



Online Course
**Data Visualization
for Professionals**



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Tableau Desktop

Temporal Data | Dashboard Actions | Parameters

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Visual+
Interactive
Data

design
informatics



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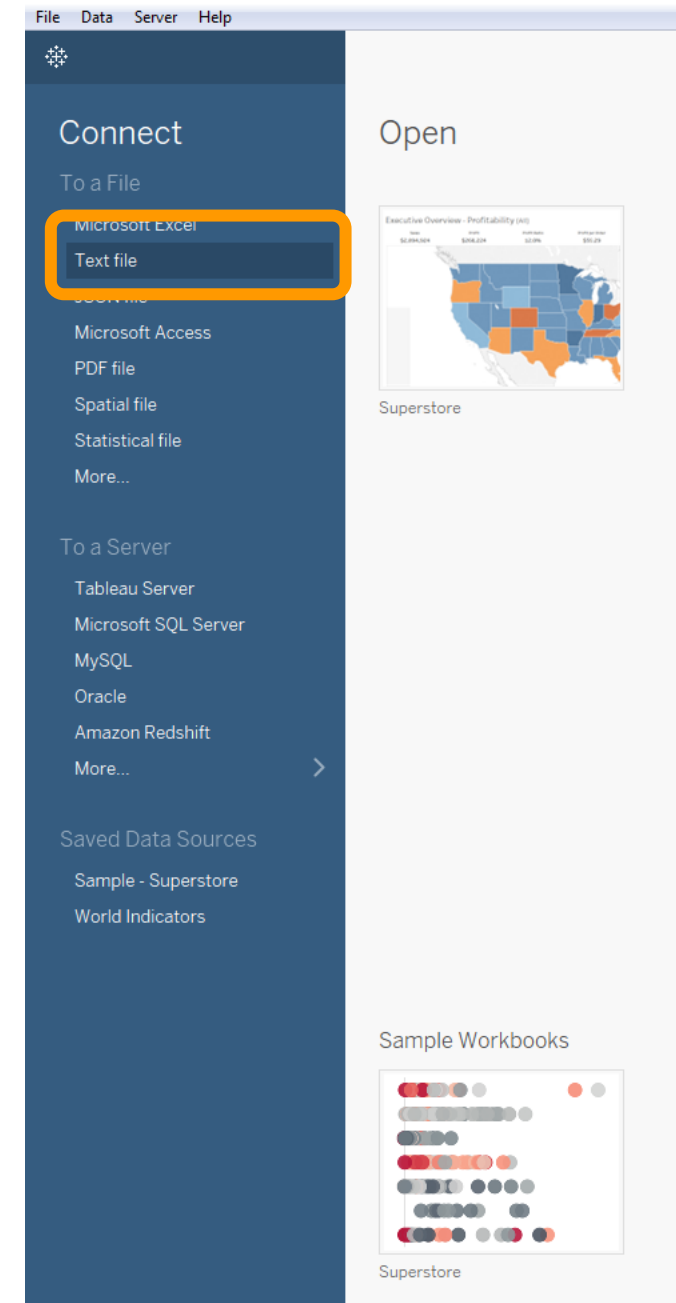
outline for today

- Building a simple timeline in Tableau Desktop
 - Manipulating data to work in a temporal way
- Creating an interactive slider to filter the timeline
- Working with Dashboard Actions
- Working with parameters for more interactivity

building a simple timeline

loading the data

- Download migrationData.csv from here
 - https://datavis-online.github.io/course_content_2022/files/tutorials/tableaudata.zip
 - Unzip the file
 - Find the migrationData.csv
- Open Tableau and load migrationData.csv as “Text File”



manipulating the data

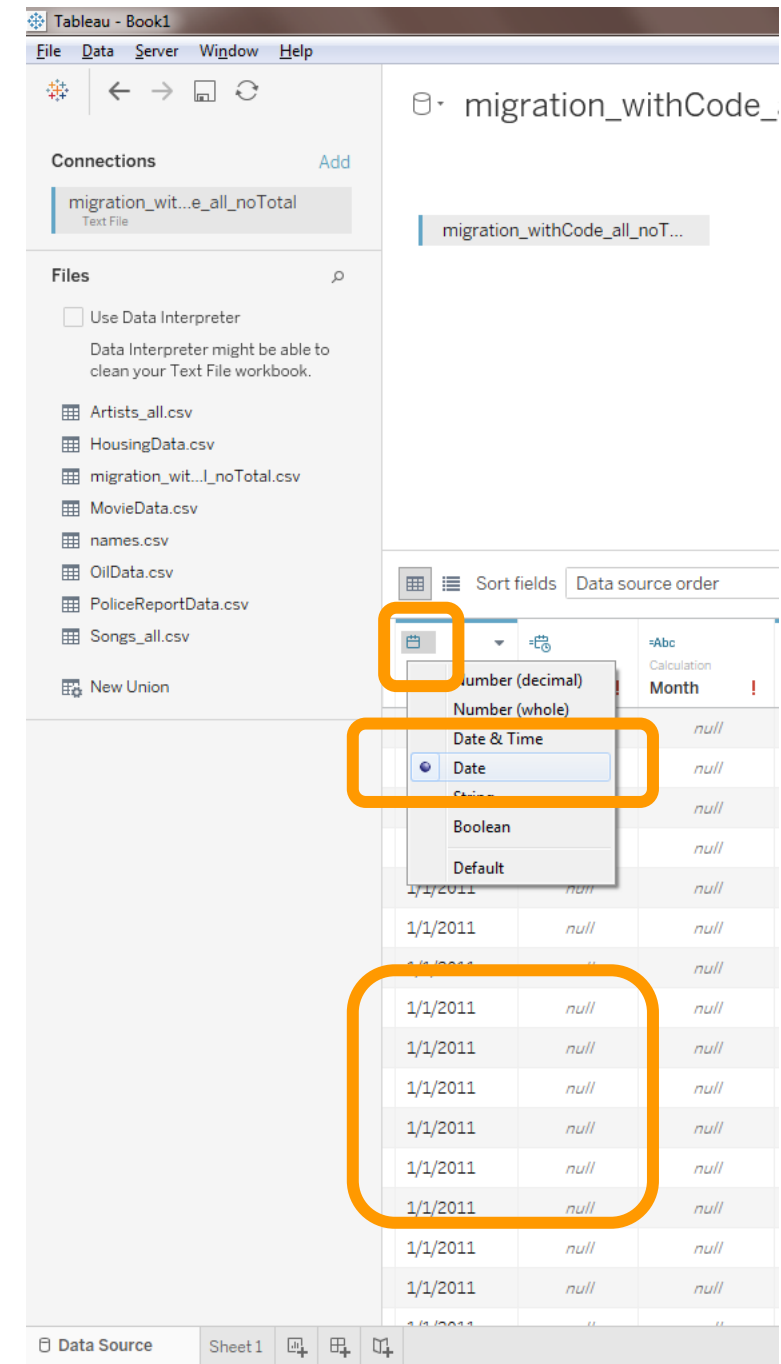
- Our data set contains temporal data, but the values are in a strange format.

The screenshot shows the Tableau interface with a data source named 'migration_withCode_all_noTotal'. The data is displayed in a table view with the following columns: Time, Geo, Citizen, Citizen Label, SEX, and AGE. The 'Time' column contains values in the format 'YYYYMM' (e.g., '2011M01'). An orange box highlights the 'Time' and 'Geo' columns. A tooltip at the bottom says 'Go to Worksheet'.

Time	Geo	Citizen	Citizen Label	SEX	AGE
2011M01	Belgium	BE	Belgium	Males	Total
2011M01	Belgium	BE	Belgium	Females	Total
2011M01	Belgium	BG	Bulgaria	Males	Total
2011M01	Belgium	BG	Bulgaria	Females	Total
2011M01	Belgium	CZ	Czech Republic	Males	Total
2011M01	Belgium	CZ	Czech Republic	Females	Total
2011M01	Belgium	DK	Denmark	Males	Total
2011M01	Belgium	DK	Denmark	Females	Total
2011M01	Belgium	DE	Germany (until 1990 f...	Males	Total
2011M01	Belgium	DE	Germany (until 1990 f...	Females	Total
2011M01	Belgium	EE	Estonia	Males	Total
2011M01	Belgium	EE	Estonia	Females	Total
2011M01	Belgium	IE	Ireland	Males	Total
2011M01	Belgium	IE	Ireland	Females	Total
2011M01	Belgium	EL	Greece	Males	Total

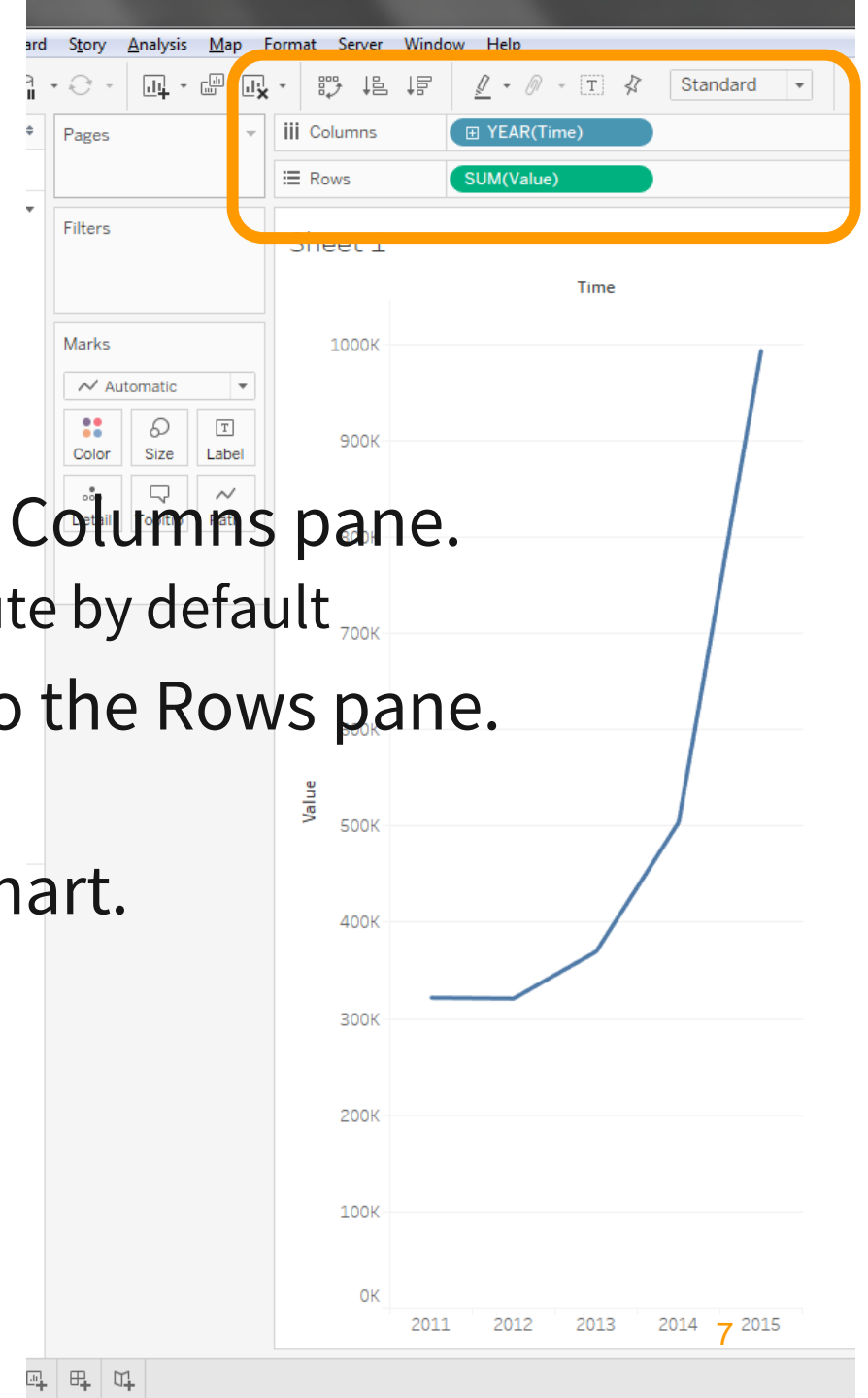
manipulating the data

- We change the data type to “Date”.
- This format now looks more like a familiar time format.



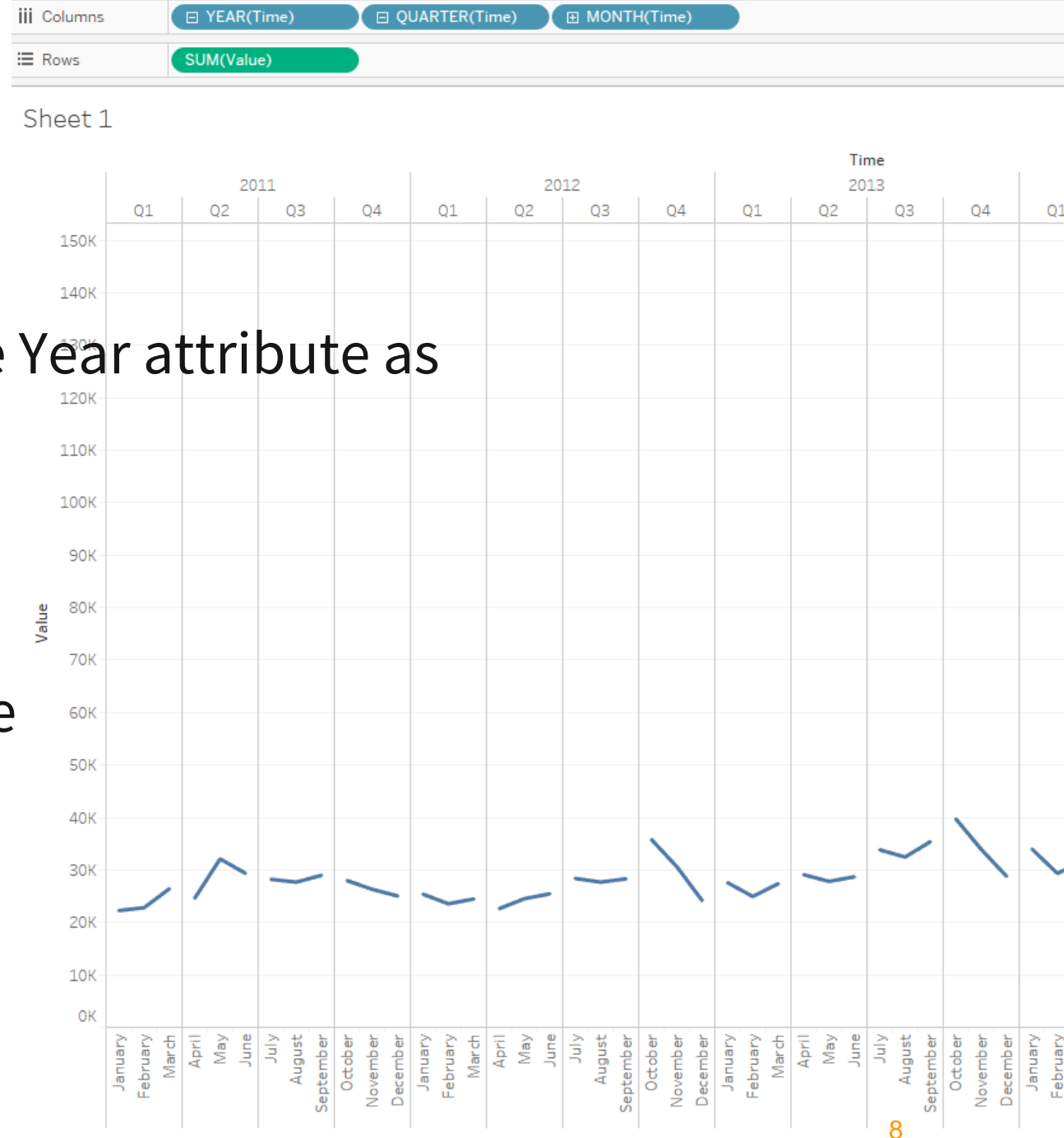
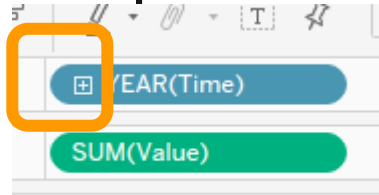
building a timeline

- Open a new worksheet.
- Drag the “Time” attribute (ordered) into the Columns pane.
 - Tableau will show the “Year” level of this attribute by default
- Drag the “Value” attribute (quantitative) into the Rows pane.
 - This is the number of migrants per year
- Tableau will automatically generate a line chart.



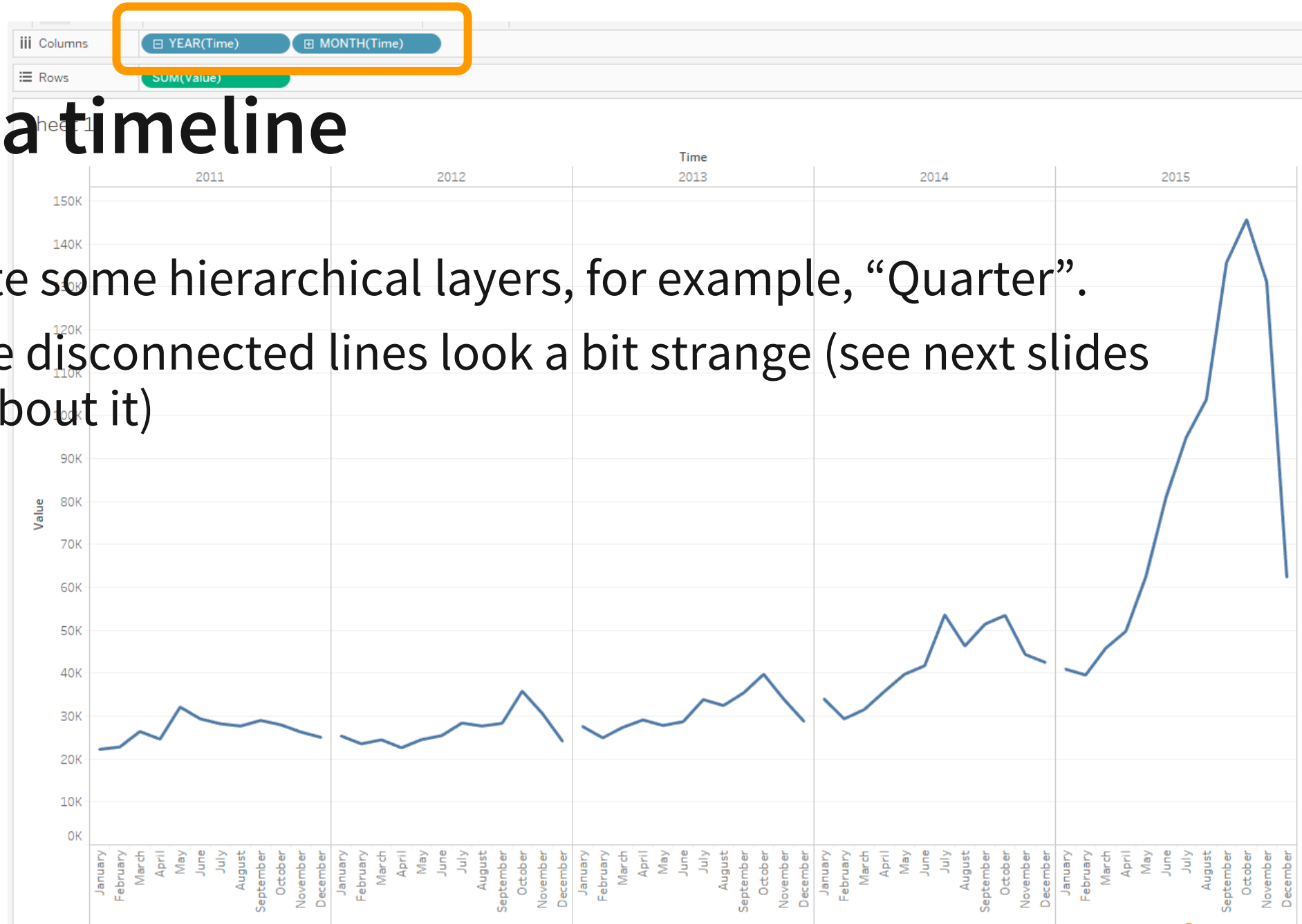
building a timeline

- Note that Tableau recognizes the Year attribute as hierarchical – it can be split into
 - Quarter
 - Month
 - Day
- Just press the + button to explore



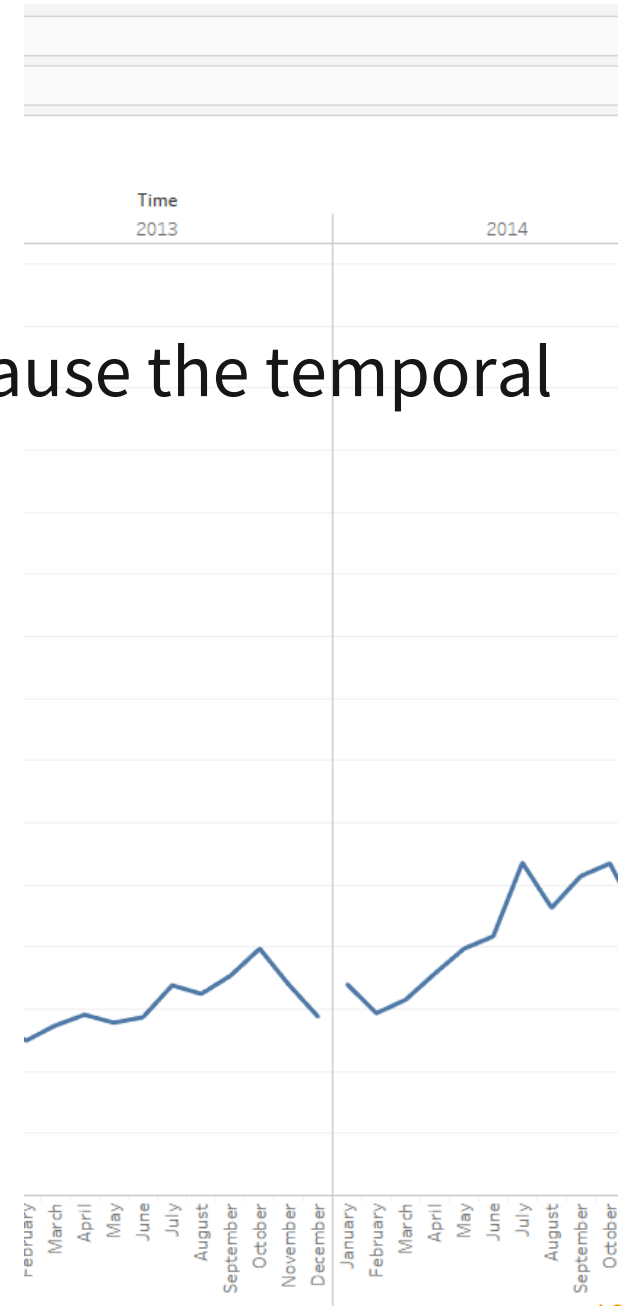
building a timeline

- We can delete some hierarchical layers, for example, “Quarter”.
- However, the disconnected lines look a bit strange (see next slides what to do about it)



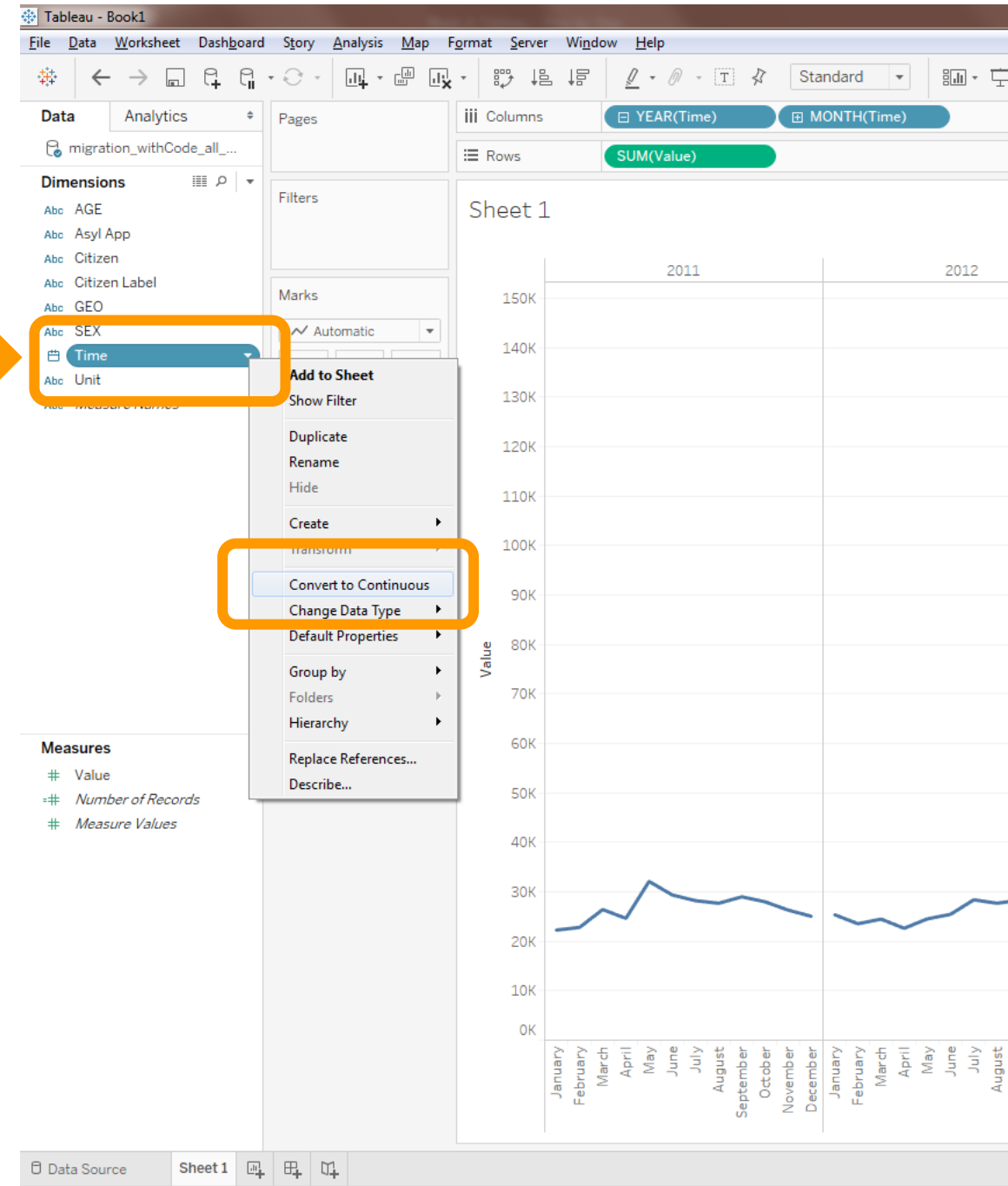
refining the line graph

- The disconnected lines in the line graph are because the temporal attributes are treated as **discrete data**.



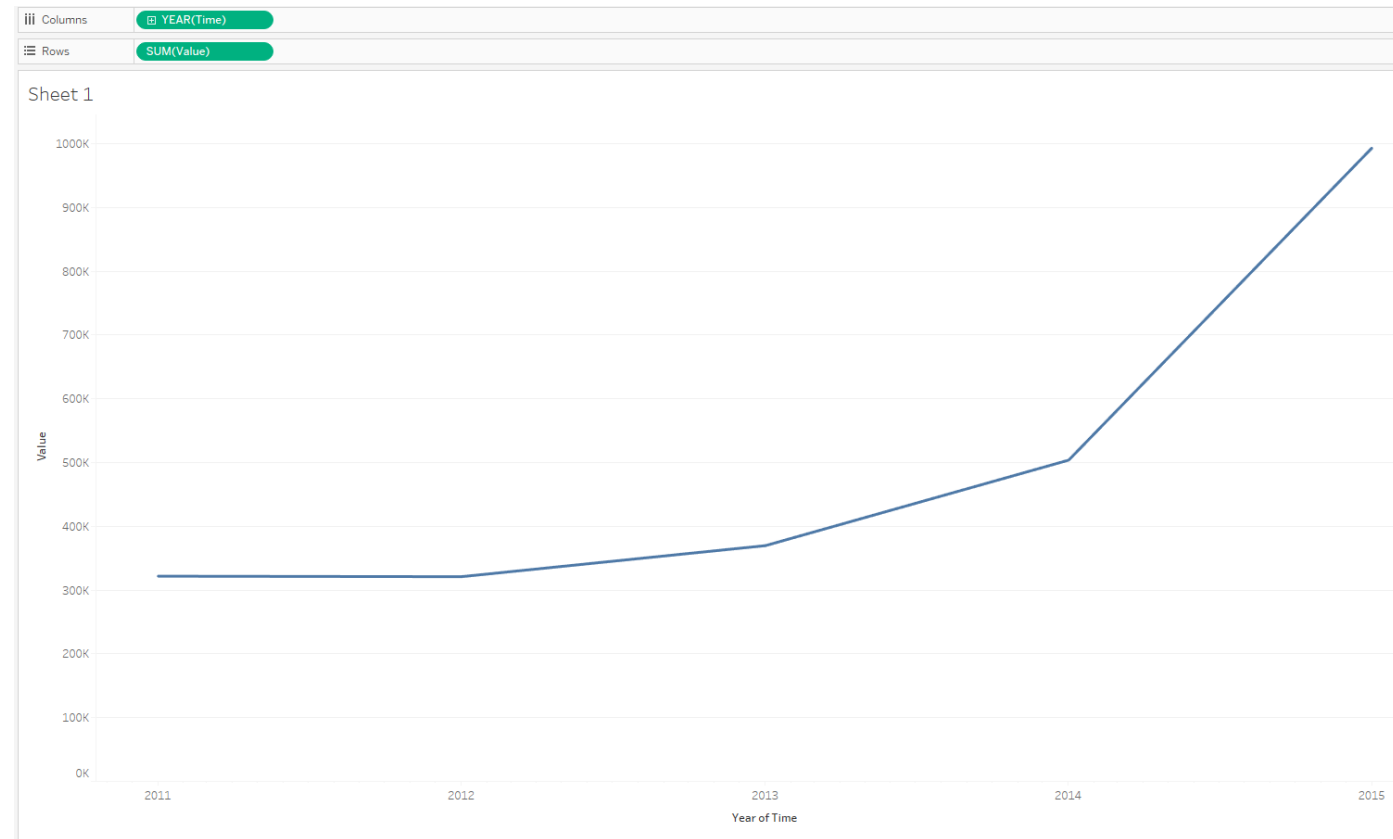
refining the line graph

- We can fix this, by making “Year” a **continuous dimension**.
- Remove the discrete “Year” and “Month” attributes from the Columns pane and re-build your line graph.



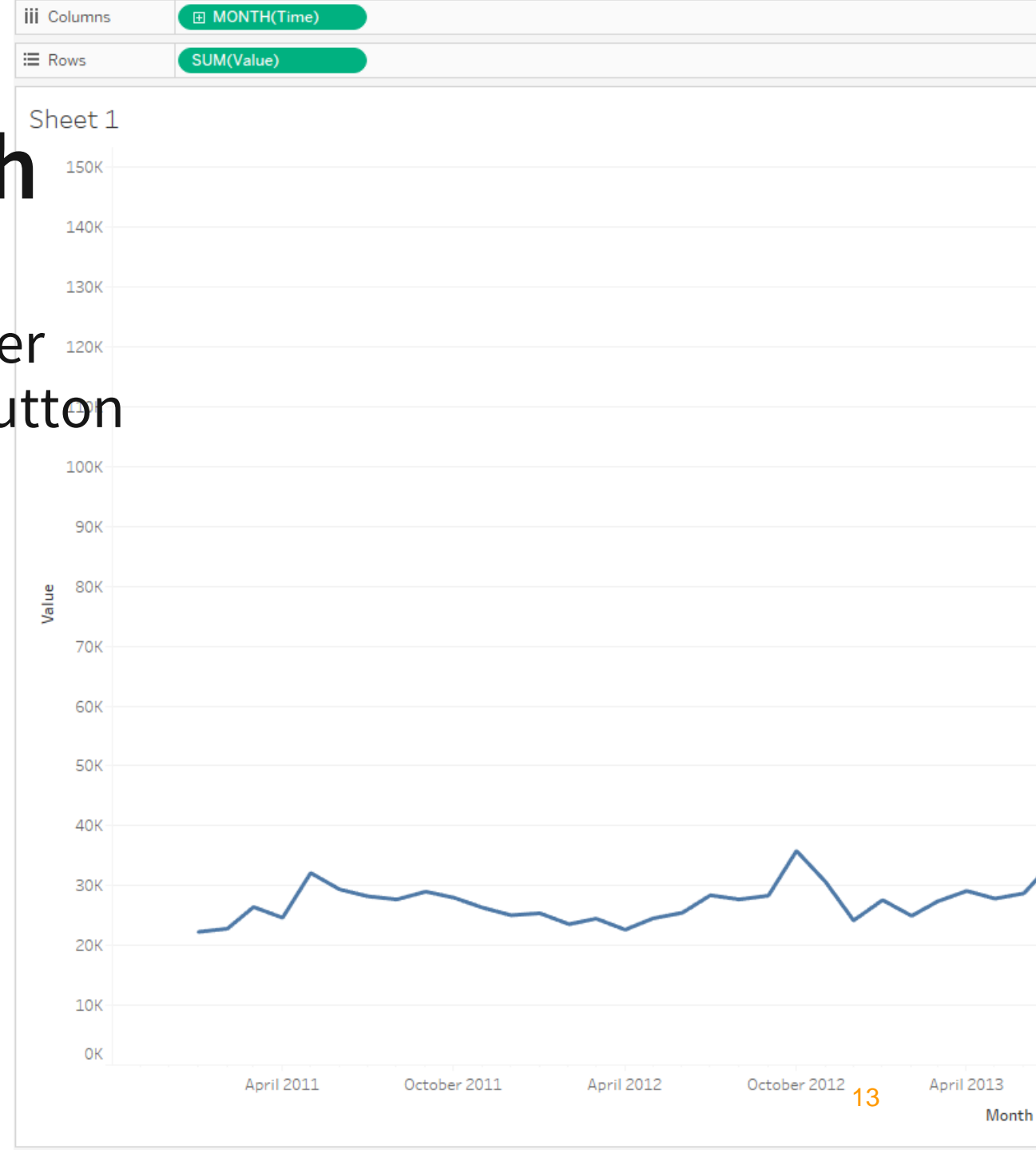
refining the line graph

- As you can see, “Year” now appears green just like a **Measure** and values are plotted continuously



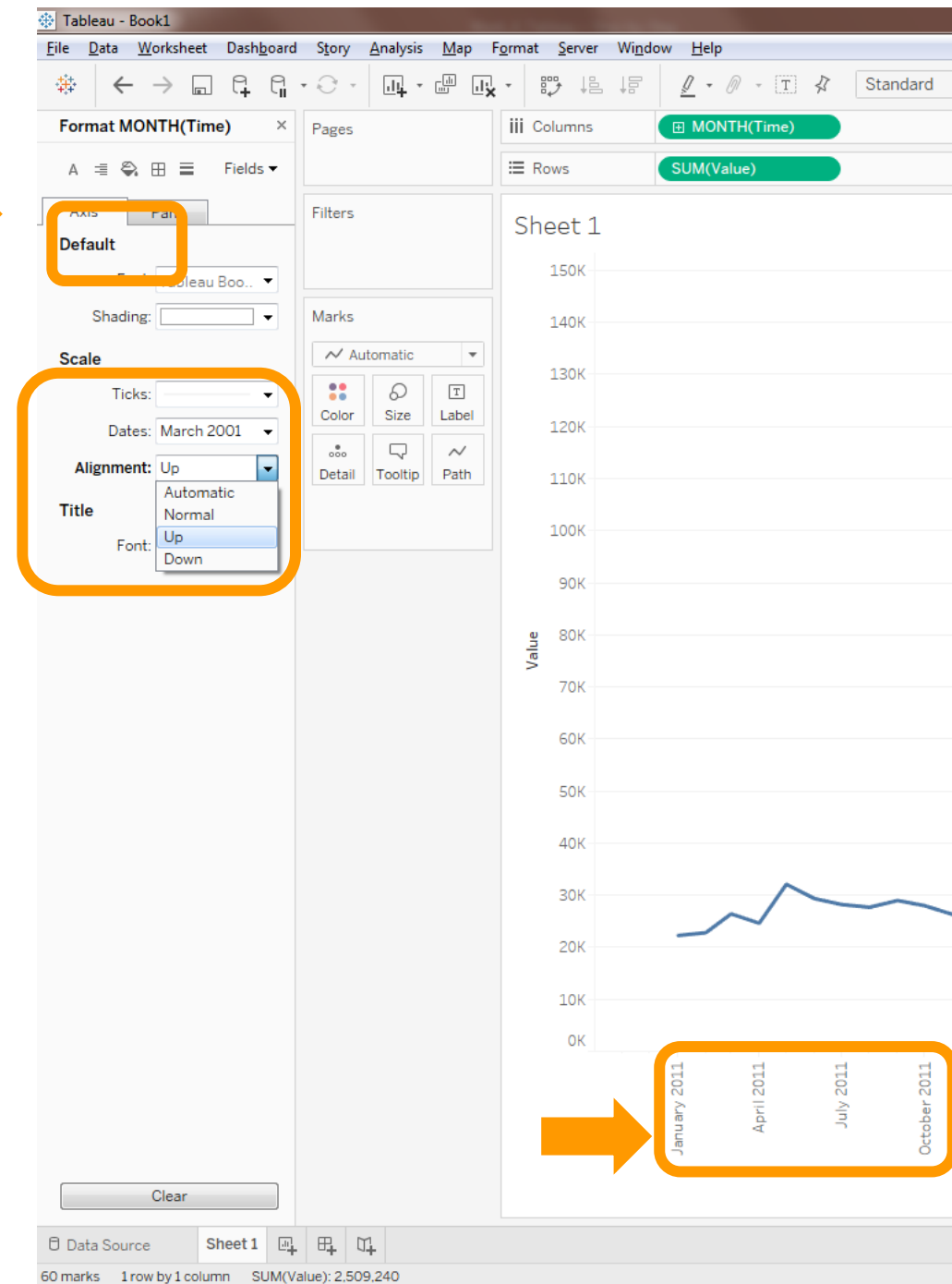
refining the line graph

- We can still show the data at lower granularity by pressing the “+” button

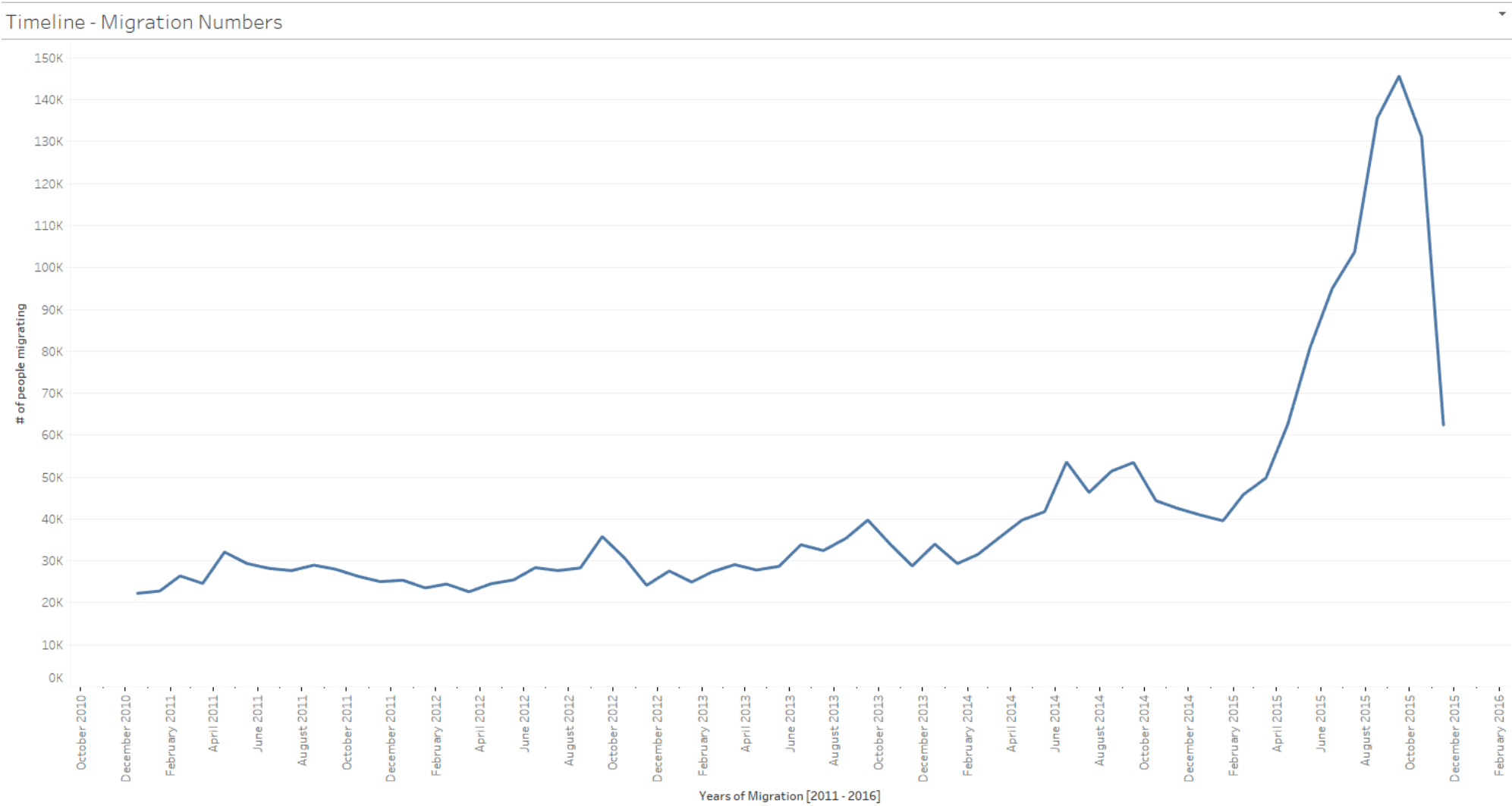


styling the x-axis

- Change labels and their alignment on the x-axis.
 - Right-click the x-axis and select “Format”
 - Change alignment to vertical alignment
 - You can also add ticks to the timeline for better readability



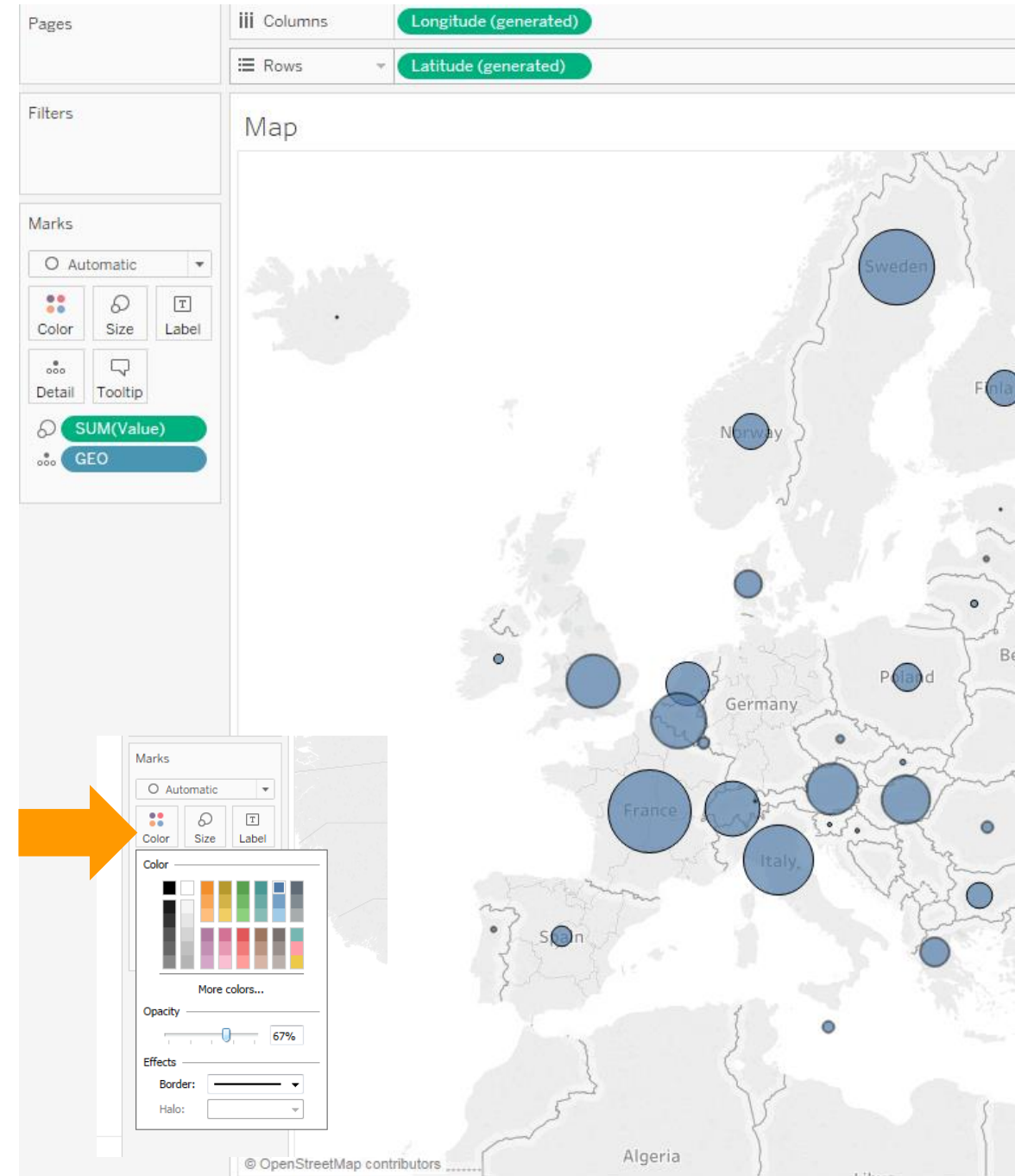
timeline



linking timeline to map

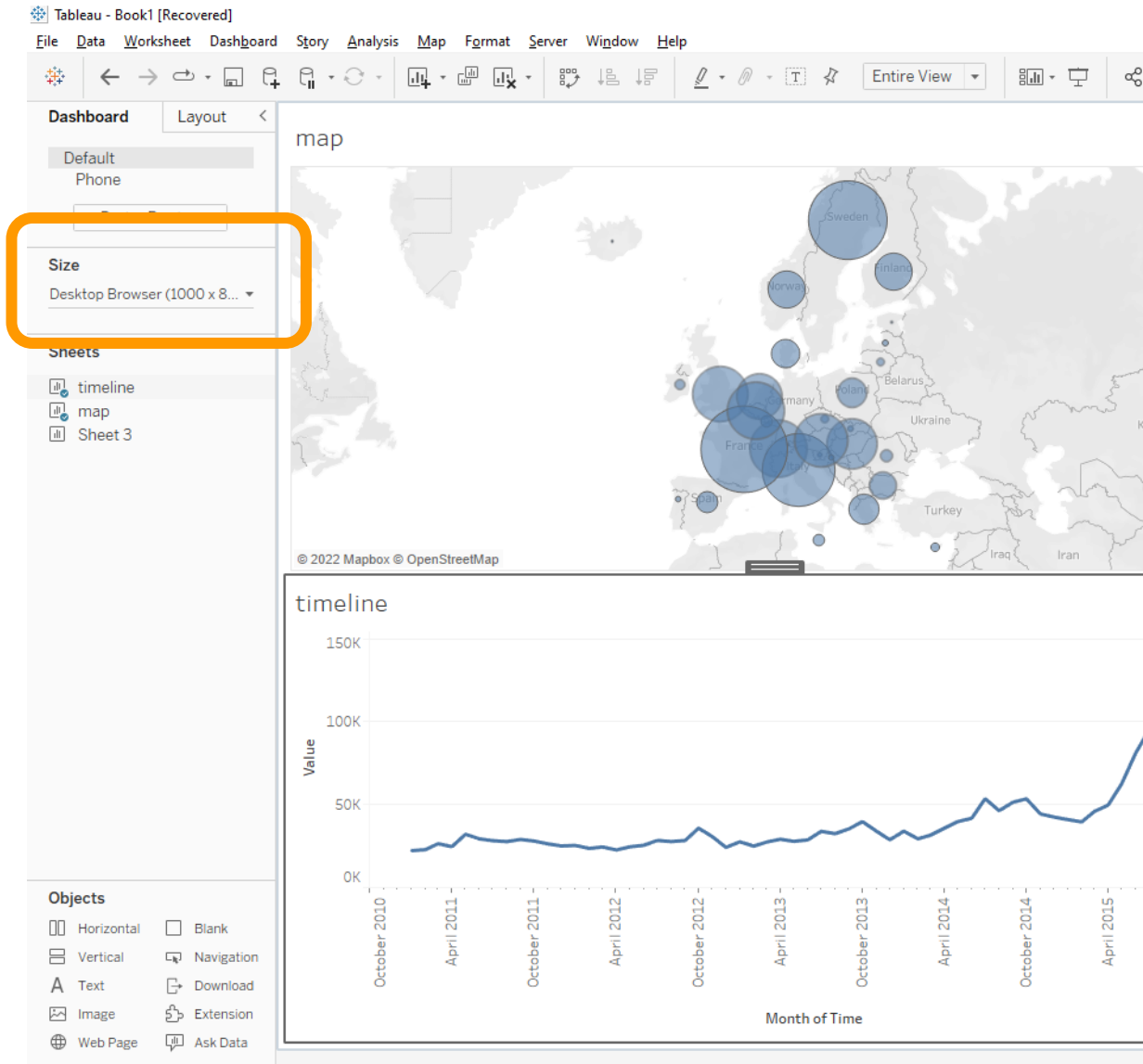
some geographic data

- Build another worksheet with a geographic map that shows the total number of immigrants into Europe
 - Use the GEO and Value attributes
 - Transform GEO into a Geographic Role
 - If you don't know how to do this, check Tableau Tutorial 01.
- Here, we have applied transparency to the circles on the map, to better deal with potential overlaps



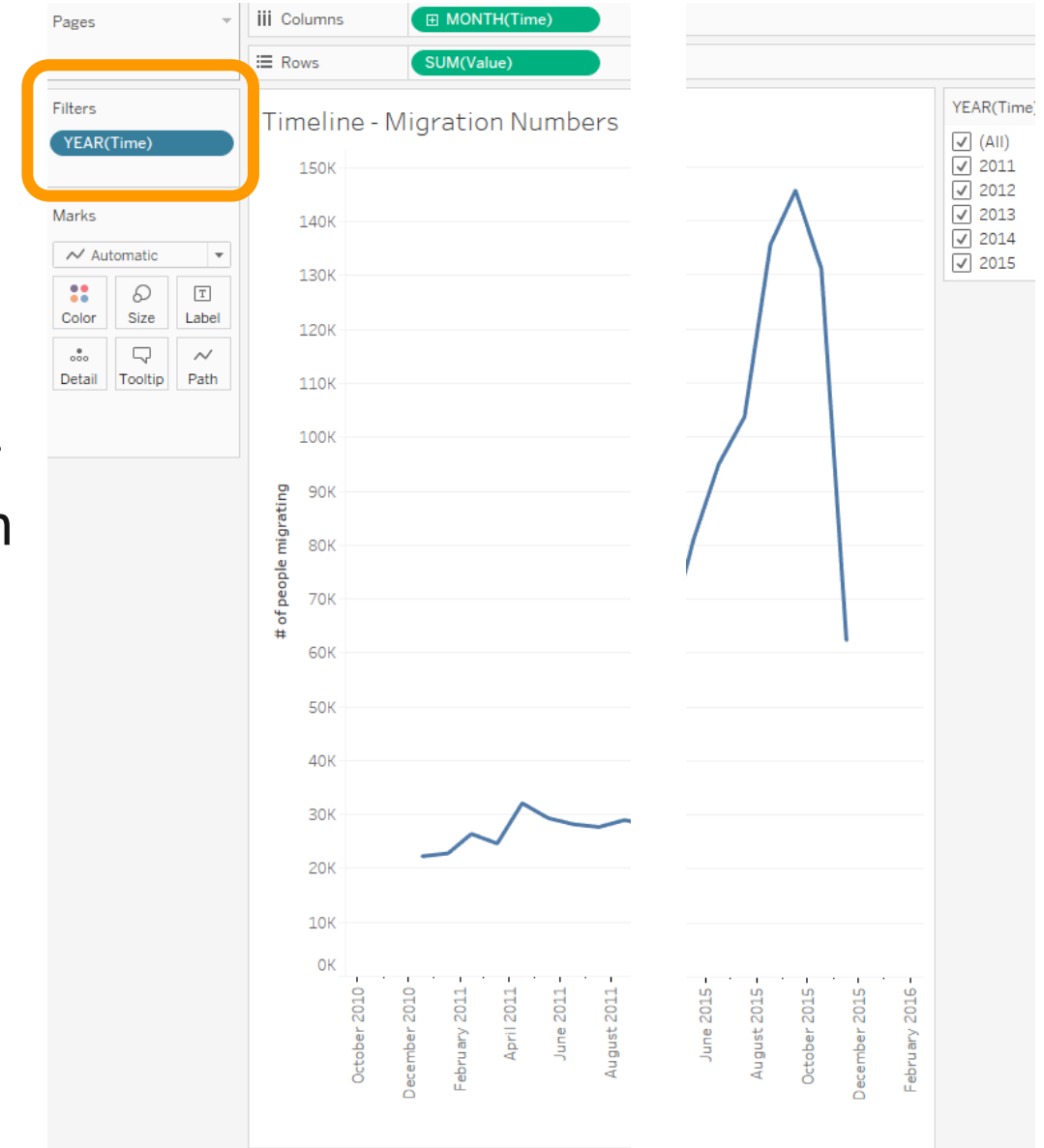
create a dashboard

- Create a dashboard juxtaposing the timeline and map.
- If you don't know how to do this, check Tableau Tutorial 01.
- Note that you can set the size of the dashboard in the left panel under “size”
- Make sure that the views are aligned and sized so that all important features are visible. E.g., the timeline should not be too flat as trends will not be visible.



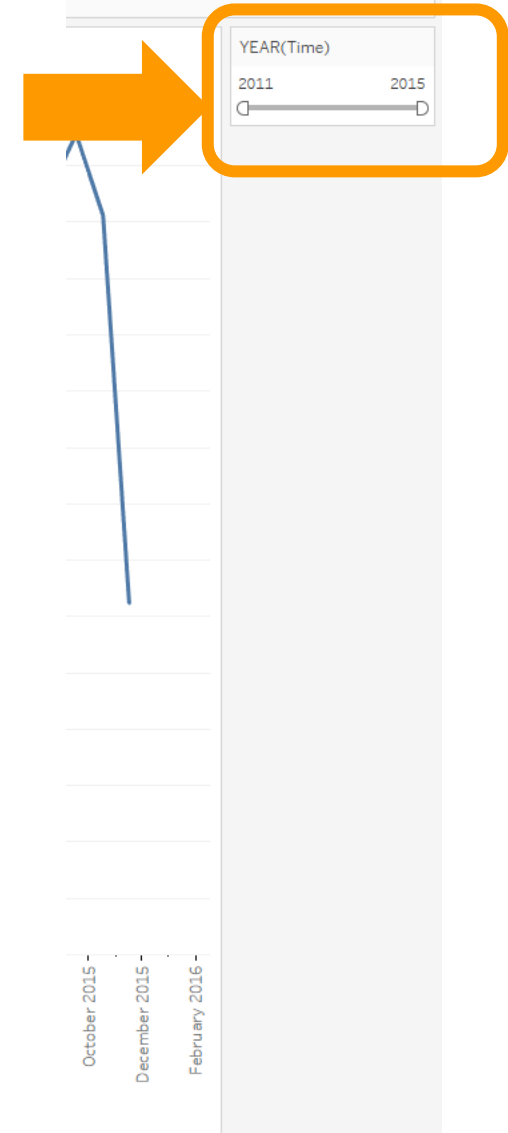
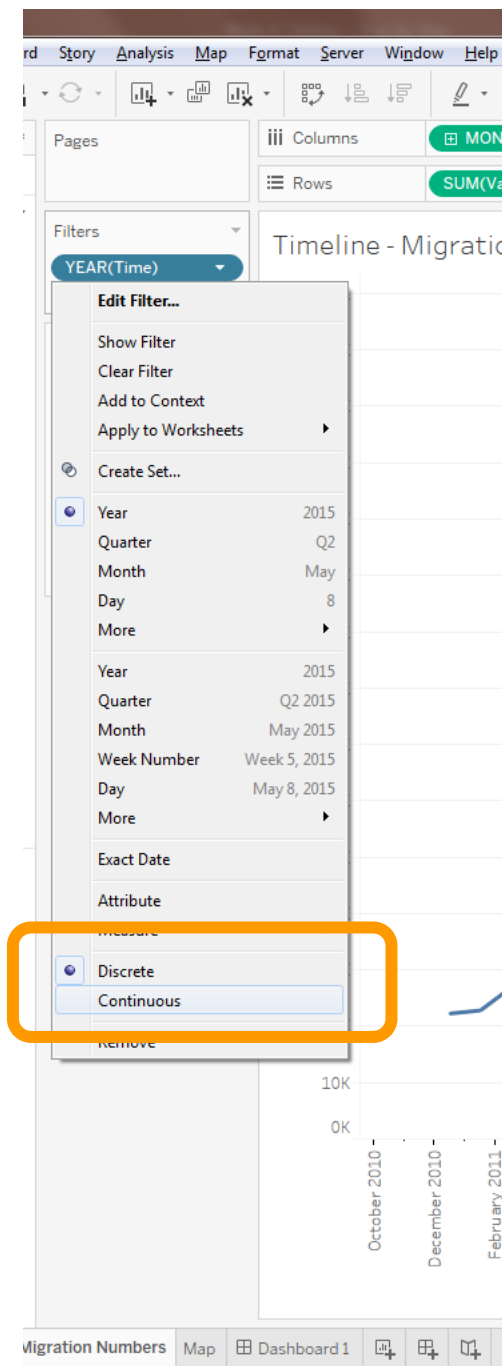
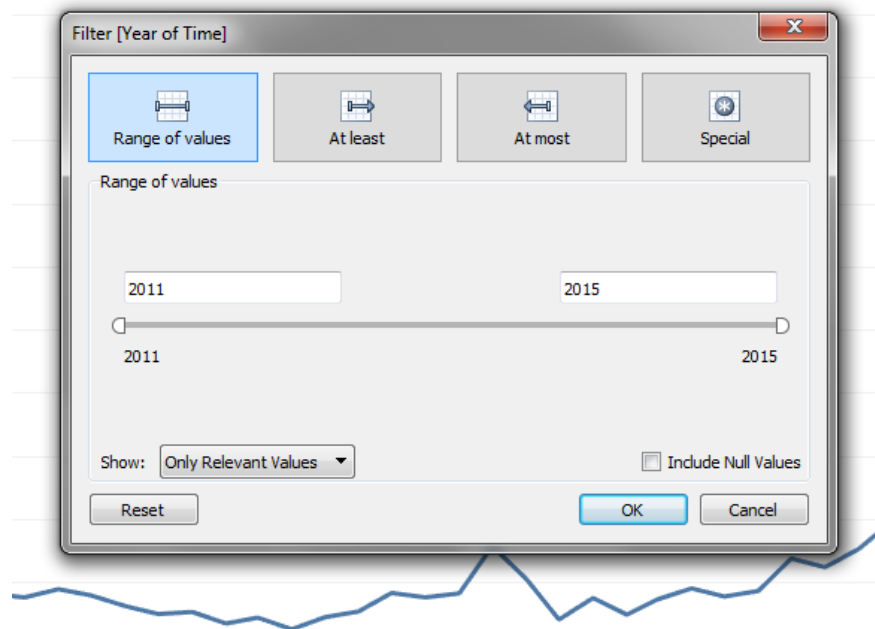
interactive timeline

- Let's make the timeline interactive to allow “zooming” into particular years.
- One option would be to apply a filter by year.
- Go to the timeline worksheet and create such a filter (use the “Time” attribute)
- If you don't know how to do this, check Tableau Tutorial 01.
- This would give you a check-box filter where individual years can be selected.



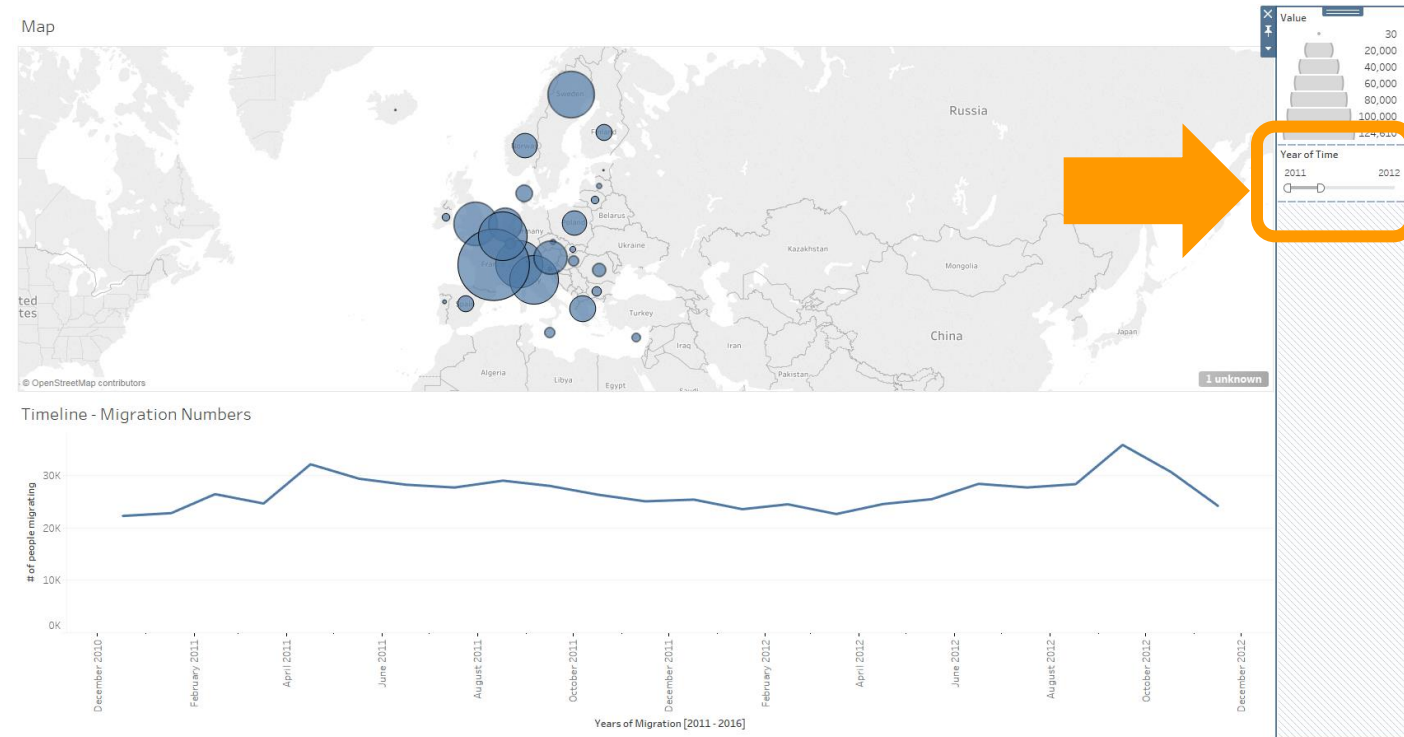
interactive timeline

- We can also create a continuous filter, by treating “year”, as an attribute with continuous values.



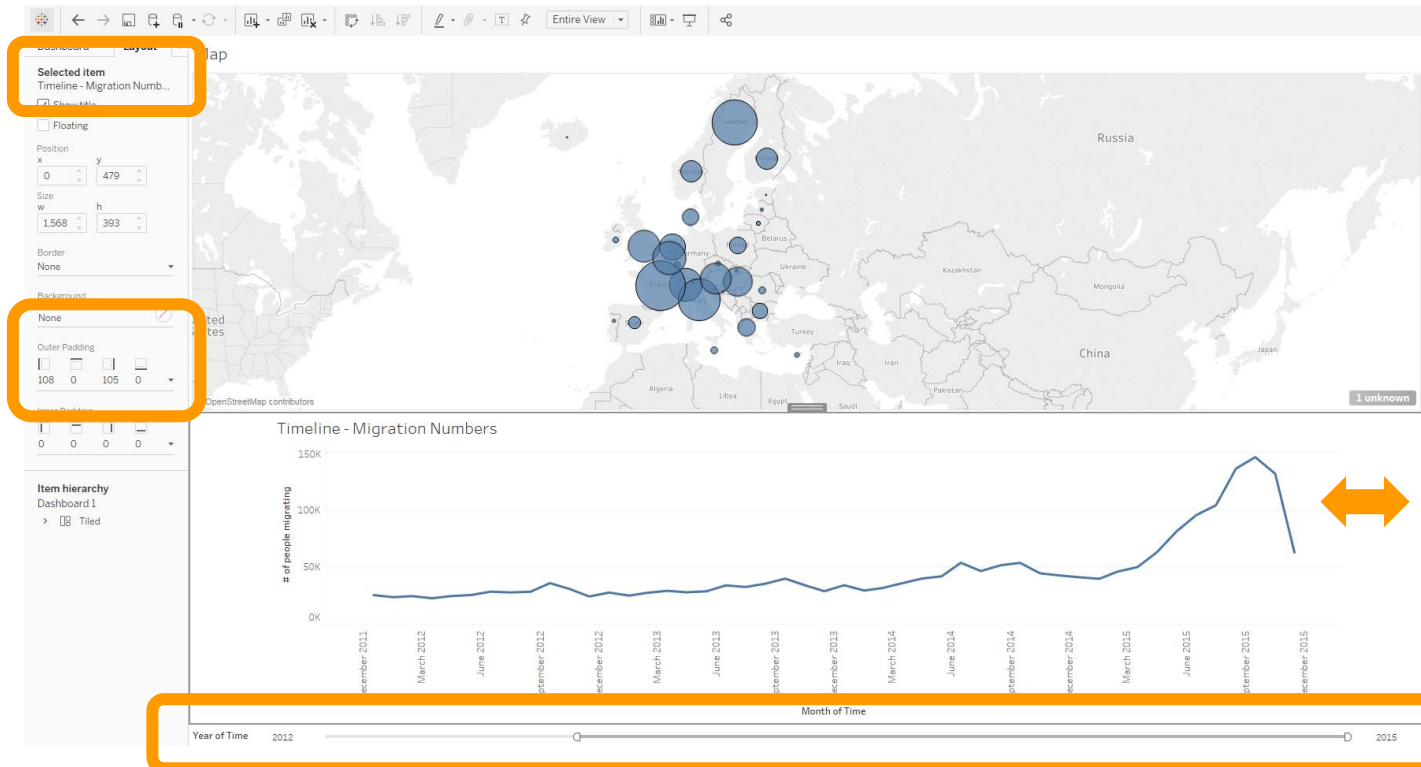
interactive timeline

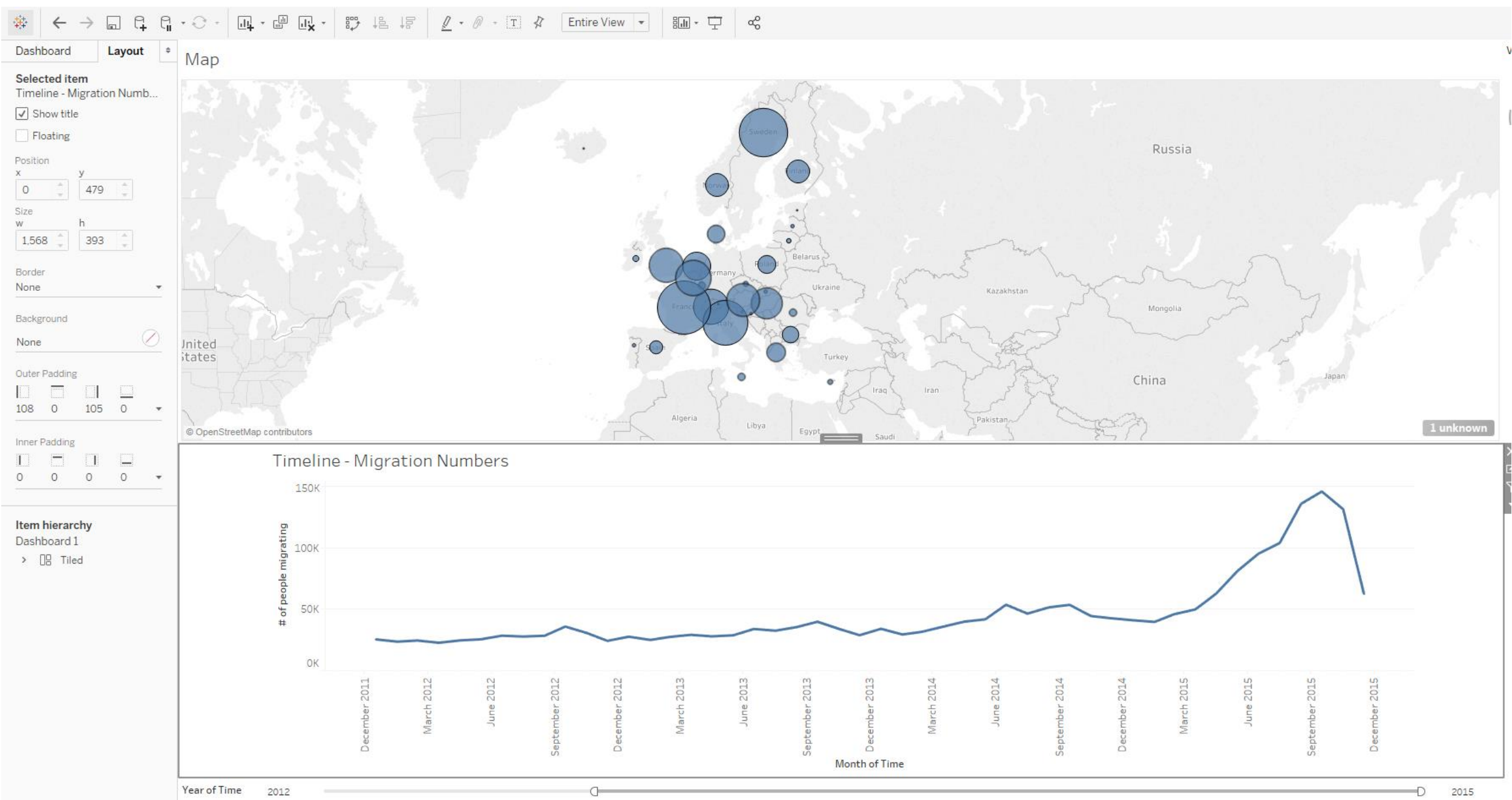
- Go back to the dashboard and connect the time slider filter (which will only apply to the timeline) also to the map.
- If you don't know how to do this, check Tableau Tutorial 01.
- You will find the slider difficult to use, as it is relatively small, and it is hard to select time ranges accurately.



interactive timeline

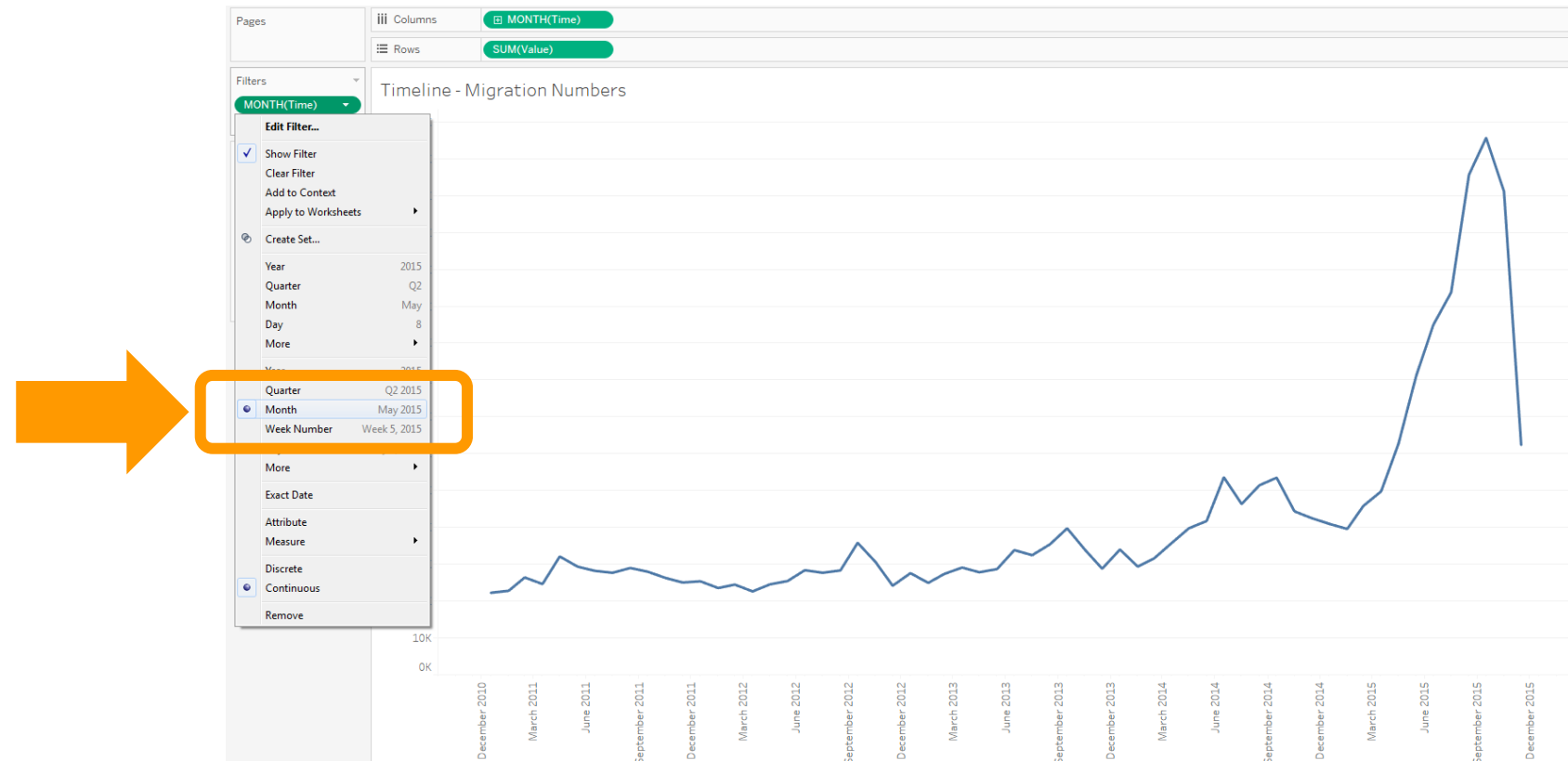
- Arranging the filter below the timeline, provides more space for interaction
- At the same time, the timeline can act as a reference to values connected to the selected time range.
- Outer padding can be applied to the timeline worksheet in order to align the timeline axis and the timeline filter
 - Manipulate the padding in “Layout” in the tab on the left panel.



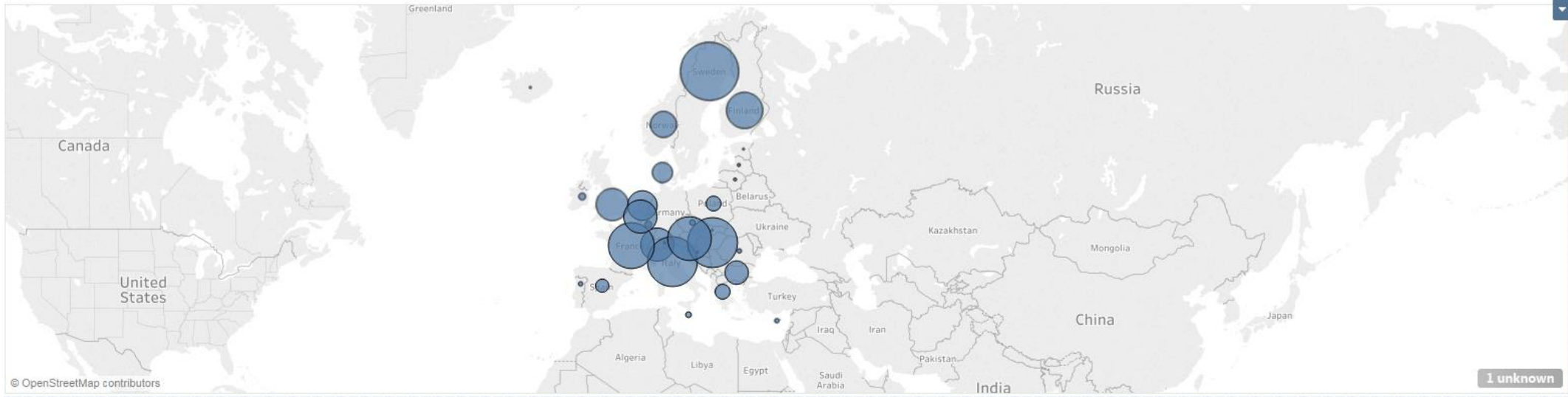


interactive timeline

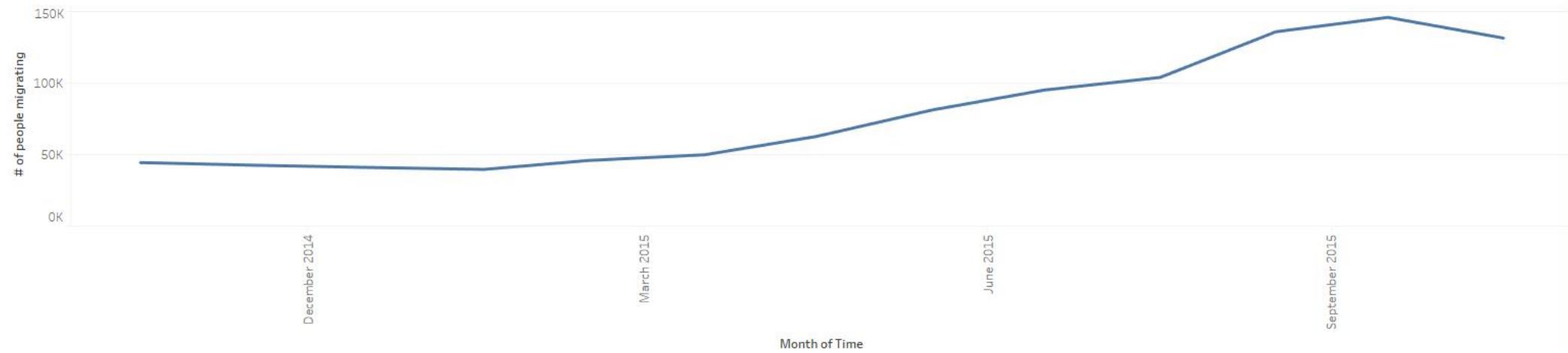
- The current timeline slider can only select years. To make it more fine-grained, you can change its option in the timeline worksheet.
- Update the filter in your timeline worksheet.



Map



Timeline - Migration Numbers



customizing dashboard interactivity

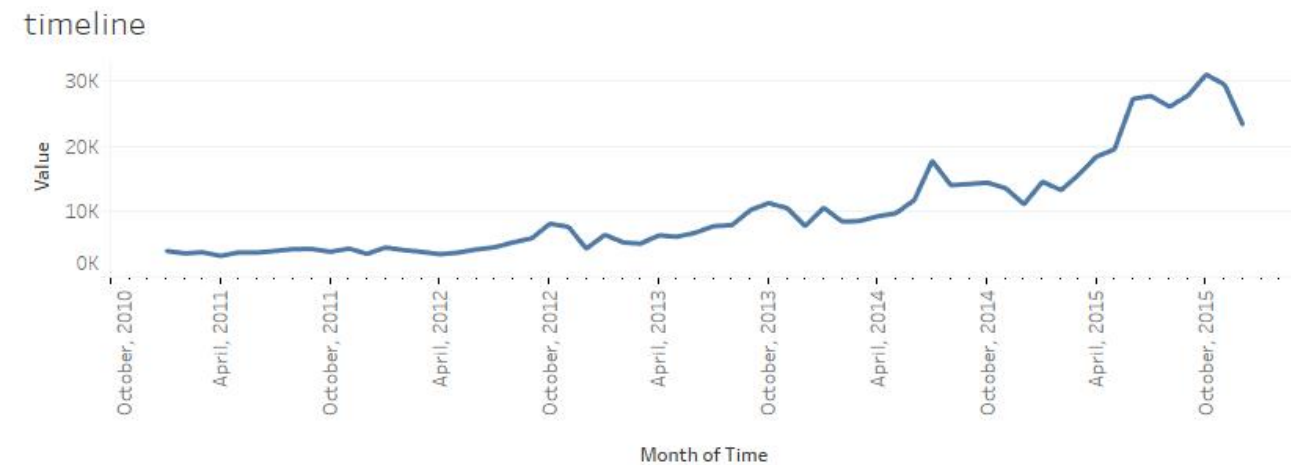


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dashboard actions

- Right now, clicking on countries in your map changes the timeline.
- Let's change this to a hover interaction.



dashboard actions

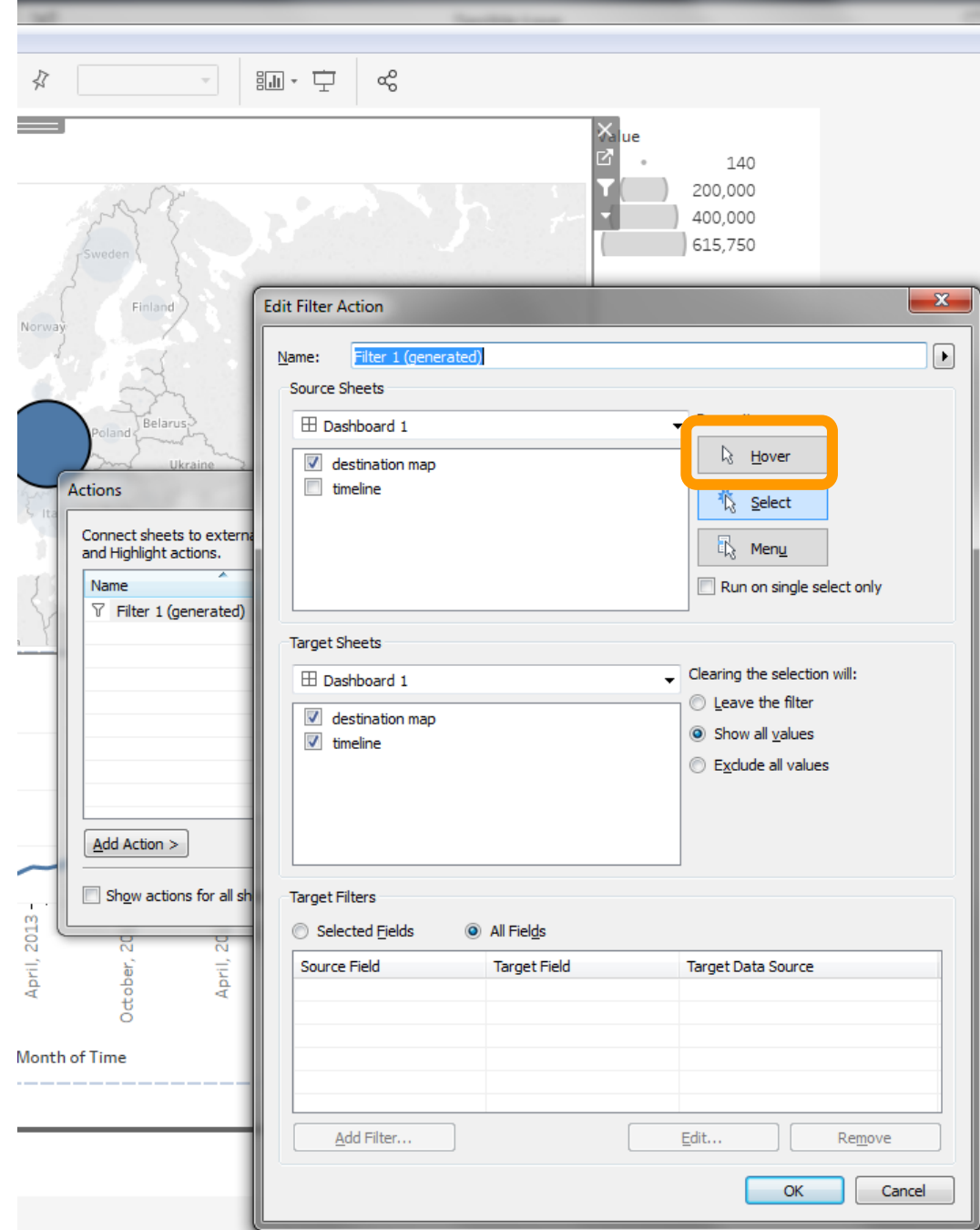
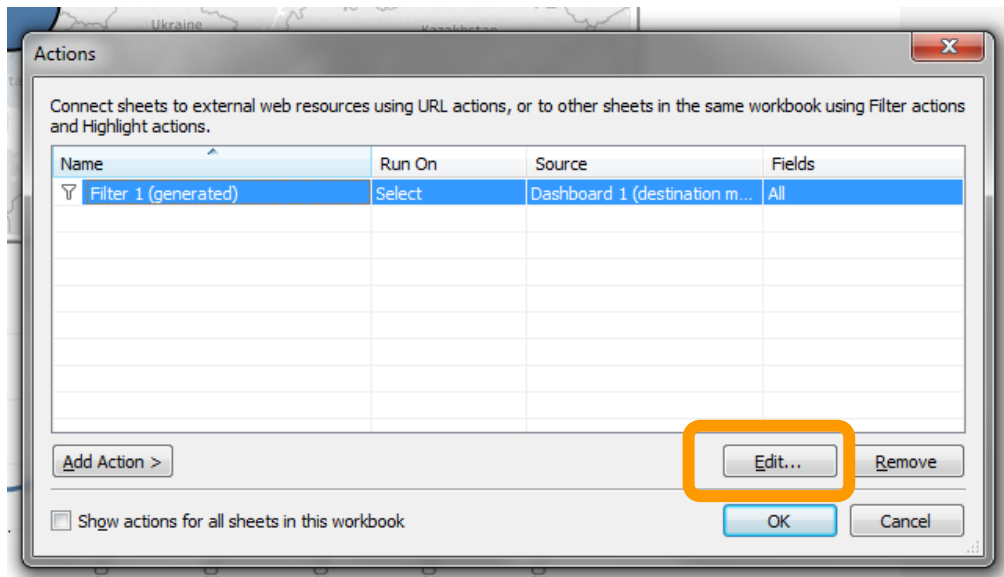
- In the menu click on “Dashboard” and then “Actions”.
- The “Action” settings will come up.
- We already have one **filter action** here that connects the map to the timeline.

The screenshot shows the Tableau Desktop interface. The 'Dashboard' menu is open, and the 'Actions...' option is highlighted. The 'Actions' dialog box is displayed, showing a table of actions. The table has four columns: Name, Run On, Source, and Fields. One action is listed: 'Filter 1 (generated)' with 'Select' as the Run On action, 'Dashboard 1 (destination m...)' as the Source, and 'All' as the Fields. The dialog also includes buttons for 'Add Action >', 'Edit...', 'Remove', 'OK', and 'Cancel', and a checkbox for 'Show actions for all sheets in this workbook'.

Name	Run On	Source	Fields
Filter 1 (generated)	Select	Dashboard 1 (destination m...	All

dashboard actions

- Click “Edit” to modify this filter.
- Currently the filtering works upon mouse-click “Select”.
- Let’s change this to a “Hover” and click “ok”.



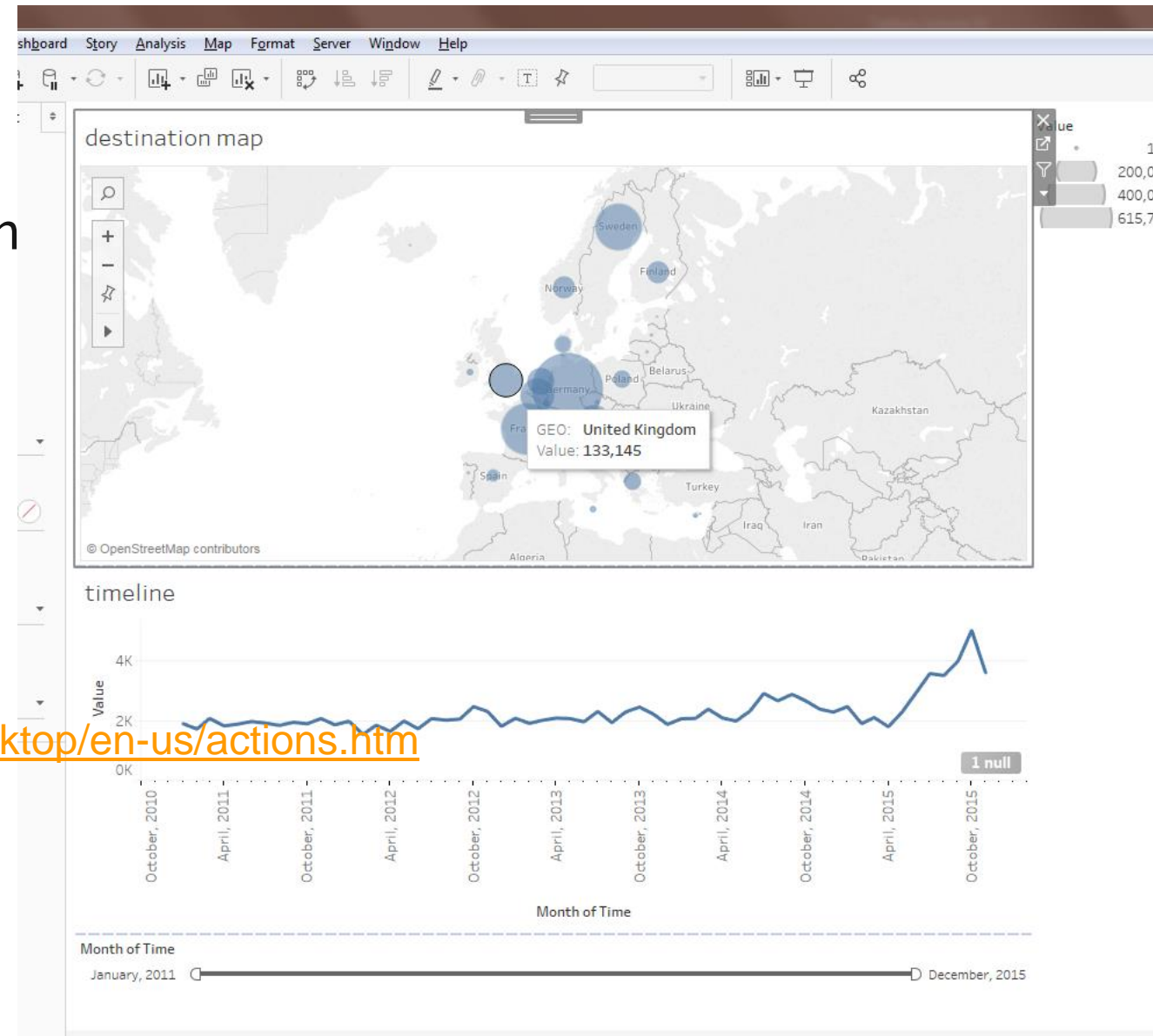
dashboard actions

- When we now hover over the circles in the map, the timeline will change.

→ **Actions** can be a powerful way to customize interactions in your dashboard.

→ More information can be found here

<https://onlinehelp.tableau.com/current/pro/desktop/en-us/actions.htm>



parameters in Tableau

parameters in Tableau

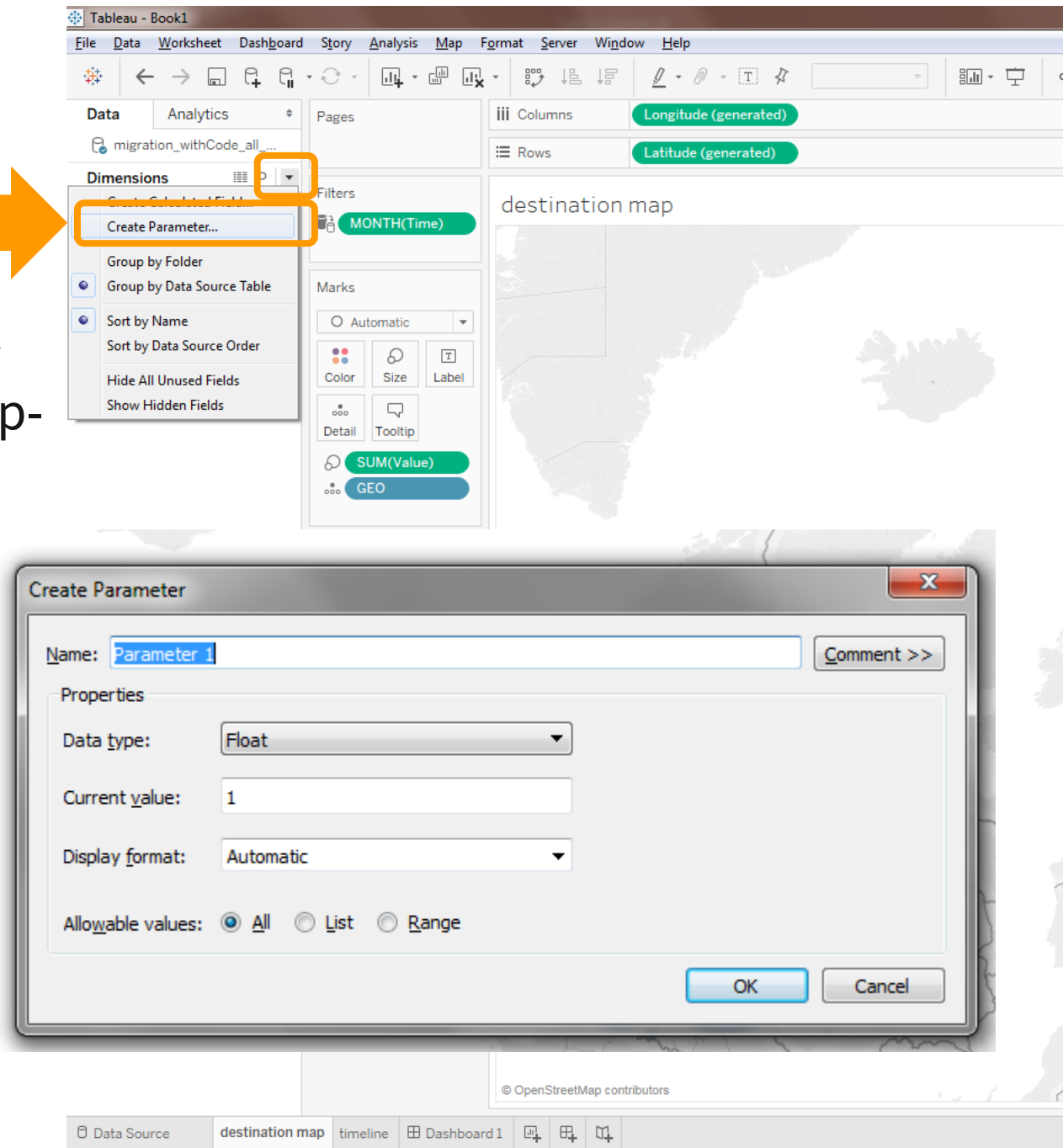
- Allow for more customised interactivity in your visualisations
 - Help implement **if-then scenarios**, e.g., to allow the user to flip between views of different attributes.
- Important points to remember
 - Parameters should be used as part of calculations to be useful
 - The parameter control should be displayed so that the user can interact with it.
- Useful information
 - <https://onlinehelp.tableau.com/current/pro/desktop/en-us/changing-views-using-parameters.htm>
 - <https://www.tableau.com/learn/tutorials/on-demand/parameters>

example use of parameters

- In the data set we have two interesting attributes
 - Destination countries of immigrants (**GEO attribute**)
 - Immigrants' countries of origin (**Citizen attribute**)
- Let's create a parameter and corresponding calculated field to allow the user to flip between the two.

creating a parameter

- Go to your map visualisation worksheet
- Above the “Tables” pane, select the drop-down menu to create a “Create Parameters...”



creating a parameter

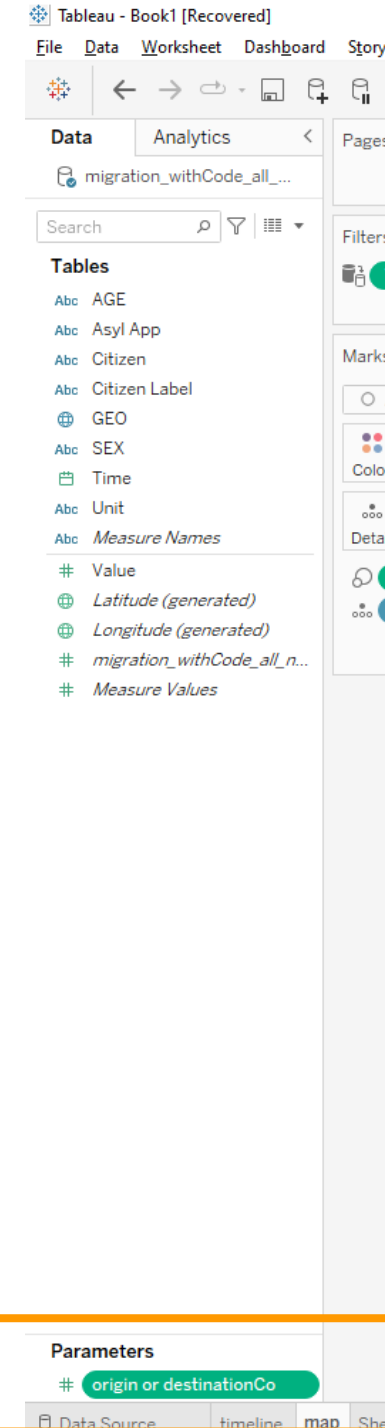
- Give the parameter a meaningful name that matches its purpose, for example:
 - “origin or destination”
- Let’s configure the parameter.
- We leave the data type at “float”
- We want to manipulate the list of allowable values, so we select “List”
- Here we set parameter options
 - 1 for “Country of Origin”
 - 2 for “Country of Destination”
- Click “ok”

The screenshot shows the Tableau interface with a map titled 'destination map'. The 'Create Parameter' dialog box is open, and the 'List' option is selected under 'Allowable values'. The 'List of values' table contains two entries: '1' for 'Country of Origin' and '2' for 'Country of Destination'. The 'Name' field is set to 'origin or destination', 'Data type' is 'Float', and 'Current value' is 'Country of Origin'.

Value	Display As
1	Country of Origin
2	Country of Destination
Add	

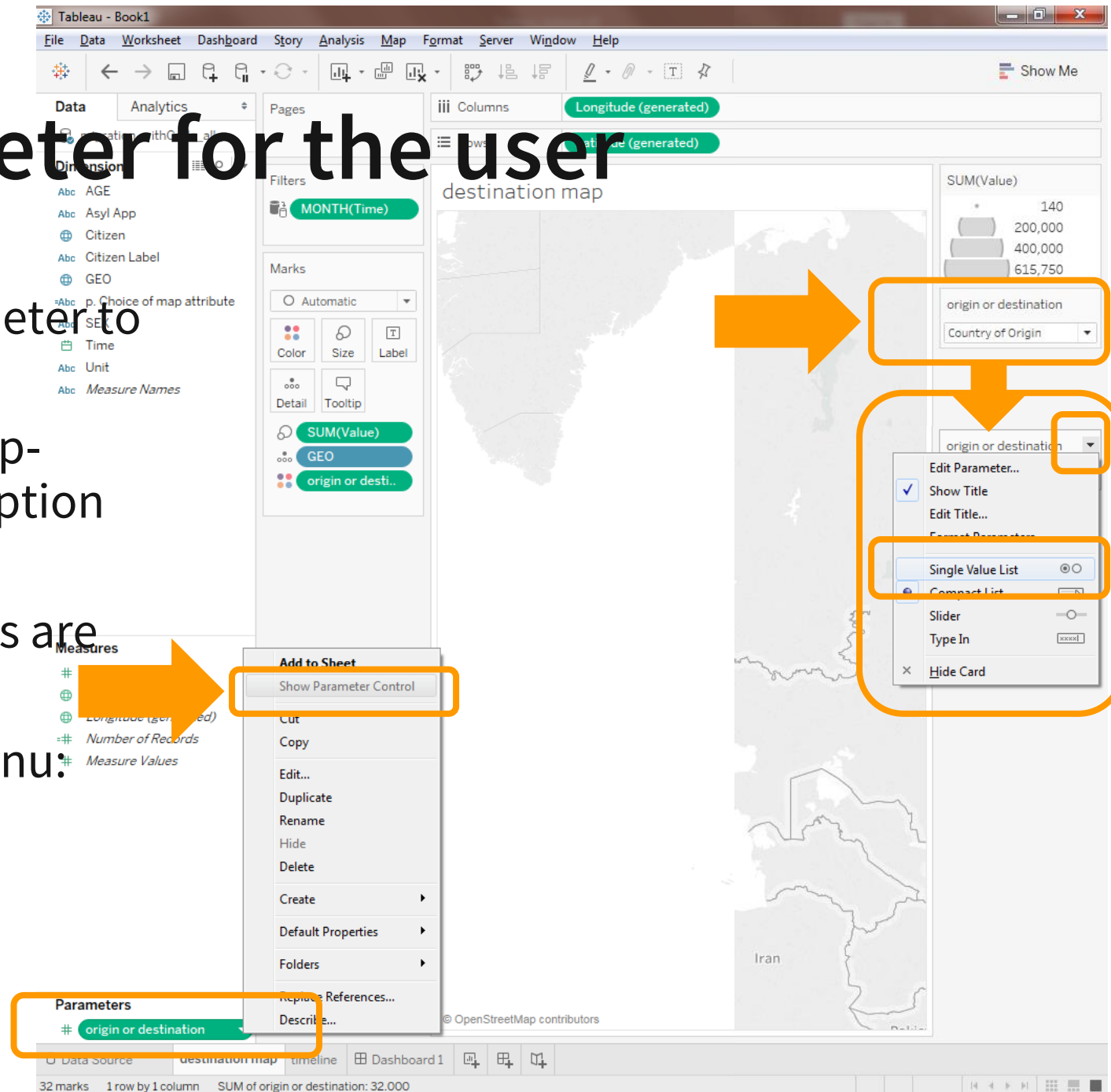
creating a parameter

- Our new parameter is now visible to the left below the “Table” pane
- We can now use this parameter for simple “if”-statements



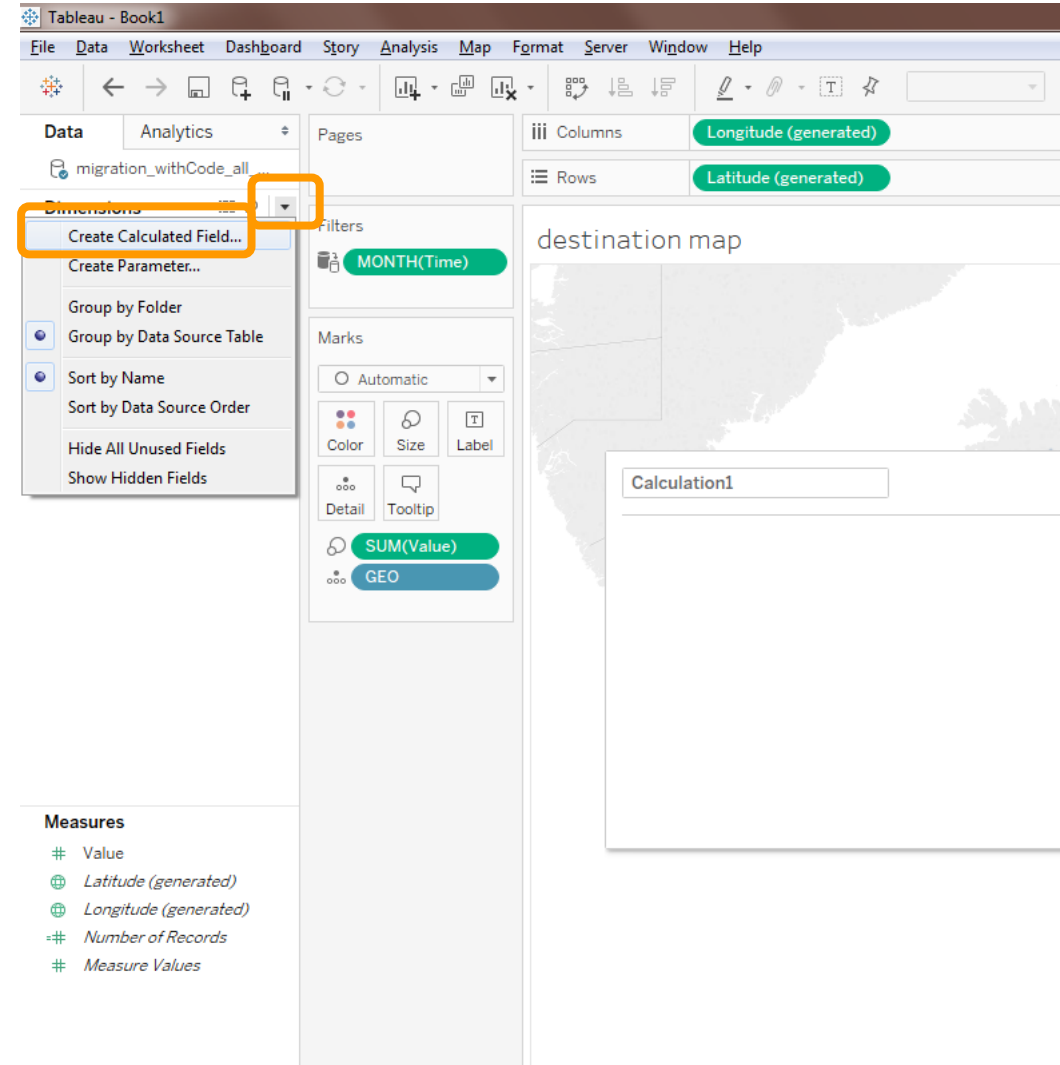
display the parameter for the user

- We want to make our new parameter to be visible to the user.
- In the clicking the parameter drop-down menu will provide us the option to “Show Parameter Control”
- By default, the parameter options are offered via a drop-down menu.
- Change this to a radio button menu:
 - “Single value list” in Tableau



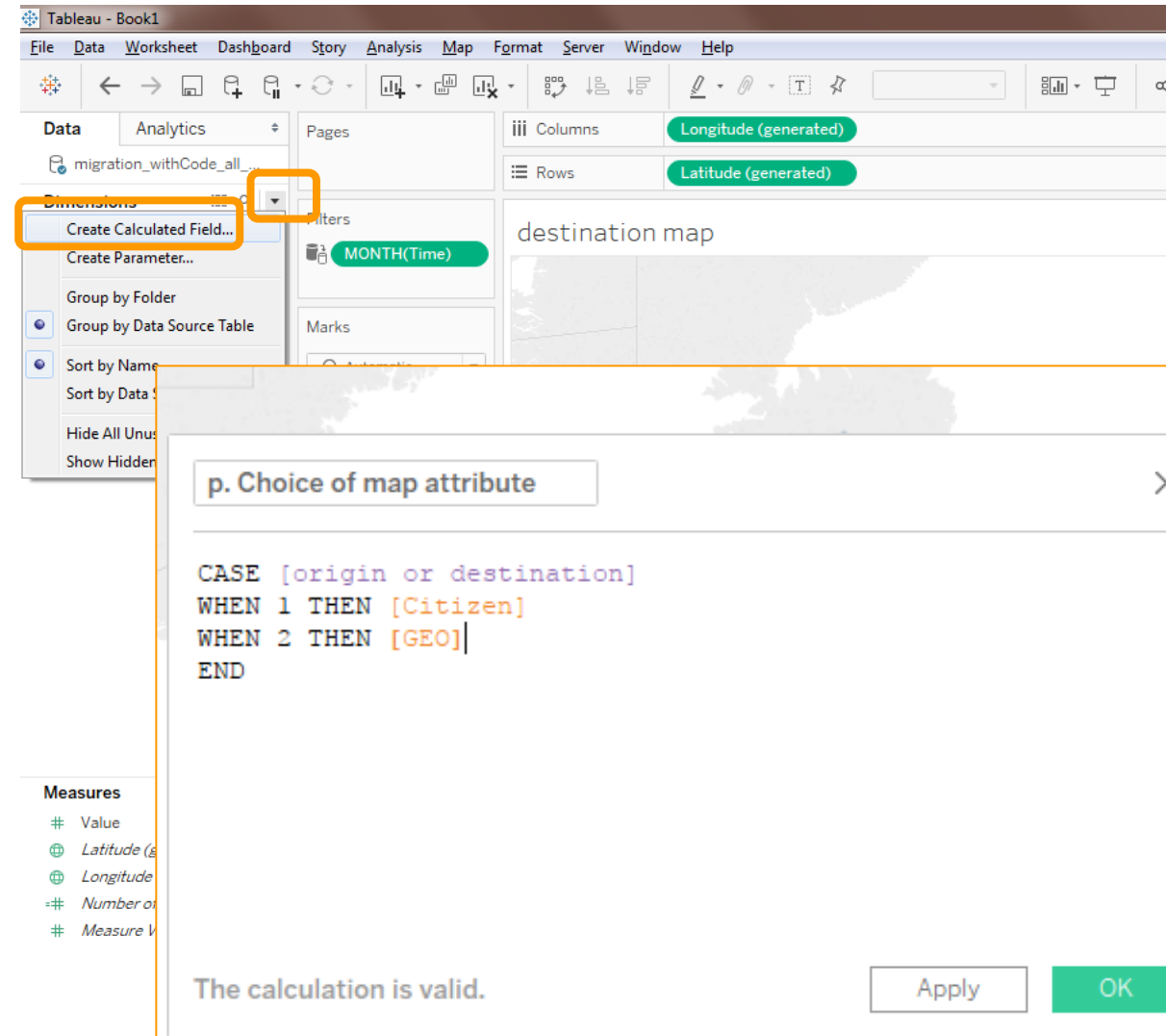
using parameters in calculated fields

- Above the “Table” pane to the left, select the drop-down menu to create a “New Calculated Field”



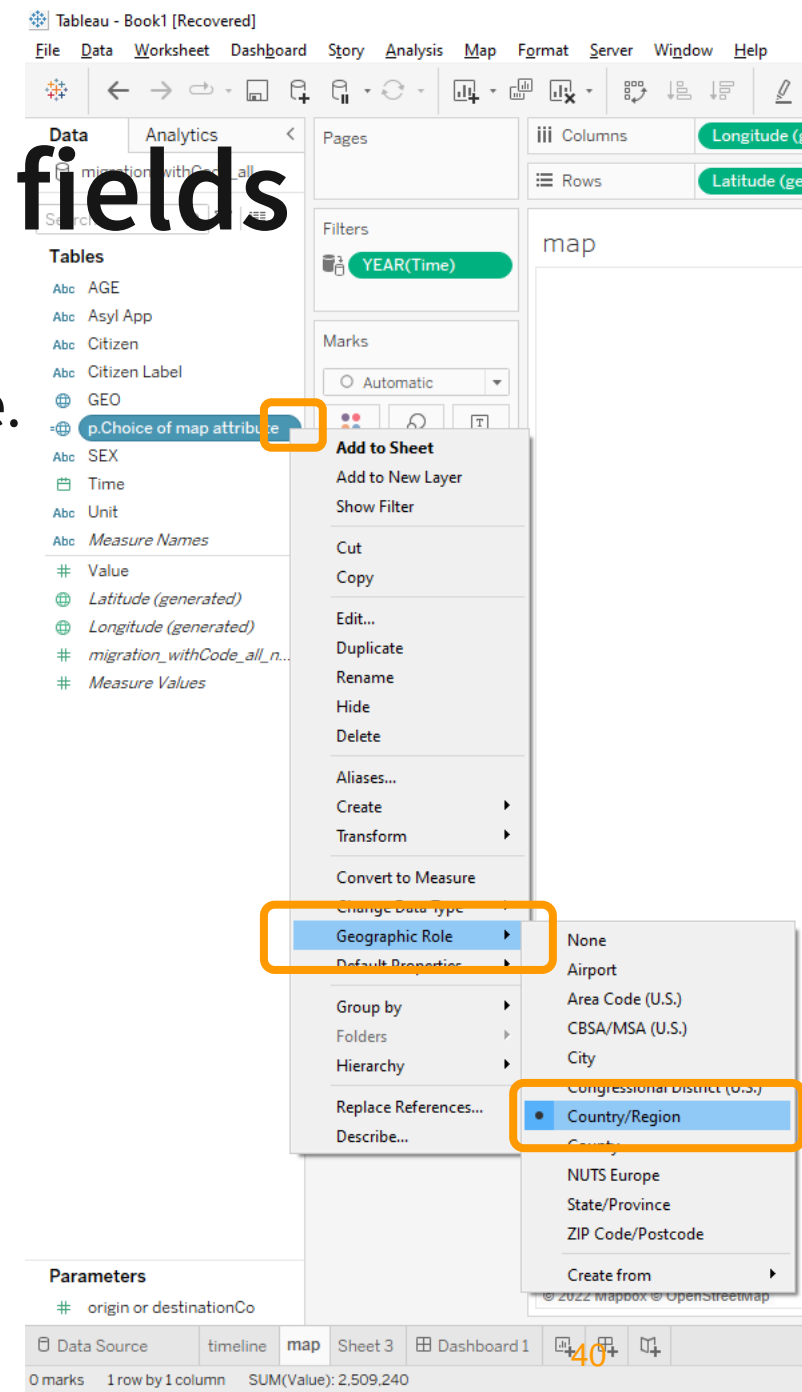
using parameters in calculated fields

- Give the calculated field a meaningful name such as “p. Choice of map attribute”.
- We use “p.” here to indicate that the calculated field makes use of parameters.
- The calculated field will contain a simple if statement to switch between the “GEO” (destination) and “Citizen” (origin) attributes upon user interaction.
- Click “ok”



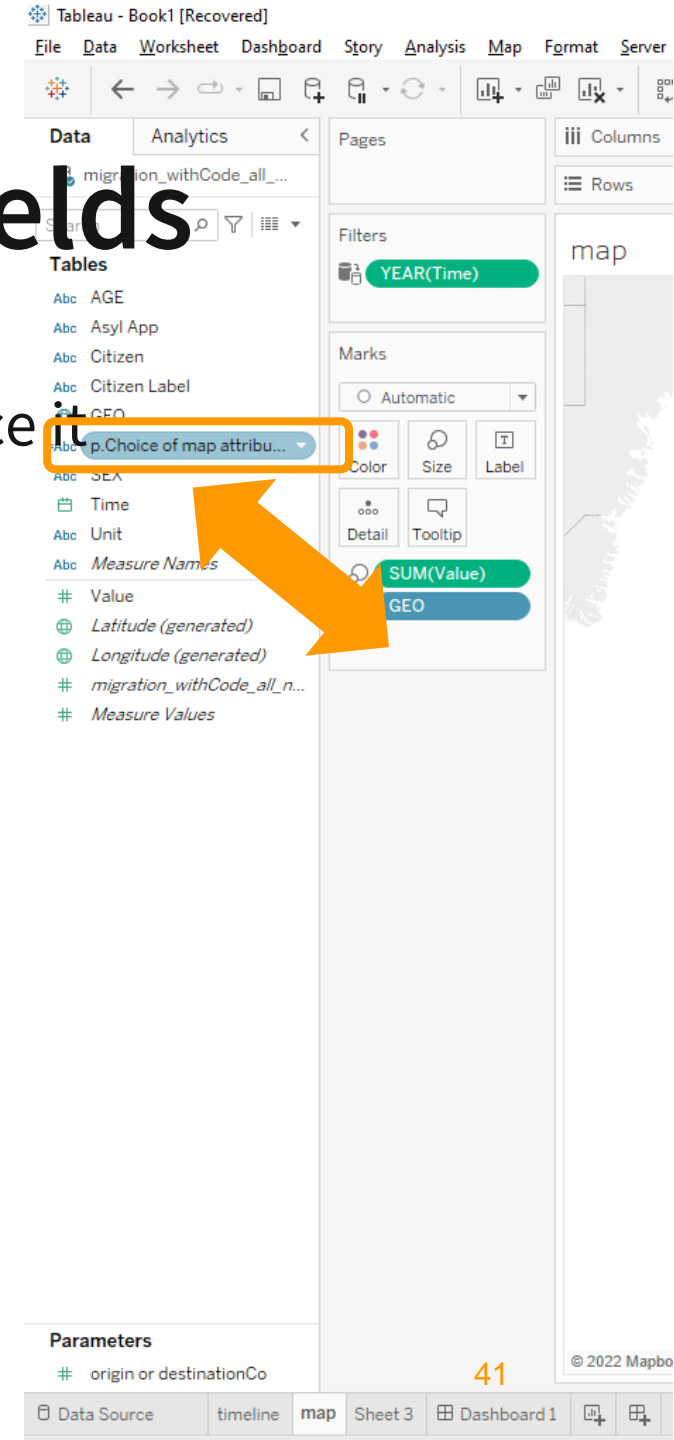
using parameters in calculated fields

- We now see our new calculated field in the “Tables” pane.
- Make sure this parameter-based field is recognized as a geographic attribute. If it is not, convert it.

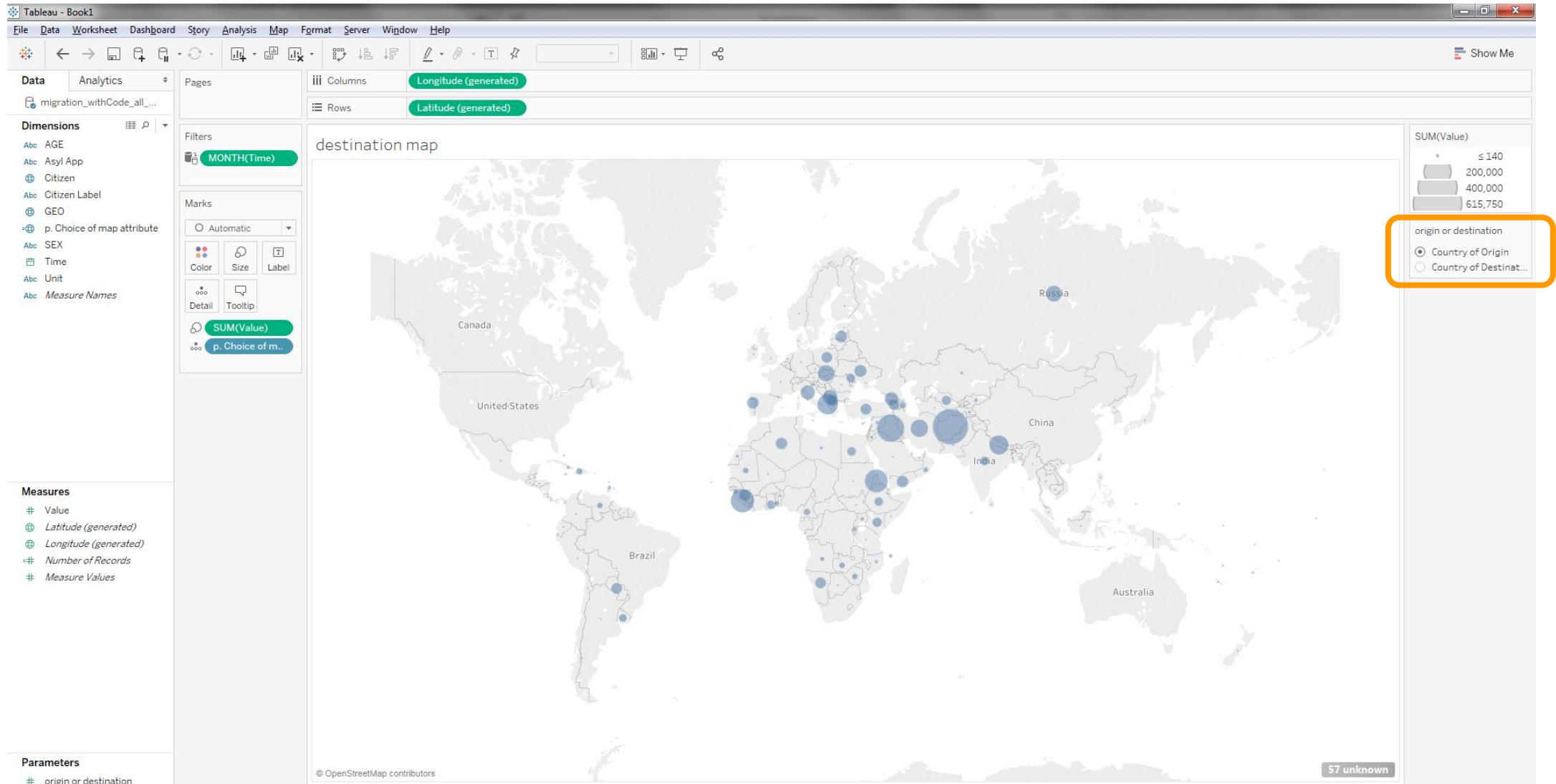


using parameters in calculated fields

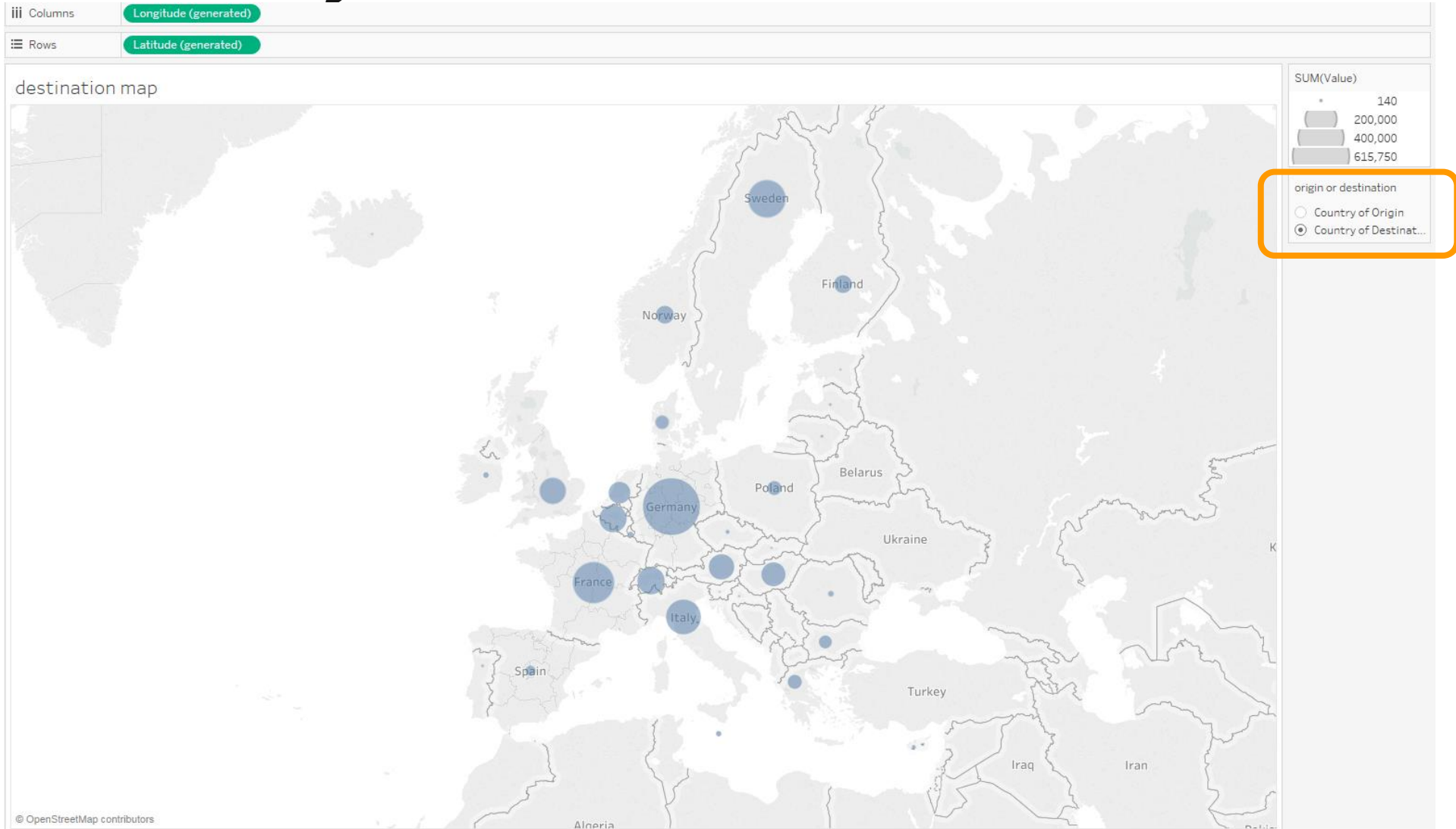
- Delete the “GEO” attribute from the “Marks” pane and replace it with the new parameter-based calculated field.



with country of origin selected...

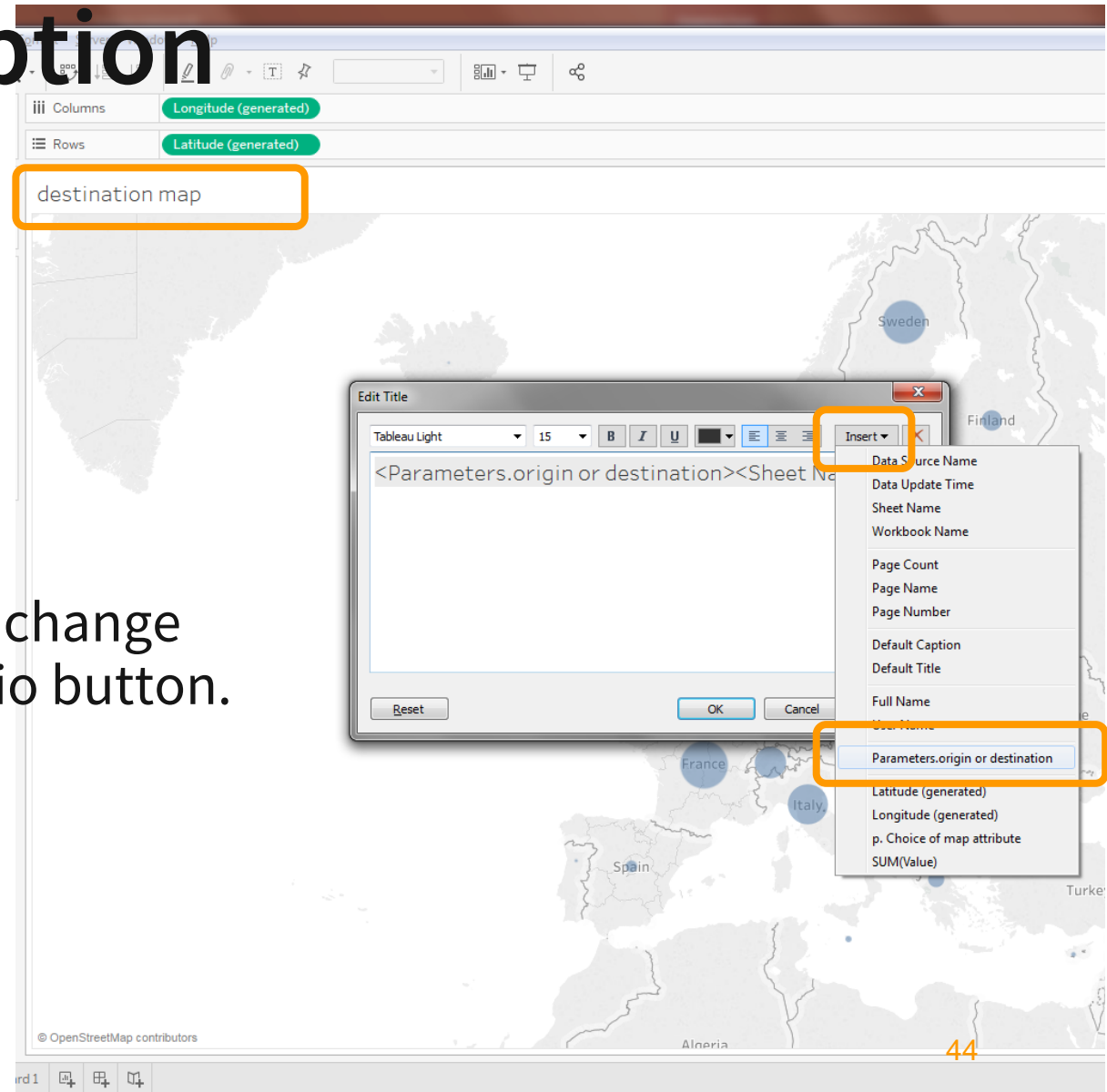


with country of destination selected...



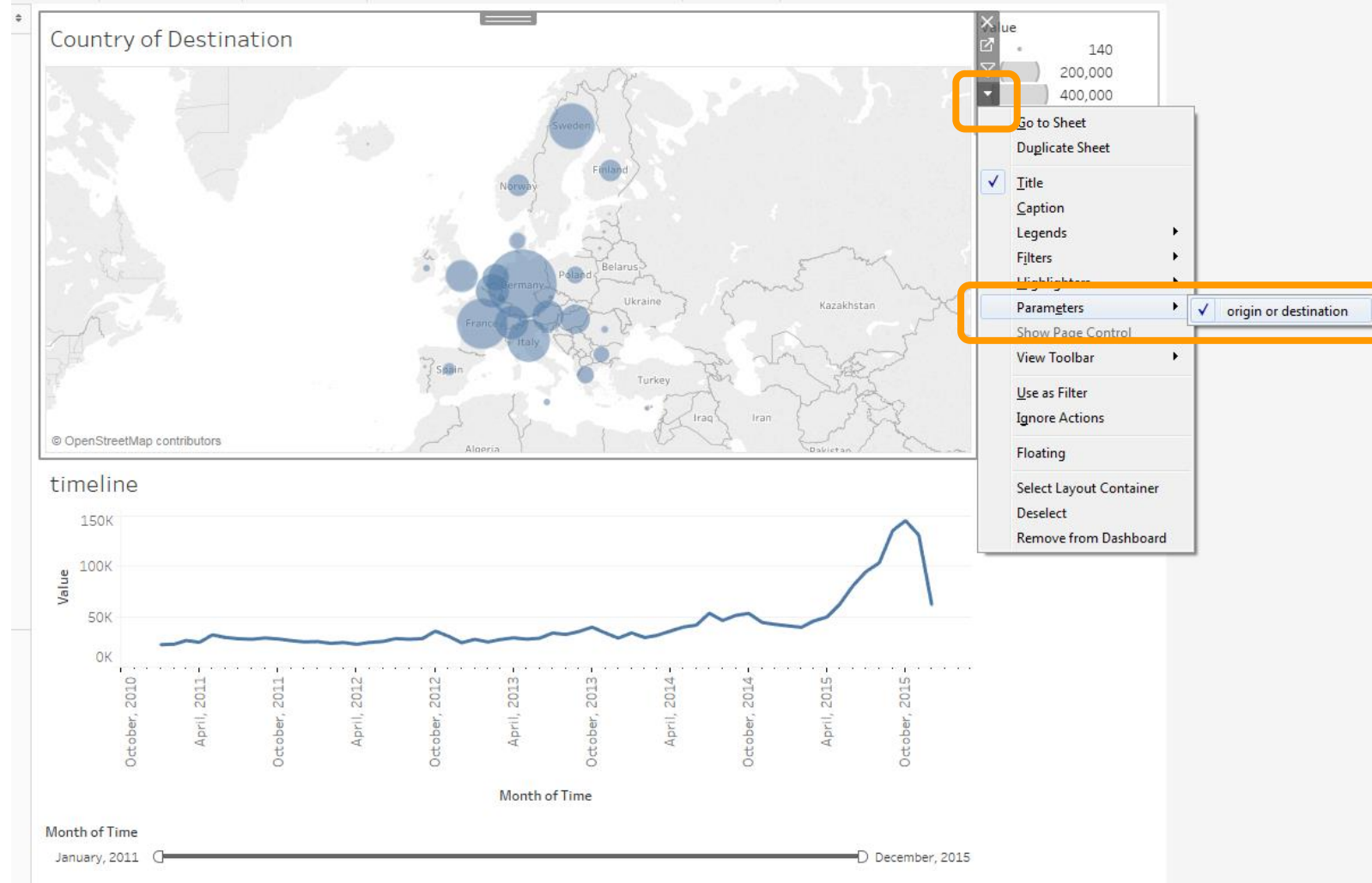
make sure the title of the map changes with the parameter option

- Double click the title of the worksheet
- Select “Insert”
- Select the parameter
- Click apply
- The title of your worksheet should now change with the selection of the parameter radio button.



insert the new parameter-based map into your dashboard

- Style the parameter option element as you like.
 - Radio button
 - Drop-down menu

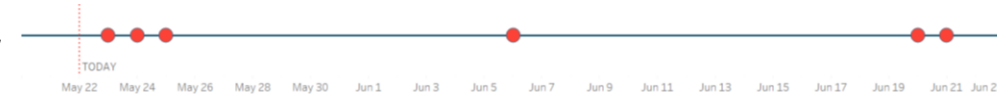


activities

- Apply the “origin or destination” parameter to change the colour of circles in the map depending on the selected option.
- For “origin” the circles should be blue
- For “destination” the circles should be orange
 - Hint: you have to create another parameter-based calculated field
 - Colours in Tableau scripts can be specified in quotes, e.g., “Blue” or “Orange”
- Bring comparisons of gender (“SEX”) into your visualisation dashboard
 - Experiment with area charts
- Try and support a side-by-side comparison of destination countries and countries of origin.

more resources on timelines in Tableau

- How to make a timeline in Tableau, Ryan Sleeper
 - <https://www.ryansleeper.com/how-to-make-a-timeline-in-tableau/>
- Making timeline charts in Tableau step-by-step
 - <https://umarthejourno.com/2017/03/02/making-timeline-charts-in-tableau-step-by-step/>



- Creating a Gantt Chart
 - http://onlinehelp.tableau.com/current/pro/desktop/en-us/buildexamples_gantt.html

