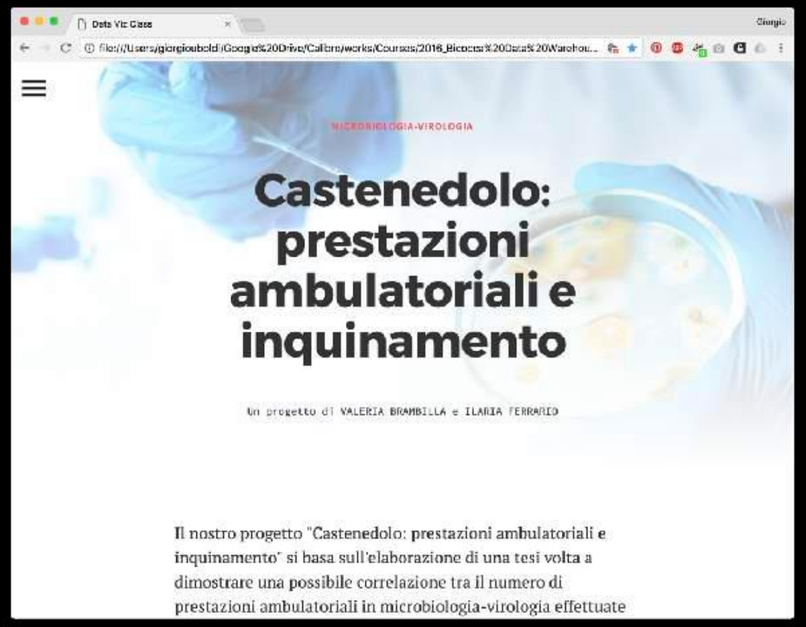


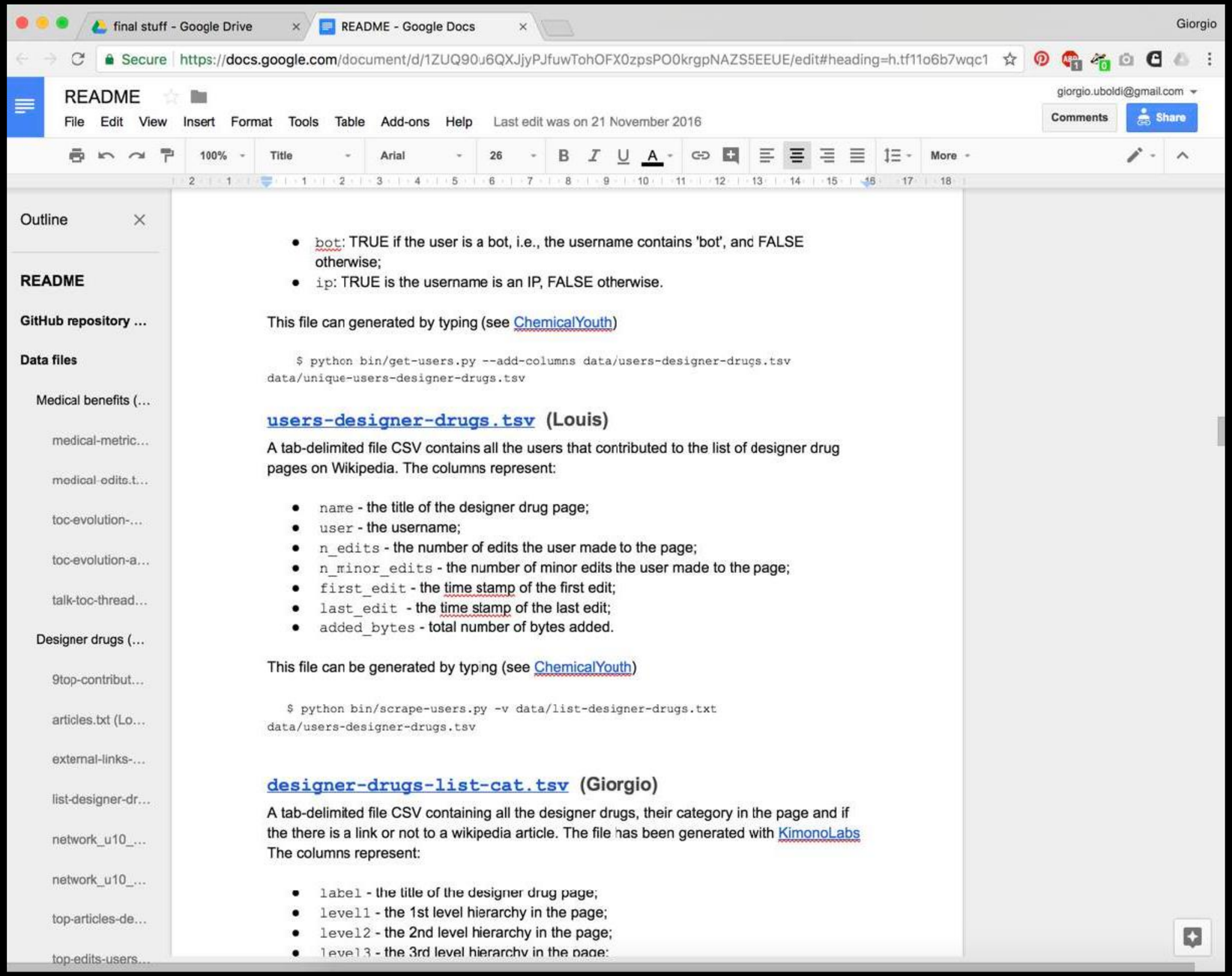
SUGGESTION

Choose a topic you already know and interests you.

Choose a topic that has different dimensions (social, political, economical, technical, etc.).

SOME EXAMPLES



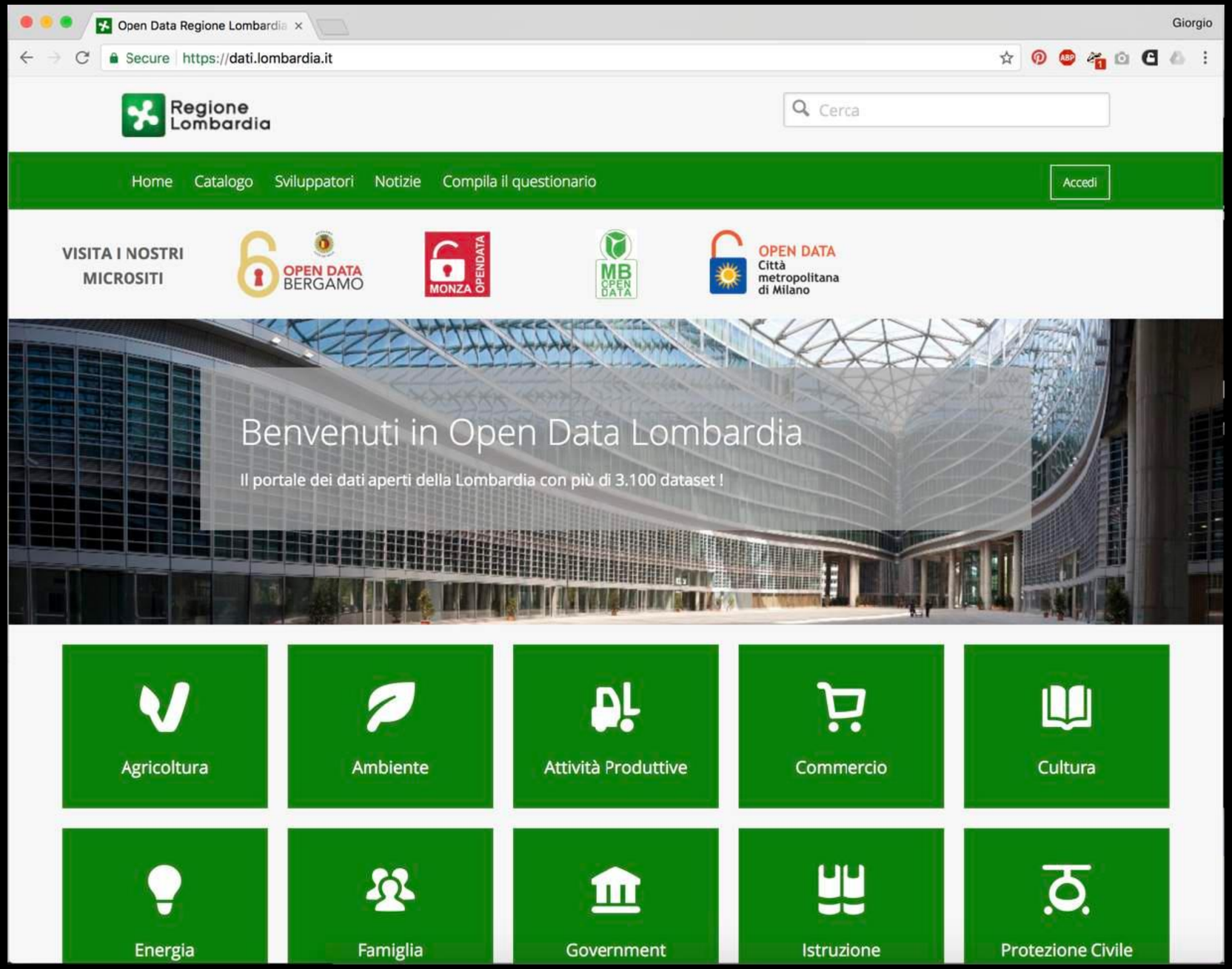


SUGGESTION

Keep track of what you did

Work with shared spreadsheets

Keep the original versions of the datasets



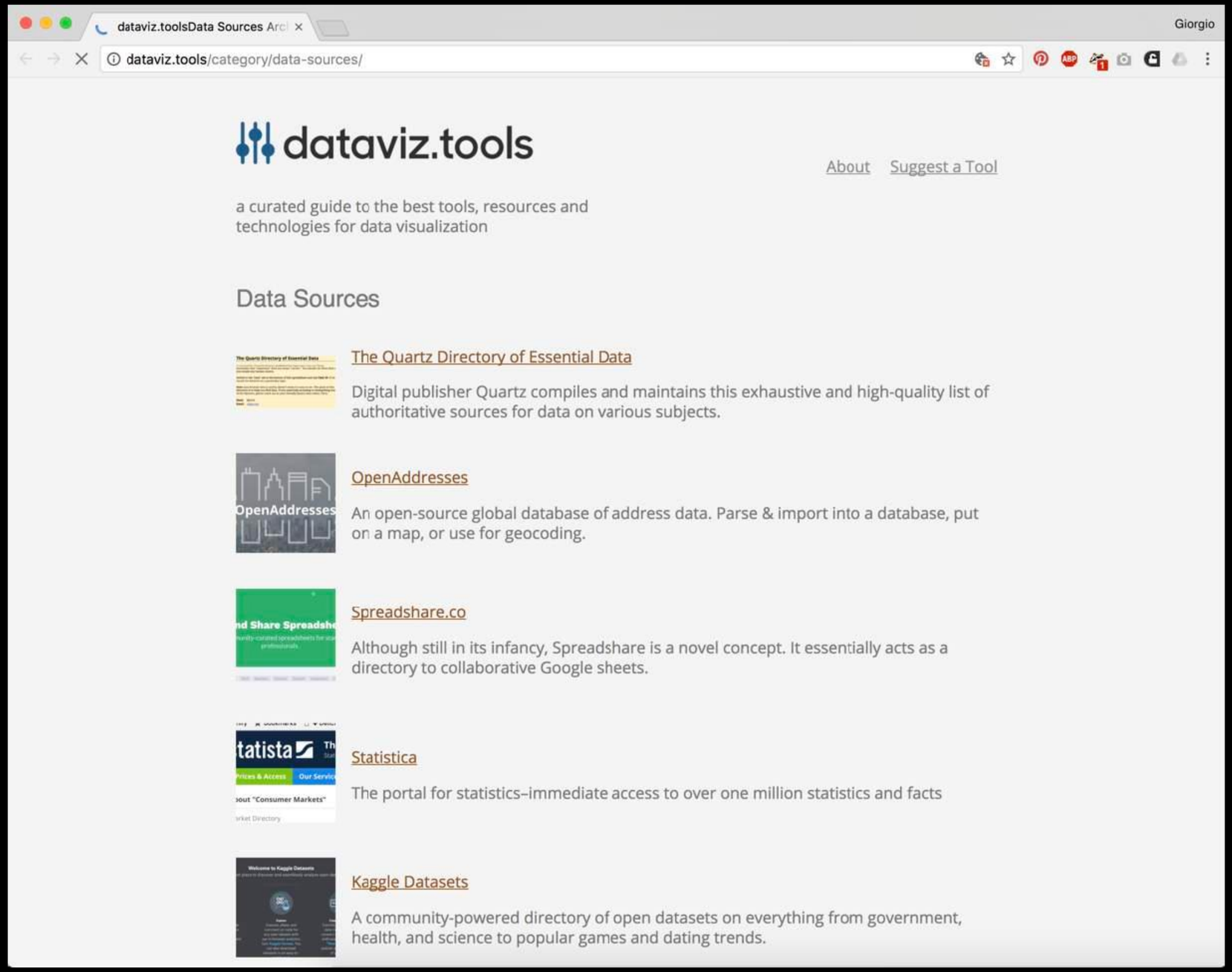
DATA?

Open data platforms

Online repositories

From tools to extract data from digital platforms

Scraping



DATA?

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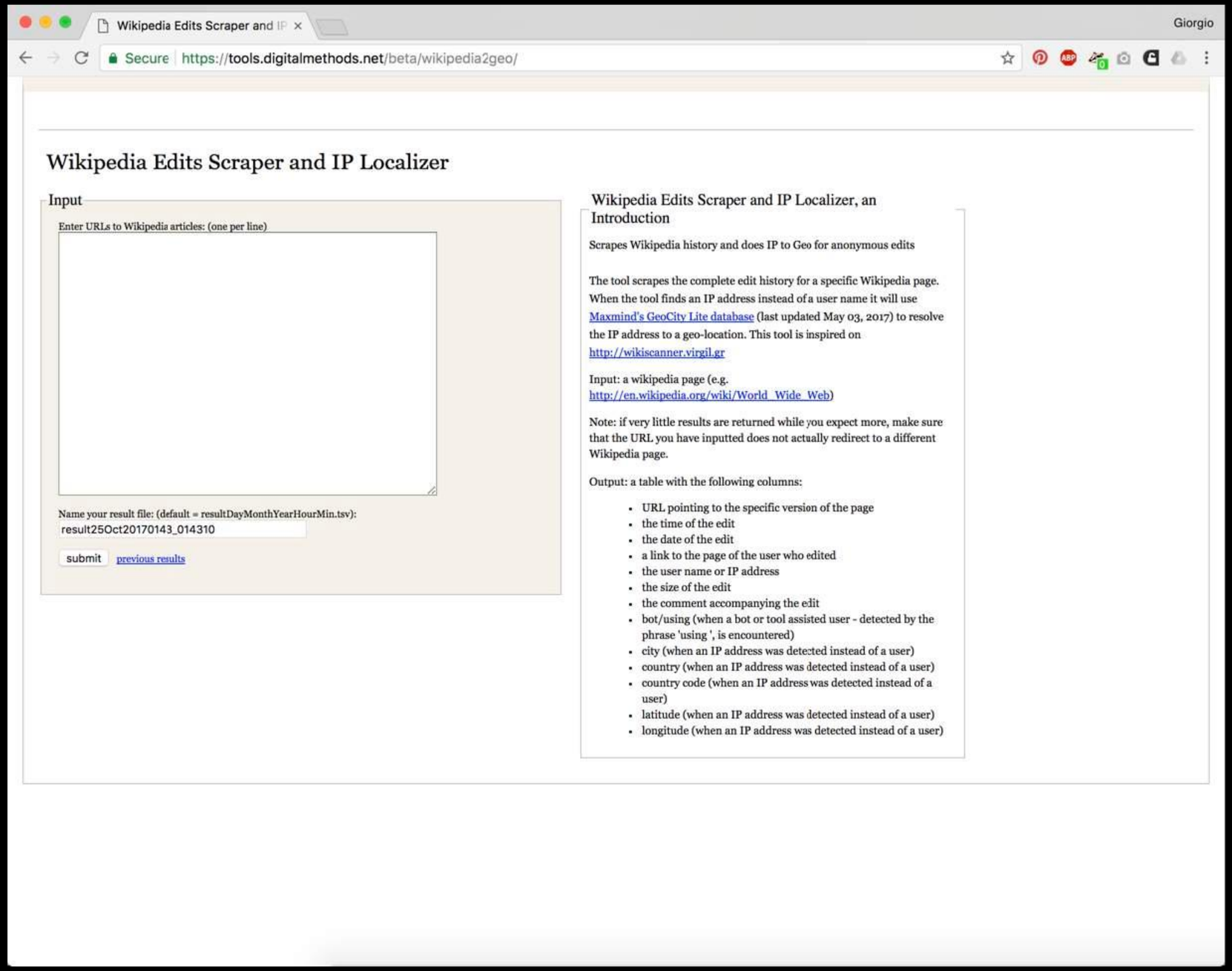

DATA?

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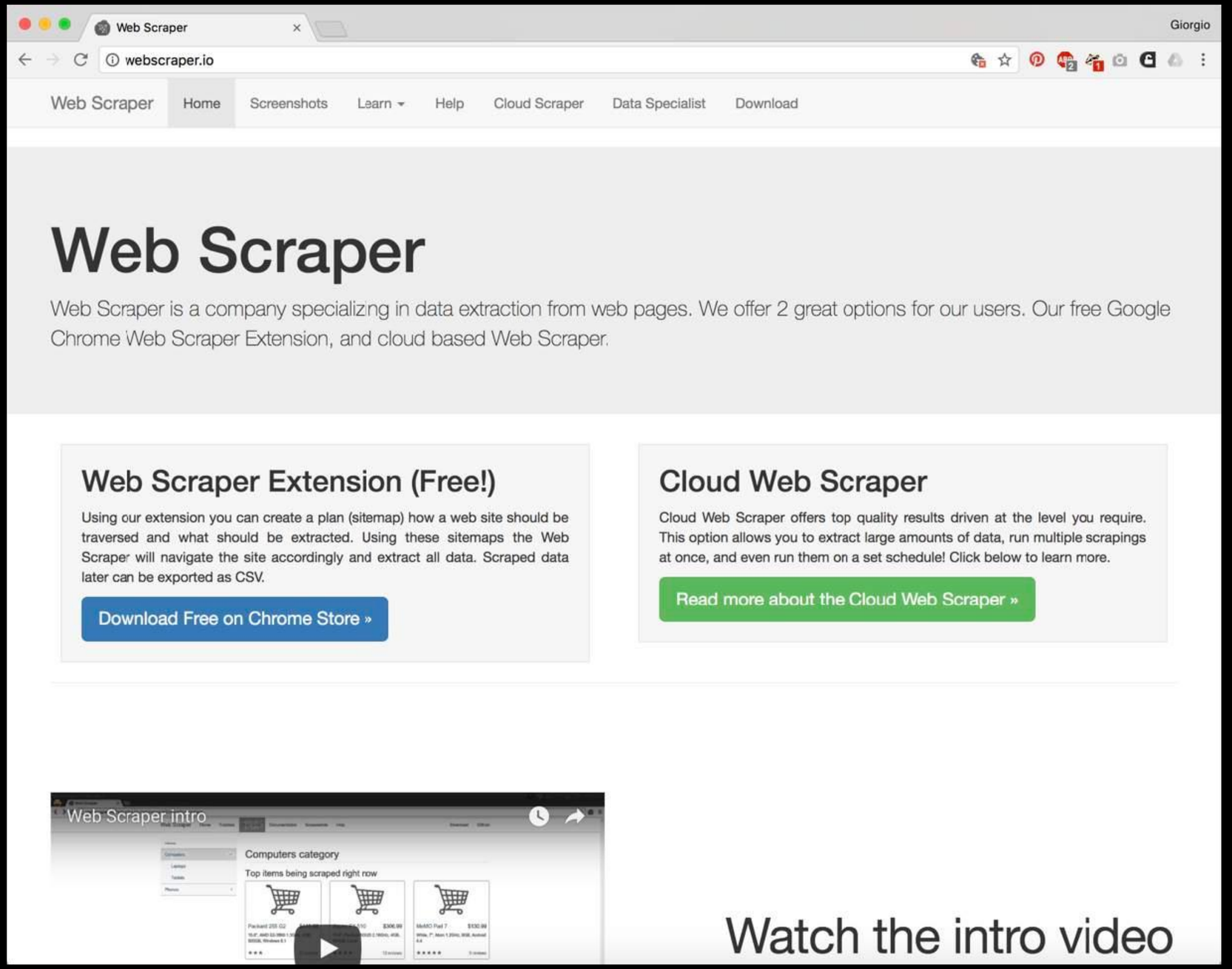
Scraping



DATA?

Open data platforms

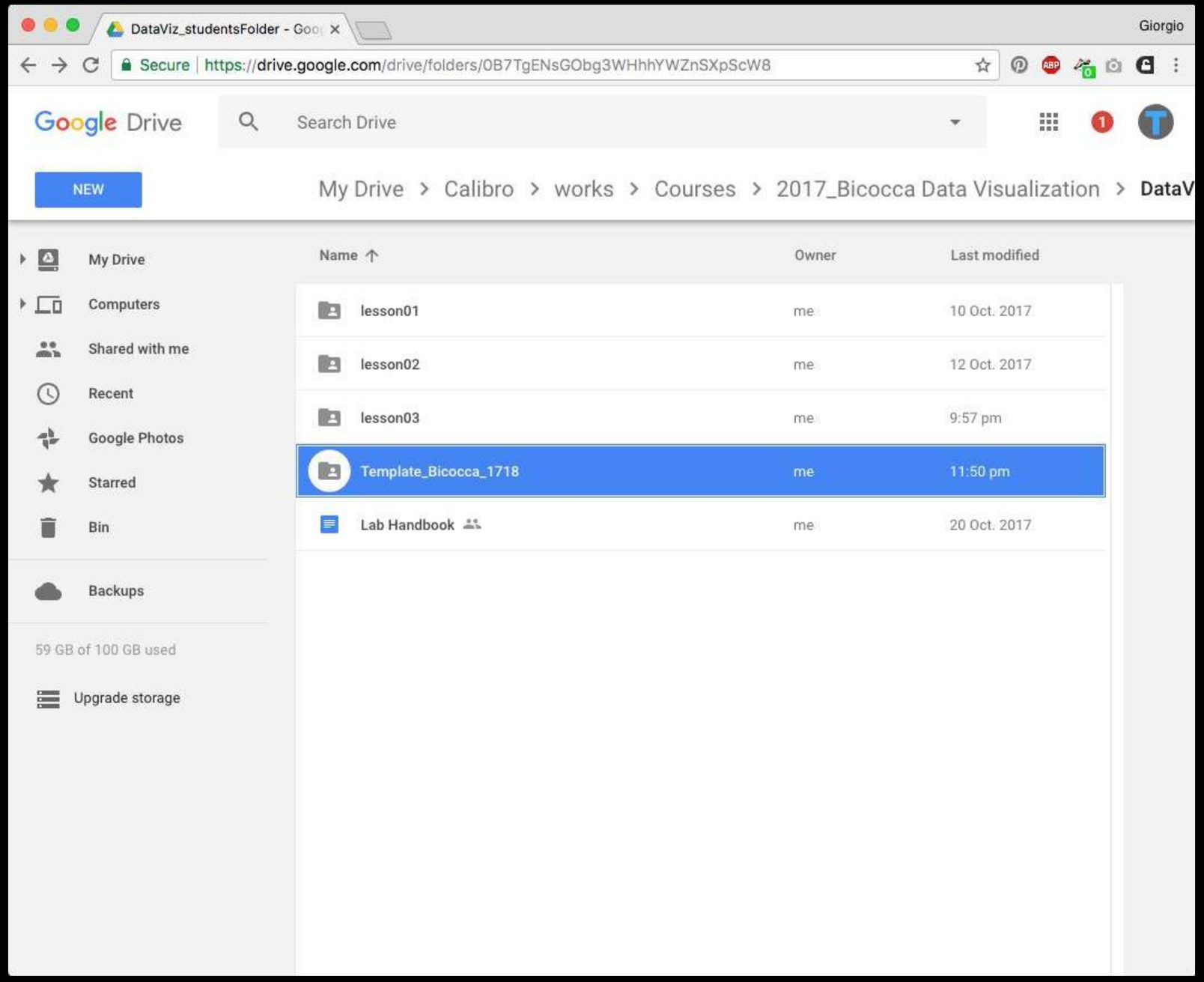
Online repositories

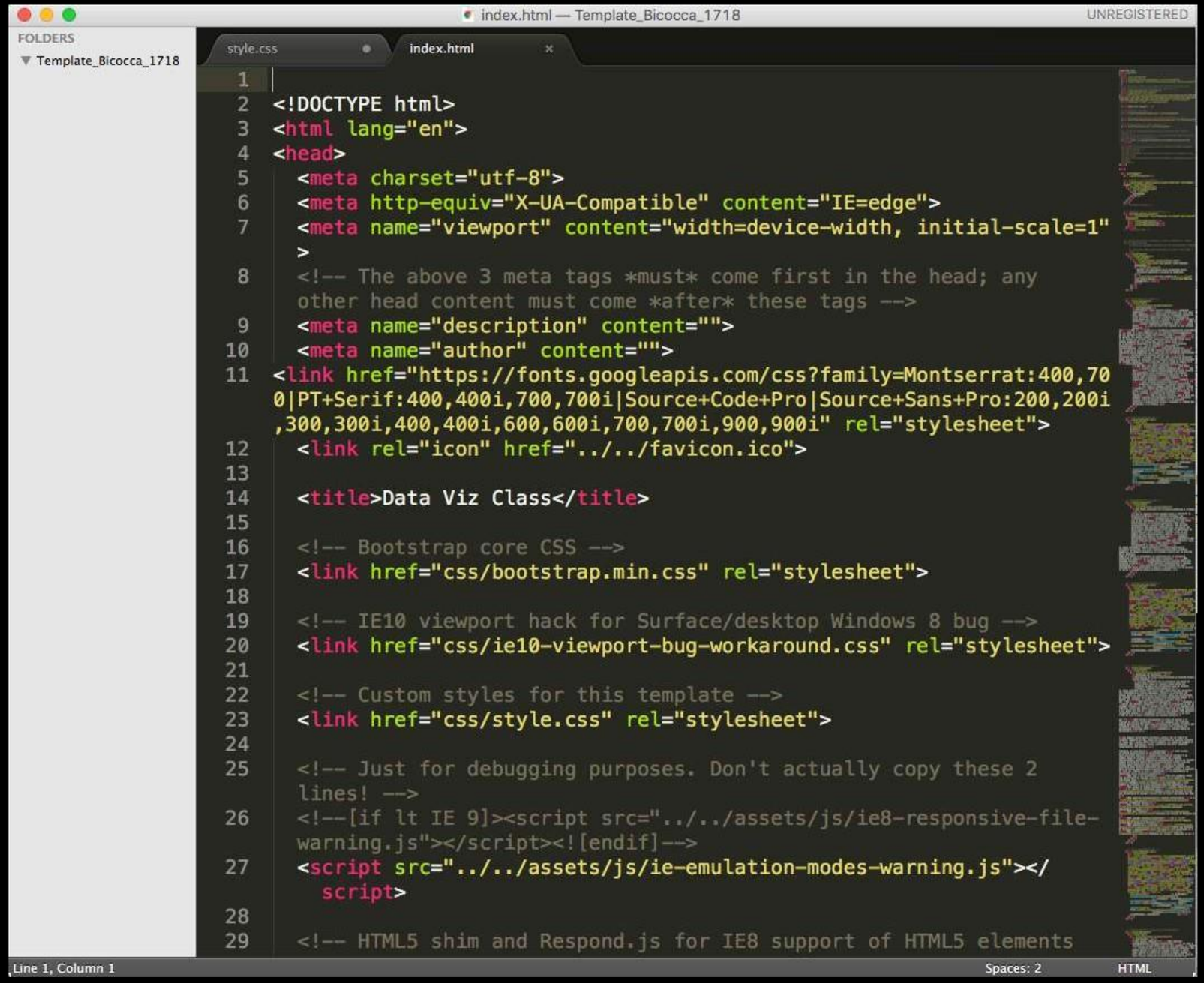
From tools to extract data from digital platforms

Scraping

THE TEMPLATE

The template is inside the shared folder called “Template_Bicocca_2021”





THE TEMPLATE

How to use the template?

Edit the content inside index.html, **embedding your visualisations (static or interactive).**

Read the comments within the html code to better understand how to use it.

SUGGESTED TOOLS

Google spreadsheet
(data preparation)

Plot.ly
(visual bootstrapping and semifinished visualizations)

Tableau
(visual analytics, interactive visualizations)

Python
(static visulizations)

Gephi
(network graphs)

TODAY’ S LESSON

Tableau part 1

TO DAY’ S LESSON

Why Tableau?

It has a free version

It allows different types of visualization

It allows to create interactive visualizations

It’s useful for visual analytics and prototyping

It’s widely spread in the industry (business, design, journalism, etc.)

VS

Not free*

No limits of data and connectors

Free

Only to local data

Can’t save locally

Can’t print / export pdfs

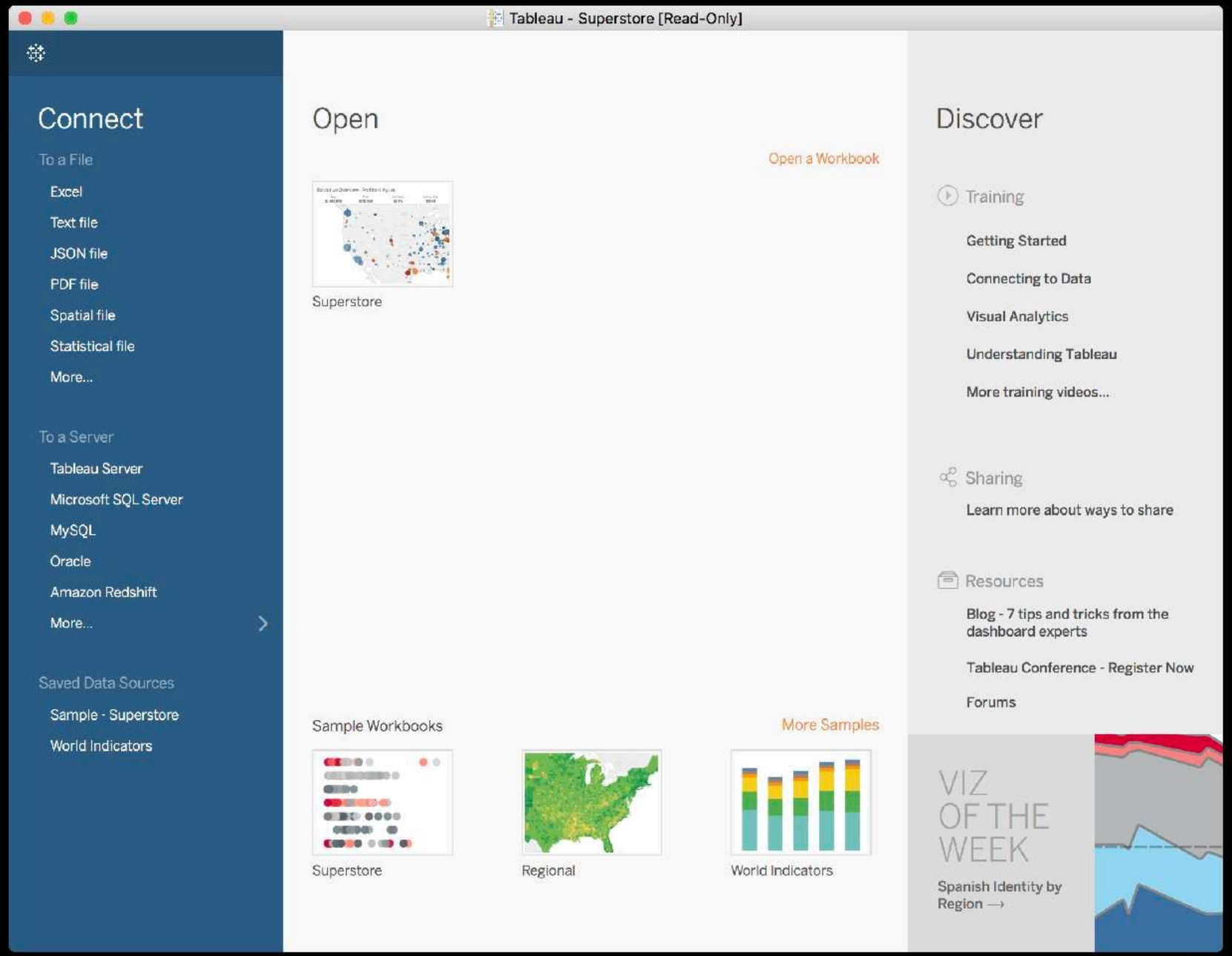
*free for students

OVERVIEW

Welcome screen

Here you can:

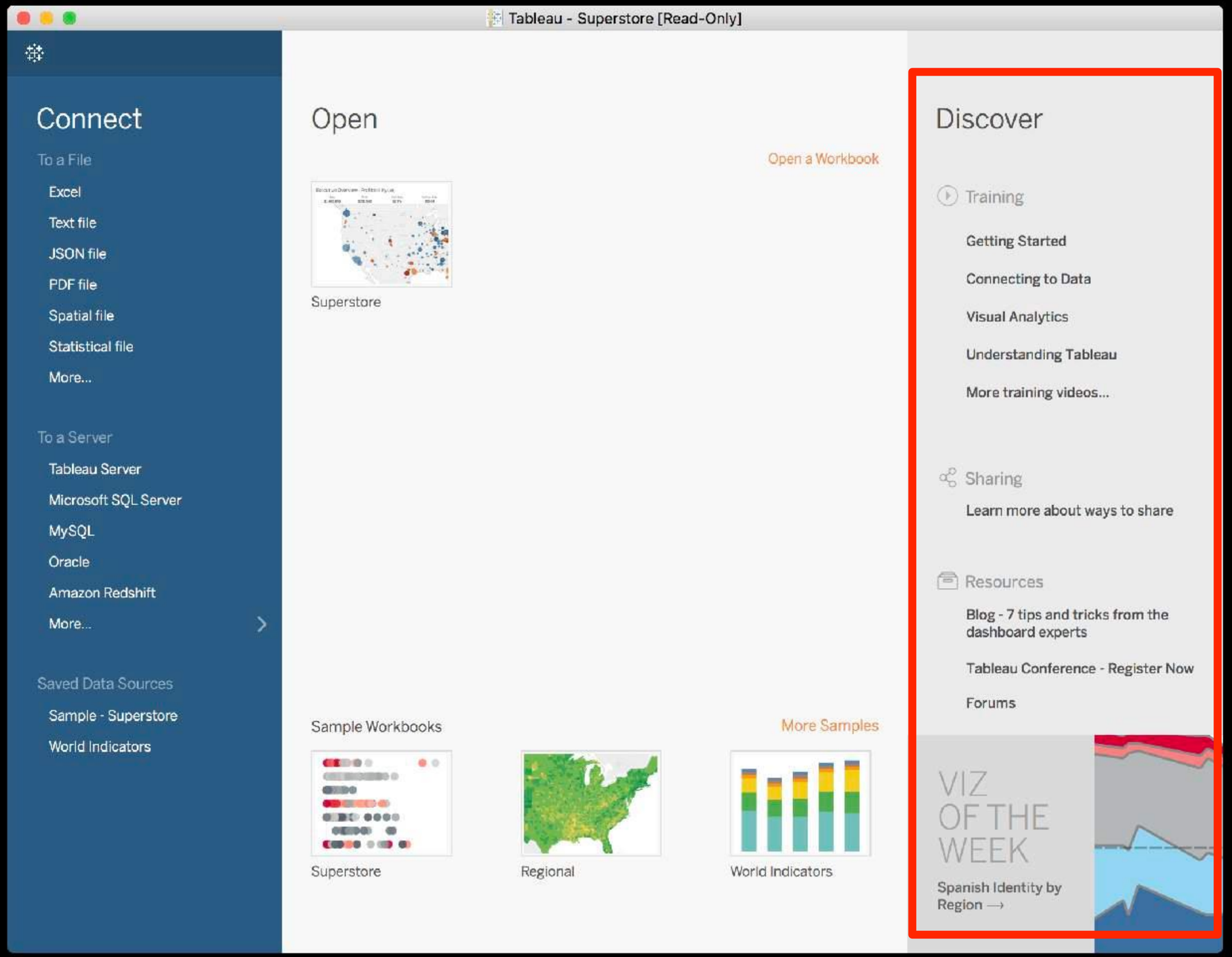
- **create a new project starting from a Excel file, text file, etc.**
- **open an existing project**



OVERVIEW

Welcome screen

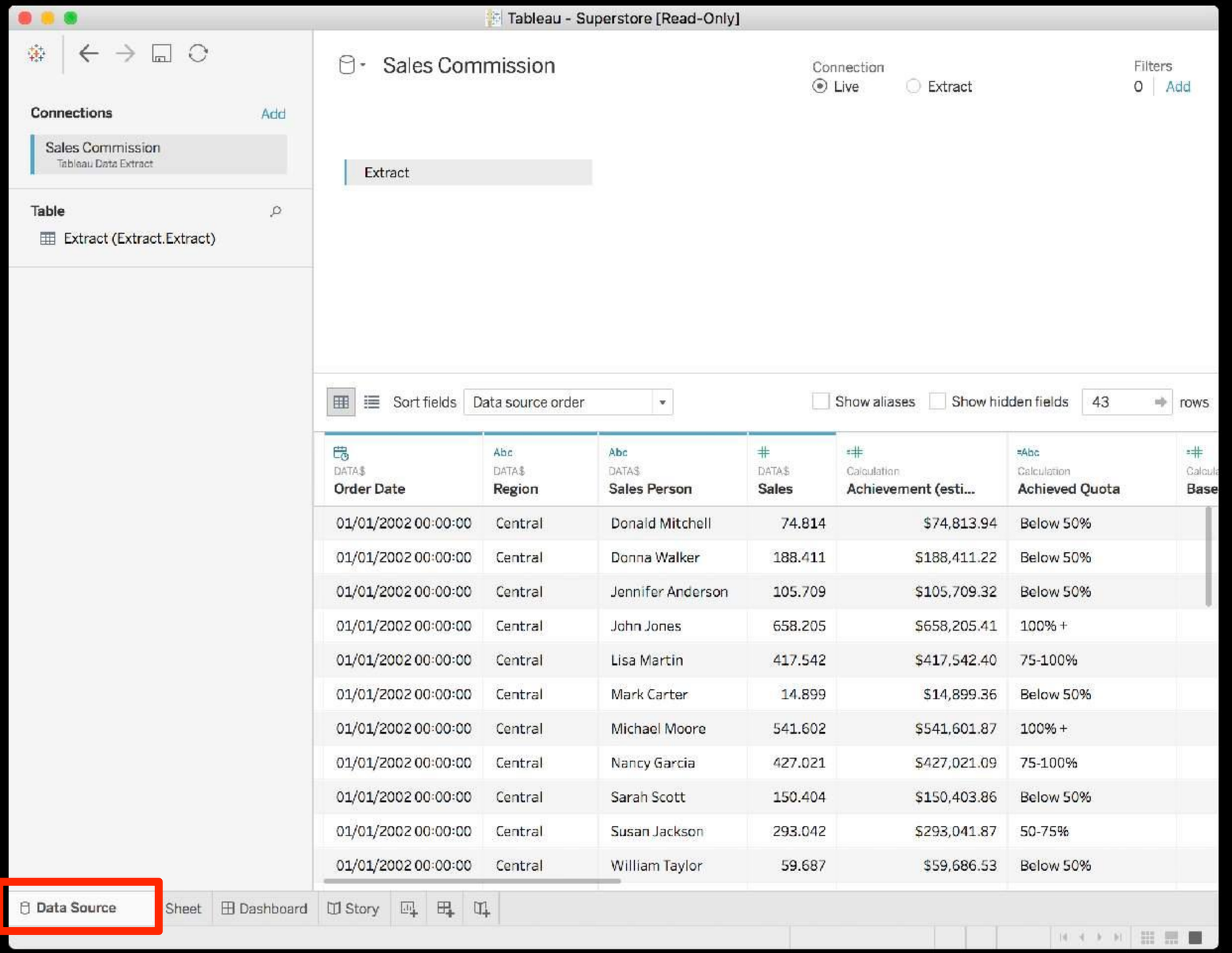
Discover tutorials and resources



OVERVIEW

Data source screen

It's the screen where you can see your data sources, format, transform and clean your data.

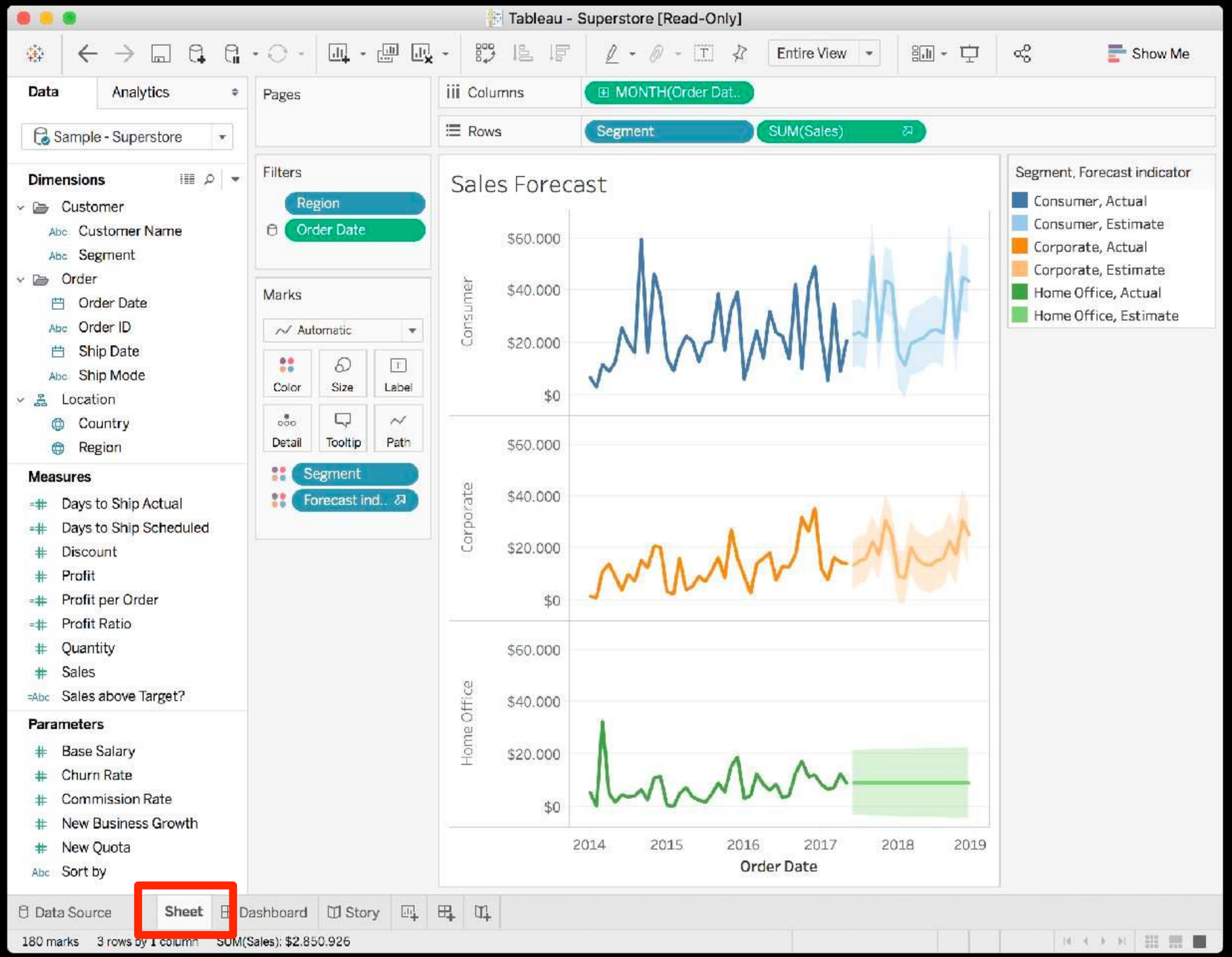


OVERVIEW

Sheets

It's where you can visually explore your dataset and create visualizations.

You can also filter and interact with the visualizations.

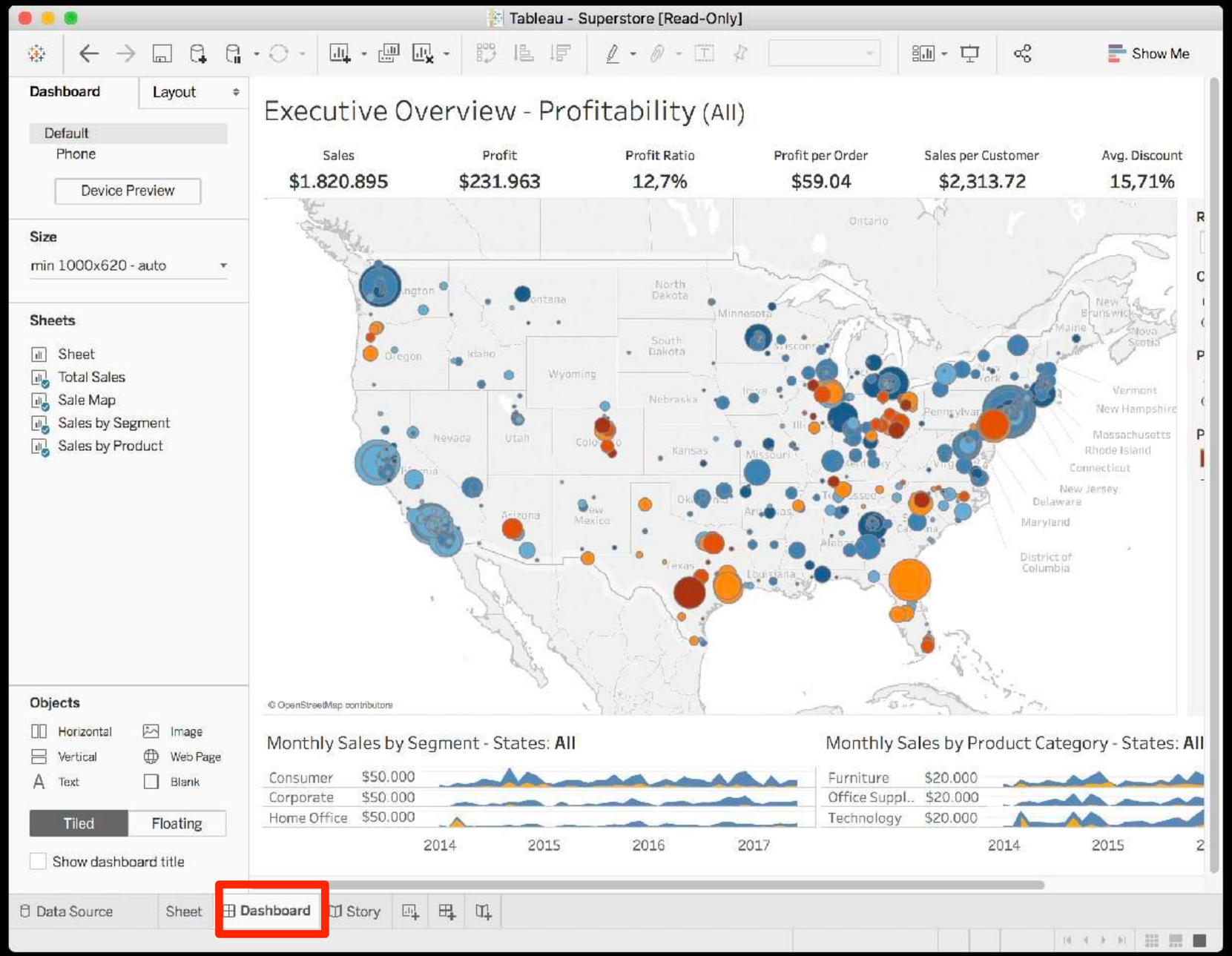


OVERVIEW

Dashboards

It's where you connect different visualizations (sheets) and create interactive dashboards.

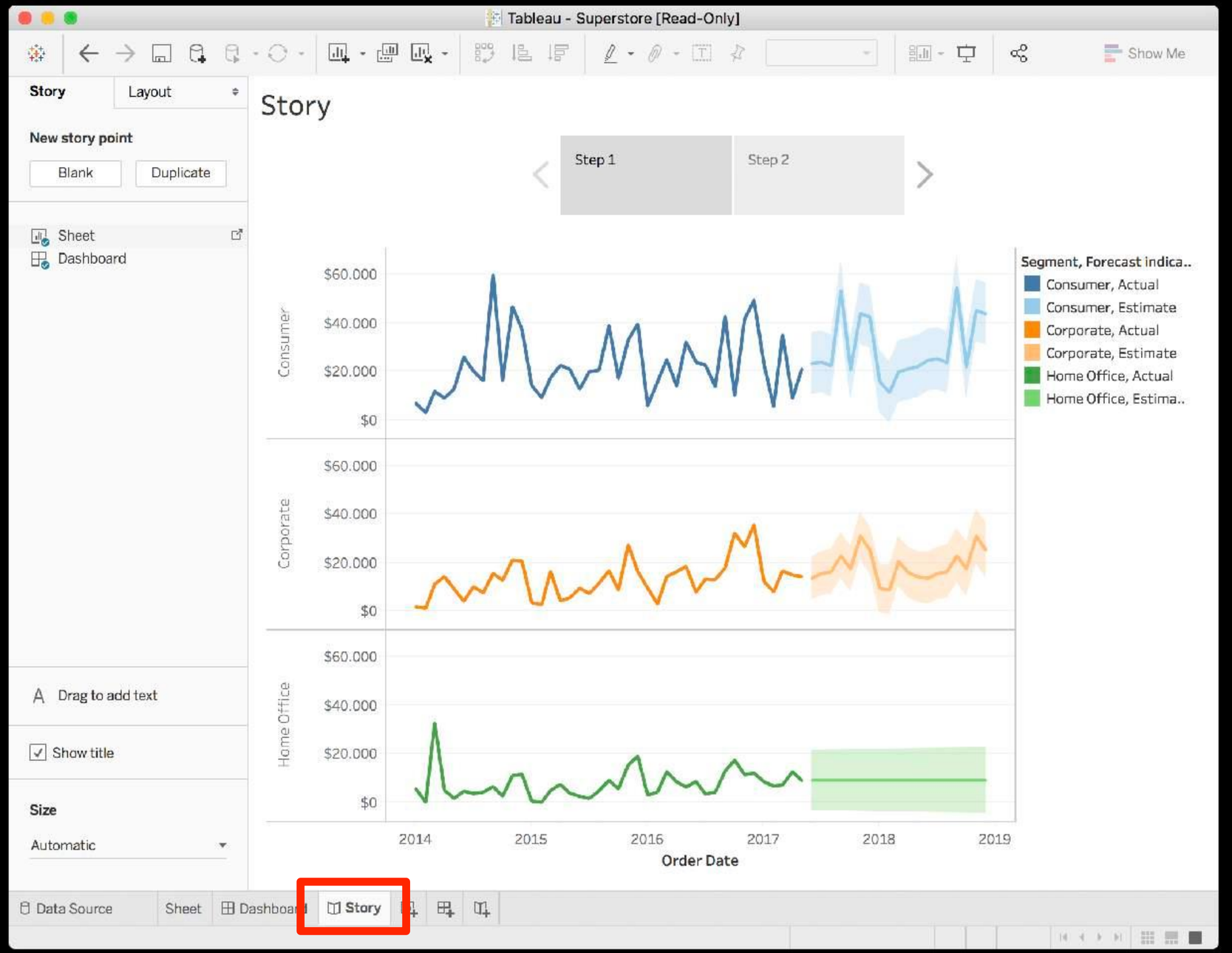
It's where you finalize your output (legends, filters, titles, layout, etc.)



OVERVIEW

Stories

It's another way to prepare your output and create a step by step visualization.

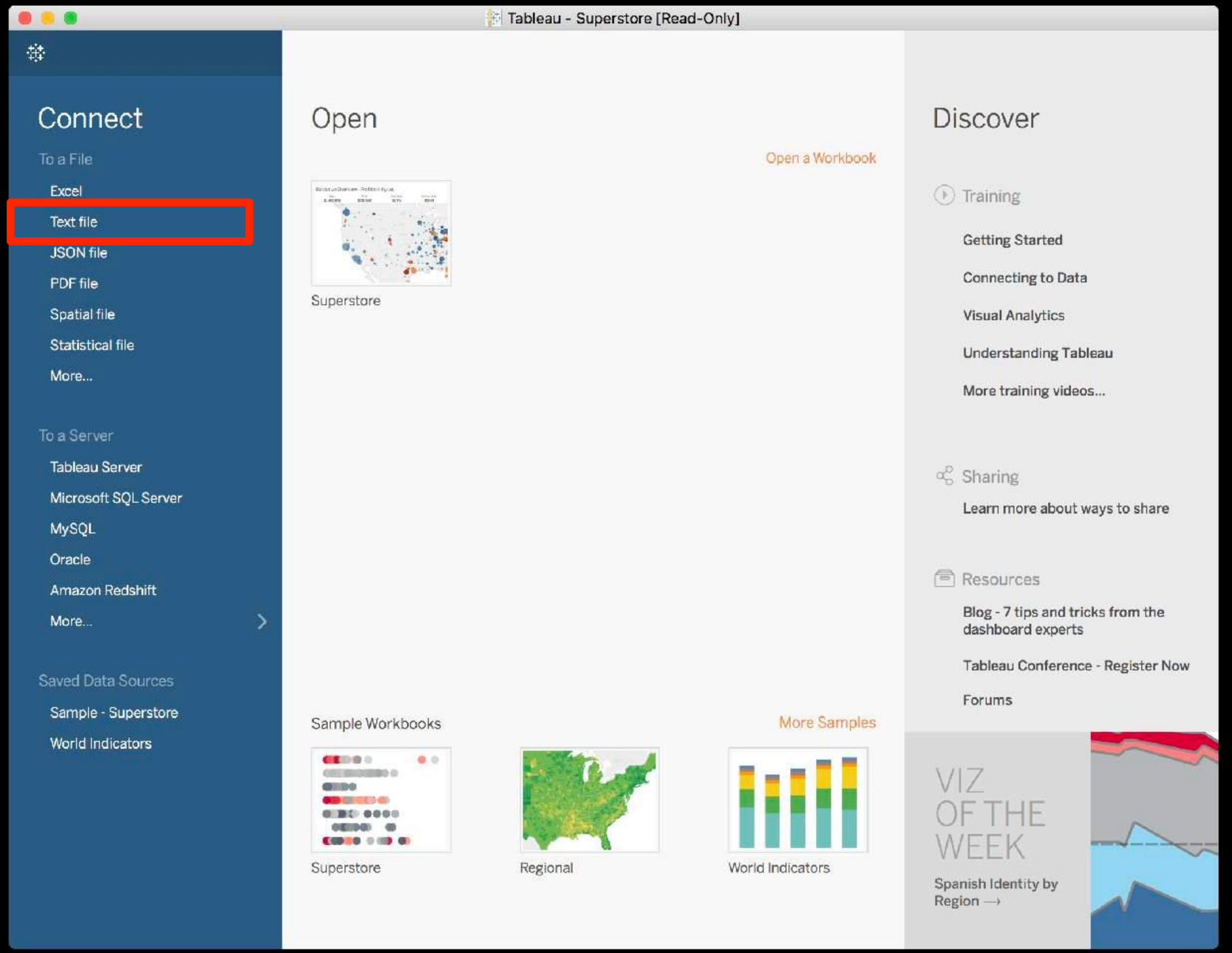


VISUALIZING WORLD POPULATION

Import the data

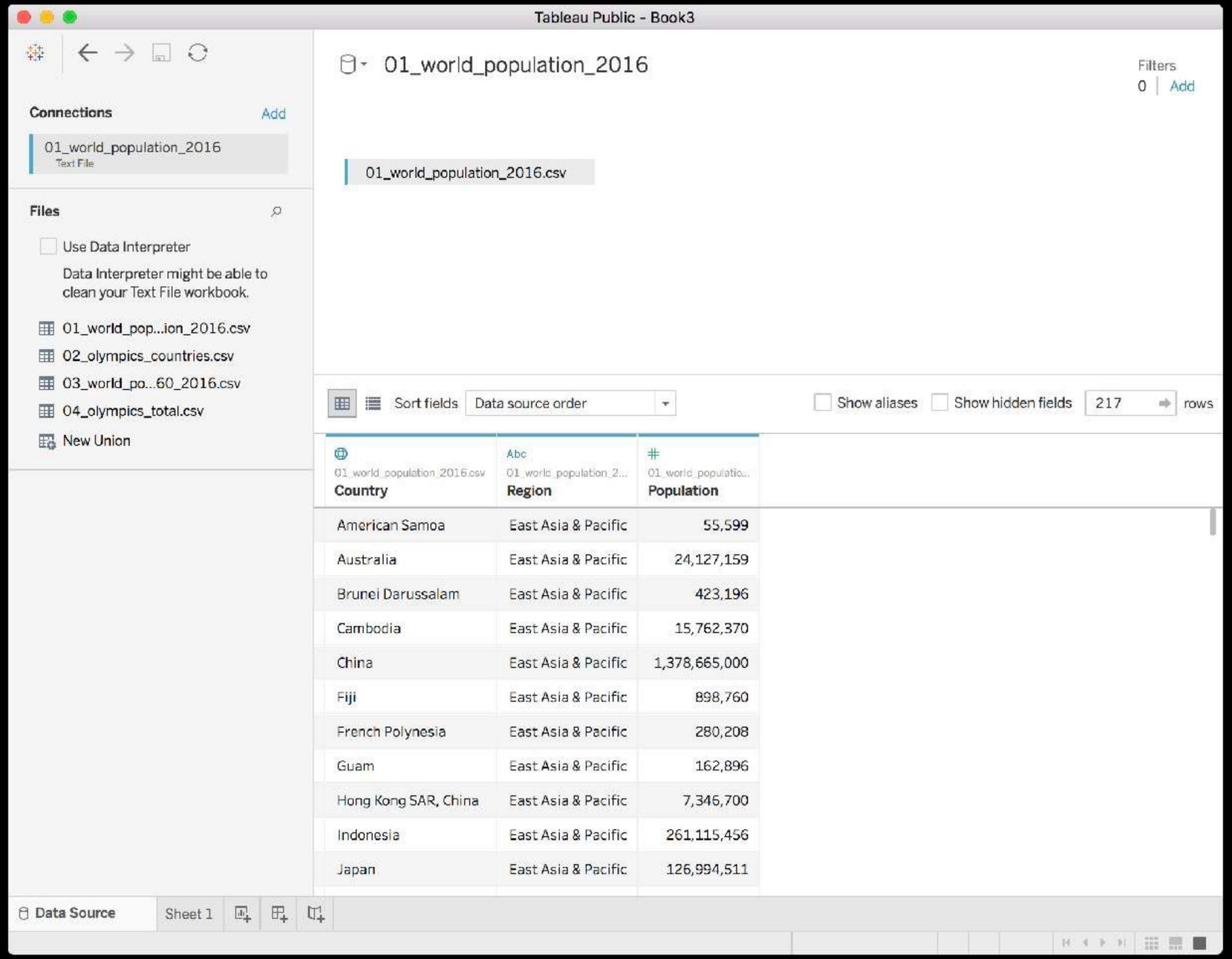
Select "Text file" on the left

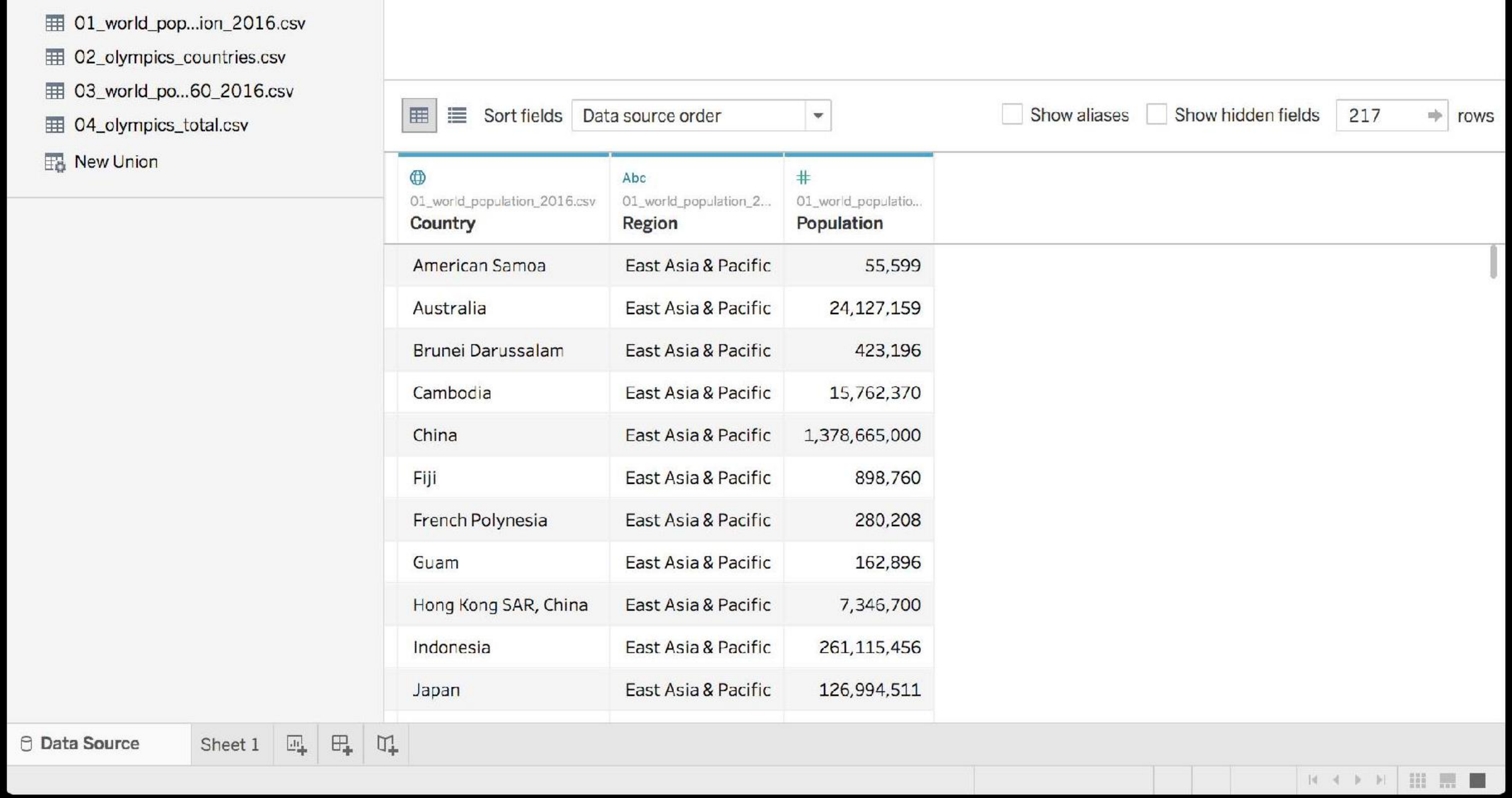
Inside the data folder select 01_world_population_2016.csv



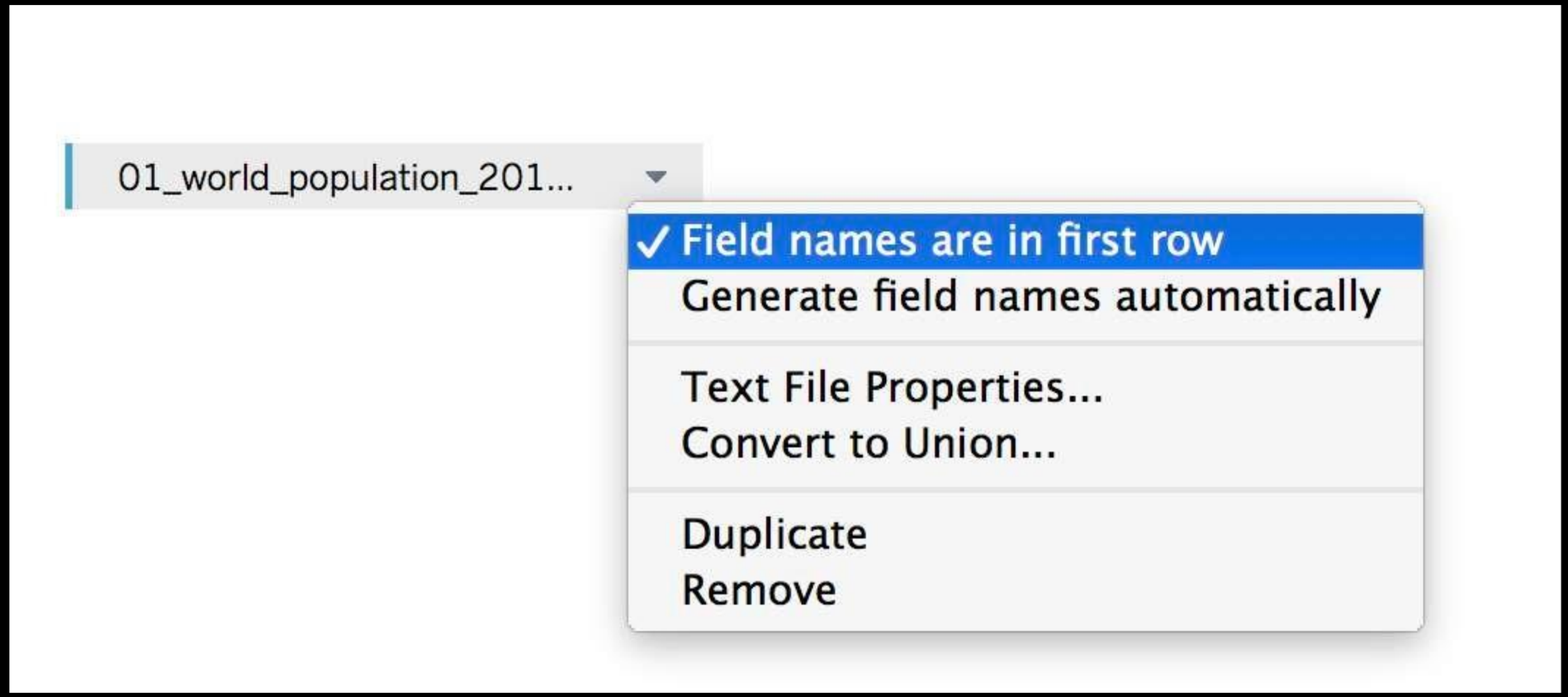
VISUALIZING WORLD POPULATION

Import the data

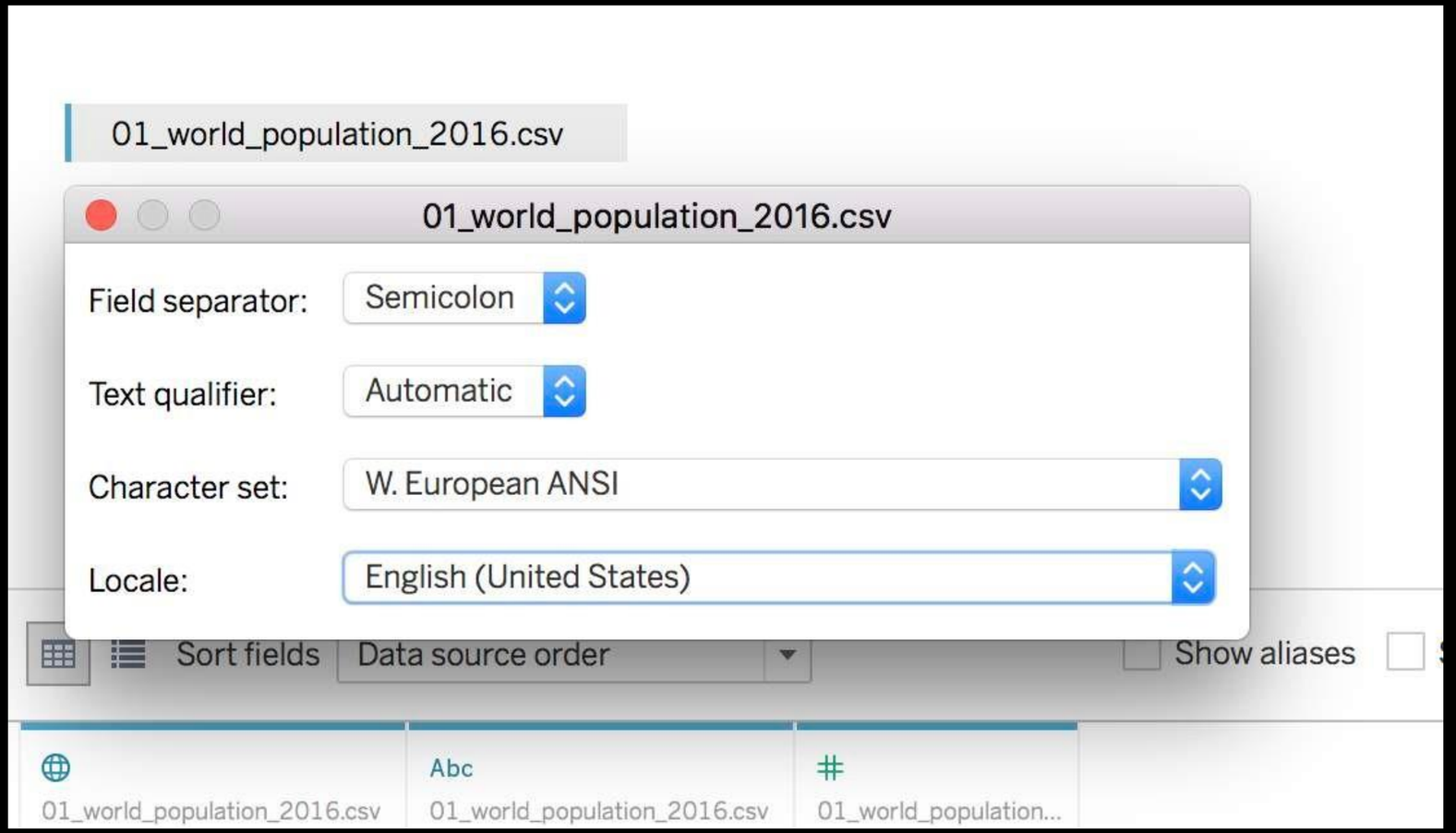




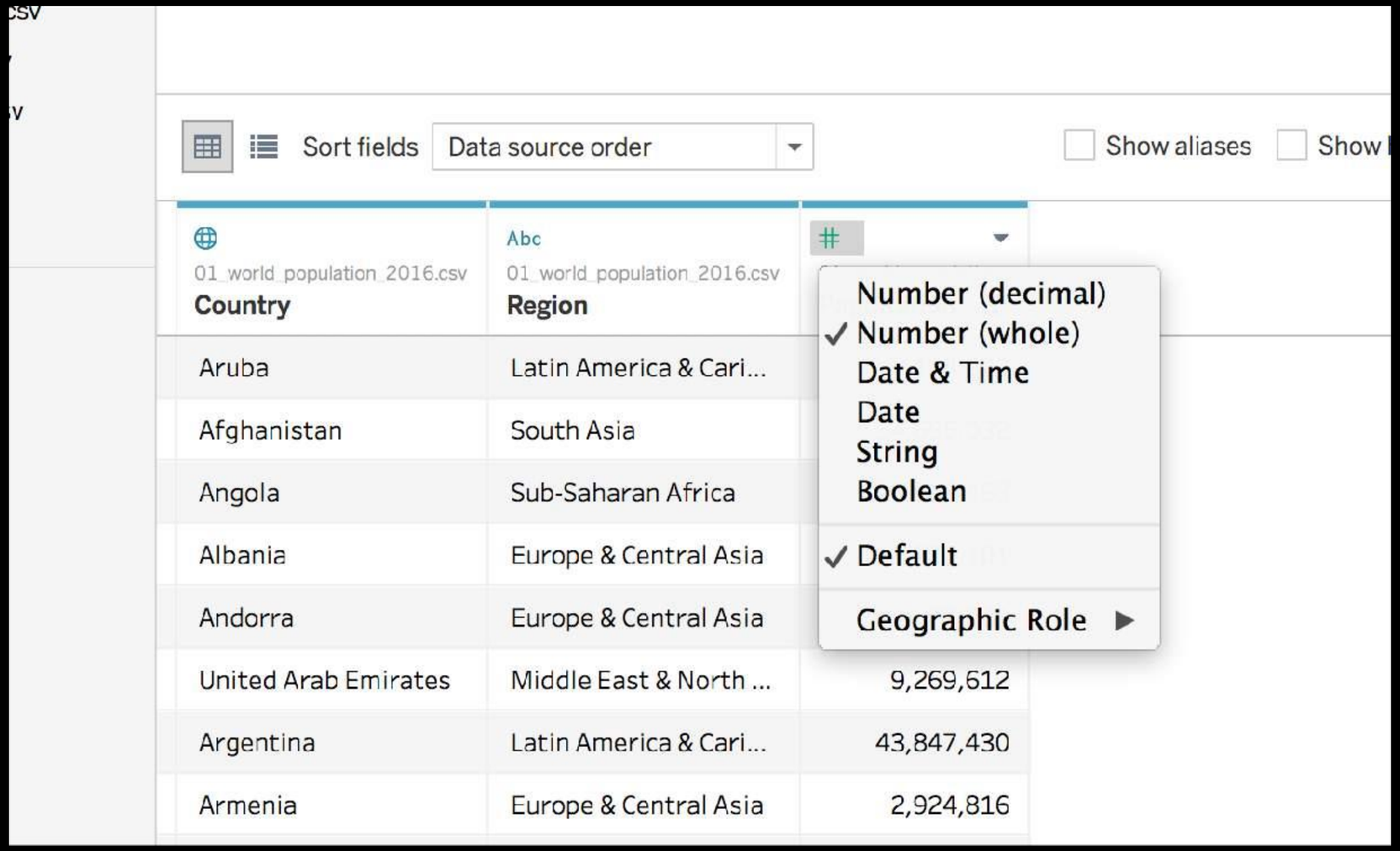
This dataset is about the population of each country in the world in 2016



Be sure this is selected



Be sure text file properties are like this

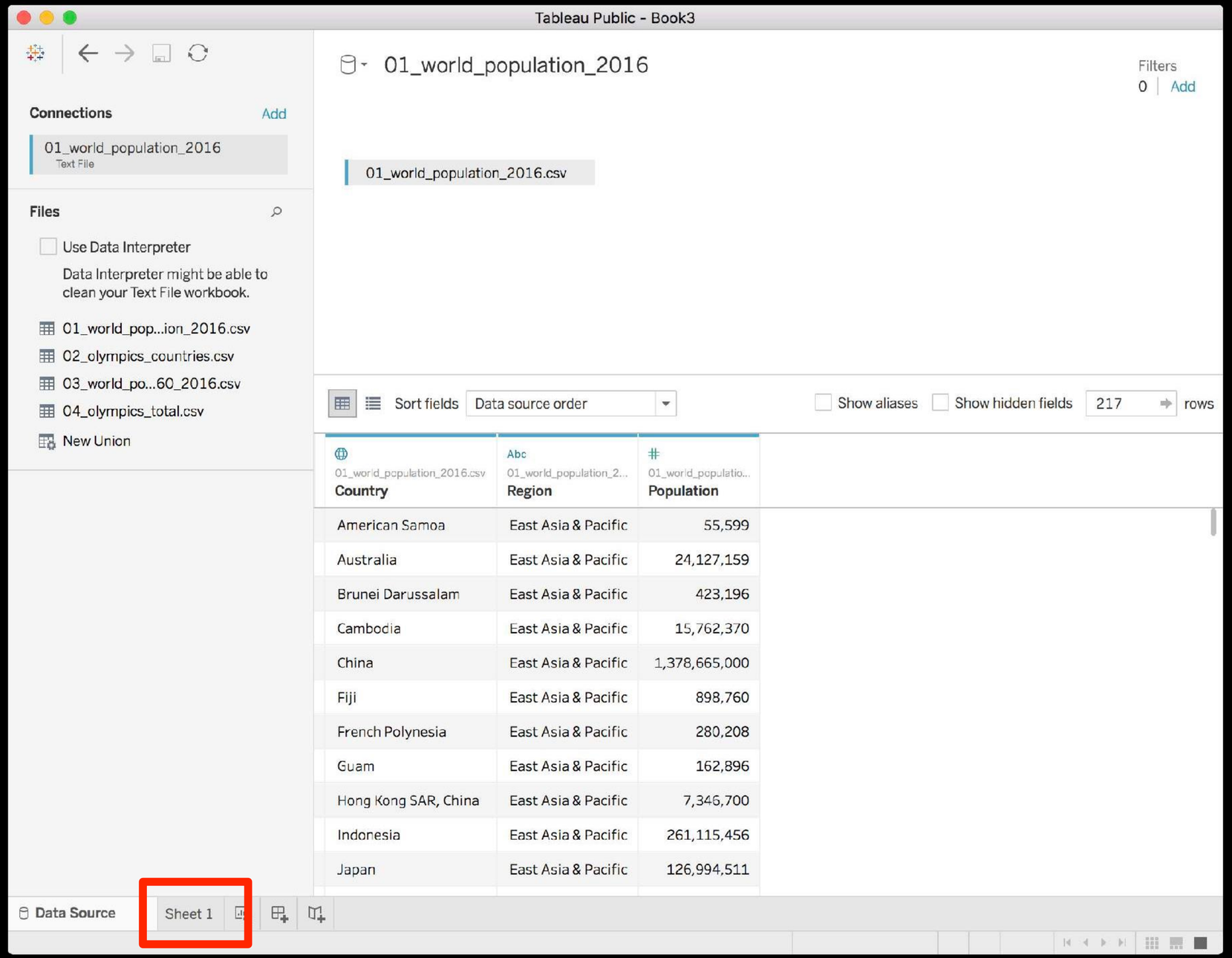


Pay attention to data types

VISUALIZING WORLD POPULATION

Import the data

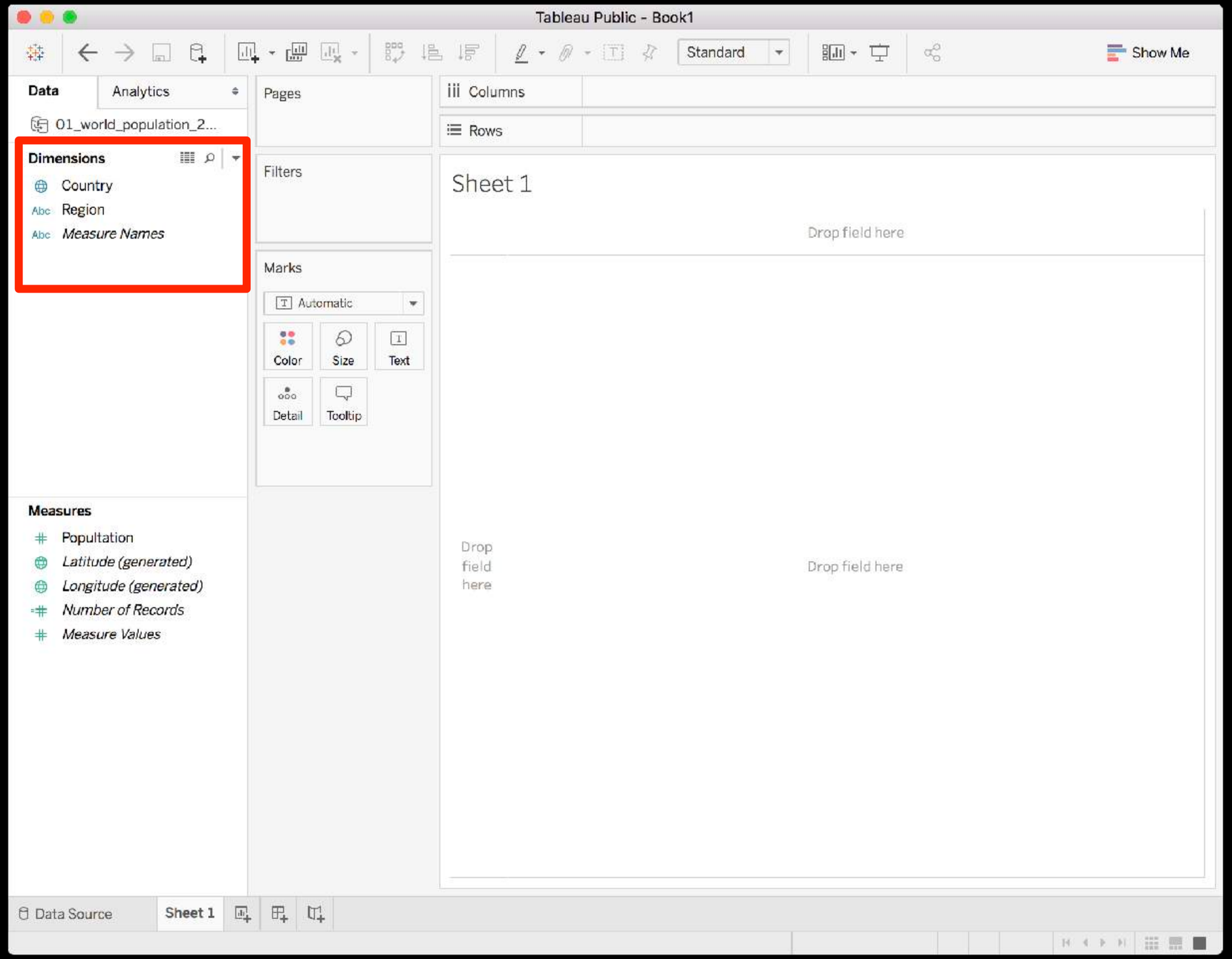
Click on "Sheet 1"



VISUALIZING WORLD POPULATION

Dimensions VS Measures

Dimensions are fields that can't be aggregated (e.g. names, dates, IDs, geographical info)

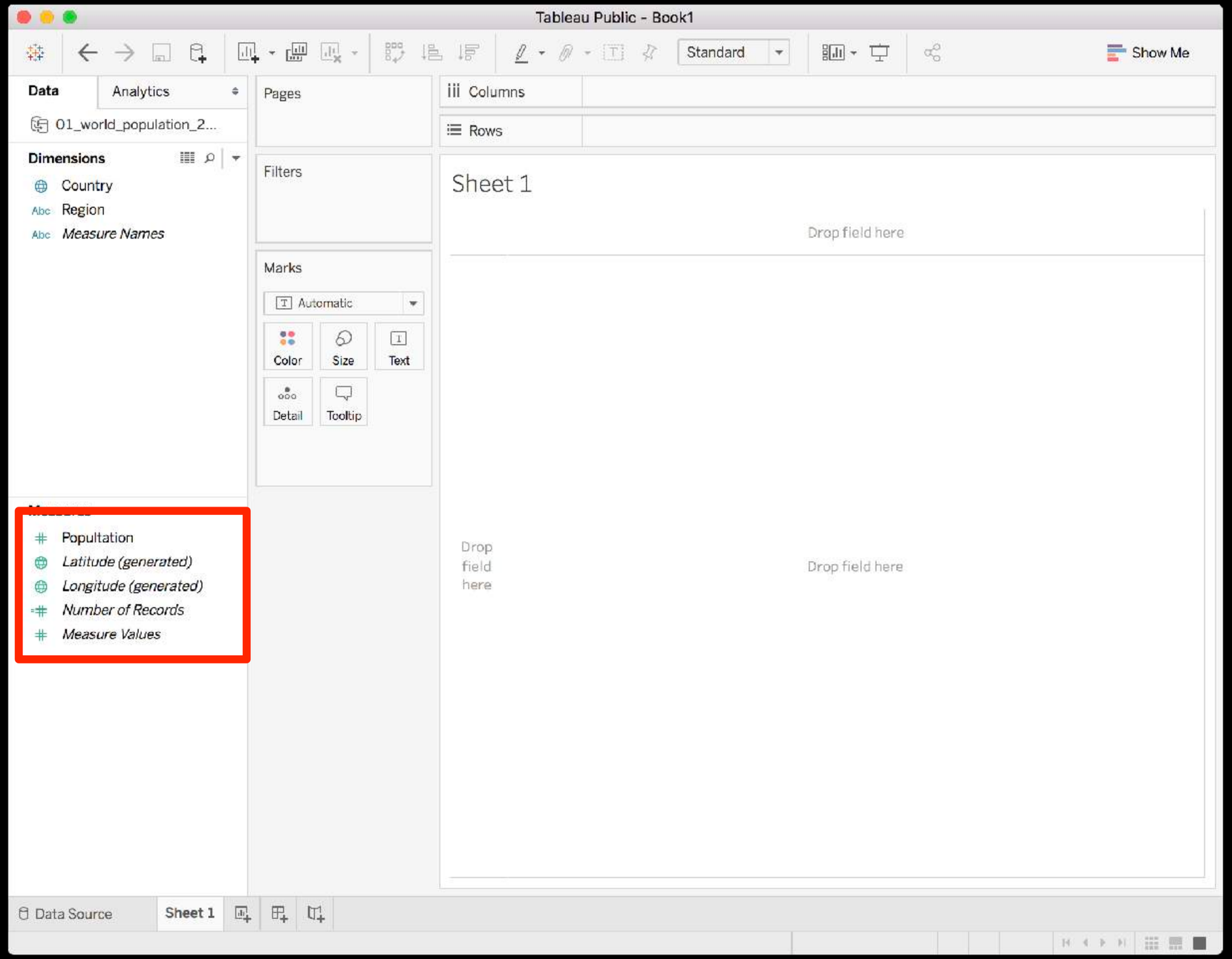


VISUALIZING WORLD POPULATION

Dimensions VS Measures

Measures are records that will be aggregated (summed, averaged, etc) to arrive at some final result.

Inside we have also some generated fields such as "latitude and longitude".

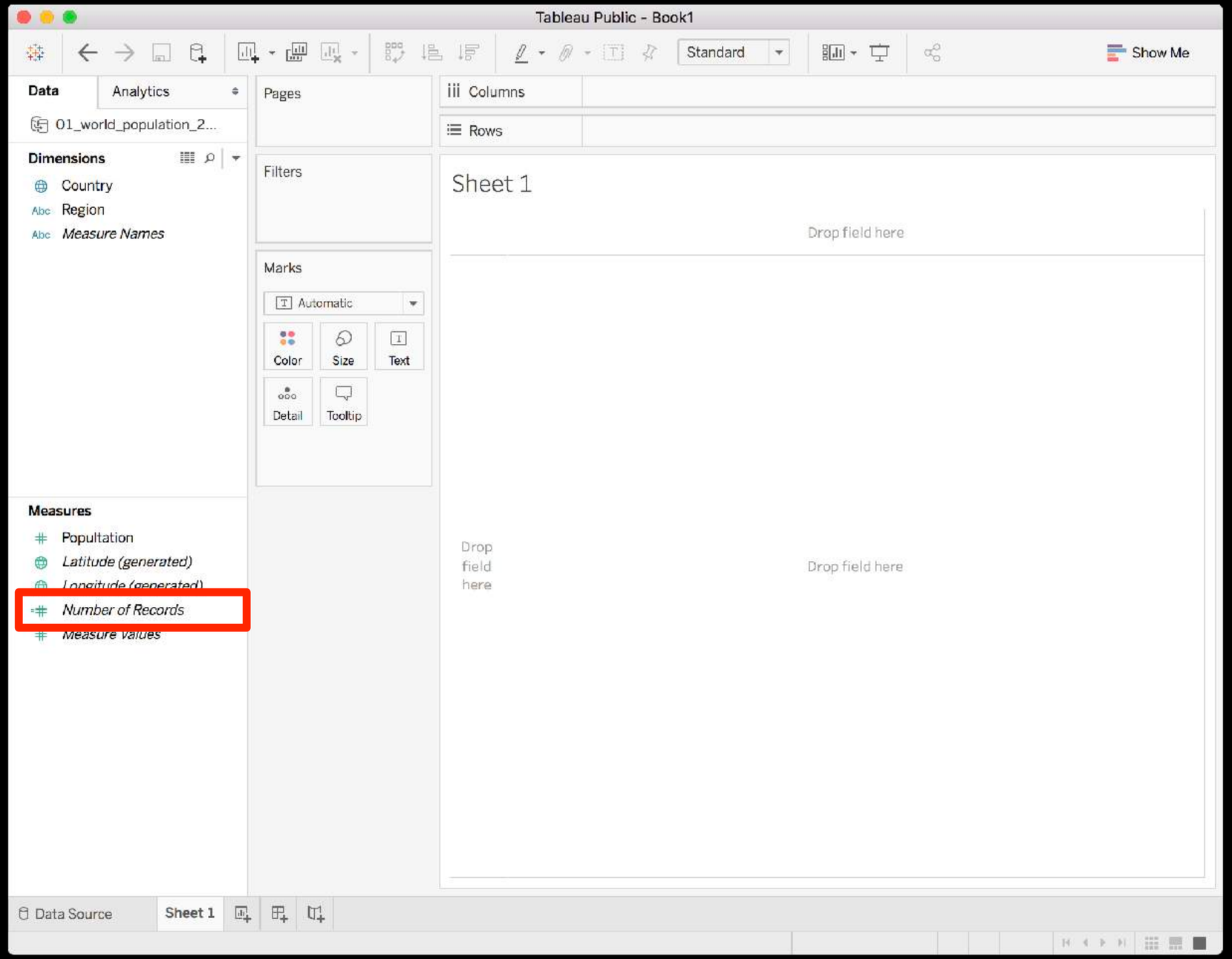


VISUALIZING WORLD POPULATION

Dimensions VS Measures

"Number of Records" is also not part of the underlying data.

This field represents the number of rows in the data source.

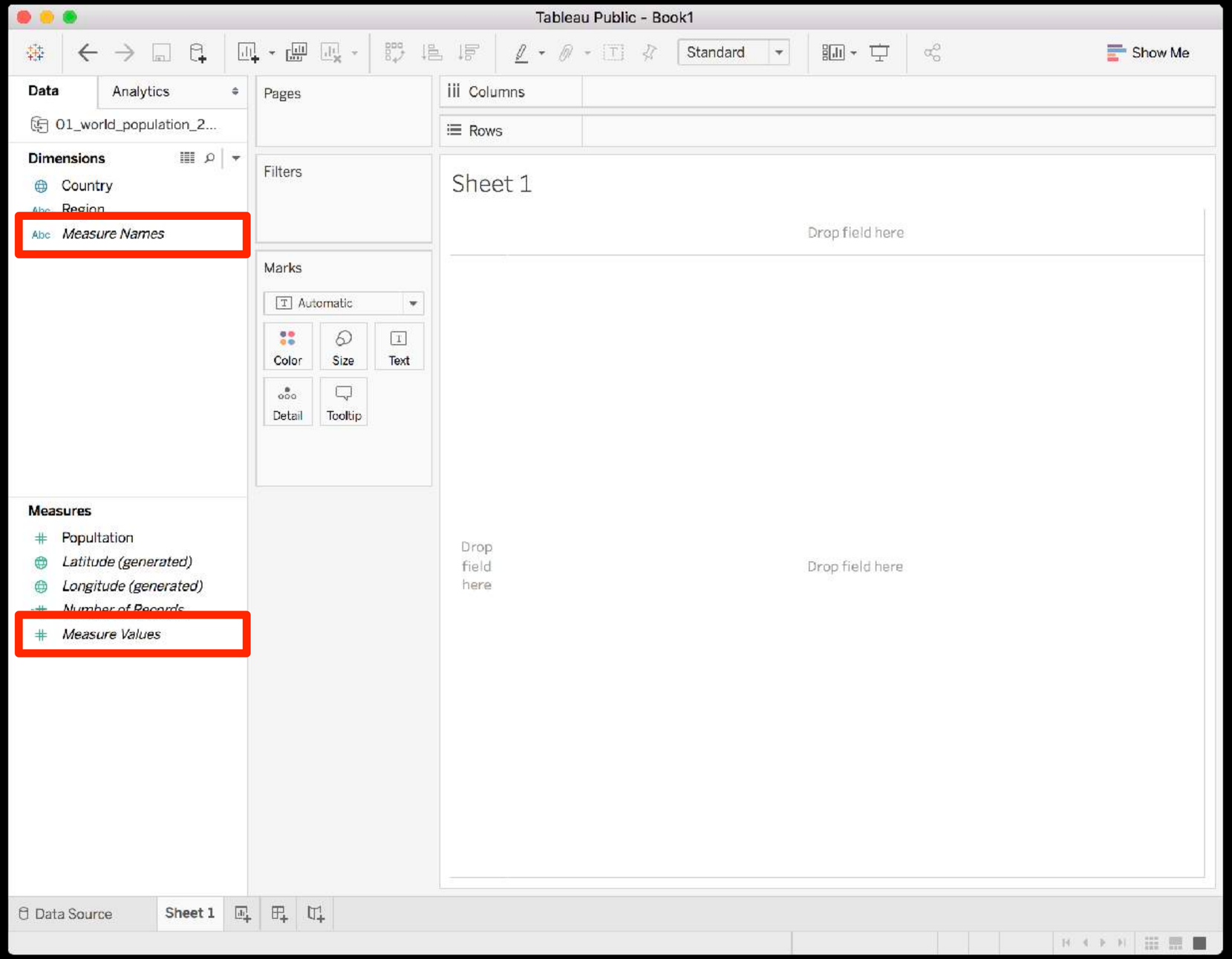


VISUALIZING WORLD POPULATION

Dimensions VS Measures

"Measure names" contains the names of all measures in your data, collected into a single field with discrete values.

"Measure names" contains all the measures in your data, collected into a single field with continuous values.

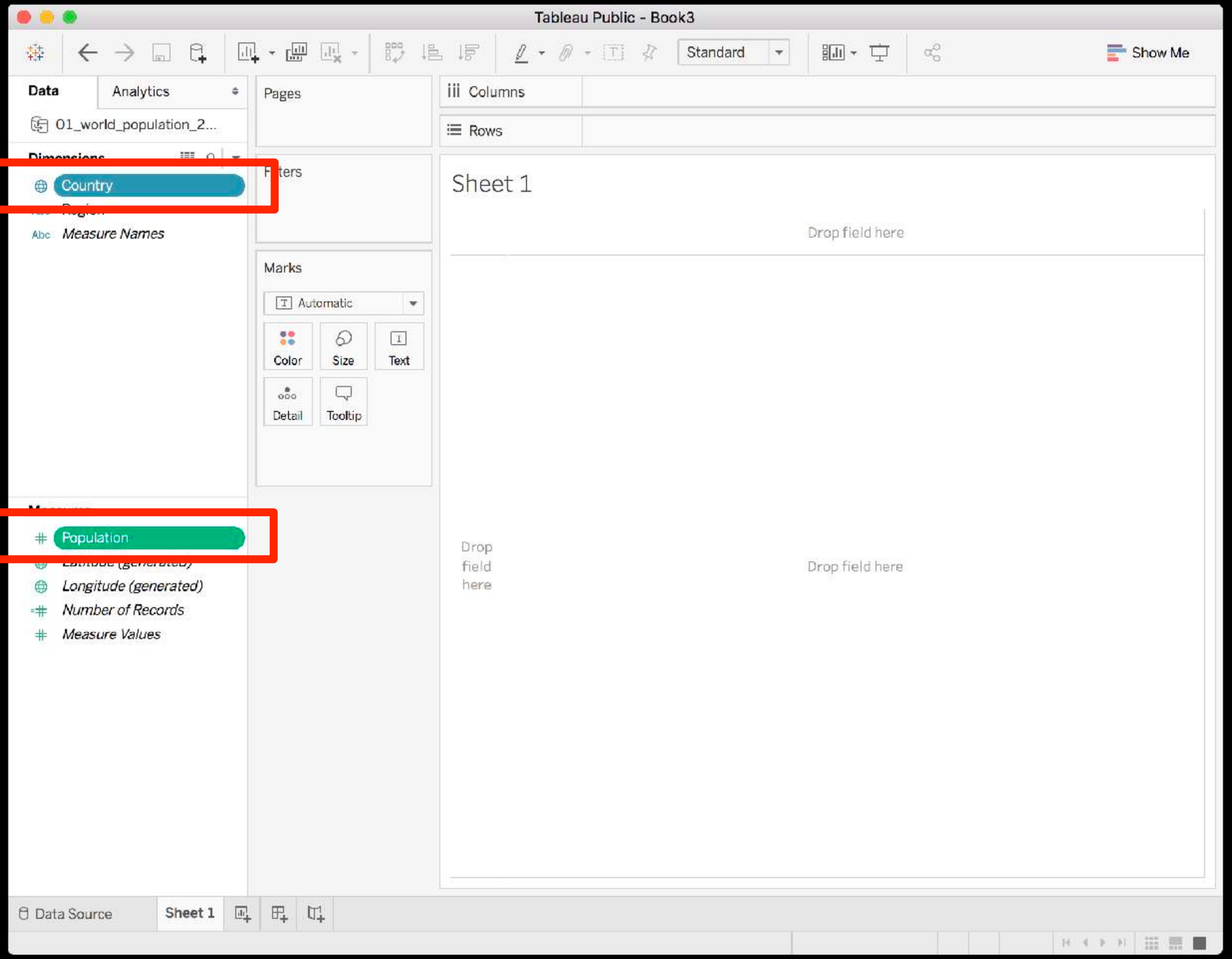


VISUALIZING WORLD POPULATION

Let's make a bar chart

How many people live in each country?

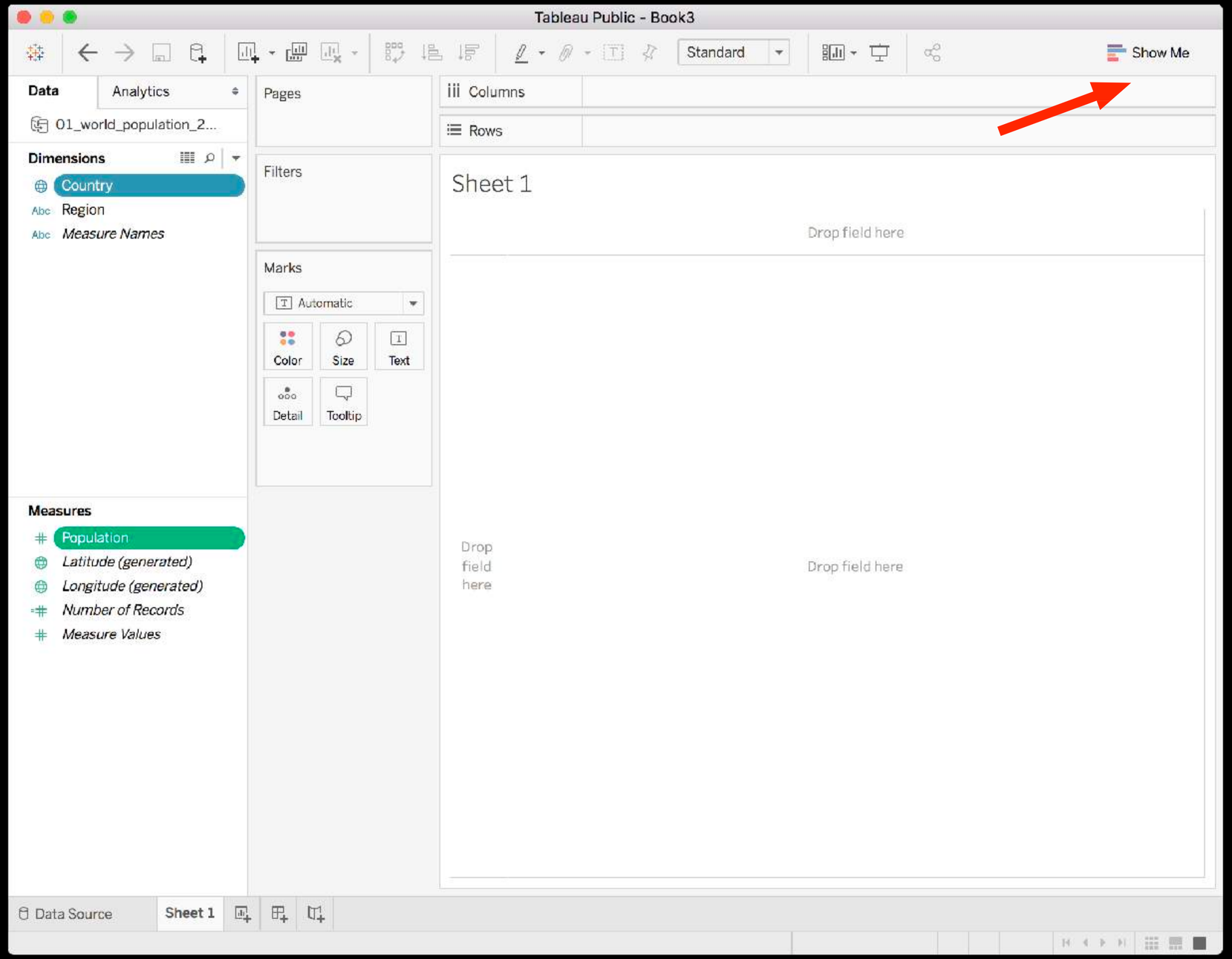
Select "Country" and "Population"



VISUALIZING WORLD POPULATION

Let's make a bar chart

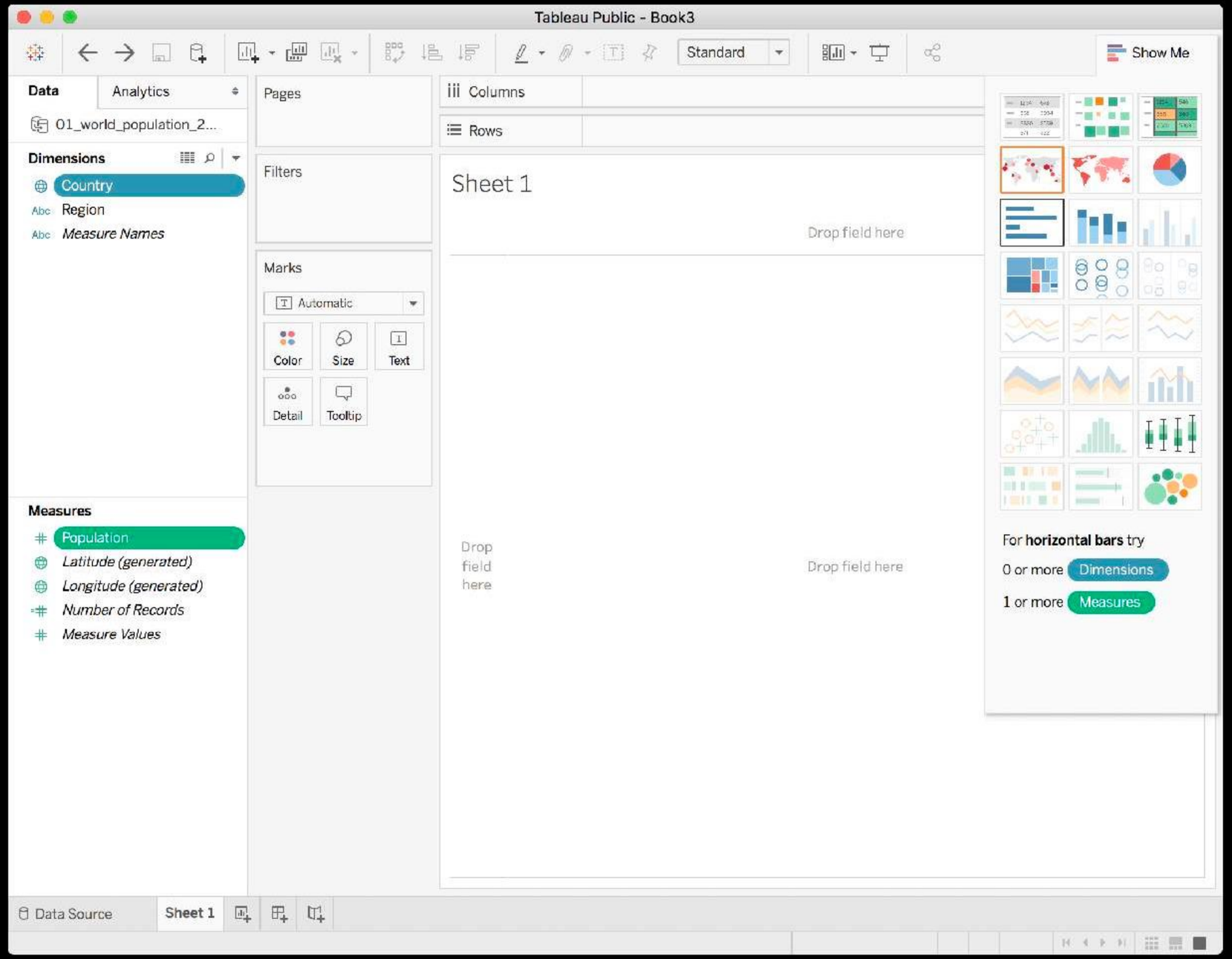
Click on "Show Me"



VISUALIZING WORLD POPULATION

Let's make a bar chart

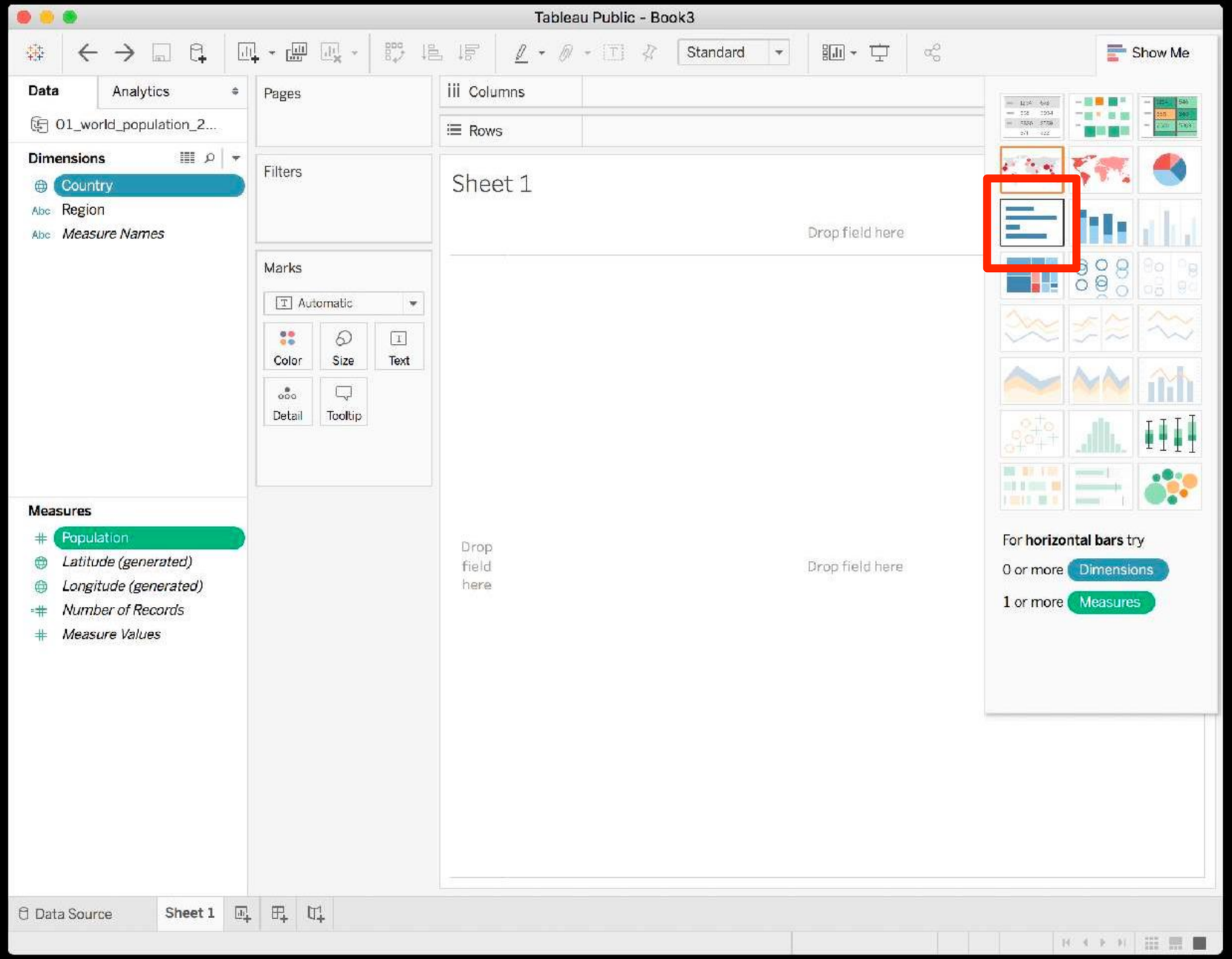
The "Show me" tool shows you the charts you can create according to the dimensions and measures you have selected.



VISUALIZING WORLD POPULATION

Let's make a bar chart

Click on the horizontal bar chart

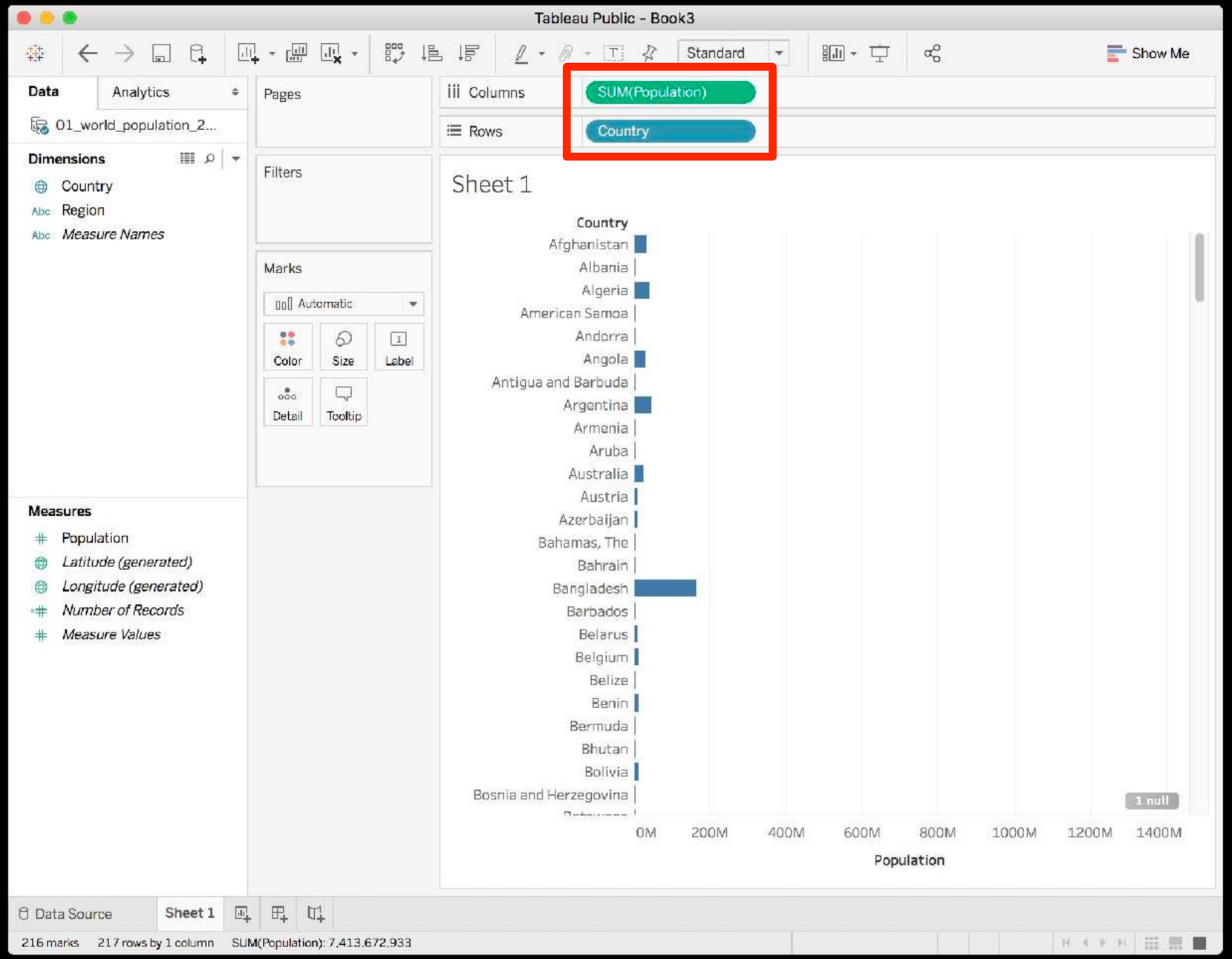


VISUALIZING WORLD POPULATION

The shelves

When you place a dimension on the Rows or Columns shelves, headers for the members of that dimension are created.

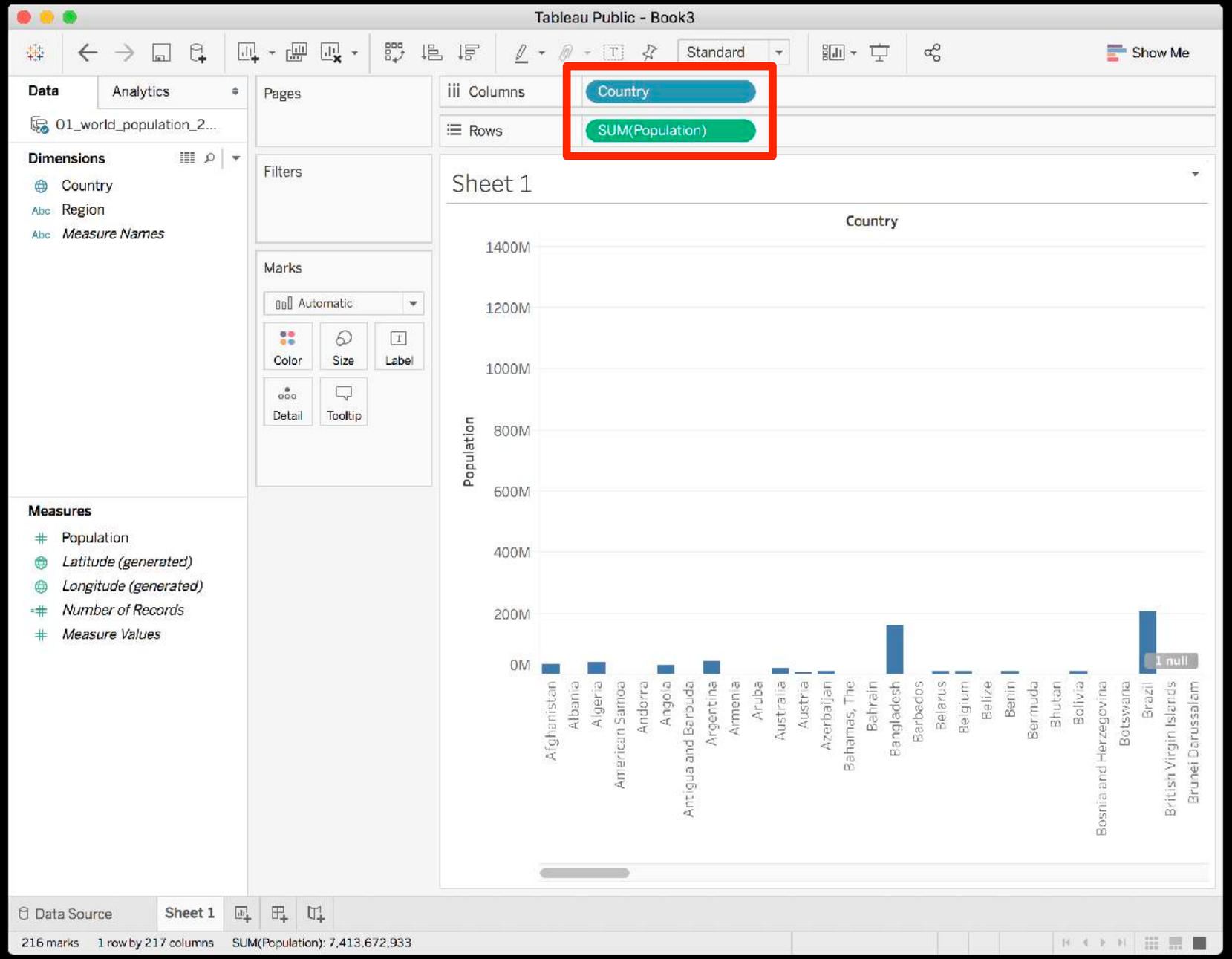
When you place a measure on the Rows or Columns shelf, quantitative axes for that measure are created.



VISUALIZING WORLD POPULATION

The shelves

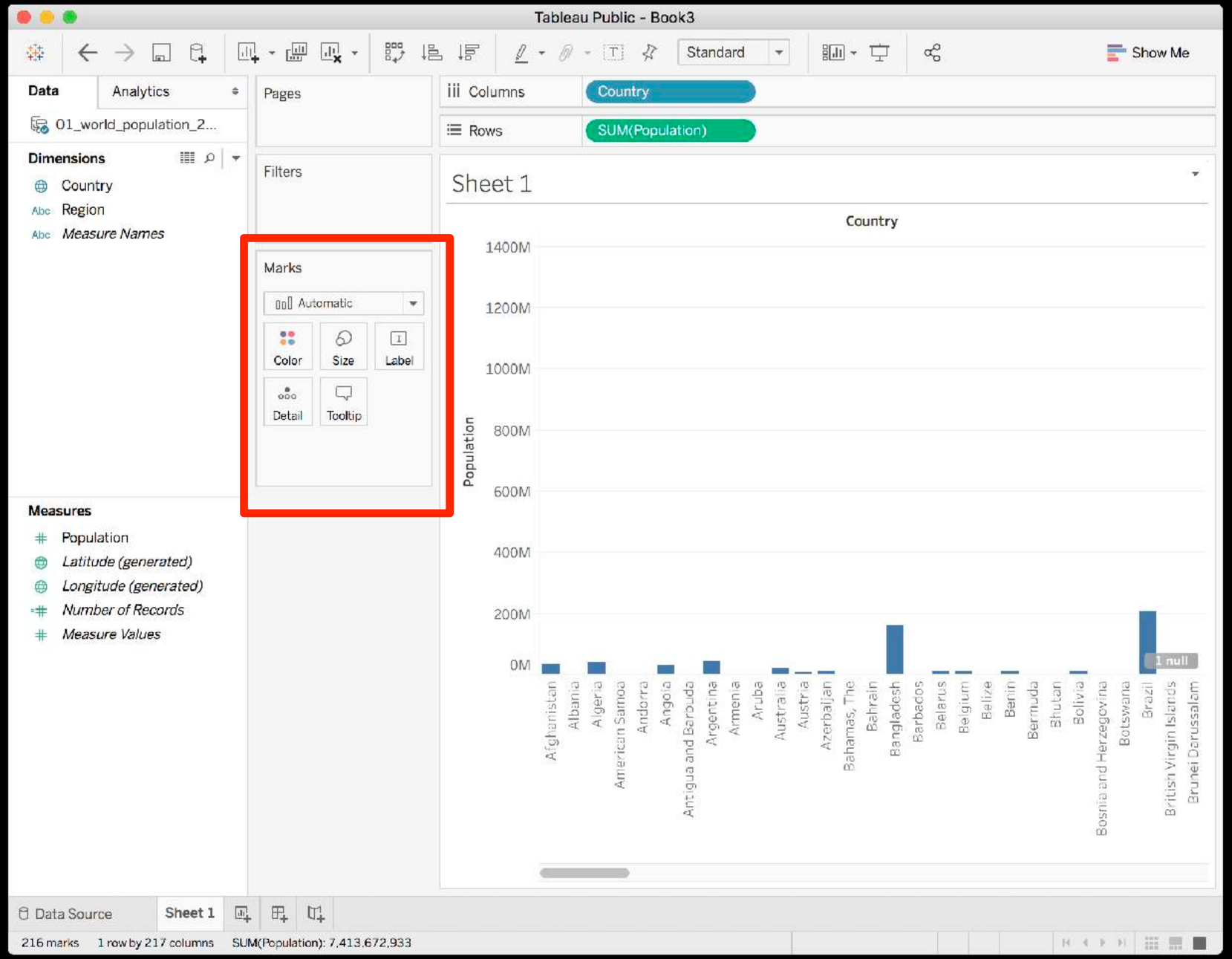
Try to invert the fields on the shelves.



VISUALIZING WORLD POPULATION

Marks

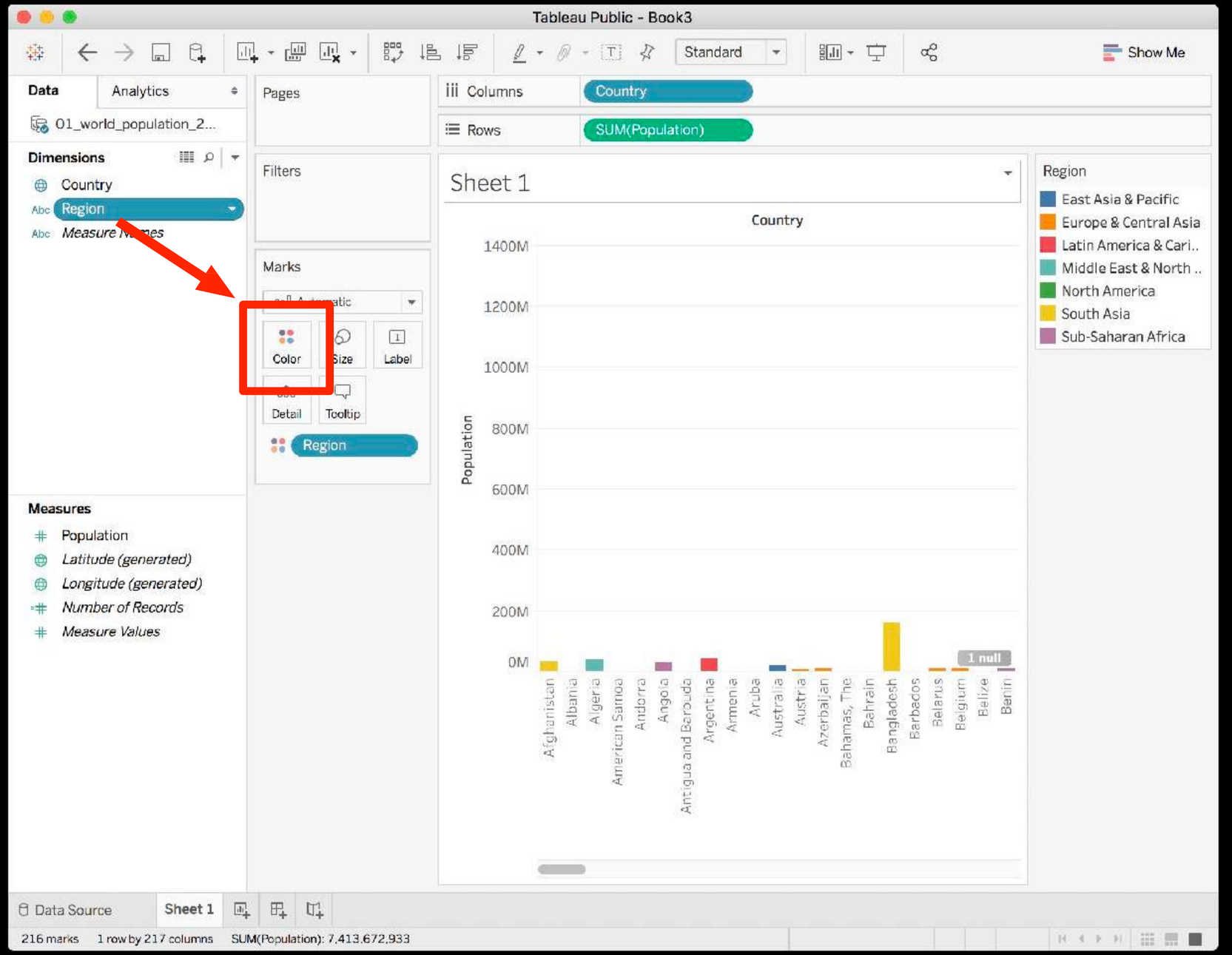
In this area you can manage the marks of your visualization and theirs visual variables.



VISUALIZING WORLD POPULATION

Marks

Drag and drop "region" over "color" to map the color according to the geographical region.



VISUALIZING WORLD POPULATION

Sorting

To sort the bars from the more populated country to the least populated one click on the small icon next to the "population" axis.

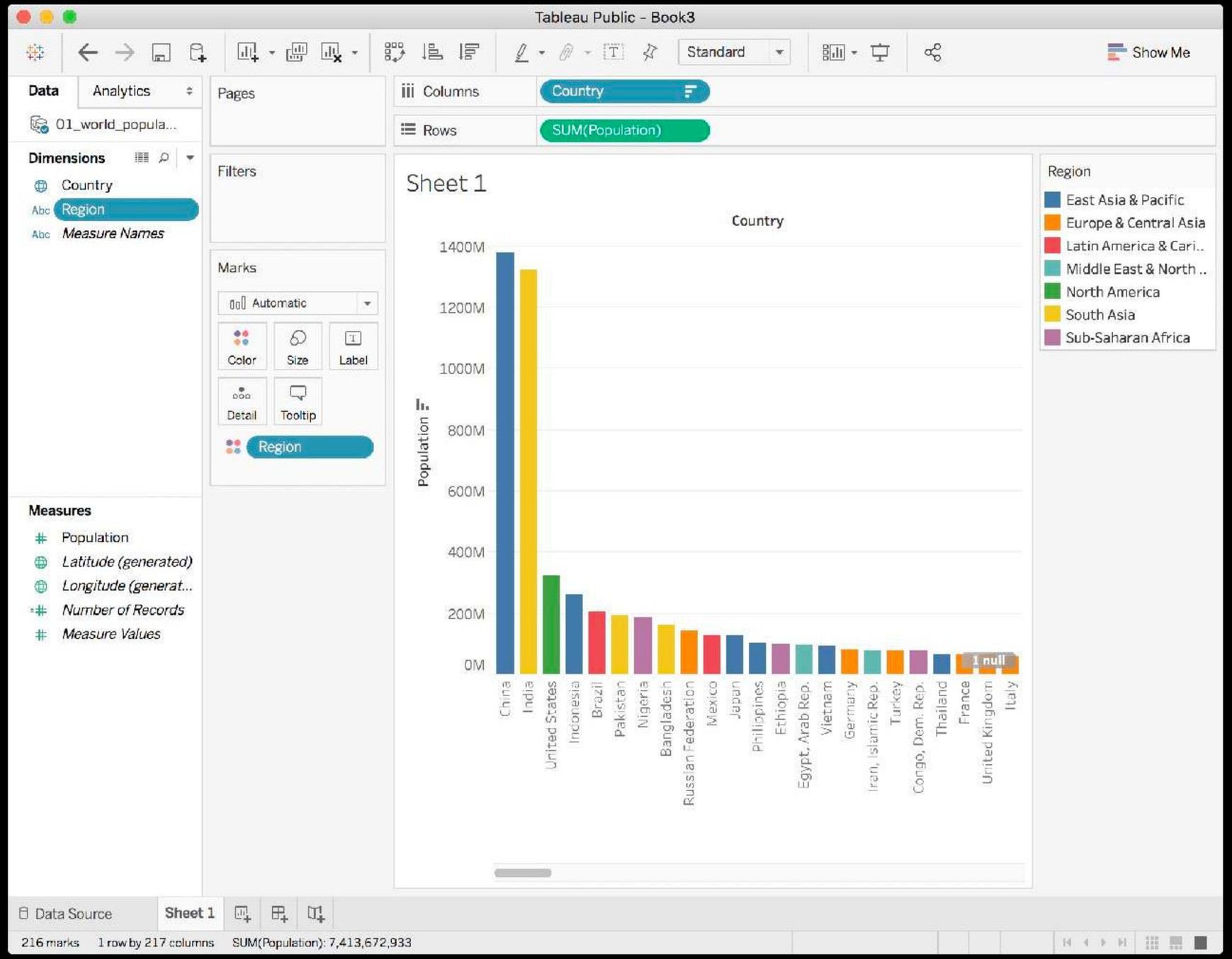
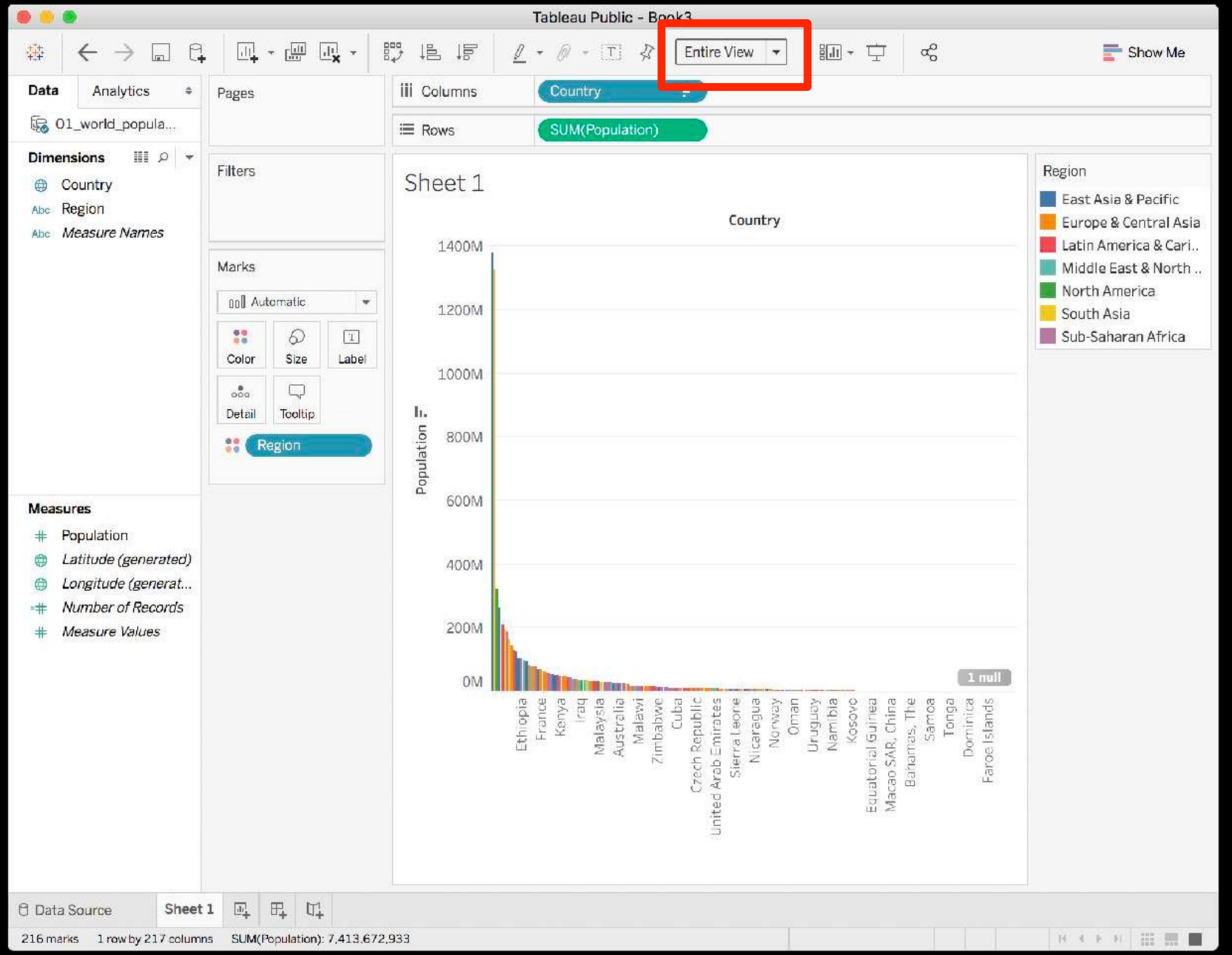


Tableau Public - Book3
Standard
Show Me
Data
Analytics
01_world_popula...
Dimensions
Country
Region
Measure Names
Measures
Population
Latitude (generated)
Longitude (generat...
Number of Records
Measure Values
Pages
Filters
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Region
Columns
Country
Rows
SUM(Population)
Sheet 1
Country
Population
1400M
1200M
1000M
800M
600M
400M
200M
0M
1 null
China
India
United States
Indonesia
Brazil
Pakistan
Nigeria
Bangladesh
Russian Federation
Mexico
Japan
Philippines
Ethiopia
Egypt, Arab Rep.
Vietnam
Germany
Iran, Islamic Rep.
Turkey
Congo, Dem. Rep.
Thailand
France
United Kingdom
Italy
Region
East Asia & Pacific
Europe & Central Asia
Latin America & Cari..
Middle East & North ..
North America
South Asia
Sub-Saharan Africa
Data Source
Sheet 1
216 marks
1 row by 217 columns
SUM(Population): 7,413,672,933

VISUALIZING WORLD POPULATION

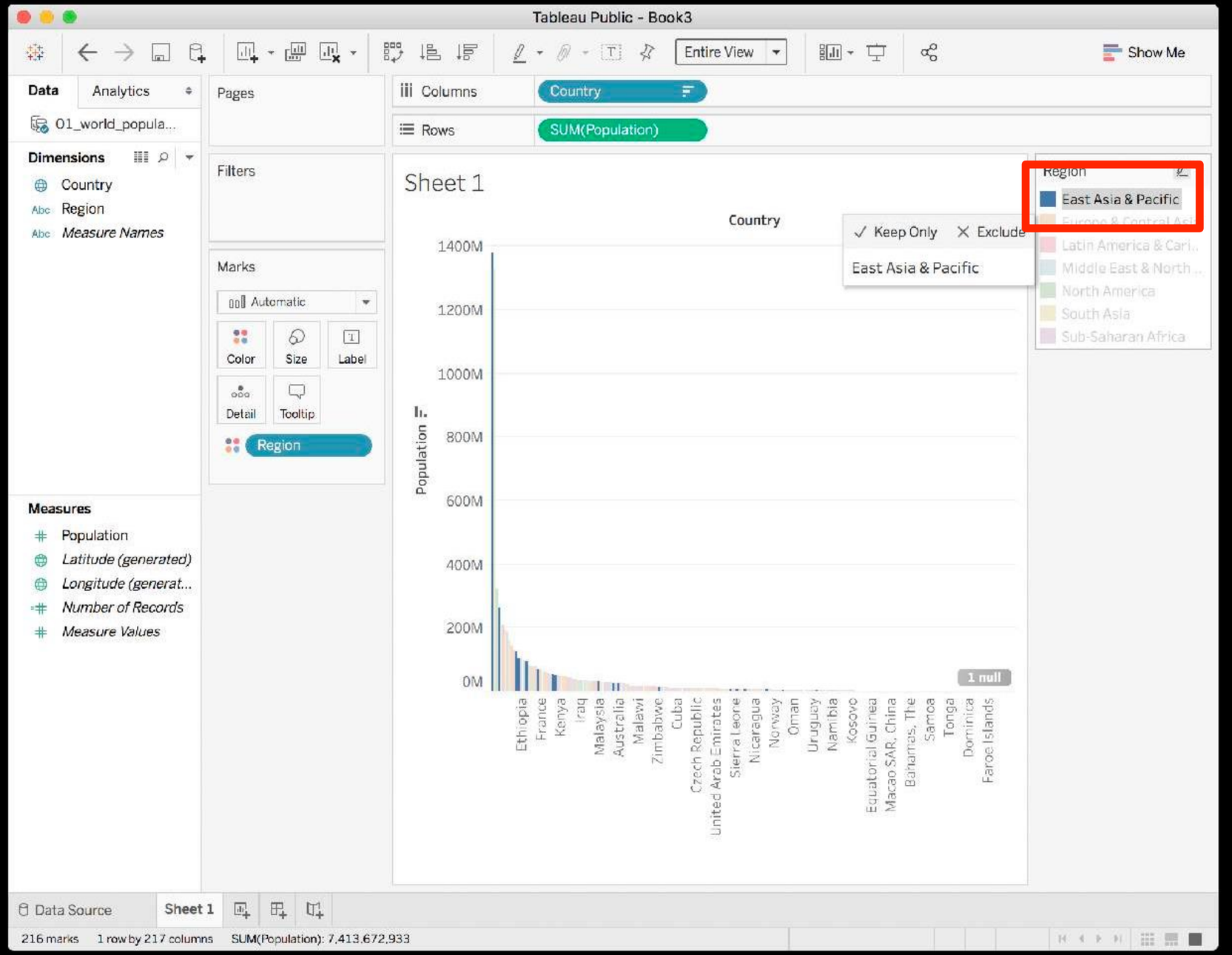
Display options

Click on the dropdown to change fit the visualization in the window.



VISUALIZING WORLD POPULATION

Interact with the legend to highlight categories

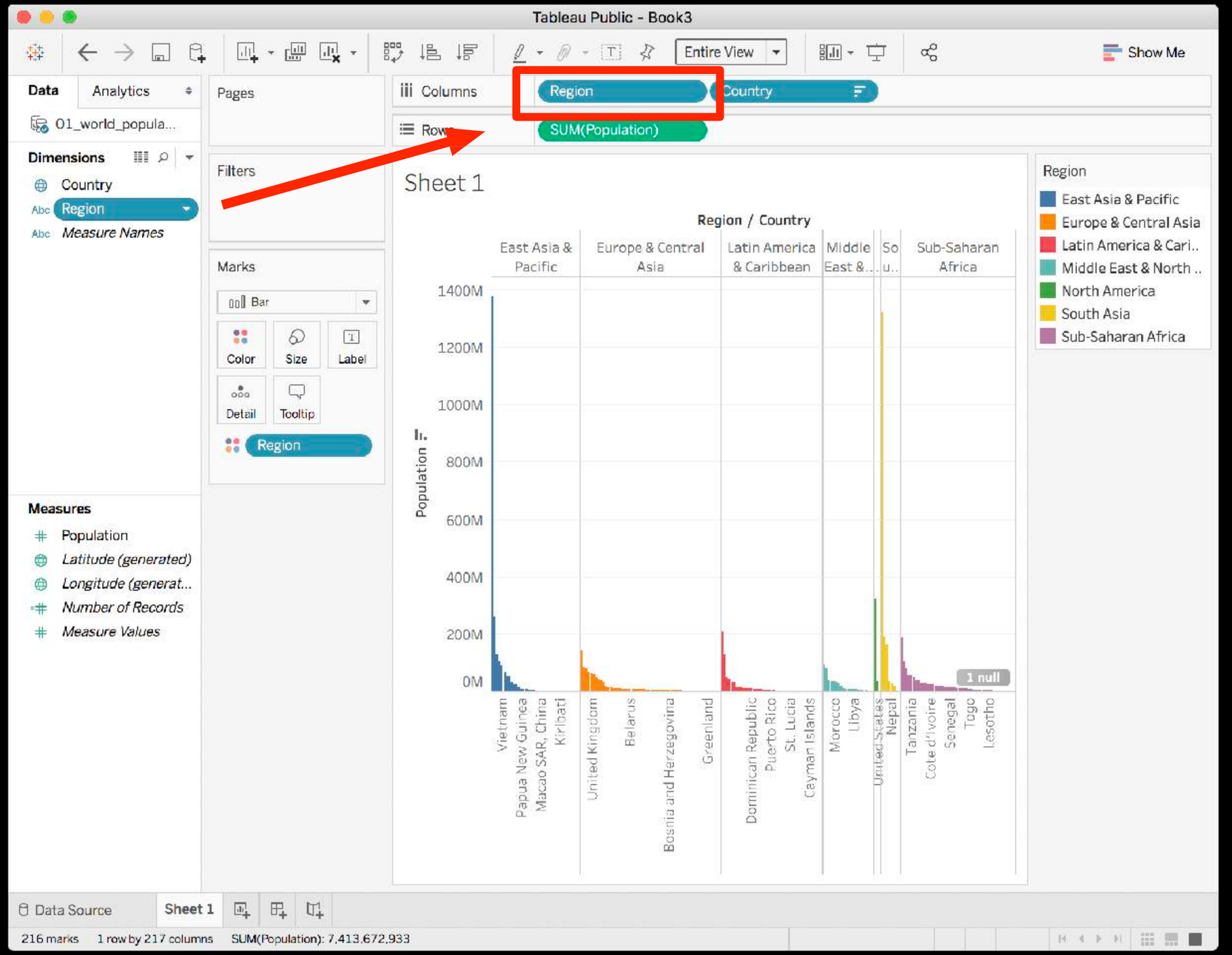


VISUALIZING WORLD POPULATION

Let's group countries by region

Drag and drop "region" next to countries.

As you add more fields to the shelves, additional headers and axes are included in the table and you get an increasingly detailed picture of your data.

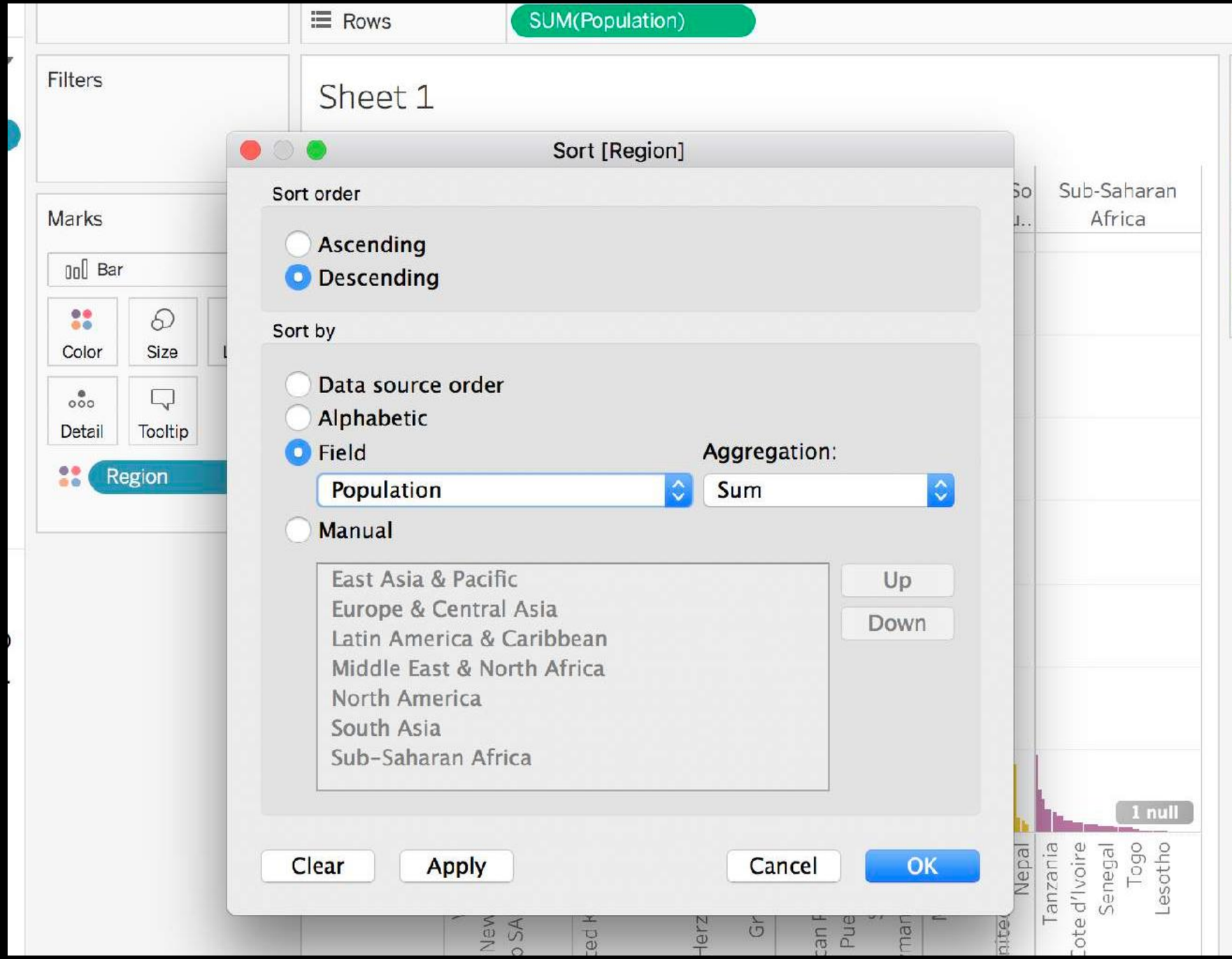


VISUALIZING WORLD POPULATION

Let's sort regions

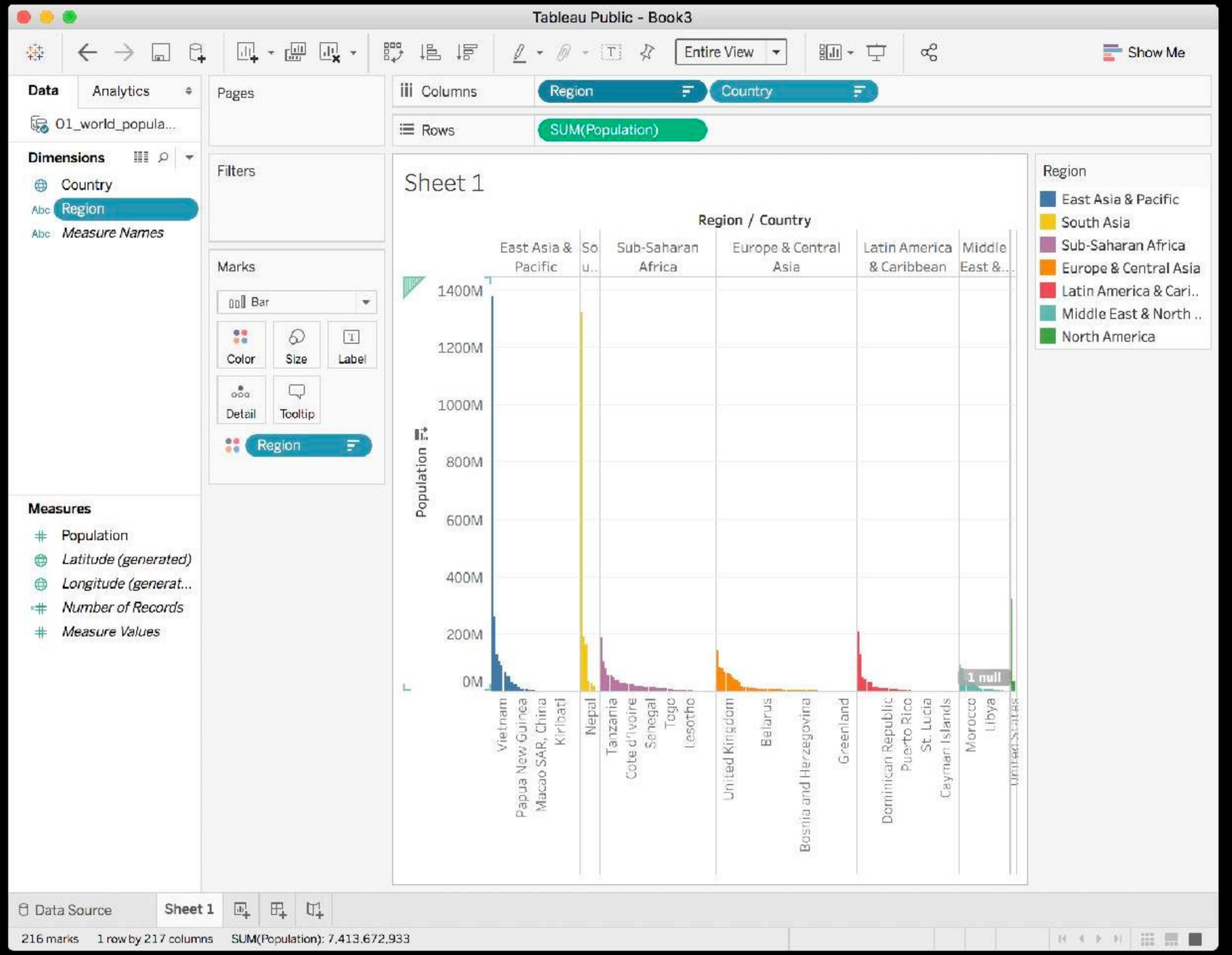
Click on the dropdown next to "region" on "Columns" and select "Sort".

Change the sorting settings in this way.



VISUALIZING WORLD POPULATION

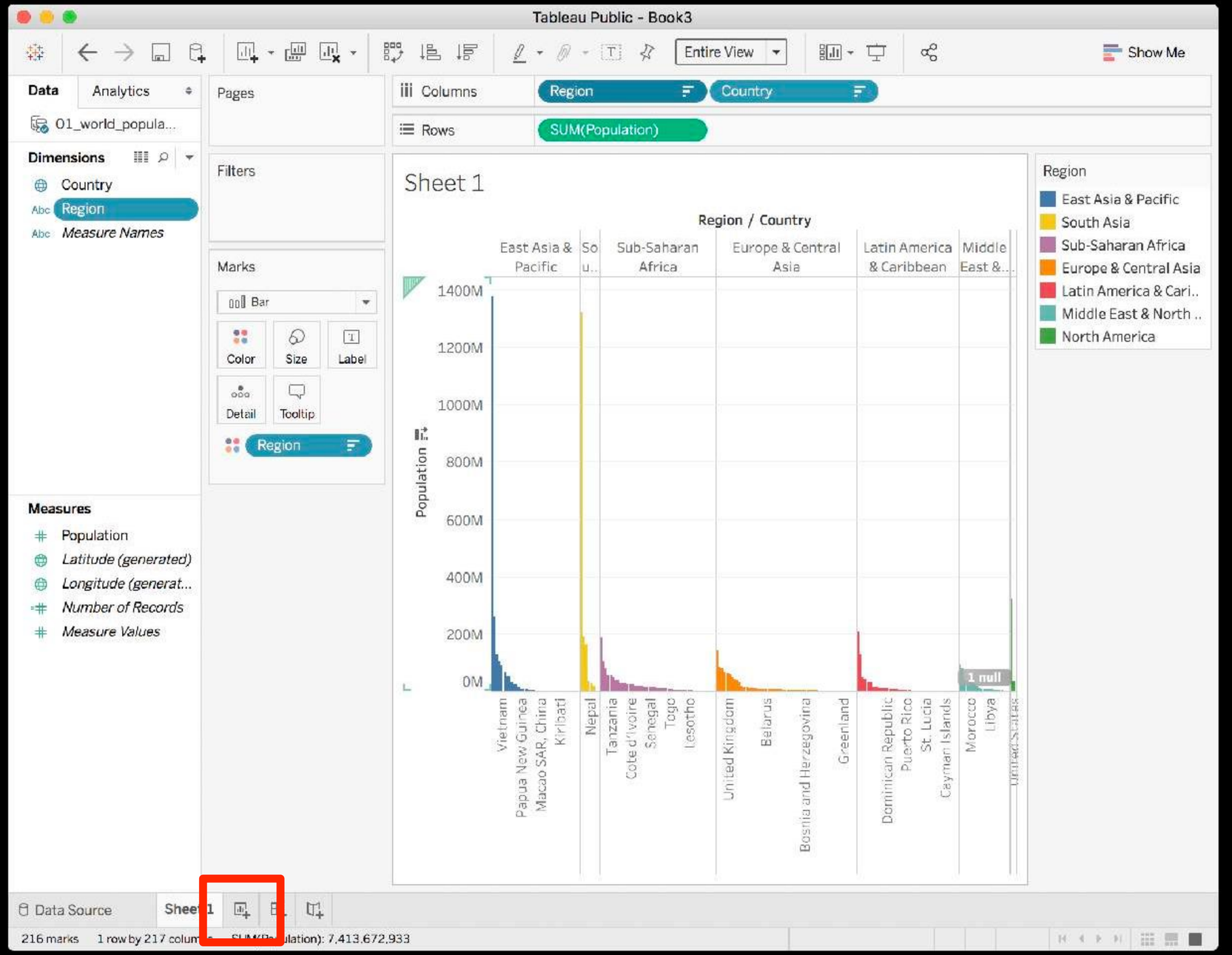
Let's sort regions



VISUALIZING WORLD POPULATION

Let's make a treemap

Create a new sheet.

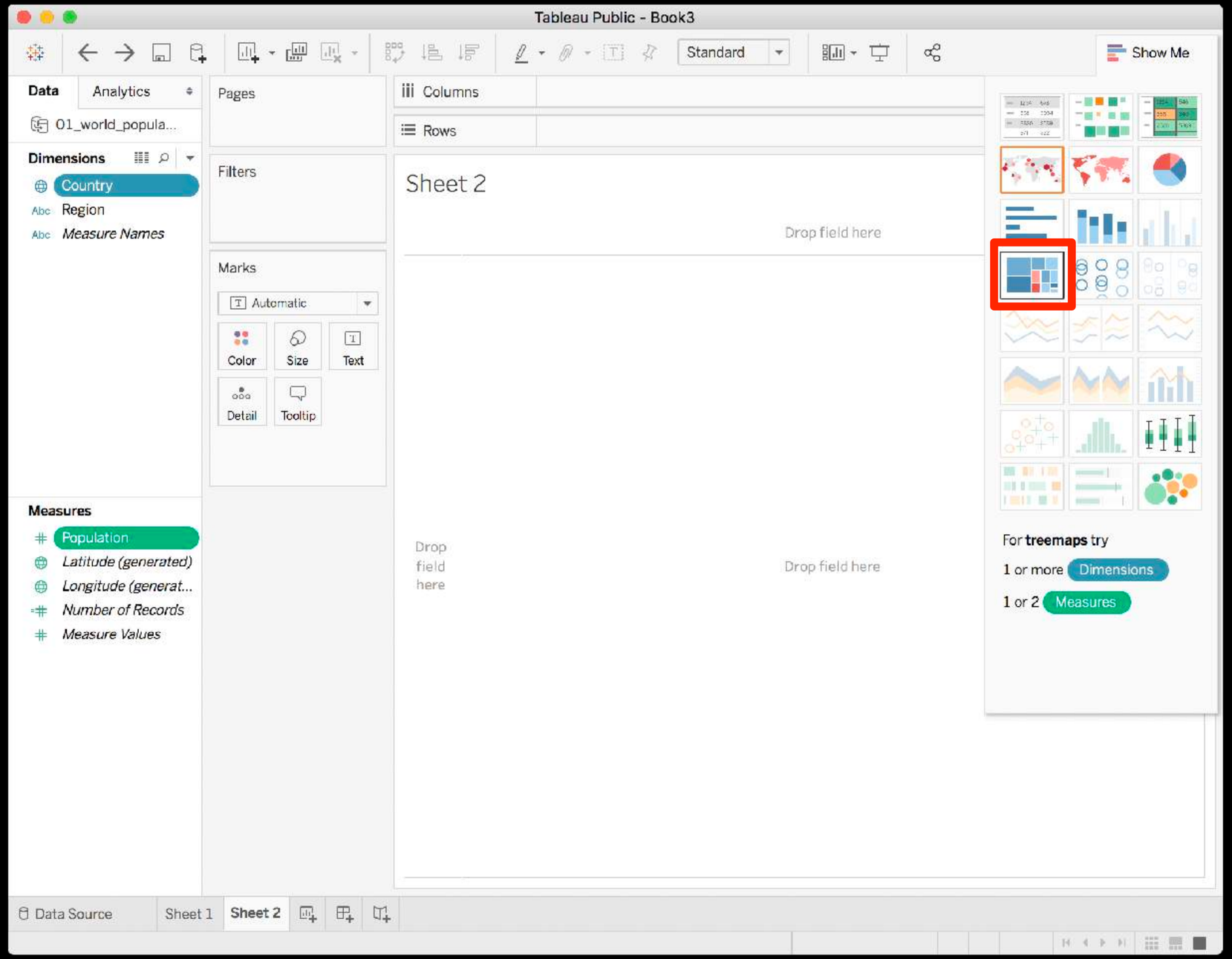


VISUALIZING WORLD POPULATION

Let's make a treemap

Select "Country" and "Population".

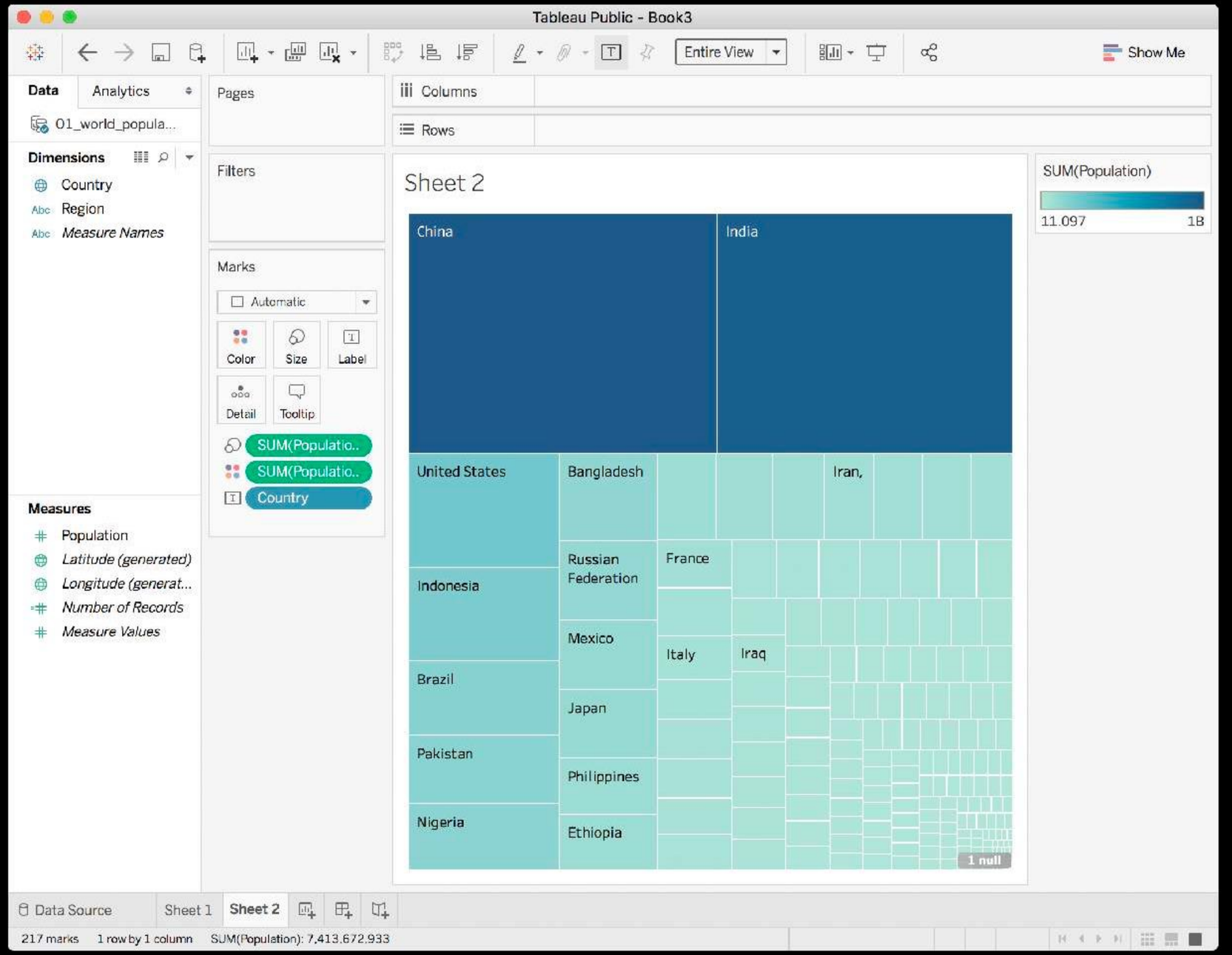
Click on "treemap" in the "show me" panel.



VISUALIZING WORLD POPULATION

Let's make a treemap

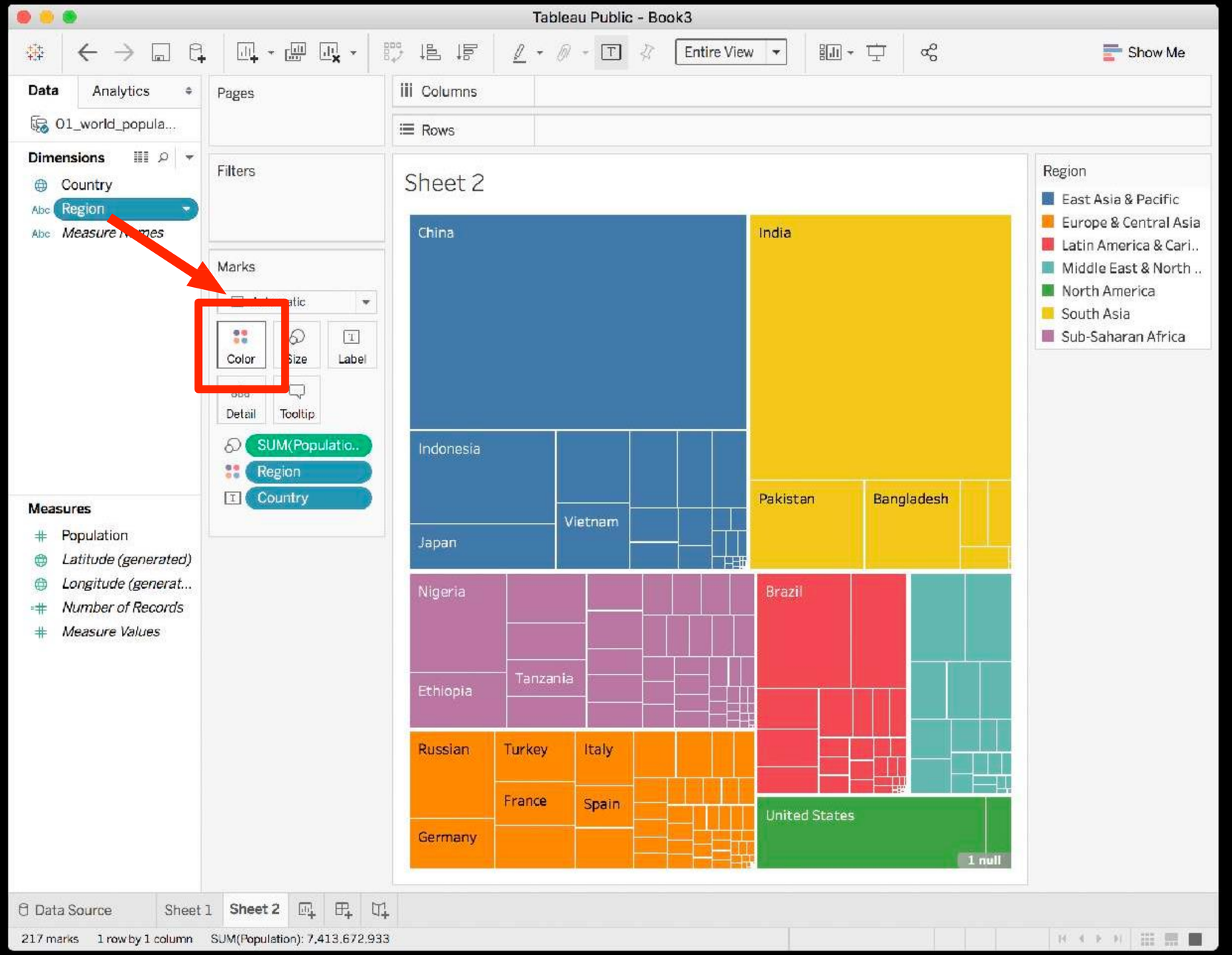
Tableau automatically mapped the size and the color of the rectangles on the "Population".



VISUALIZING WORLD POPULATION

Let's make a treemap

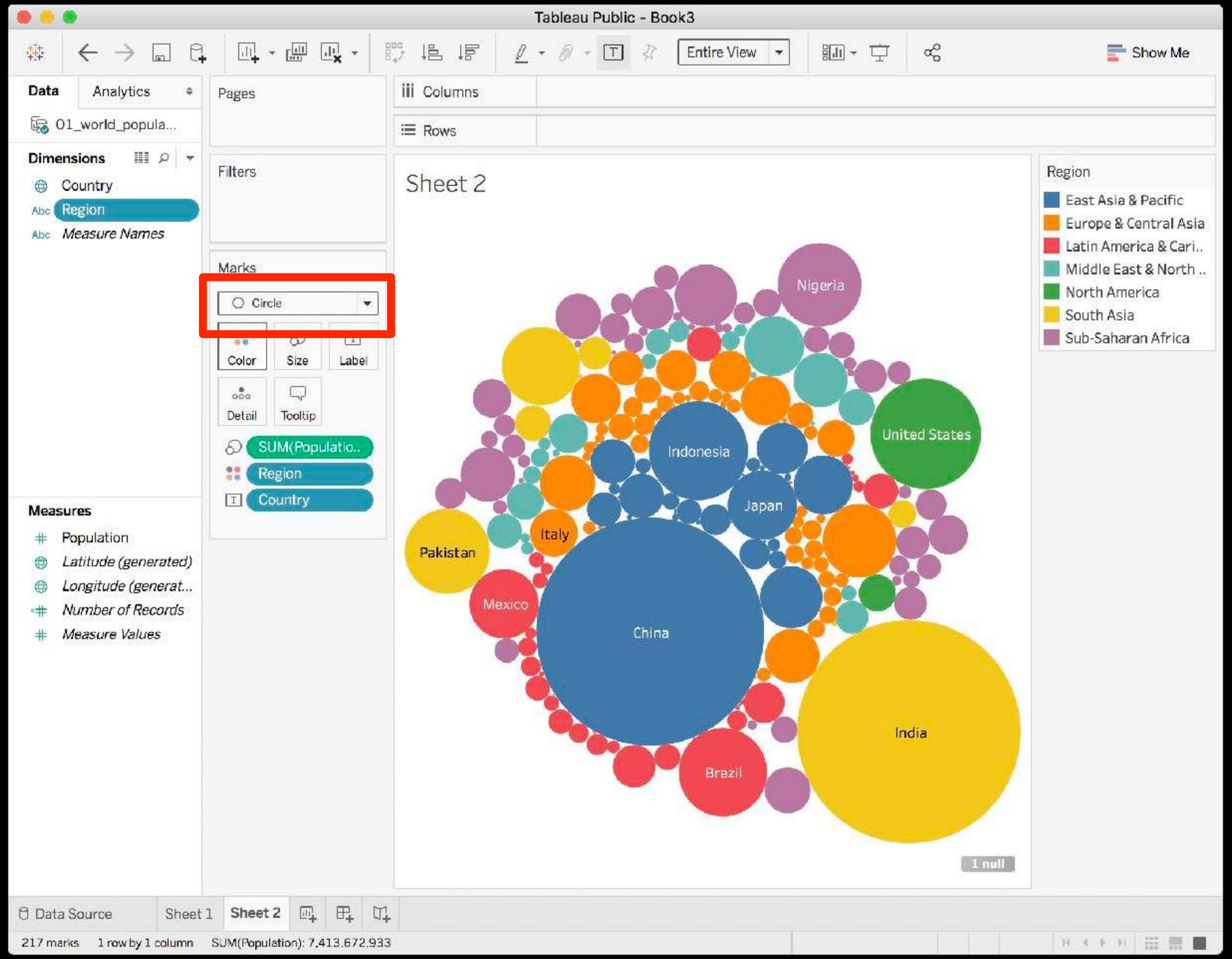
Drag "region" on color to add the countries and group them by region.



VISUALIZING WORLD POPULATION

Let's make a bubble chart

Select "circle" as mark instead of "square".

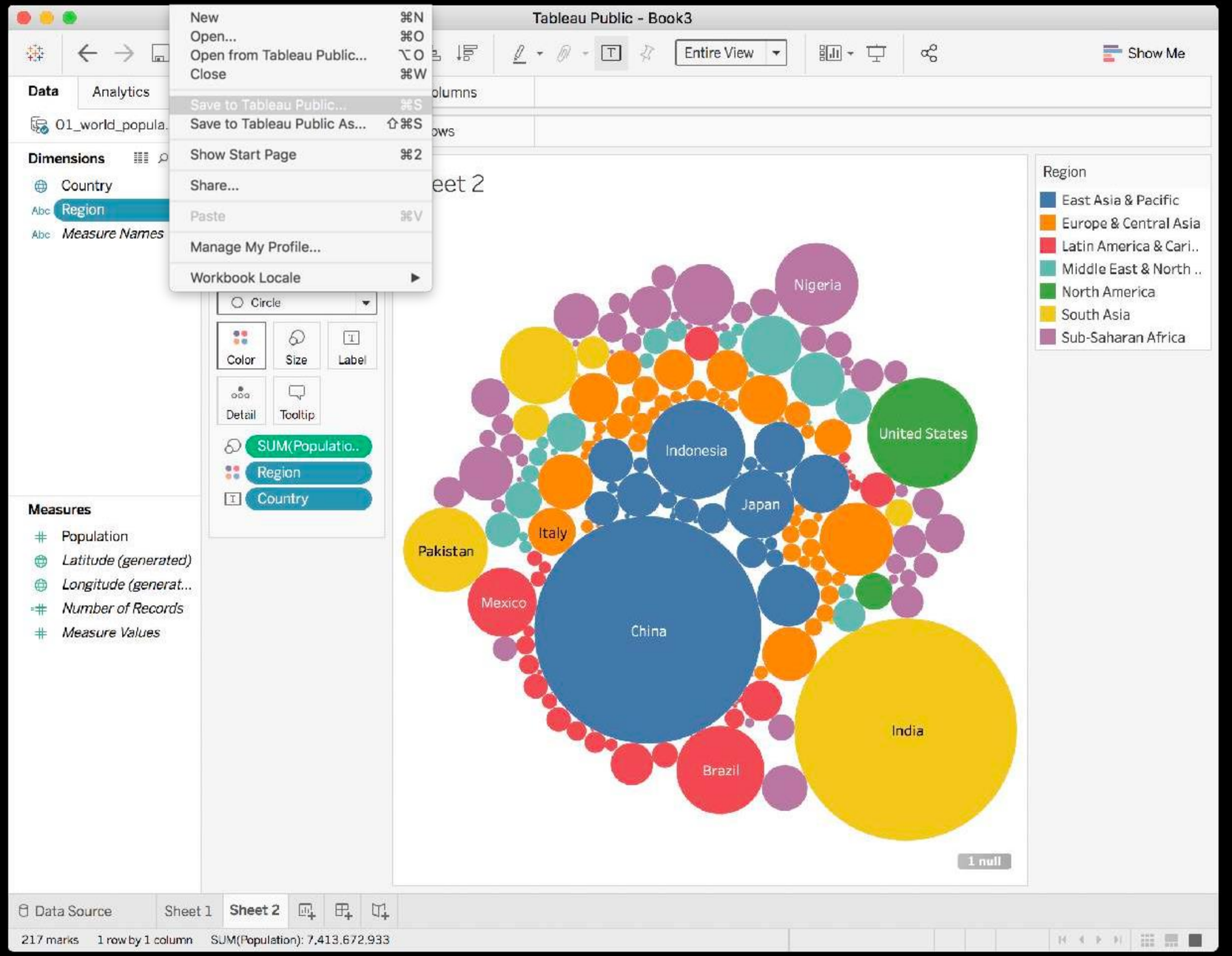


VISUALIZING WORLD POPULATION

Save your work

Click on File >Save To Tableau Public.

Create an account if you don't have one already.



EXERCISE

Visualizing the Olympic games (part 1)

Create a new tableau file and upload 02_olympics_countries.csv

Abc 02_olympics_coun... **Edition**	Abc 02_olympics_countrie... **Discipline**	02_olympics_count... **Country**	Abc 02_olympics_cou... **Medal**
1896-Athens	Swimming	Hungary	Gold
1896-Athens	Swimming	Austria	Silver
1896-Athens	Swimming	Greece	Bronze
1896-Athens	Swimming	Greece	Gold
1896-Athens	Swimming	Greece	Silver
1896-Athens	Swimming	Greece	Bronze
1896-Athens	Swimming	Hungary	Gold
1896-Athens	Swimming	Greece	Silver
1896-Athens	Swimming	Greece	Bronze

EXERCISE

Visualizing the Olympic games (part 1)

Which country has won the most medals?

Which country has won the most Olympic gold medals of all time?

In which sport Italy has won the most medals?

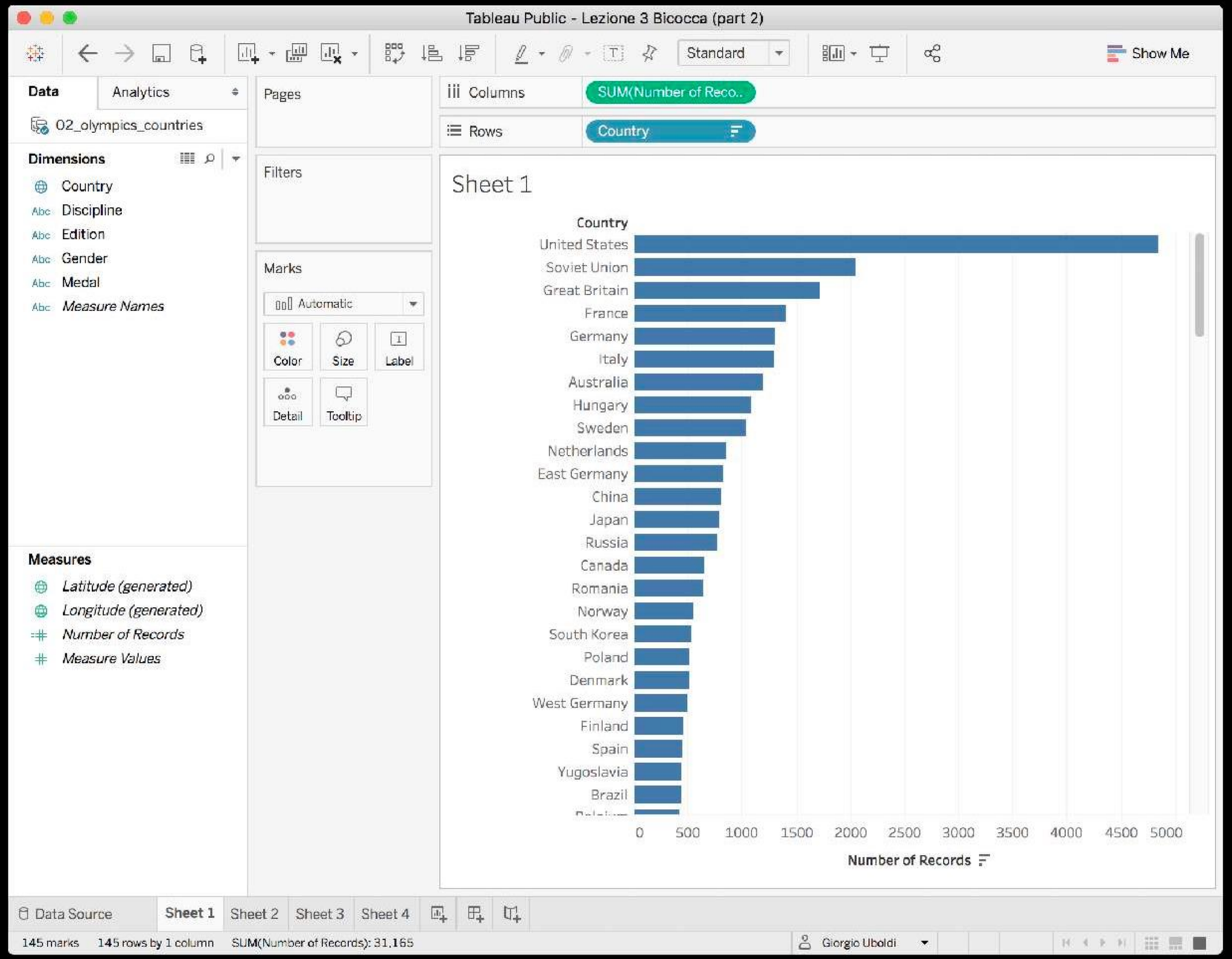
...

***remember that "number of records" represents the number of rows in the data source.**

Abc 02_olympics_coun... Edition	Abc 02_olympics_countrie... Discipline	02_olympics_count... Country	Abc 02_olympics_coun... Gender	Abc 02_olympics_cou... Medal
1896-Athens	Swimming	Hungary	Men	Gold
1896-Athens	Swimming	Austria	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Greece	Men	Gold
1896-Athens	Swimming	Greece	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Hungary	Men	Gold
1896-Athens	Swimming	Greece	Men	Silver
1896-Athens	Swimming	Greece	Men	Bronze
1896-Athens	Swimming	Austria	Men	Gold

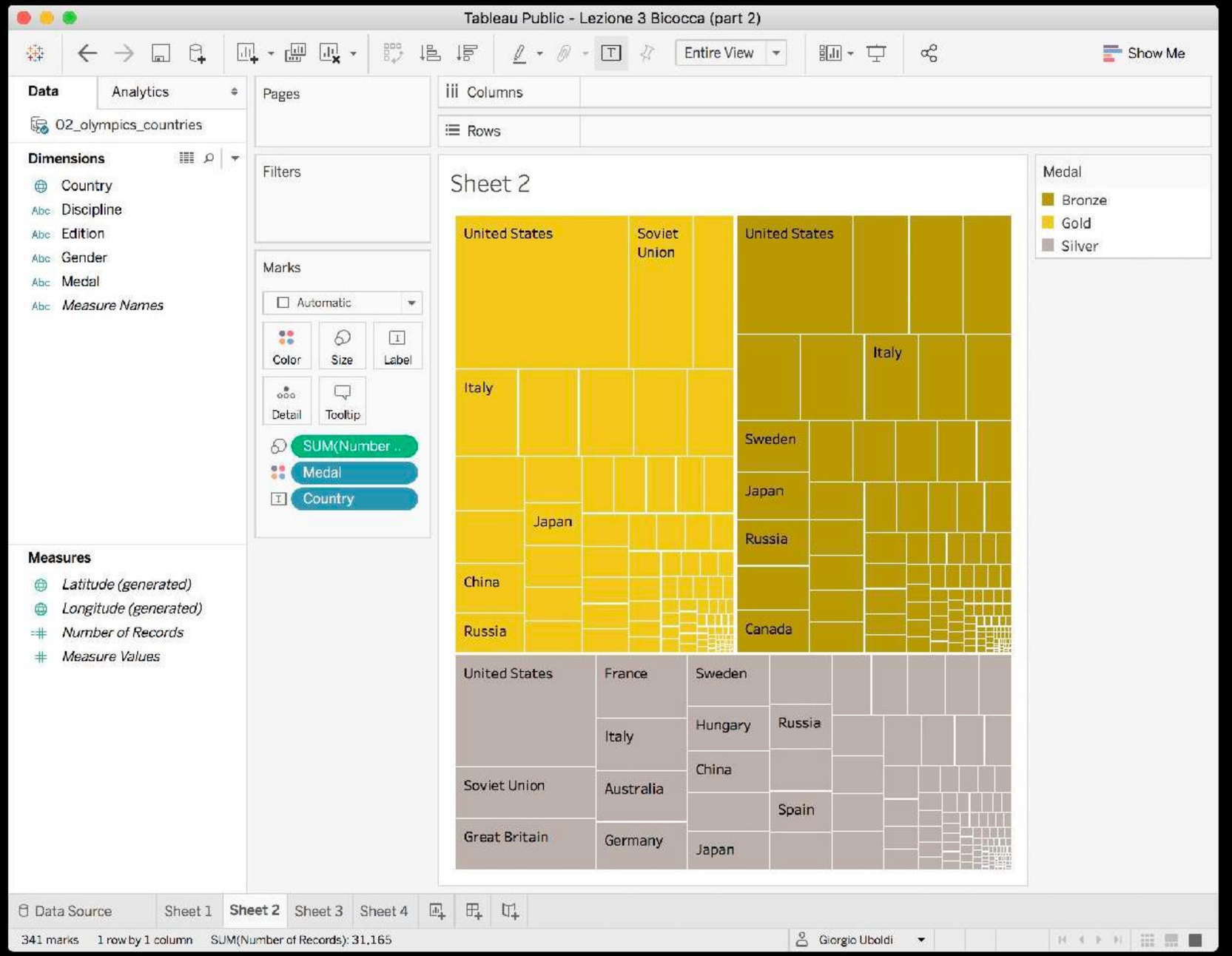
EXERCISE

Visualizing the Olympic games (part 1)



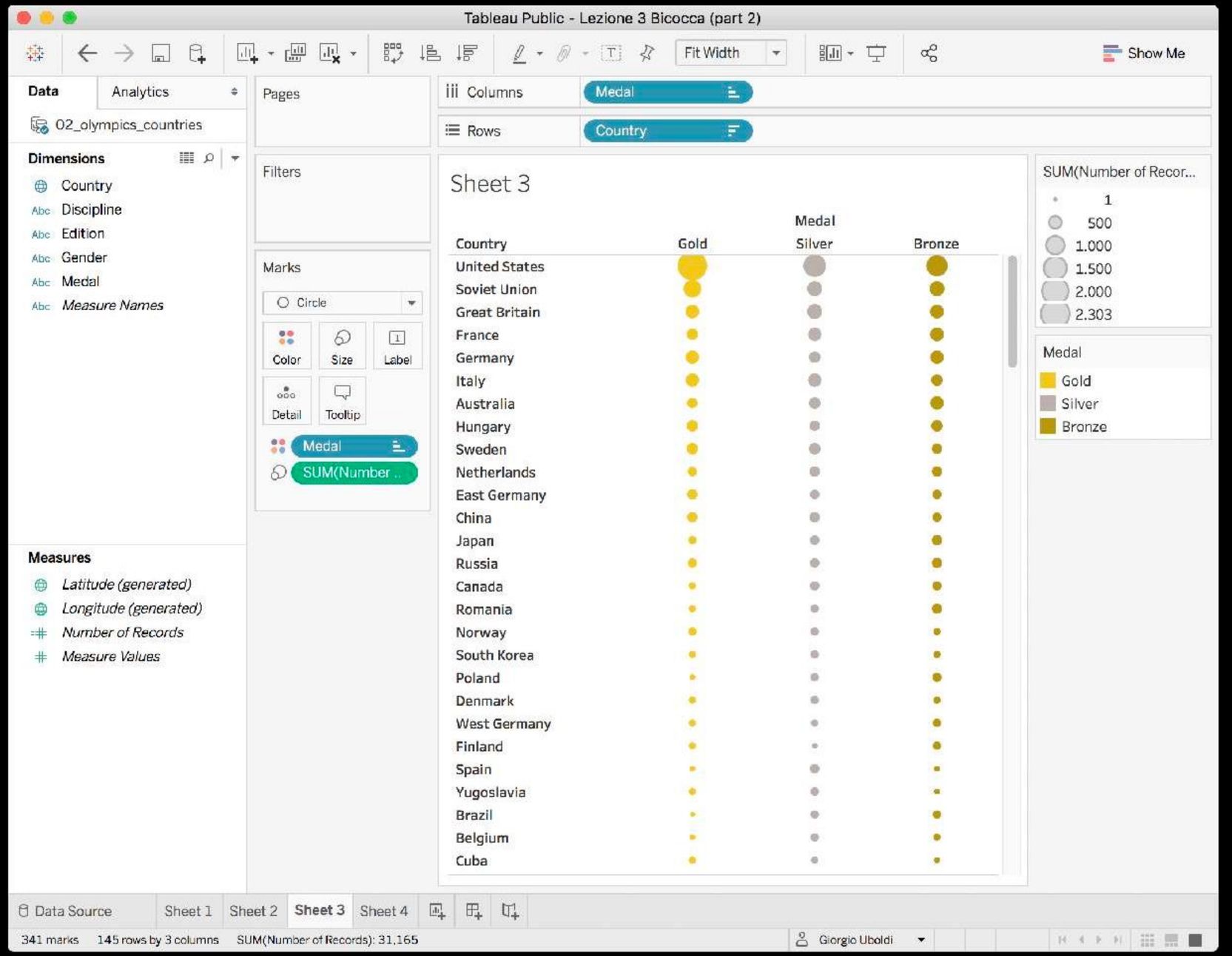
EXERCISE

Visualizing the Olympic games (part 1)



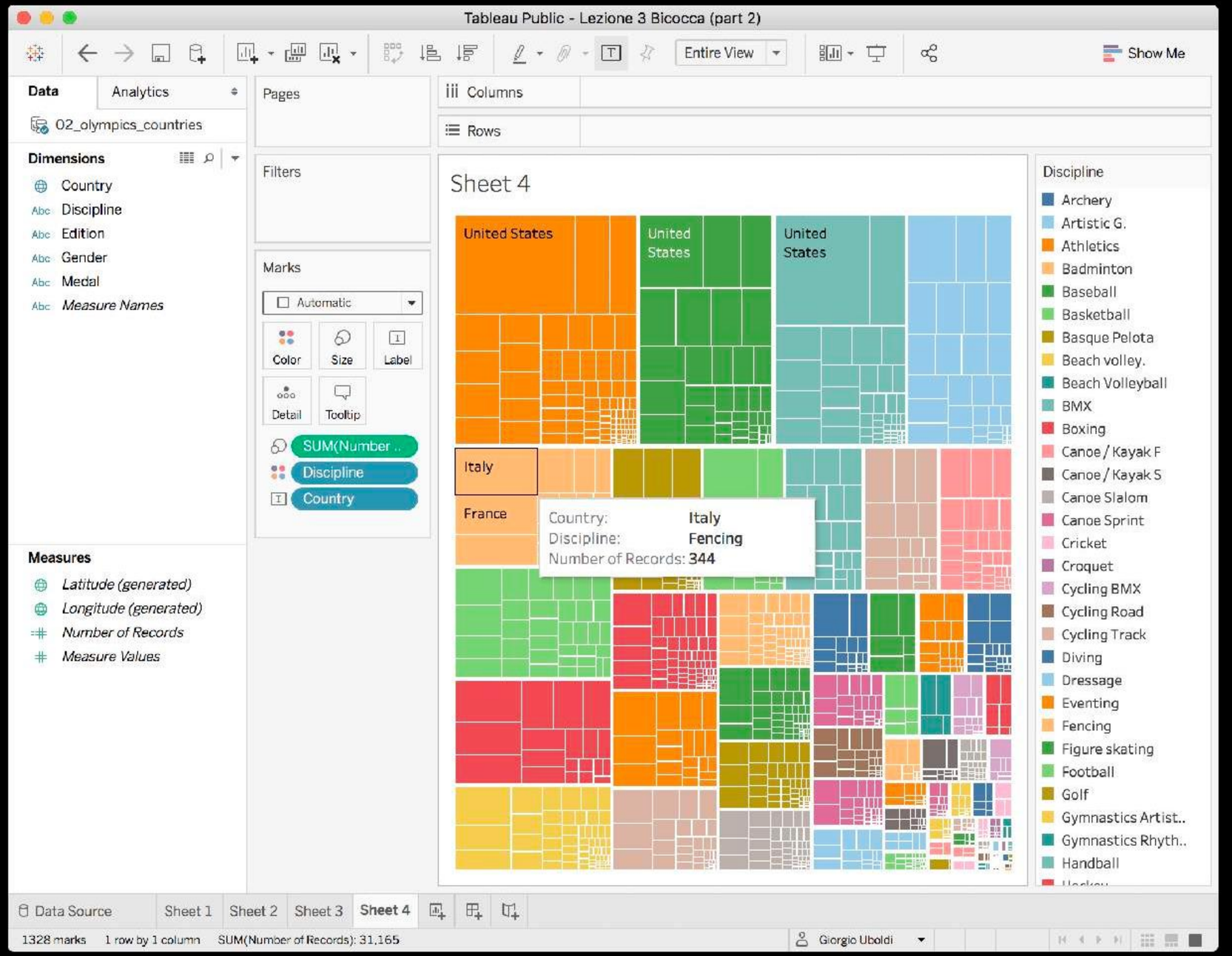
EXERCISE

Visualizing the Olympic games (part 1)



EXERCISE

Visualizing the Olympic games (part 1)

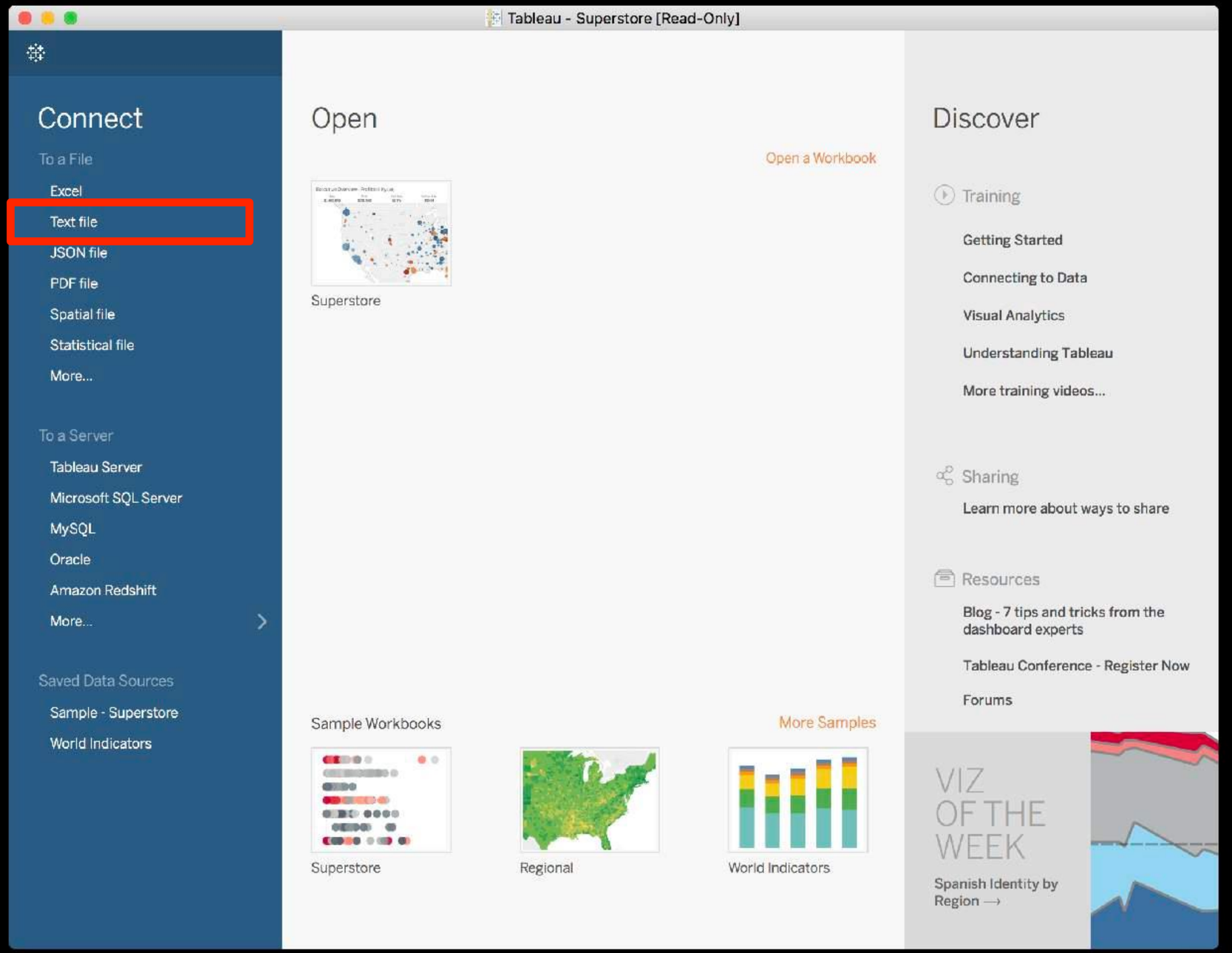


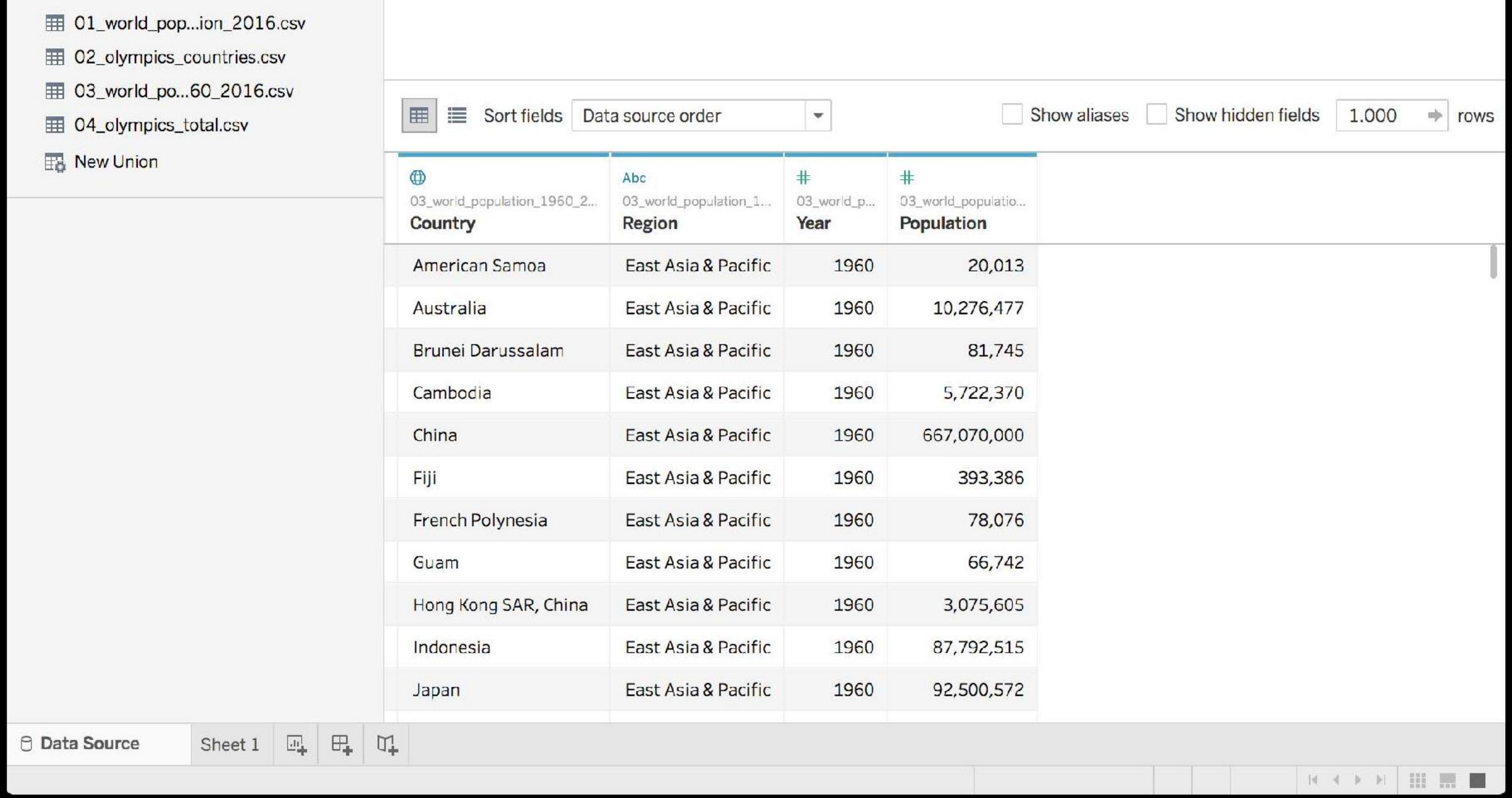
VISUALIZING WORLD POPULATION

Import the data

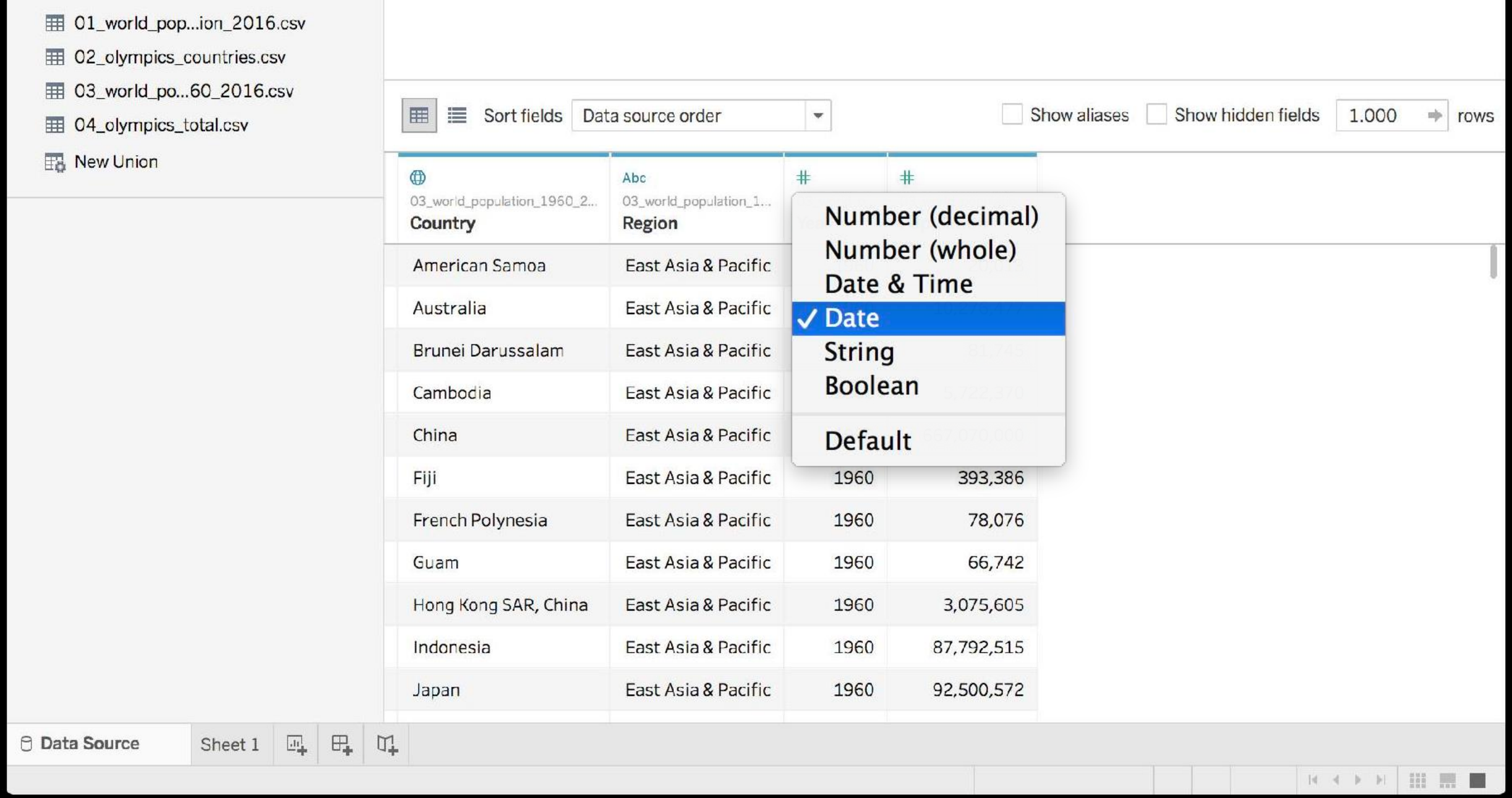
Select "Text file" on the left

Inside the data folder select 03_world_population_1960_2016.csv

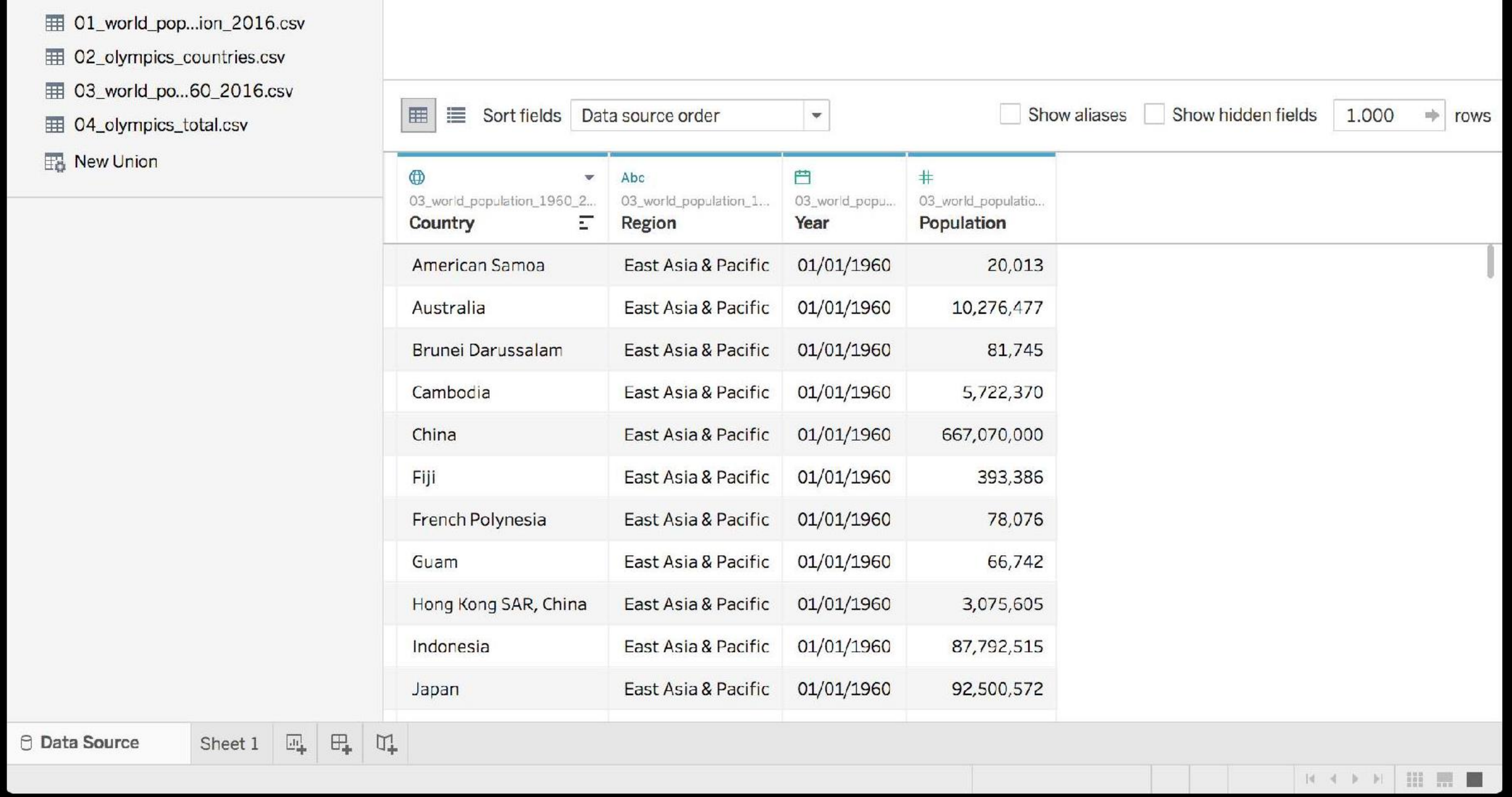




This dataset is about the population of each country in the world from



Change data type of "Year"



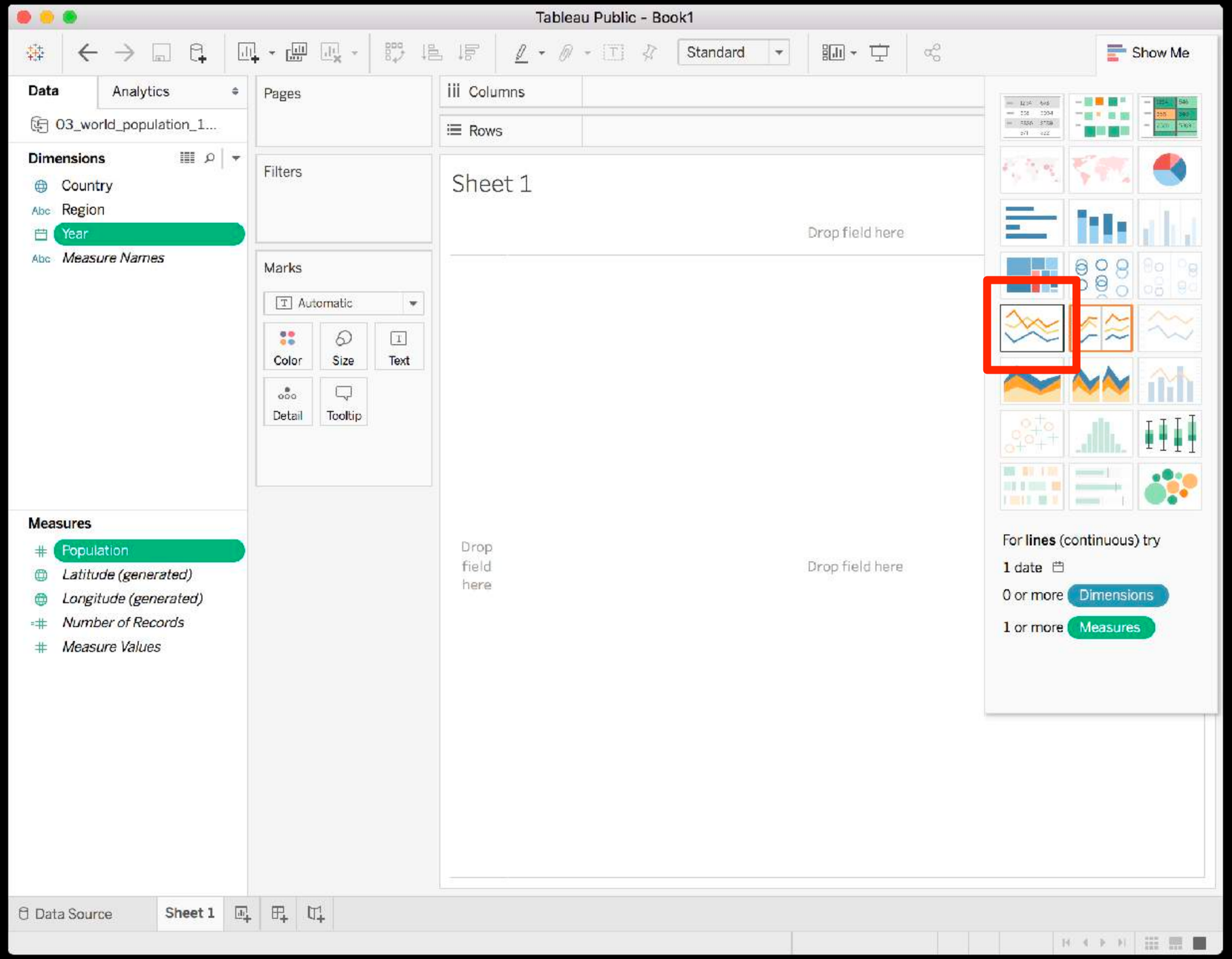
Change data type of "Year"

VISUALIZING WORLD POPULATION

Let's explore how the world population changed over time

Select "Country", "Population and "Year".

In "Show me" select the line chart

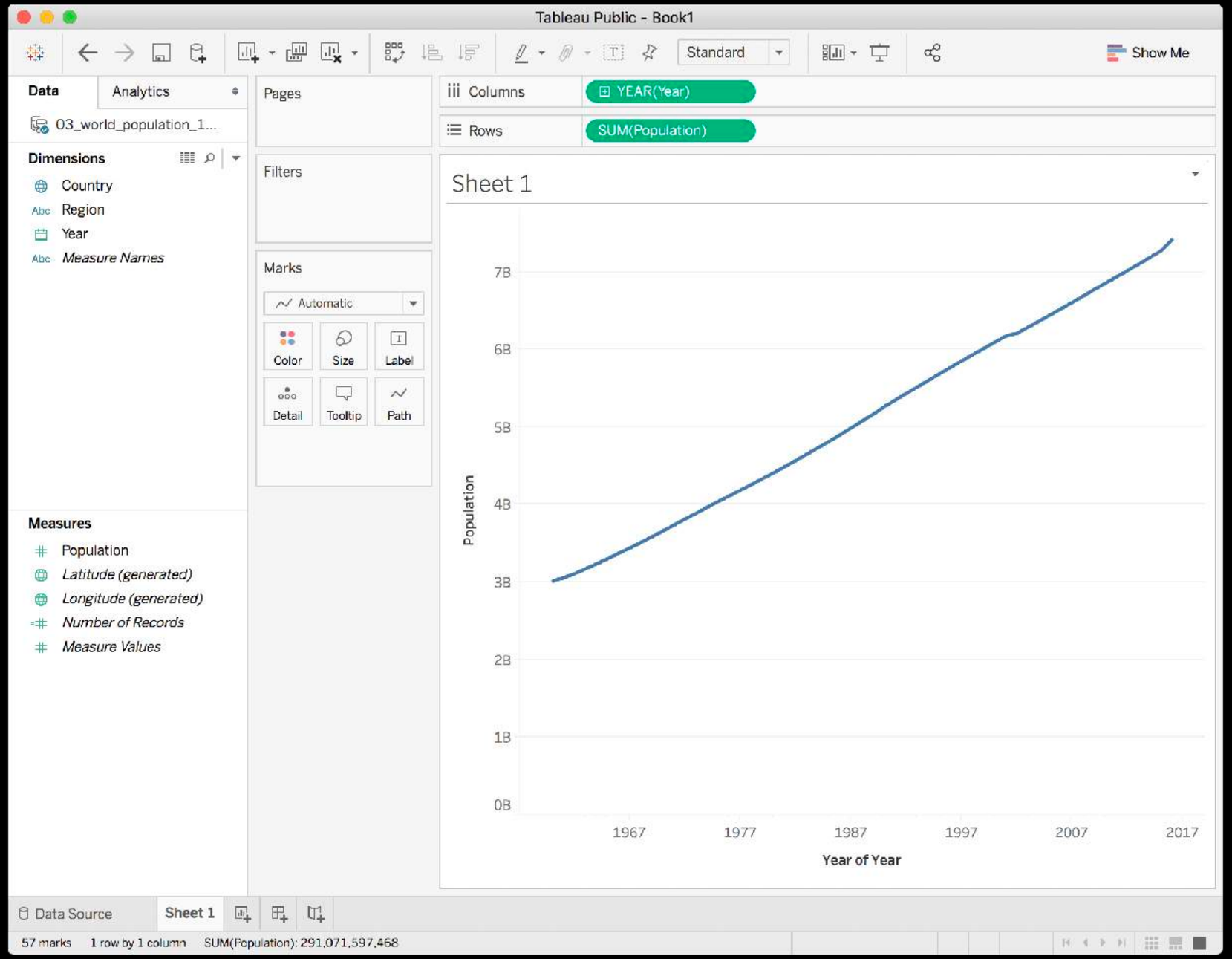


VISUALIZING WORLD POPULATION

Let's explore how the world population changed over time

Select "Country", "Population and "Year".

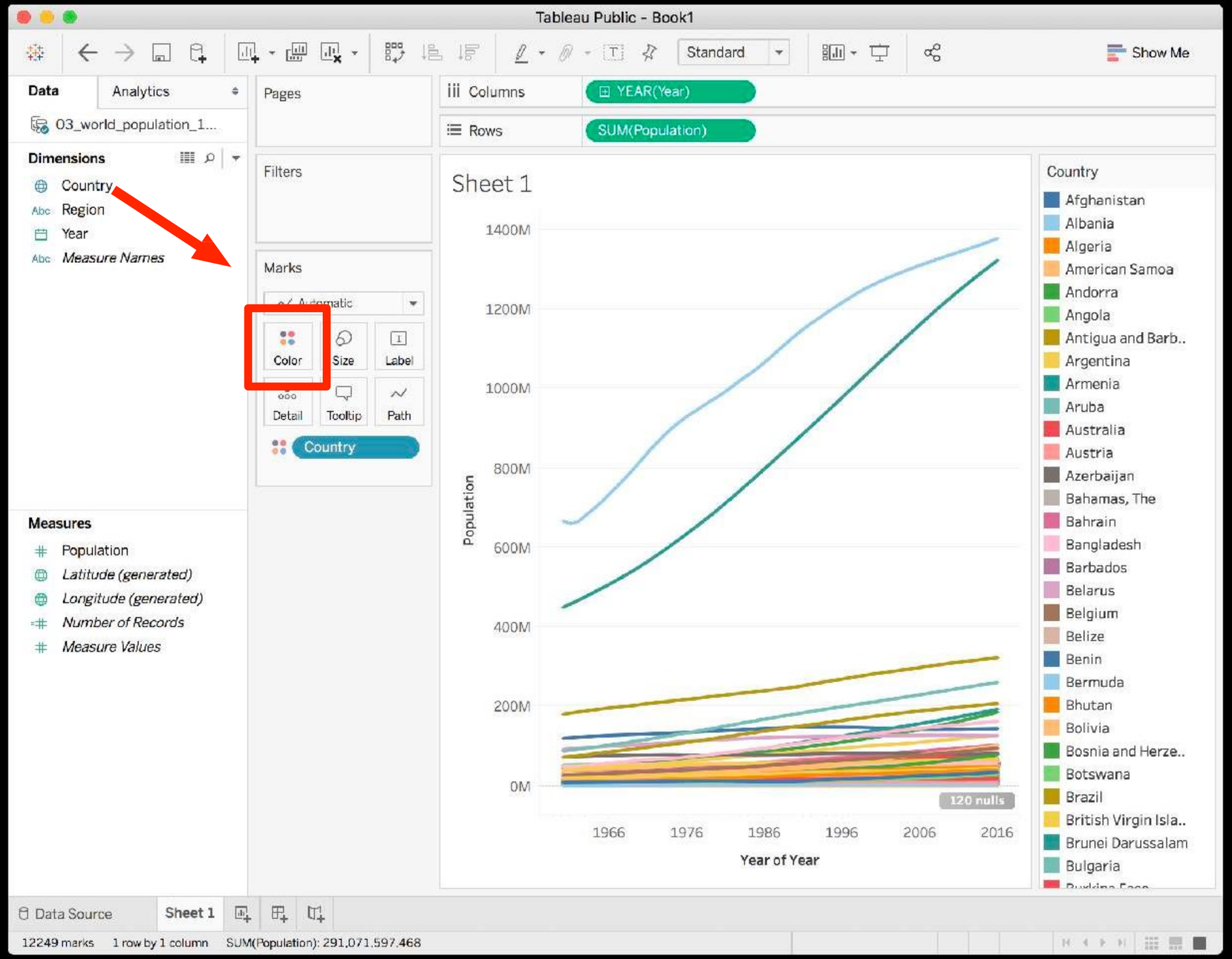
In "Show me" select the line chart



VISUALIZING WORLD POPULATION

A line for each country

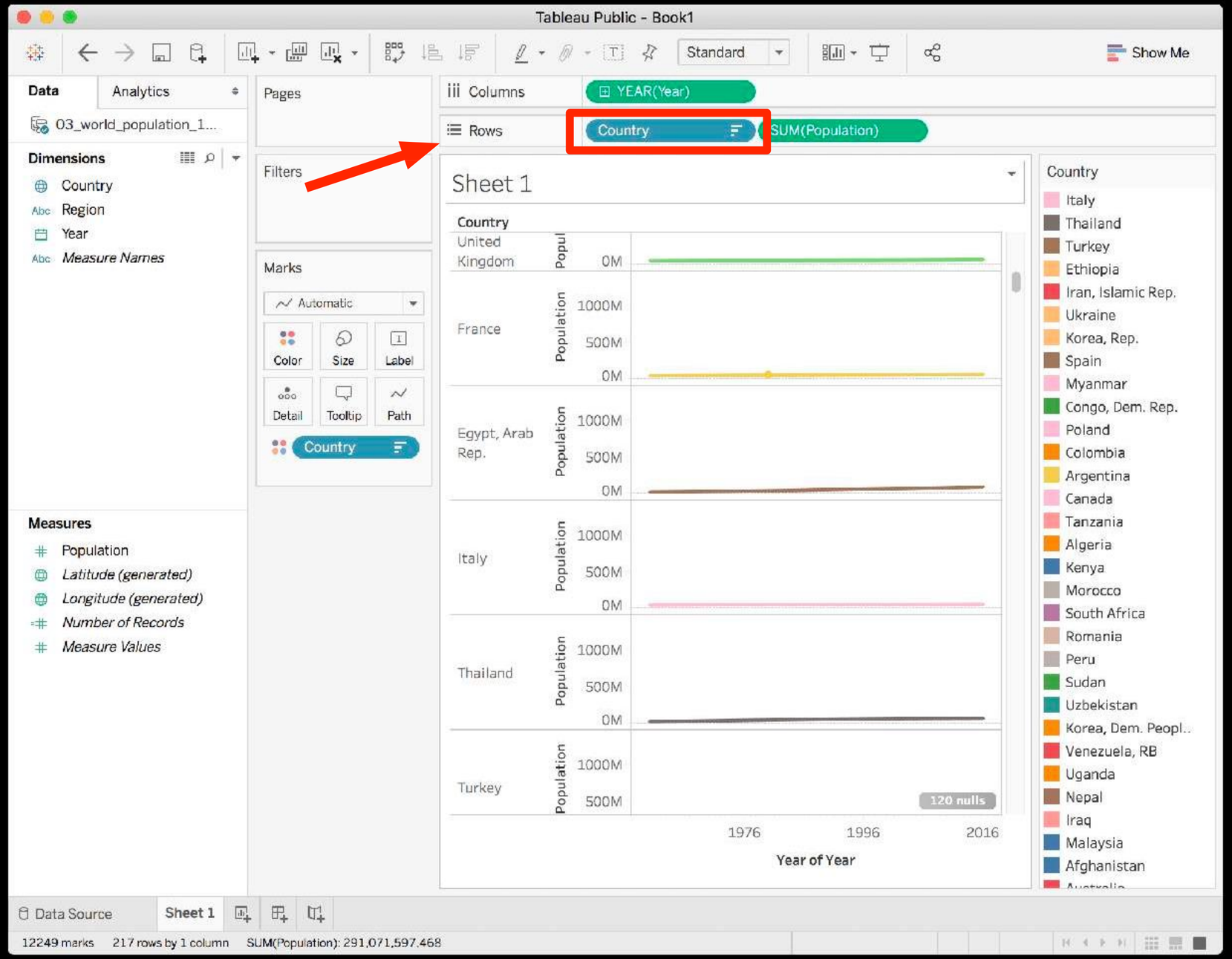
Drag "country" on "color" to add a line for each country.



VISUALIZING WORLD POPULATION

A row for each country

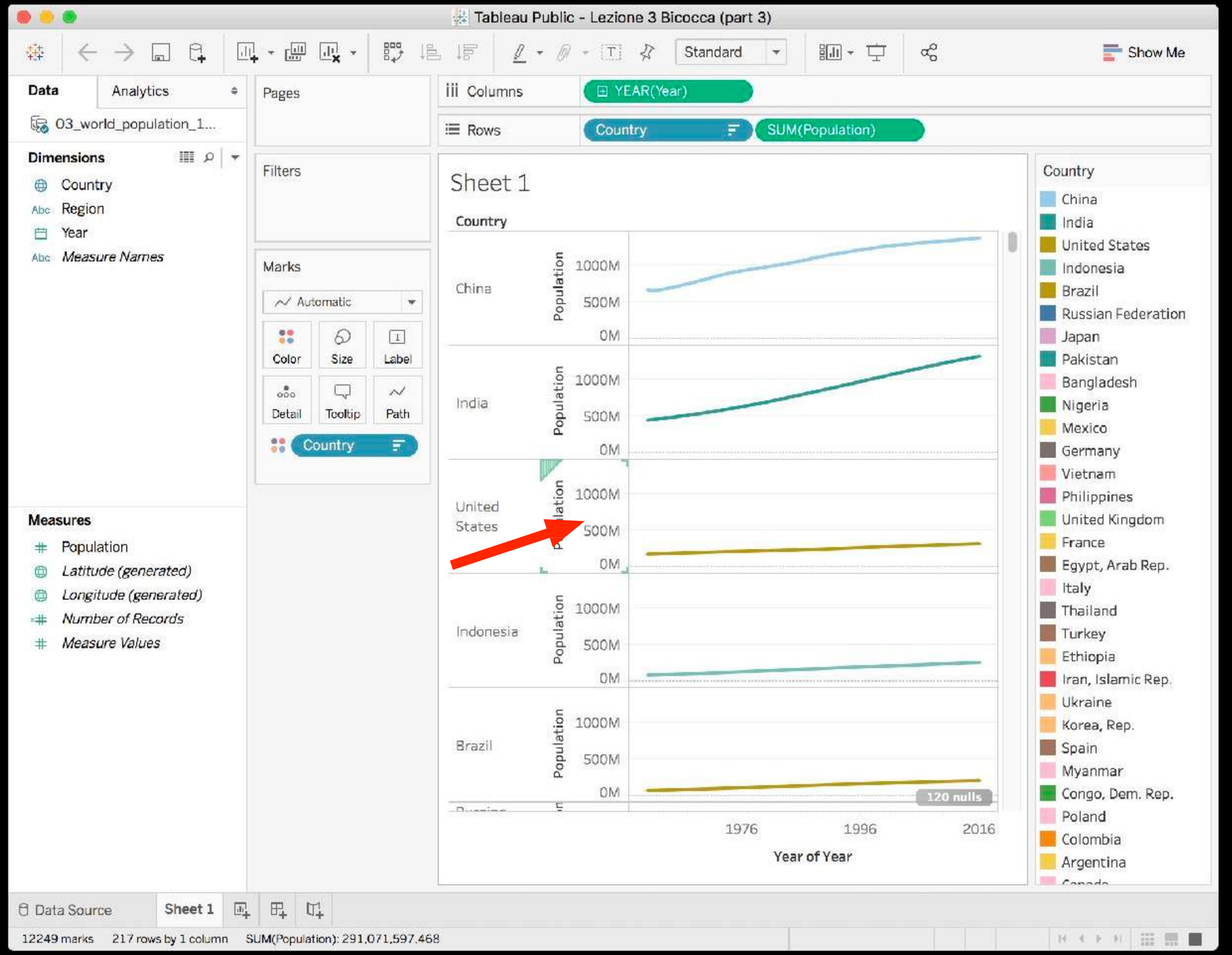
Drag "country" on "colums".



VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

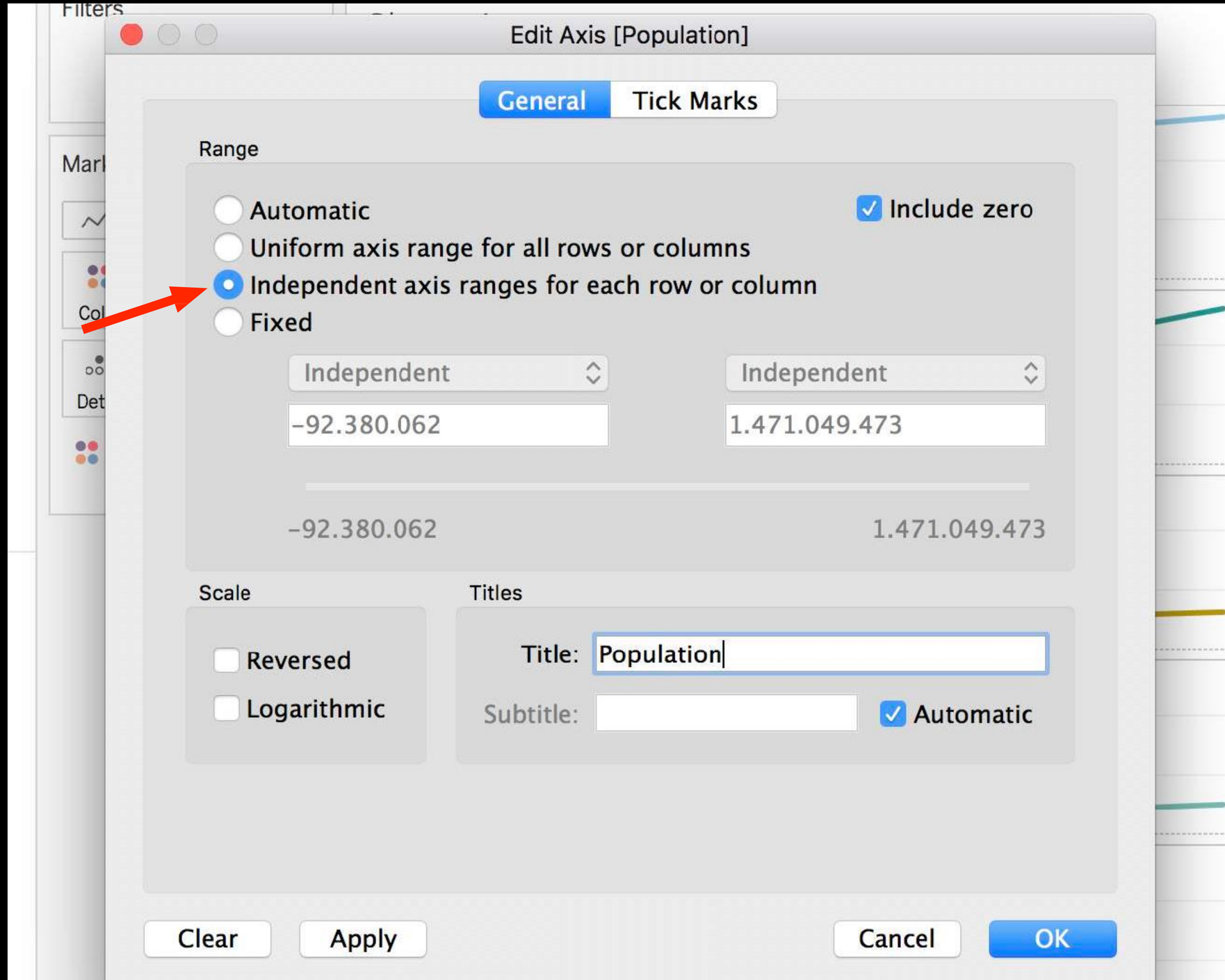
Double click on the "Population" axis.



VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

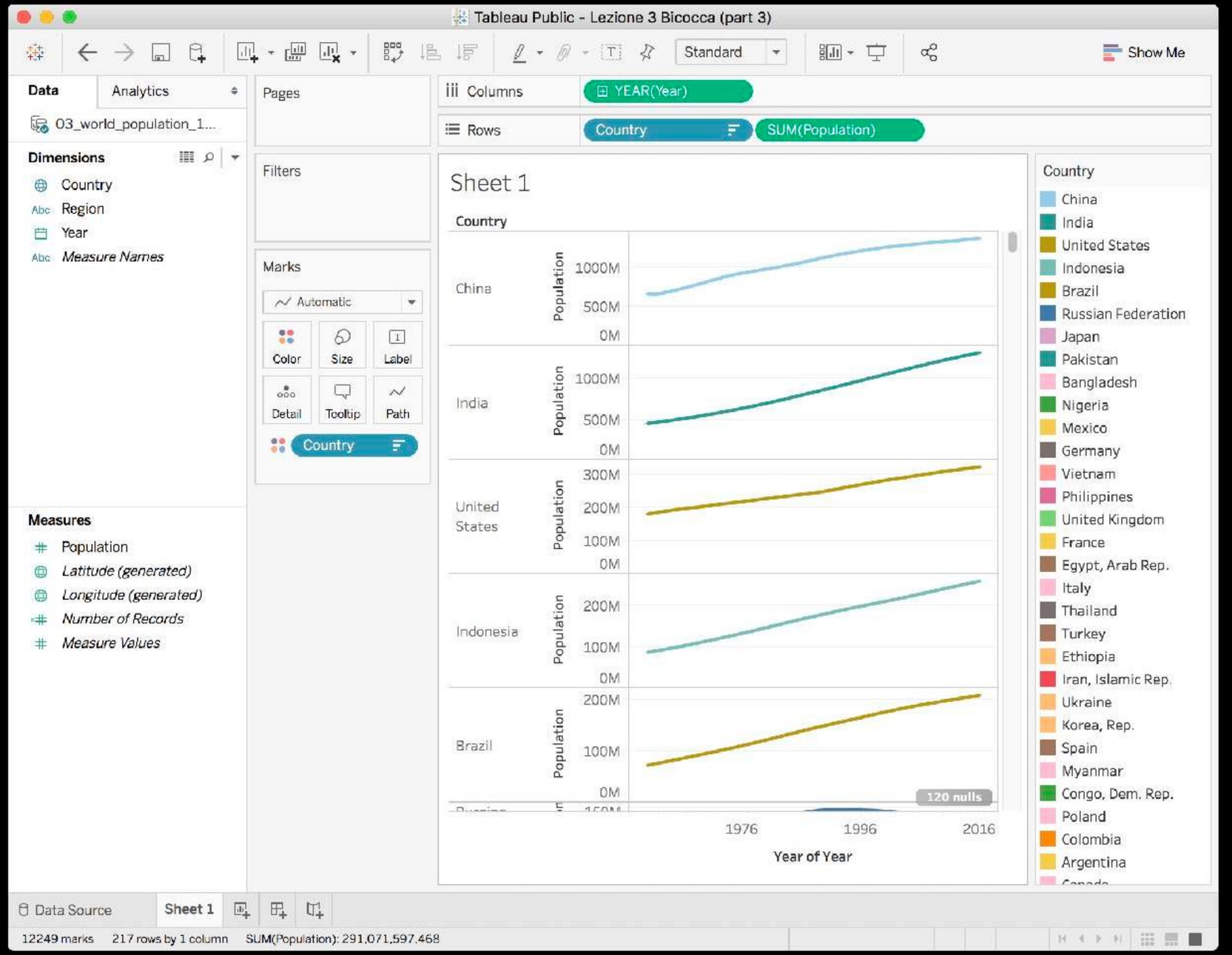
Select "Independent axis" in order to normalize the values of each country.



VISUALIZING WORLD POPULATION

Edit the axis to compare the trends

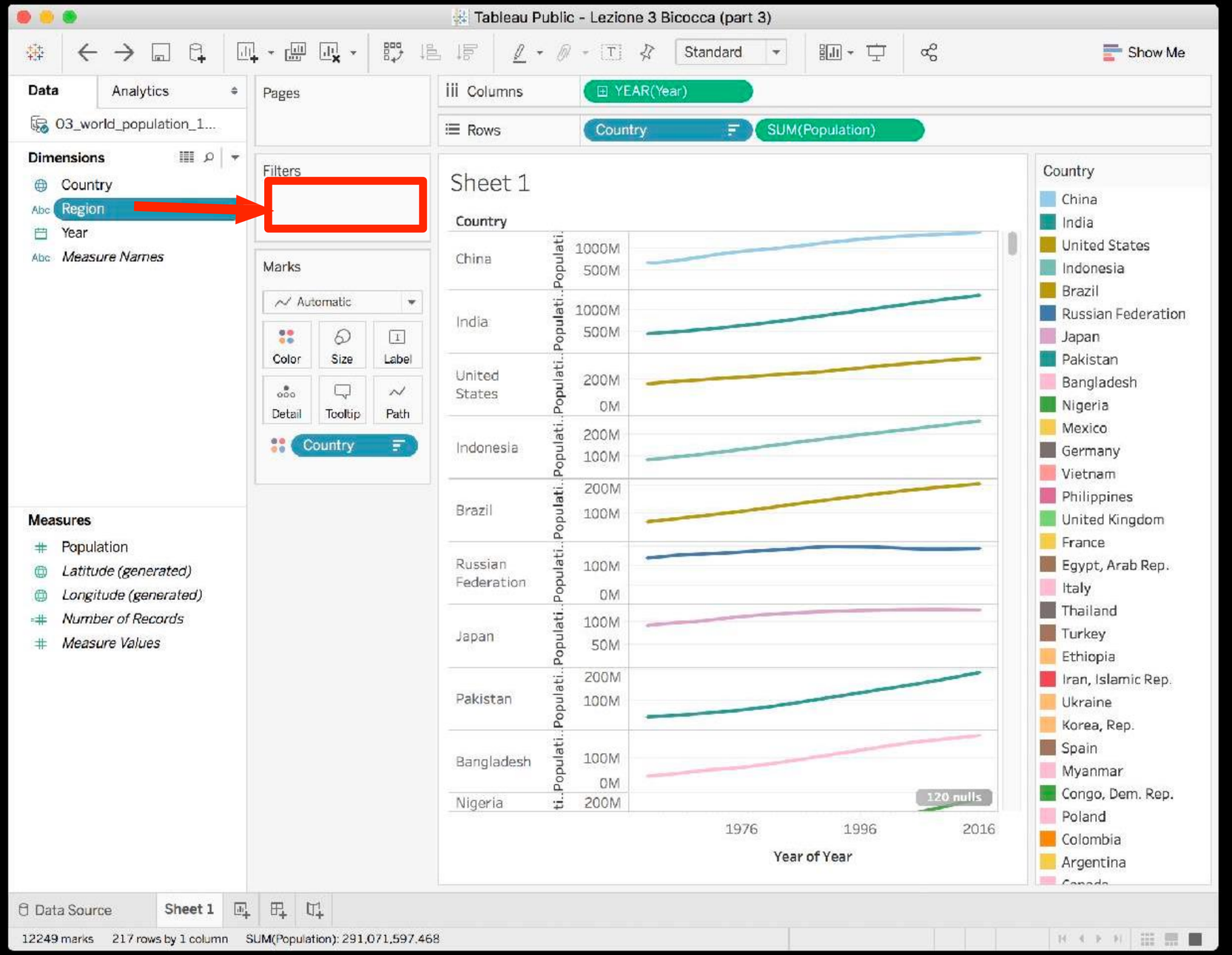
The population axis now is scaled according to the minimum and maximum value of each country.



VISUALIZING WORLD POPULATION

Apply filters to see only european countries

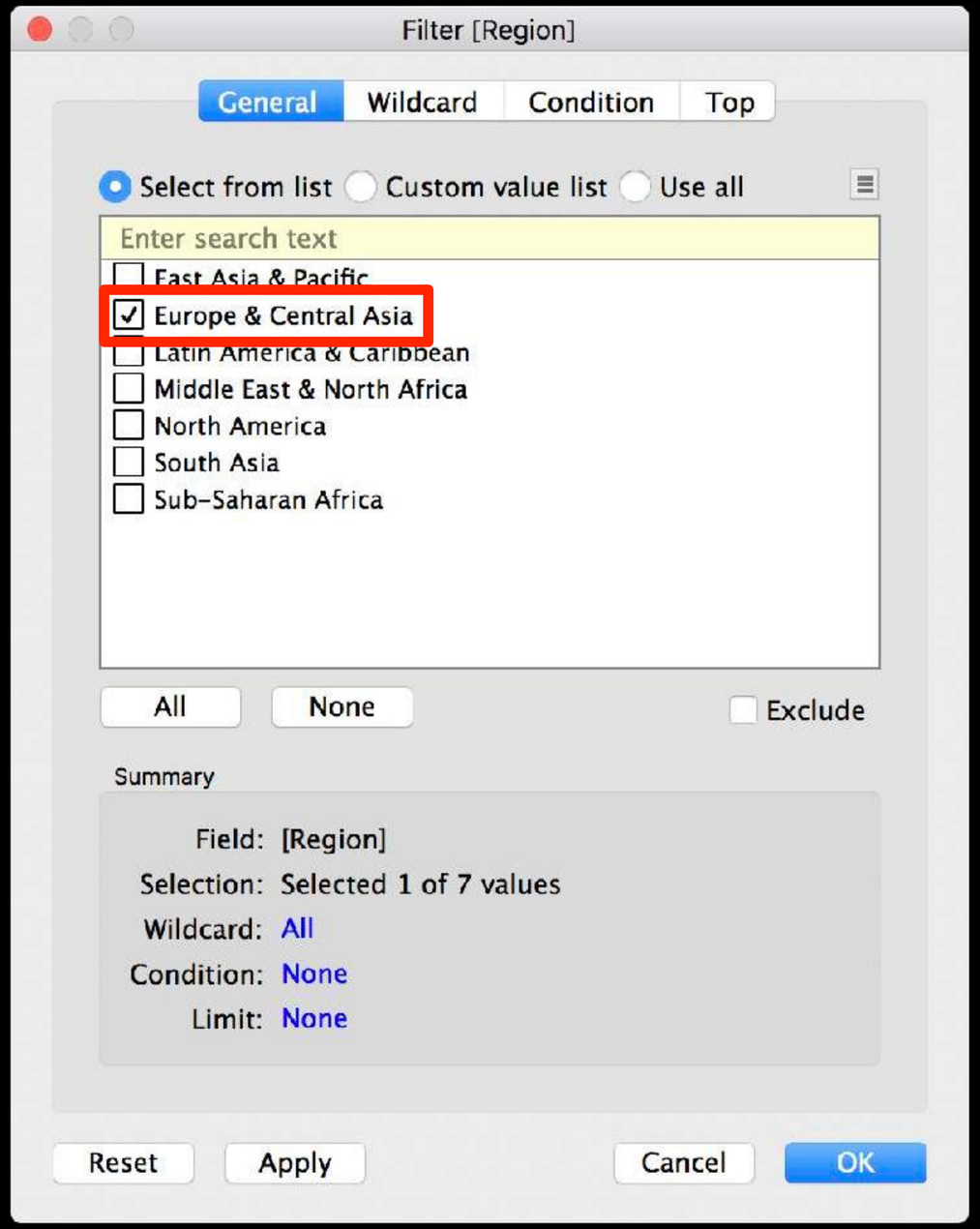
Drag "region" inside "Filters"



VISUALIZING WORLD POPULATION

Apply filters to see only european countries

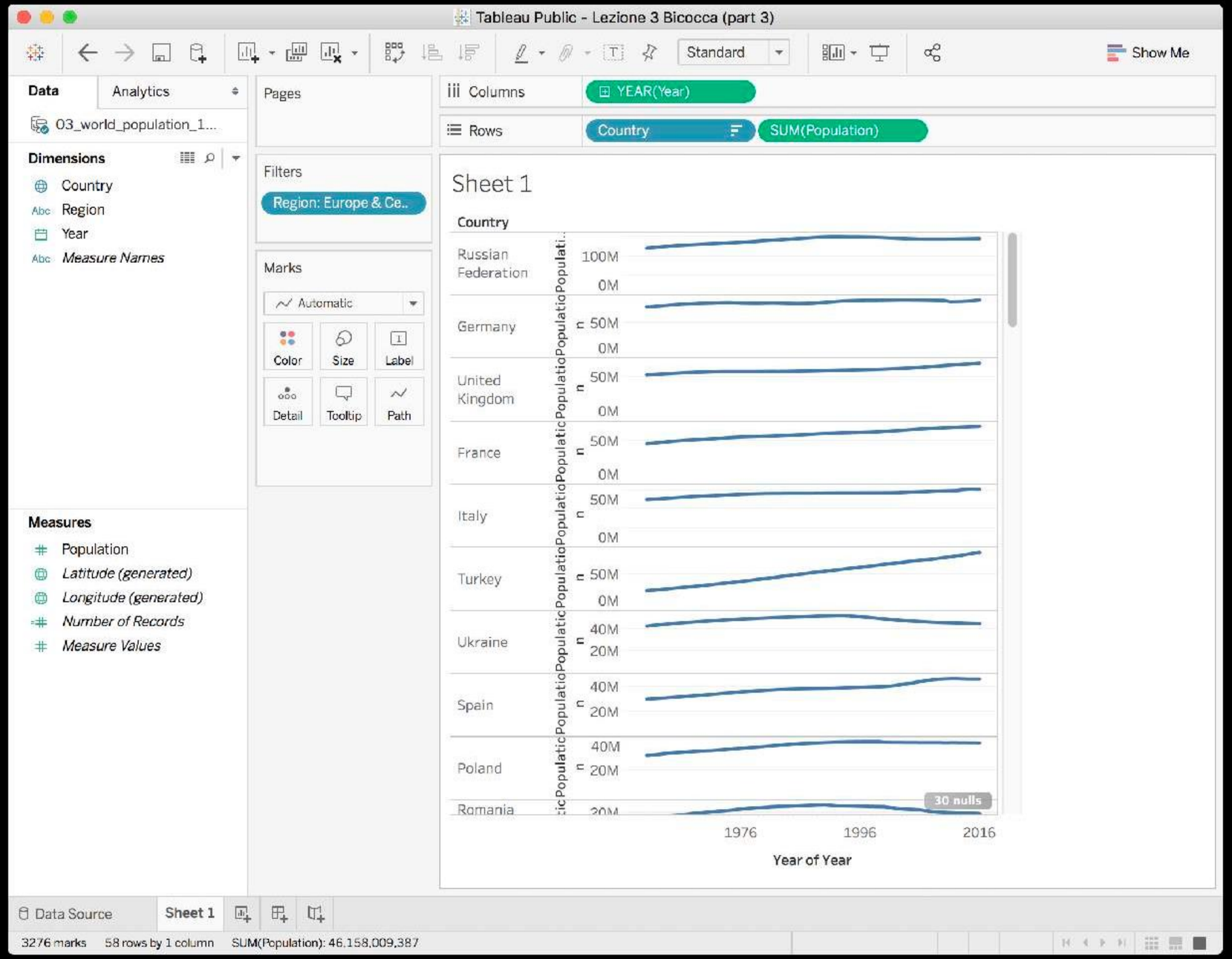
Select only "Europe & Central Asia" from the list



VISUALIZING WORLD POPULATION

Apply filters to see only european countries

Remove "contry" from color.

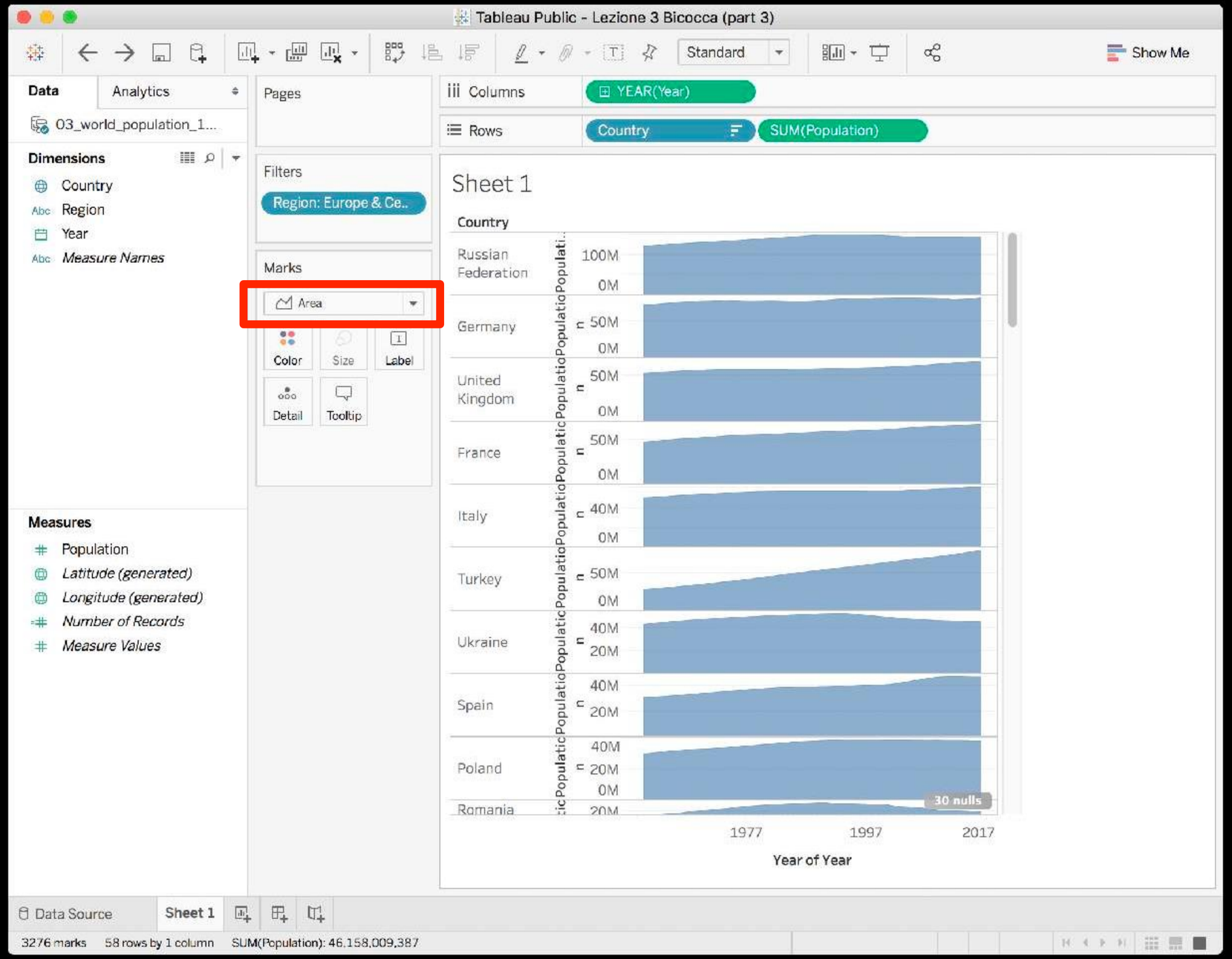


VISUALIZING WORLD POPULATION

Apply filters to see only european countries

Select "area" as visual mark.

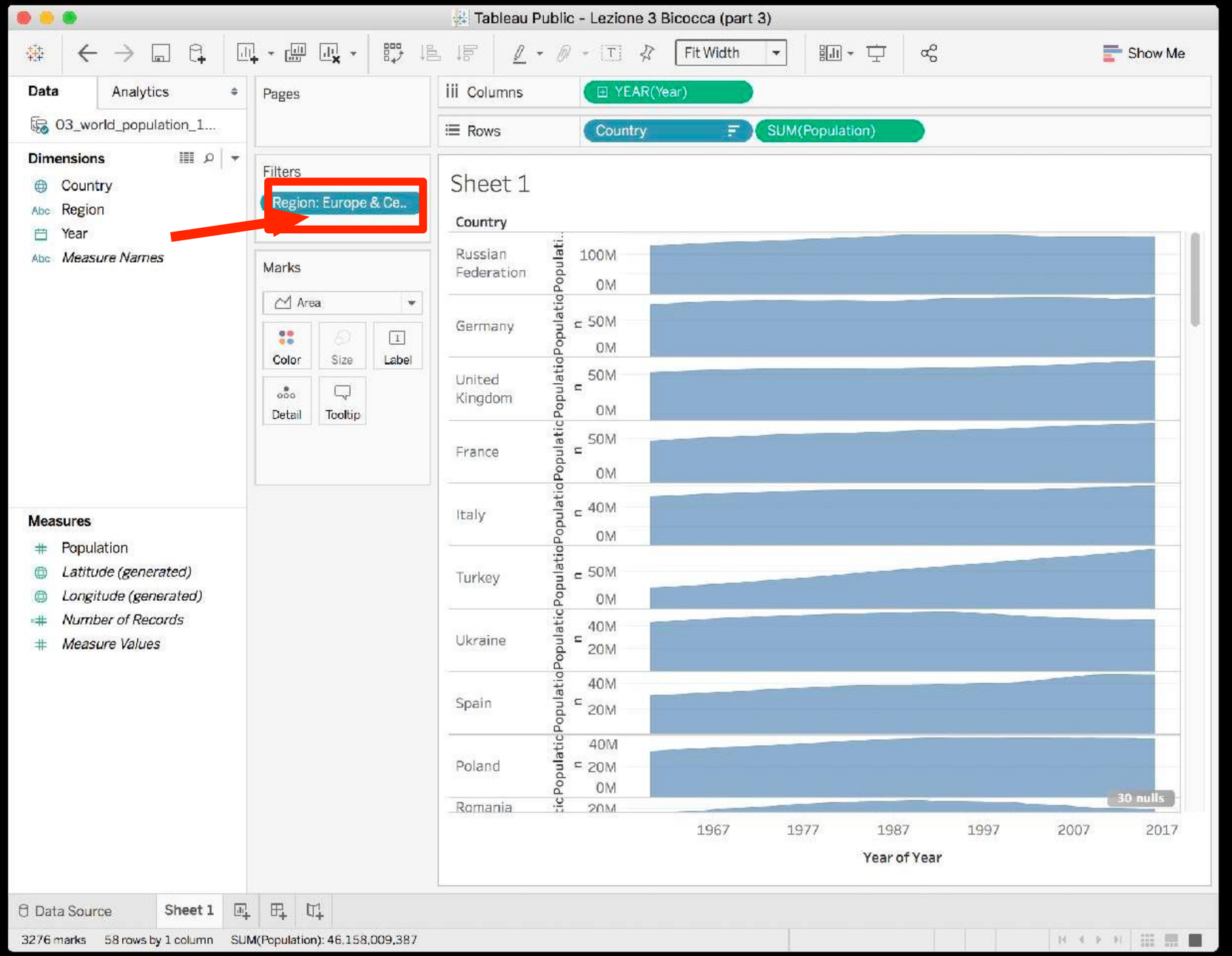
Explore the visualization.
Do we see trends? Anomalies?
What are the possible causes of certain anomalies?



VISUALIZING WORLD POPULATION

Apply filters to see only the last 30 years

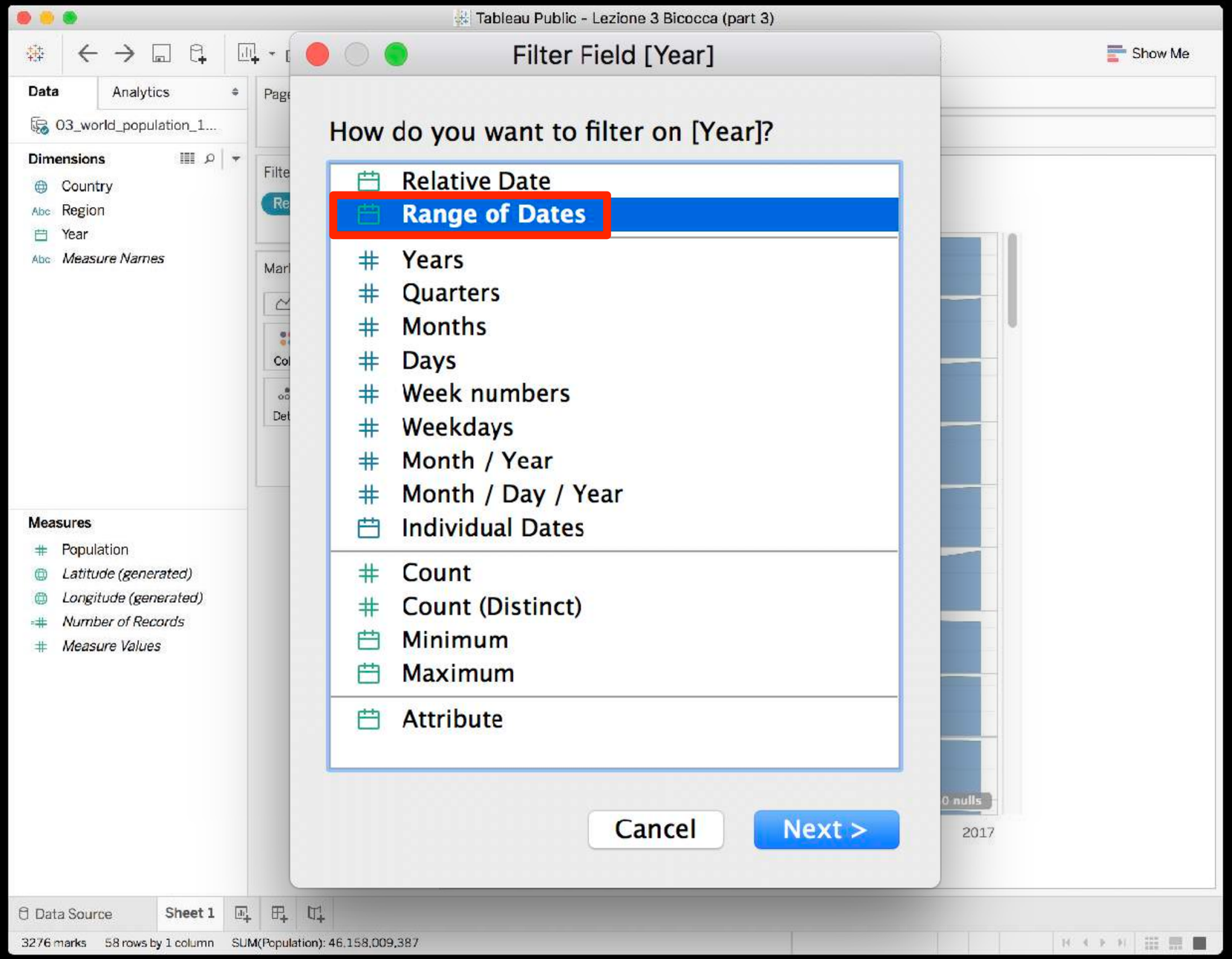
Drag "year" inside "Filters"



VISUALIZING WORLD POPULATION

Apply filters to see only the last 30 years

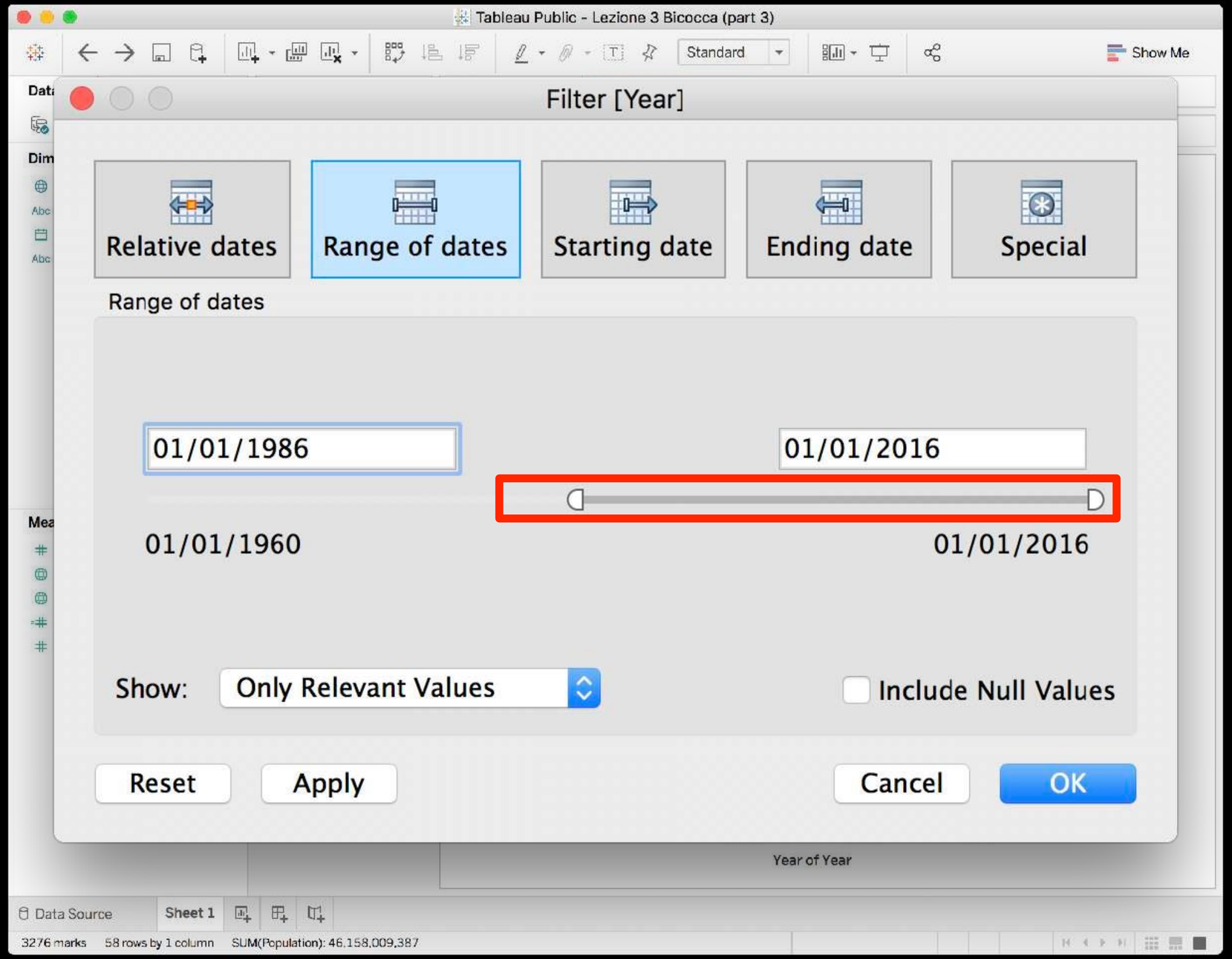
Drag "year" inside "Filters" and select "Range of Dates".



VISUALIZING WORLD POPULATION

Apply filters to see only the last 30 years

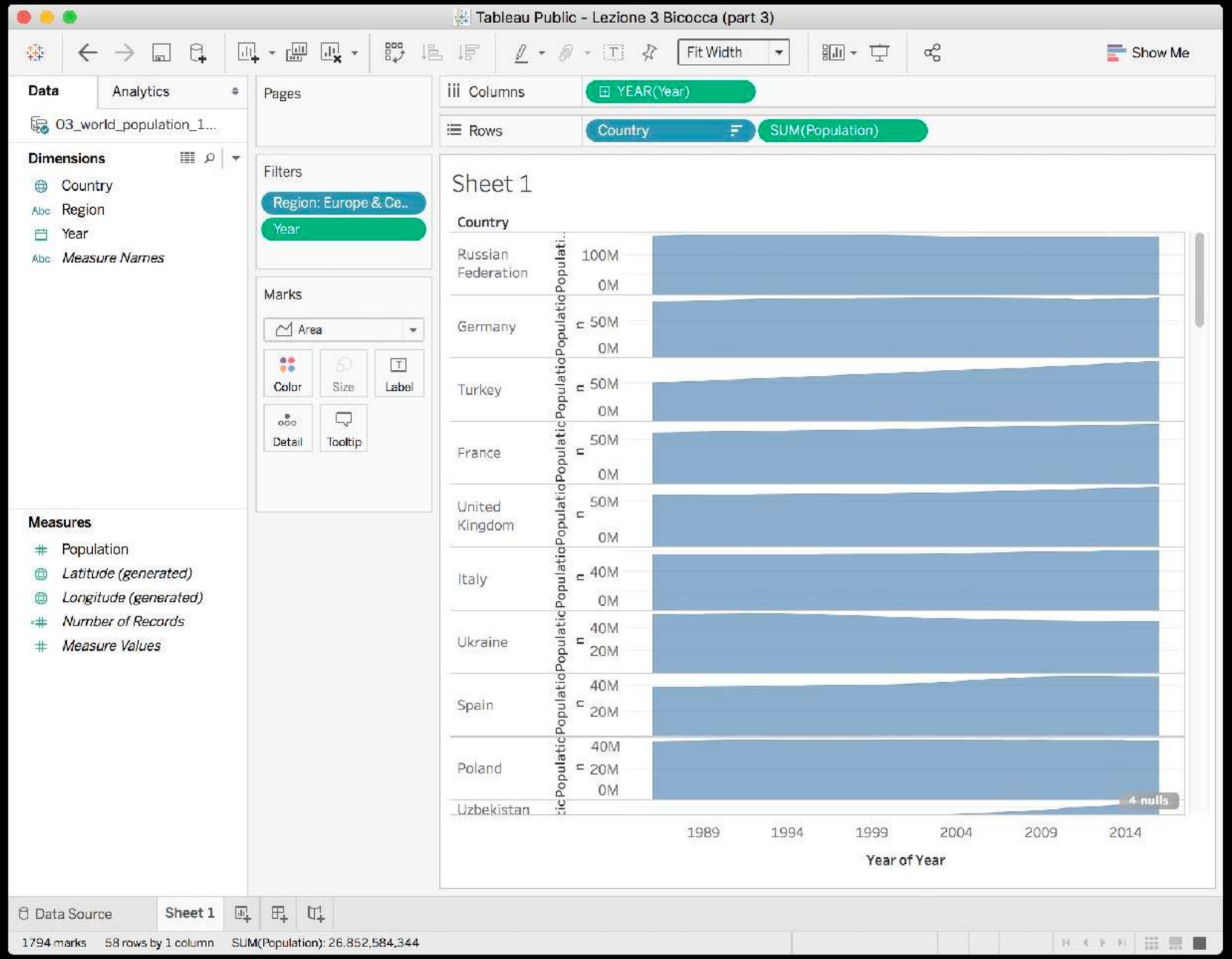
Select the range between 1986 and 2016



VISUALIZING WORLD POPULATION

Apply filters to see only the last 30 years

Save the file.



EXERCISE

Visualizing the Olympic games (part 2)

Create a new tableau file and upload 04_olympics_total.csv

04_olympic... Year	04_olympics_t... City	04_olympics_tot... Sport	04_olympics_total.csv Discipline	04_olympics_total.csv Athlete	04_olympics_total.c... Country	04_olympics_total.csv Country 1	04_olympics_total.... Gender	04_olympics_total.csv Event	04_olympics_tot... Medal
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	100M Freestyle	Gold
1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Austria	Men	100M Freestyle	Silver
1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Greece	Men	100M Freestyle For S...	Bronze
1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Greece	Men	100M Freestyle For S...	Gold
1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Greece	Men	100M Freestyle For S...	Silver
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	1200M Freestyle	Bronze
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	1200M Freestyle	Gold
1896	Athens	Aquatics	Swimming	ANDREOU, Joannis	GRE	Greece	Men	1200M Freestyle	Silver
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	400M Freestyle	Bronze
1896	Athens	Aquatics	Swimming	NEUMANN, Paul	AUT	Austria	Men	400M Freestyle	Gold
1896	Athens	Aquatics	Swimming	PEPANOS, Antonios	GRE	Greece	Men	400M Freestyle	Silver

EXERCISE

Visualizing the Olympic games (part 2)

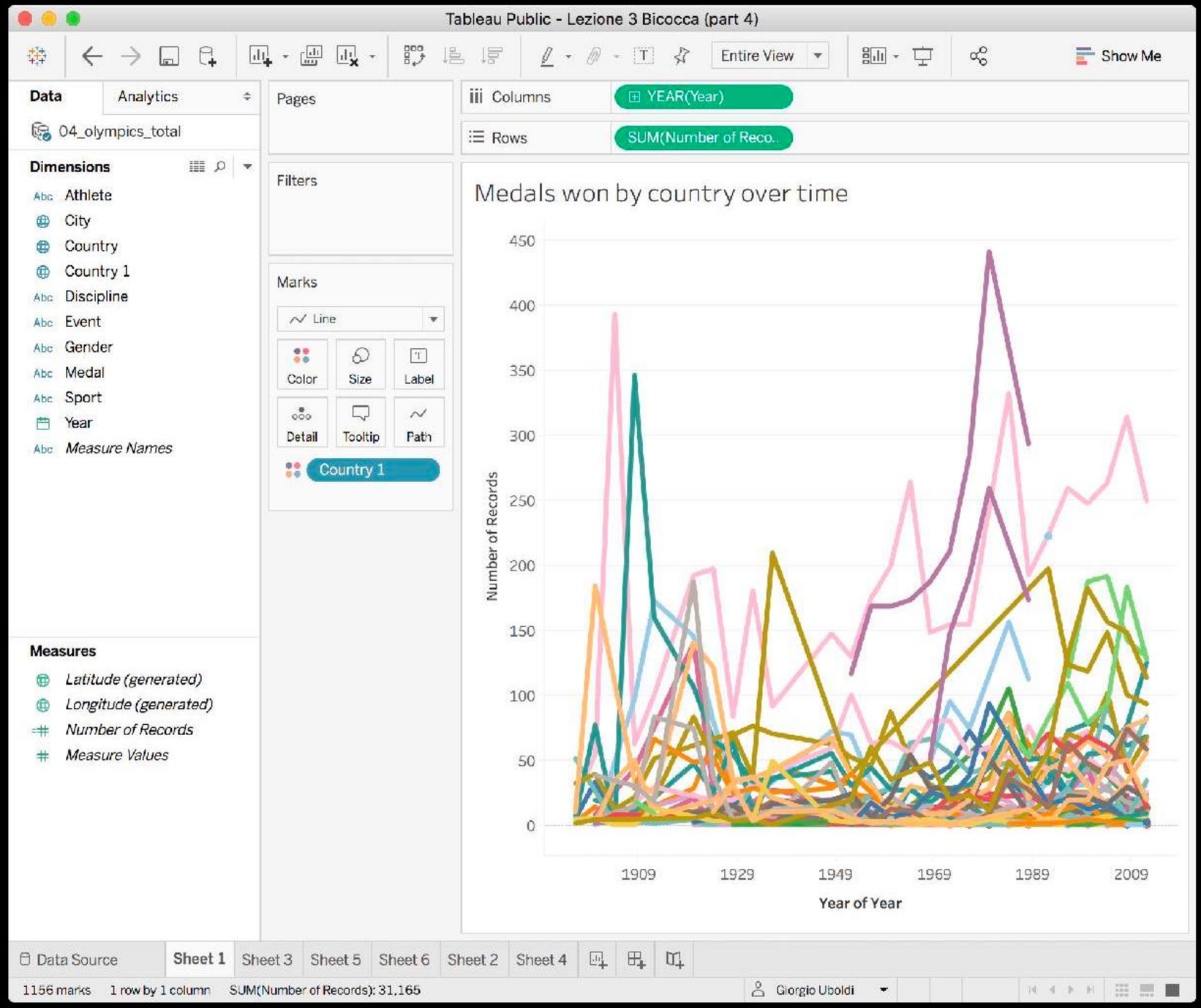
How is the evolution of countries over time? Which athlete has won the most medals? In which discipline? In which year? Who's the italian athlete who won the most gold medals?…

04_olympic... Year	04_olympics_t... City	04_olympics_tot... Sport	04_olympics_total.csv Discipline	04_olympics_total.csv Athlete	04_olympics_total.c... Country	04_olympics_total.csv Country 1	04_olympics_total.... Gender	04_olympics_total.csv Event	04_olympics_tot... Medal
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	100M Freestyle	Gold
1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Austria	Men	100M Freestyle	Silver
1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Greece	Men	100M Freestyle For S...	Bronze
1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Greece	Men	100M Freestyle For S...	Gold
1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Greece	Men	100M Freestyle For S...	Silver
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	1200M Freestyle	Bronze
1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Hungary	Men	1200M Freestyle	Gold
1896	Athens	Aquatics	Swimming	ANDREOU, Joannis	GRE	Greece	Men	1200M Freestyle	Silver
1896	Athens	Aquatics	Swimming	CHOROPHAS, Efstat...	GRE	Greece	Men	400M Freestyle	Bronze
1896	Athens	Aquatics	Swimming	NEUMANN, Paul	AUT	Austria	Men	400M Freestyle	Gold

***remember that "number of records" represents the number of rows in the data source.**

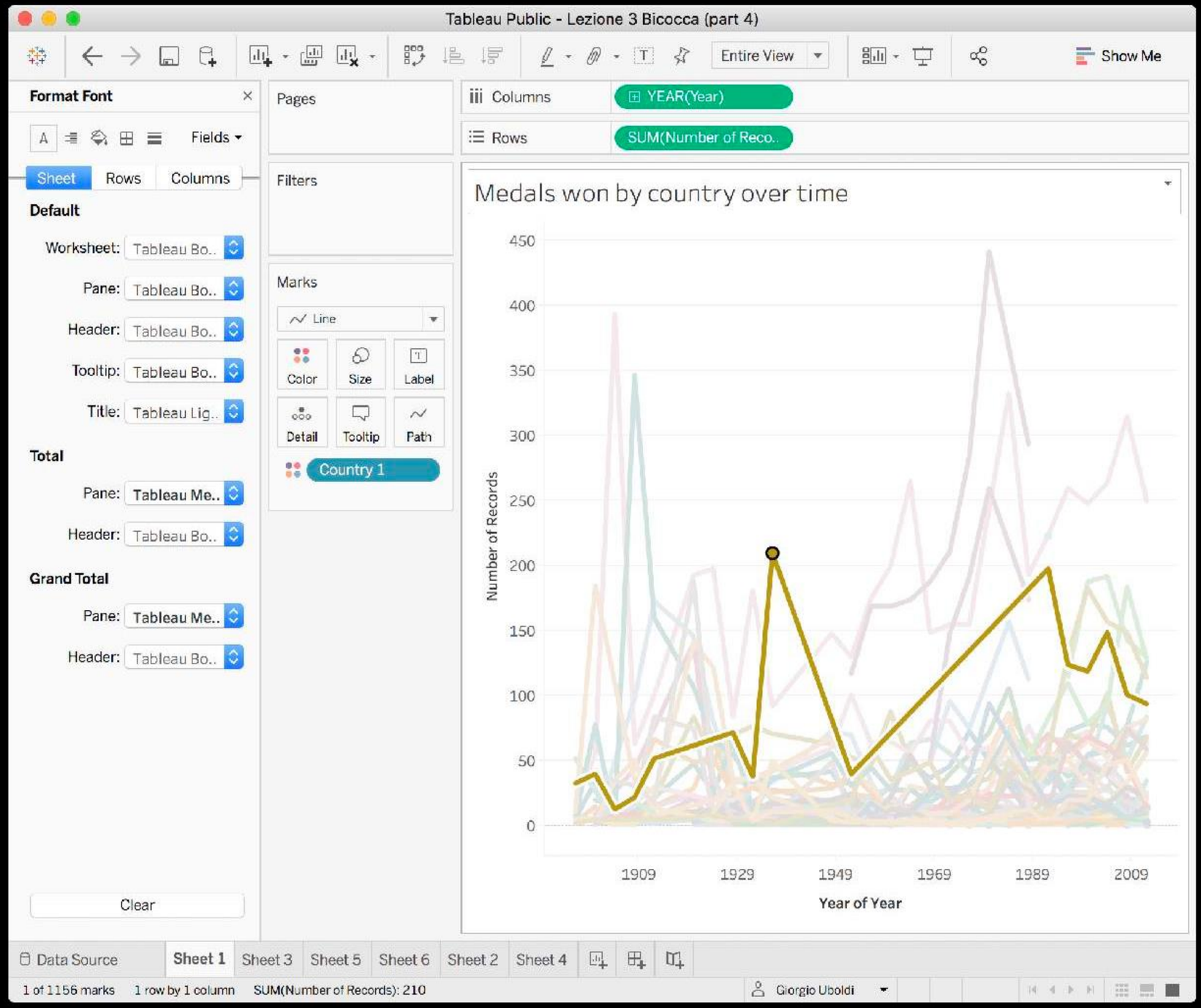
EXERCISE

Visualizing the Olympic games (part 2)



EXERCISE

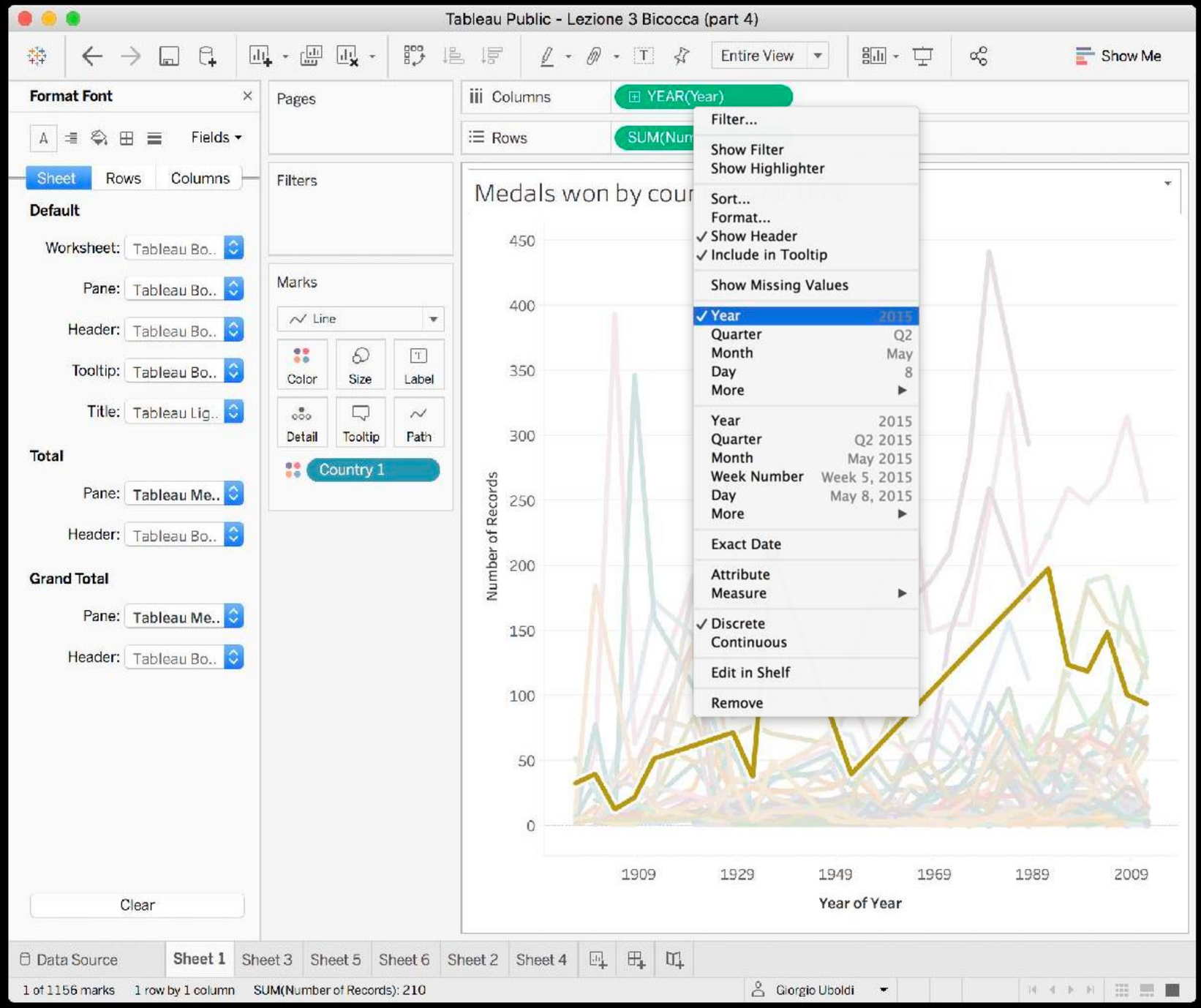
Visualizing the Olympic games (part 2)



EXERCISE

Visualizing the Olympic games (part 2)

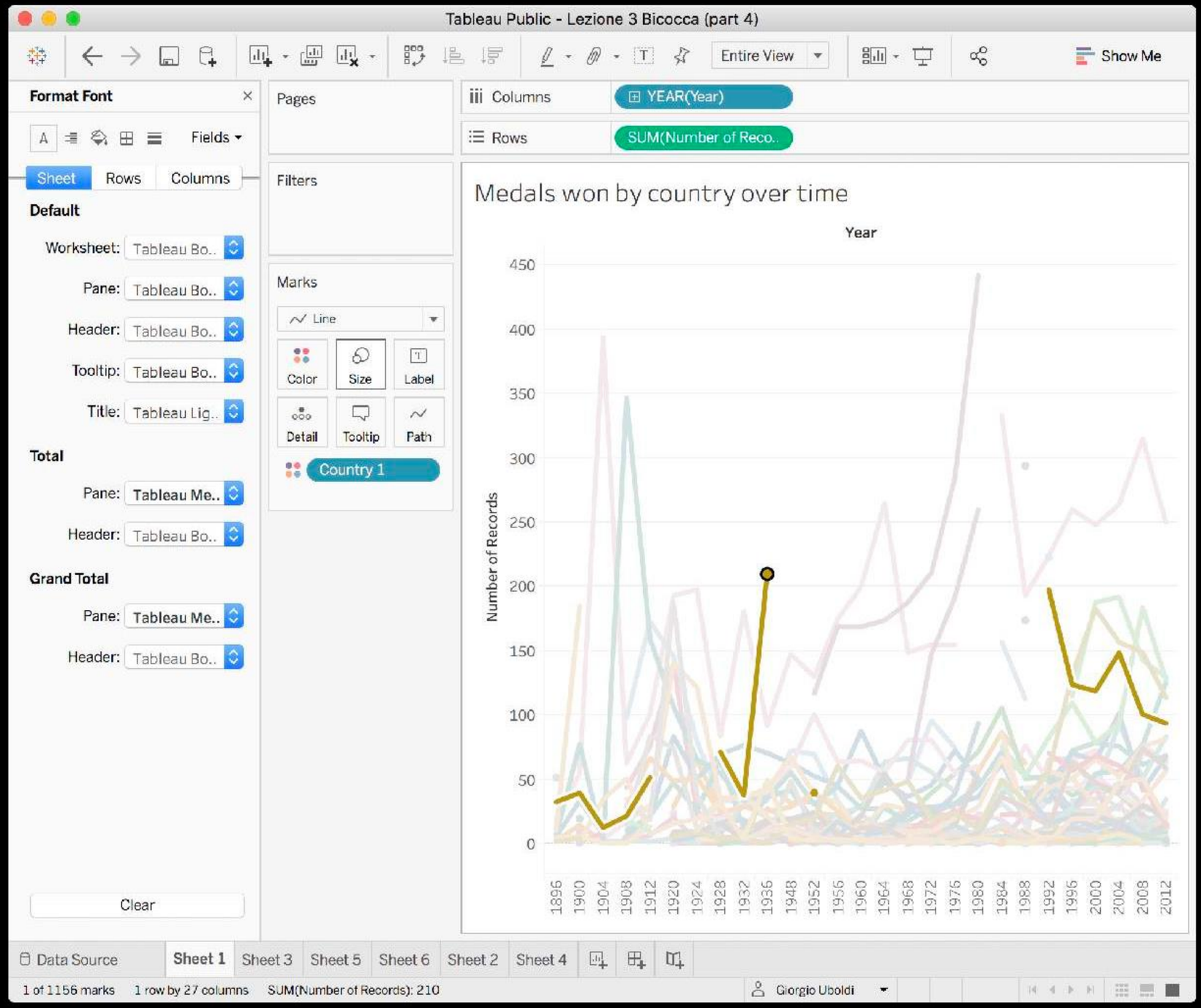
Pay attention to missing values



EXERCISE

Visualizing the Olympic games (part 2)

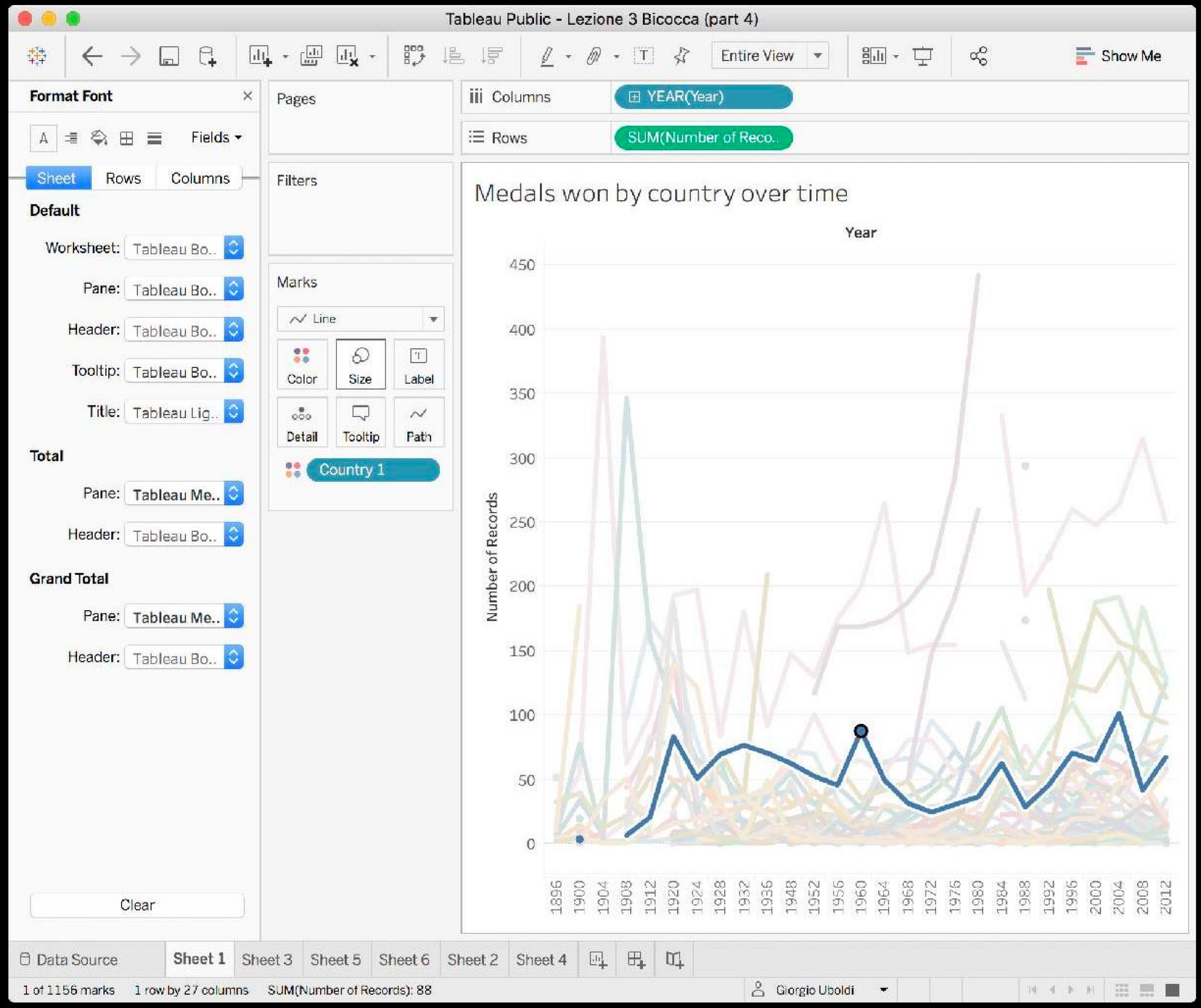
Pay attention to missing values



EXERCISE

Visualizing the Olympic games (part 2)

Pay attention to missing values



EXERCISE

Visualizing the Olympic games (part 2)

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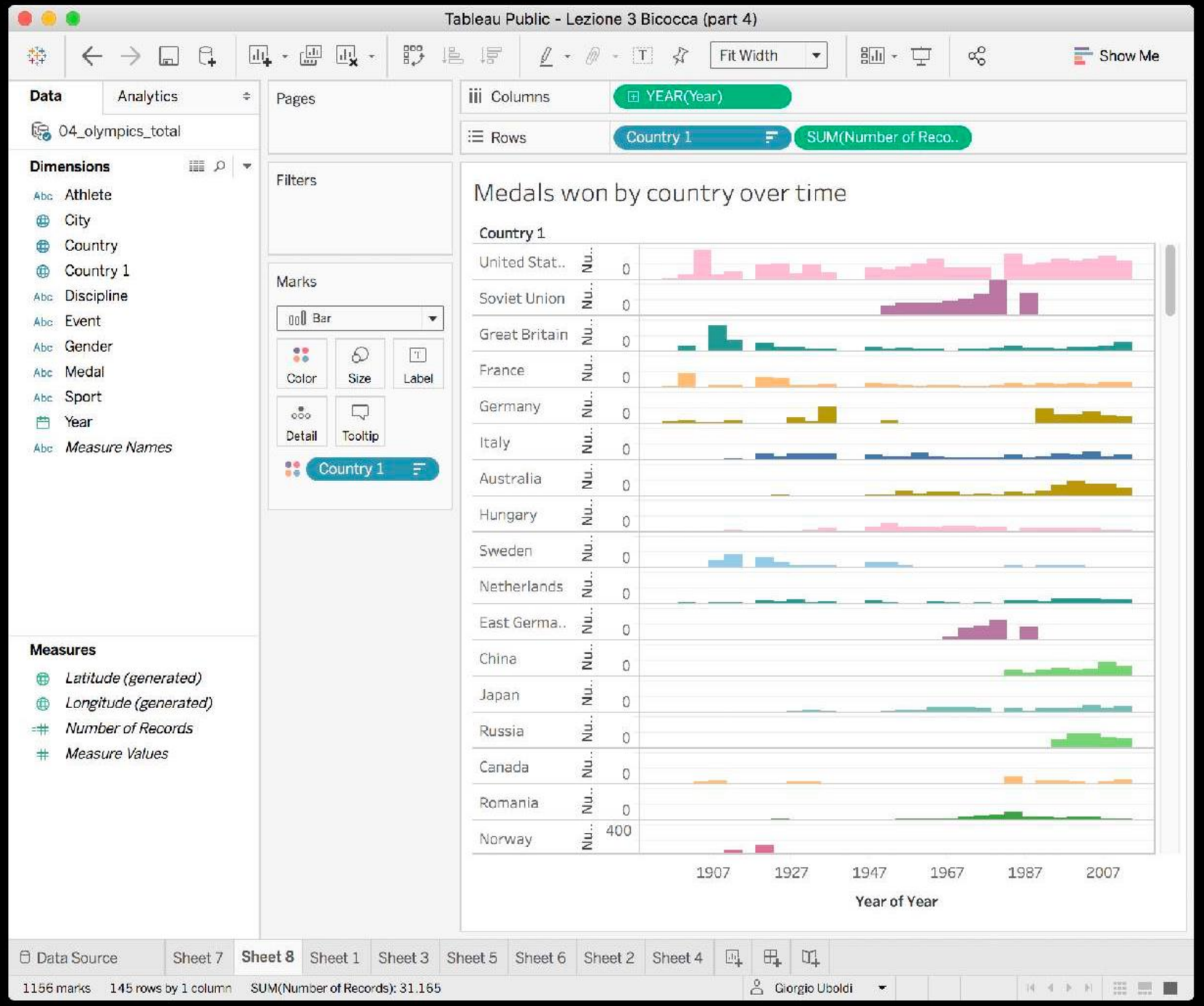
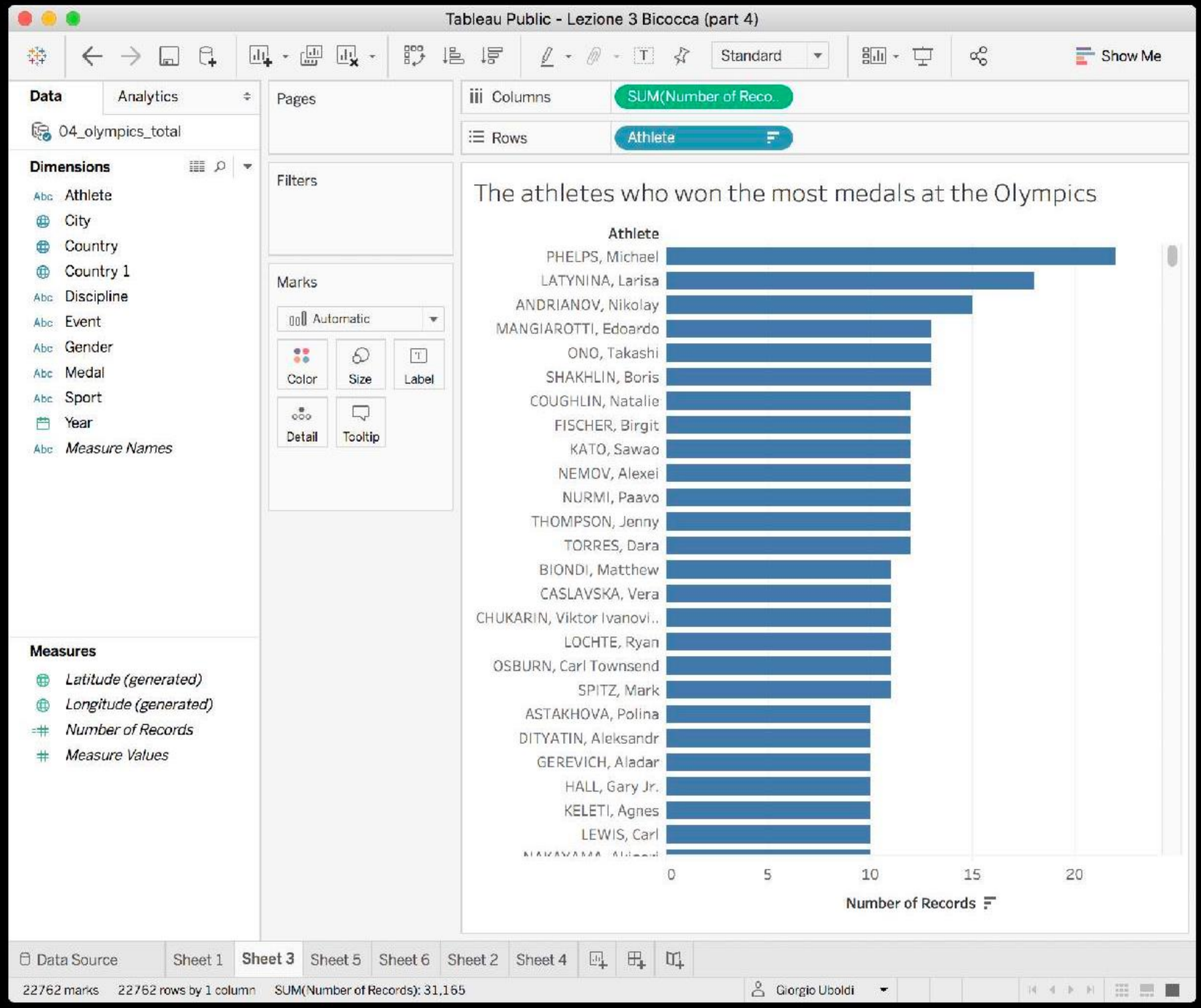


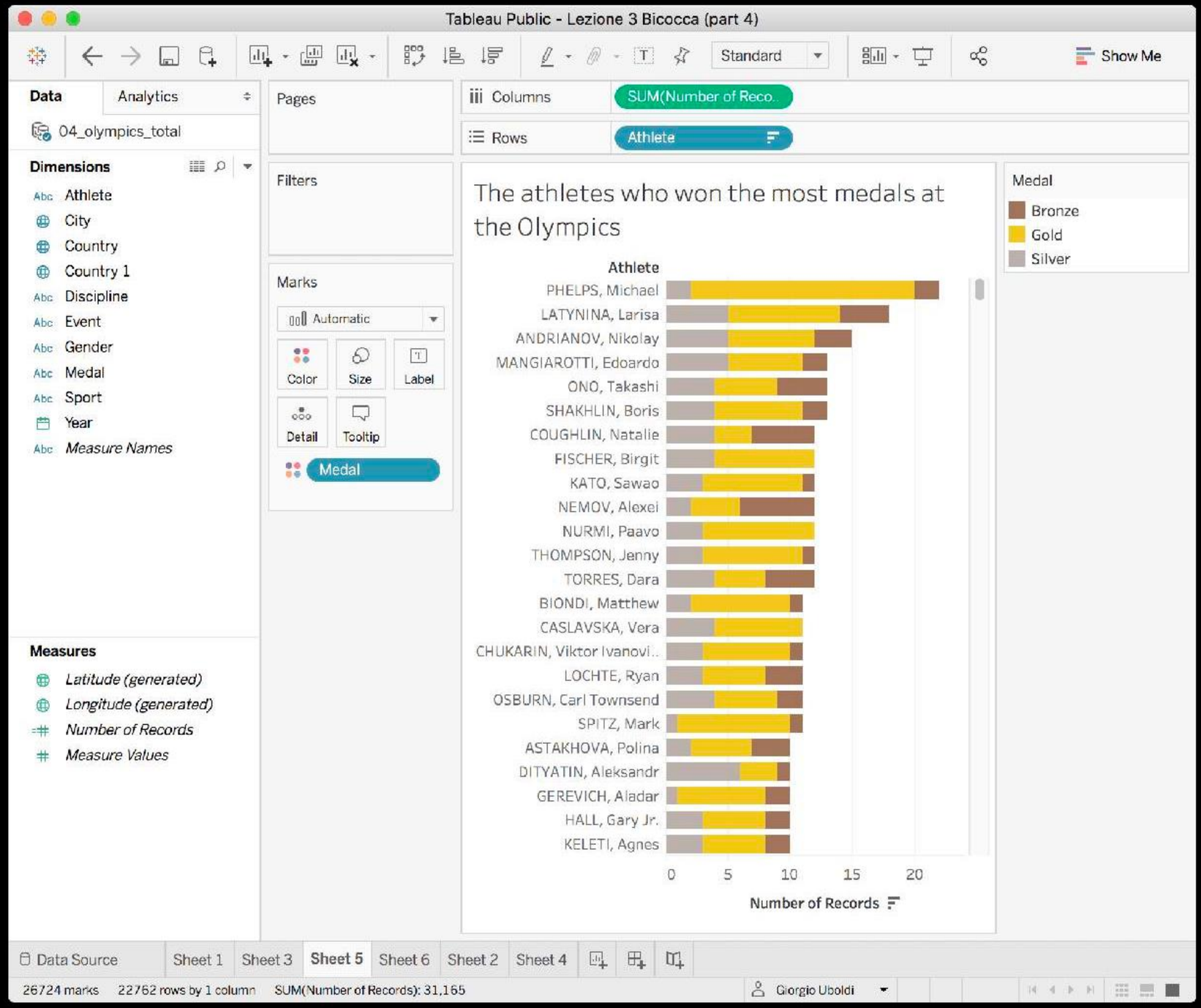
EXERCISE

Visualizing the Olympic games (part 2)



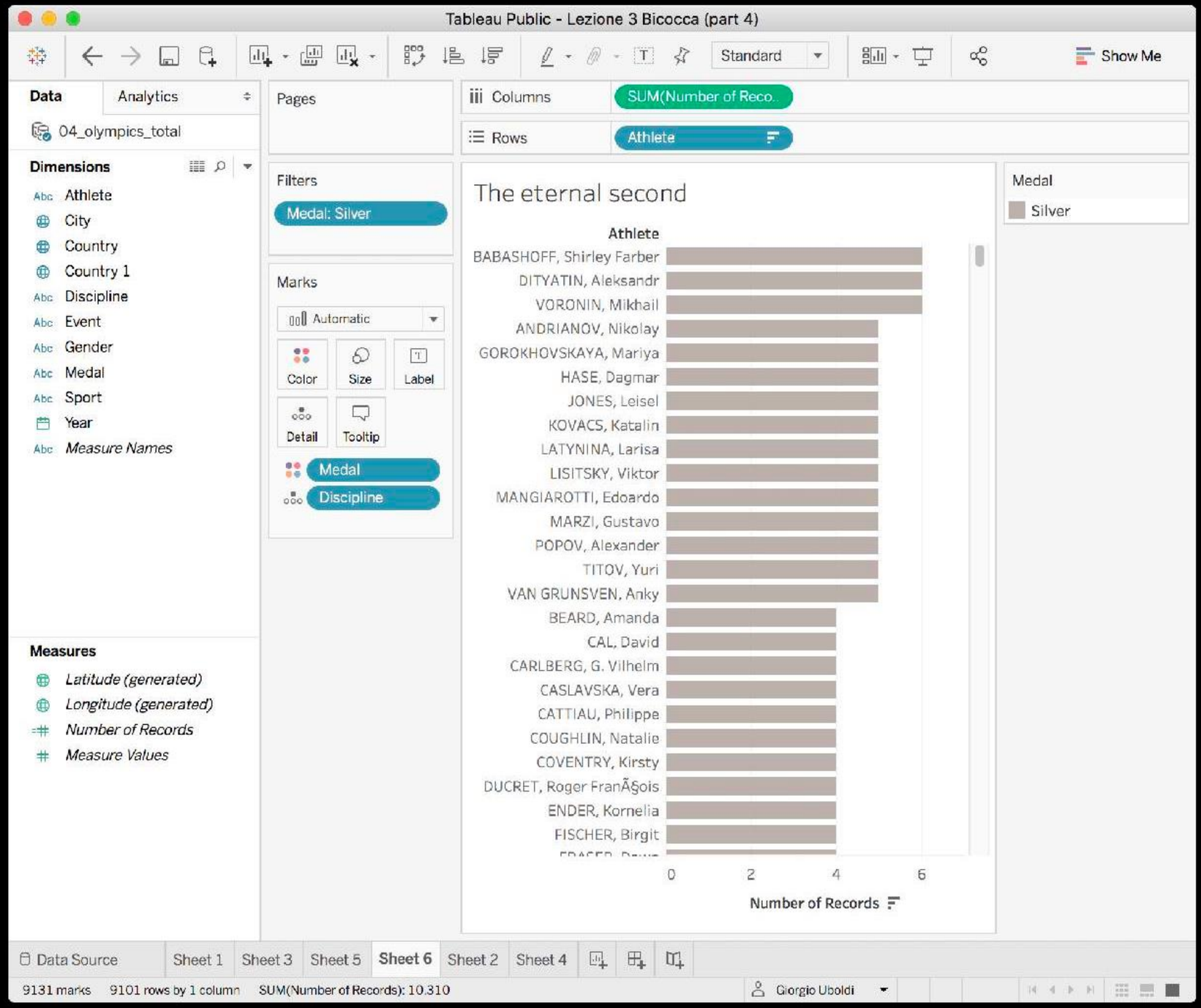
EXERCISE

Visualizing the Olympic games (part 2)



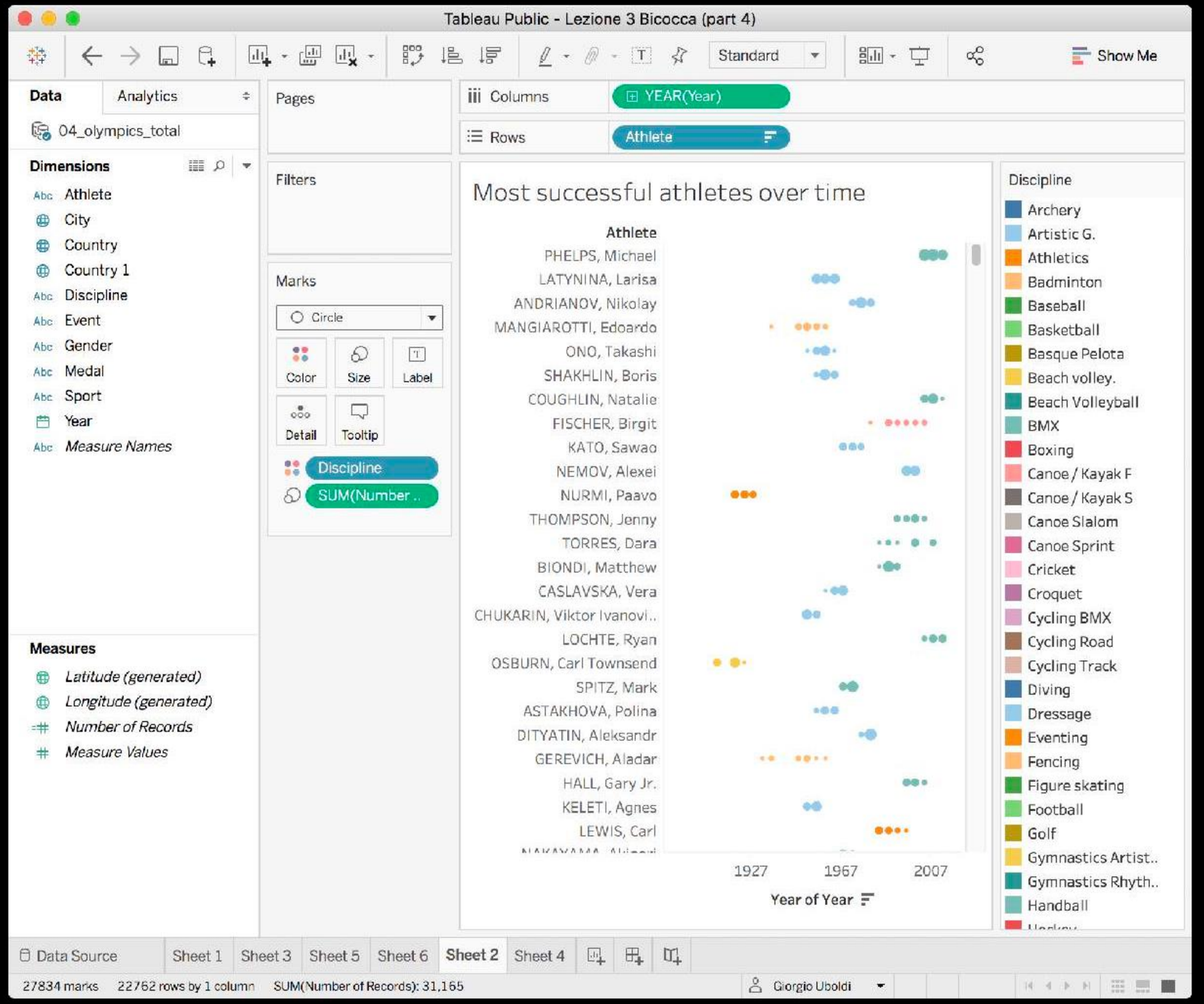
EXERCISE

Visualizing the Olympic games (part 2)



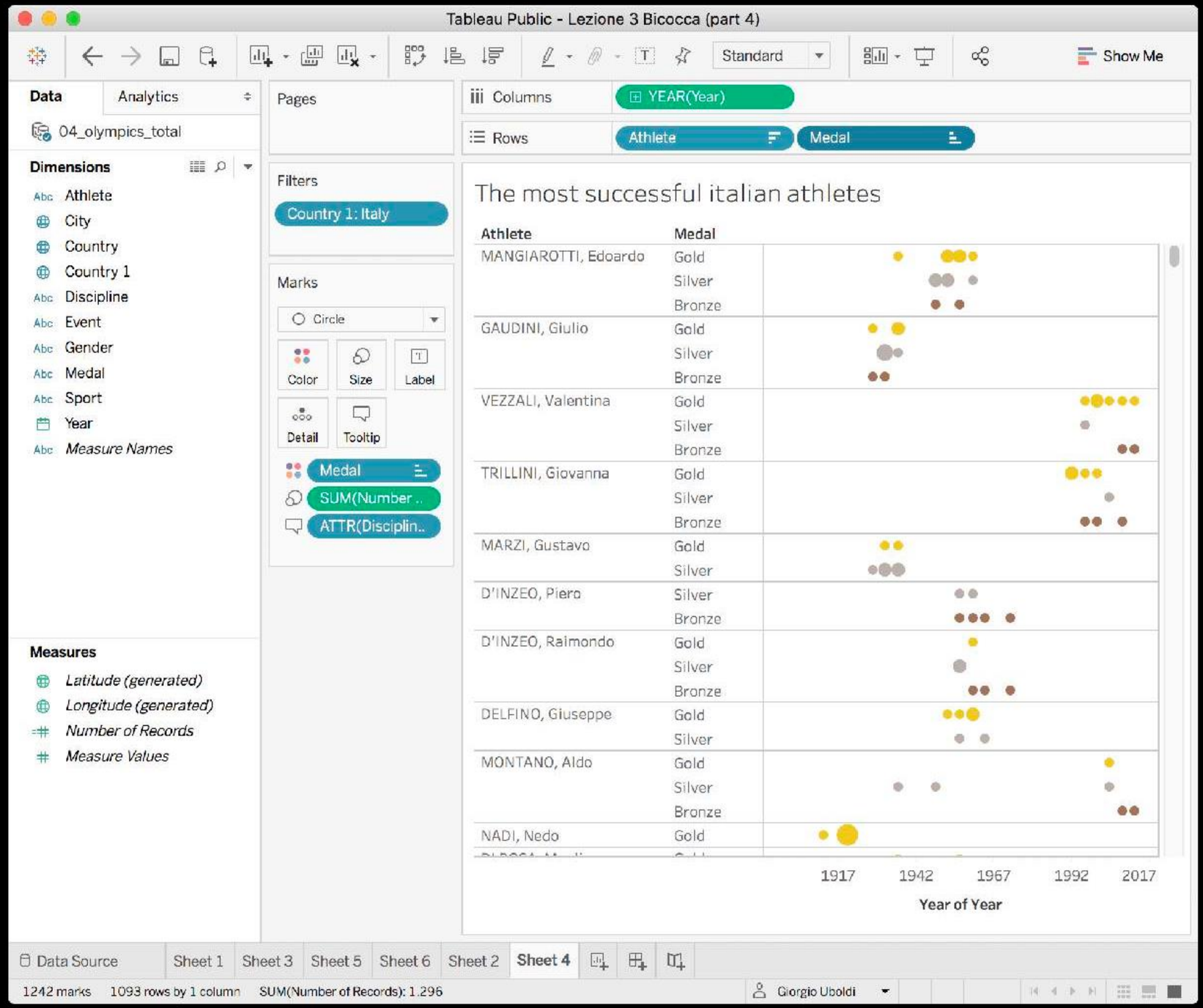
EXERCISE

Visualizing the Olympic games (part 2)



EXERCISE

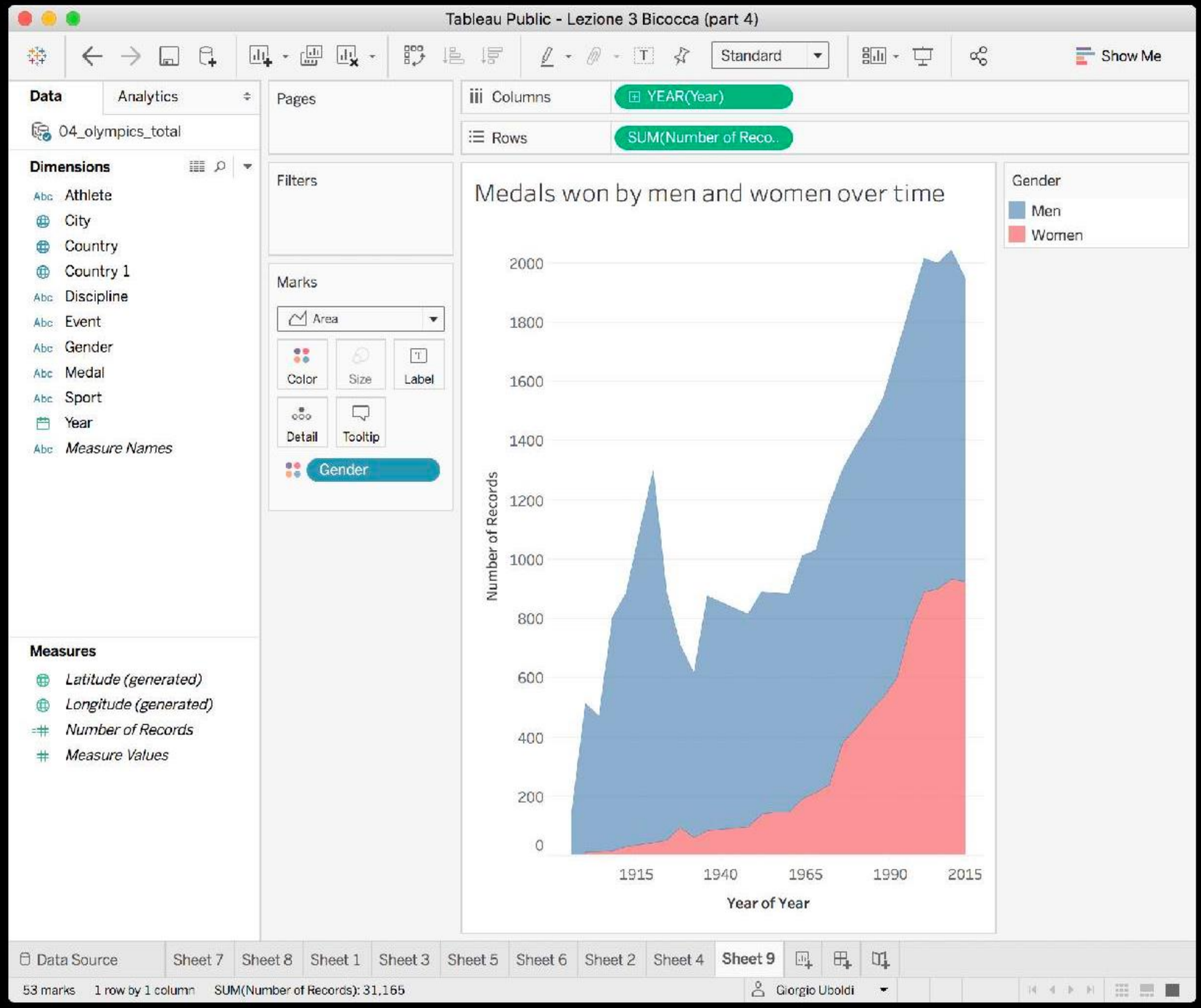
Visualizing the Olympic games (part 2)



EXERCISE

Visualizing the Olympic games (part 2)

Pay attention when you make assumptions.
Understand the data and the topic!



IF YOU ARE LOST

Follow the online tutorials here:
https://public.tableau.com/en-us/s/resources

Look for help here
https://www.tableau.com/support/help
https://community.tableau.com/welcome
and Google!