

DATA VISUALIZATION WITH TABLEAU PUBLIC

(Data for this tutorial at www.peteraldhous.com/Data)

Tableau Public allows you to create a wide variety of interactive graphs, maps and tables and organize them into dashboards that can be saved to the cloud and embedded on any website.

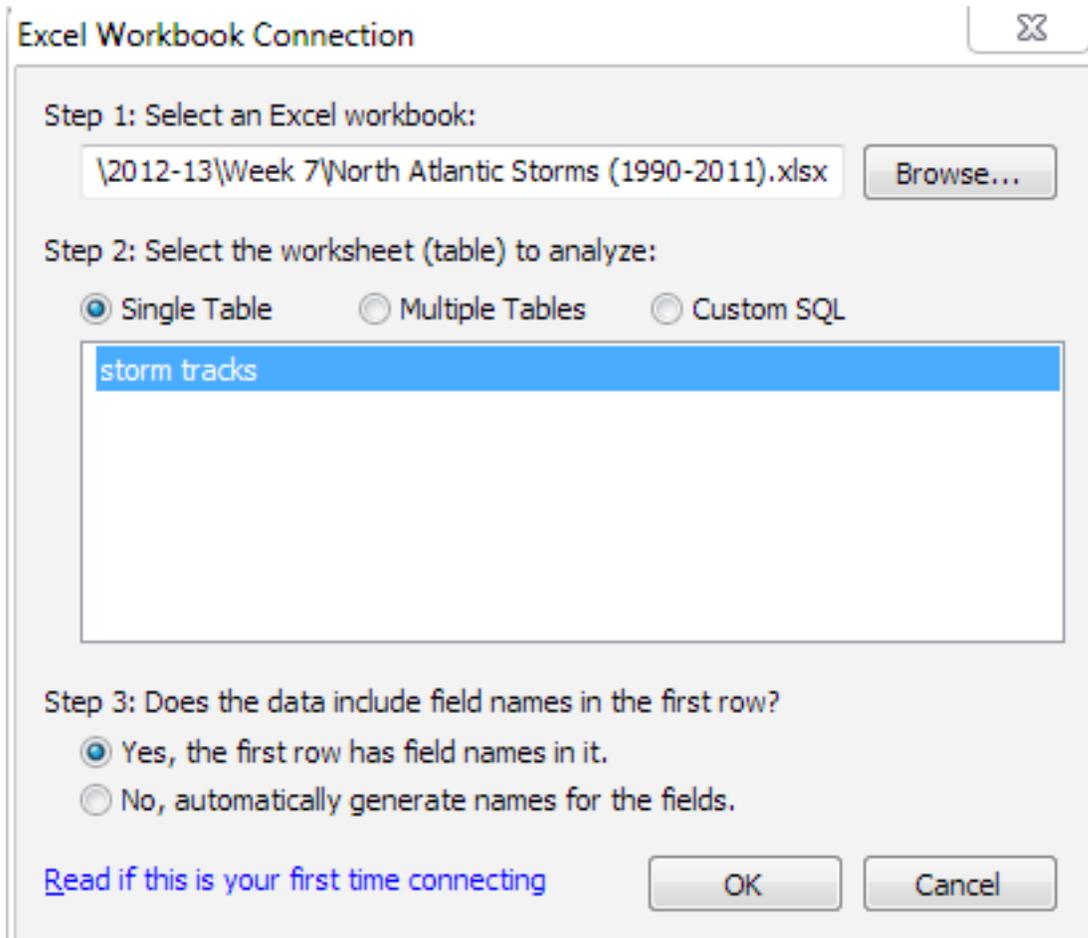
We're going to create a visualization of North Atlantic storms since 1990:
<http://public.tableausoftware.com/views/UCSCstorms/Dashboard1>

The data is in the spreadsheet **North Atlantic Storms 1990-2011.xlsx**, processed from the National Oceanic and Atmospheric Administration data, here: <http://www.aoml.noaa.gov/hrd/hurdat/easyread-2012.html>

Before starting this tutorial, check that you have the current version of Tableau Public (downloaded from <http://www.tableausoftware.com/public/download-menu>) and create a Tableau Public account at: <https://public.tableausoftware.com/auth/signup>

Connect to the data

Open Tableau Public, select **Data>Connect to Data** from the top menu, select **Microsoft Excel** and navigate to where the spreadsheet is saved, select it and hit **Open**. At the next dialog box, make sure the **storm tracks** worksheets is highlighted and hit **OK**.

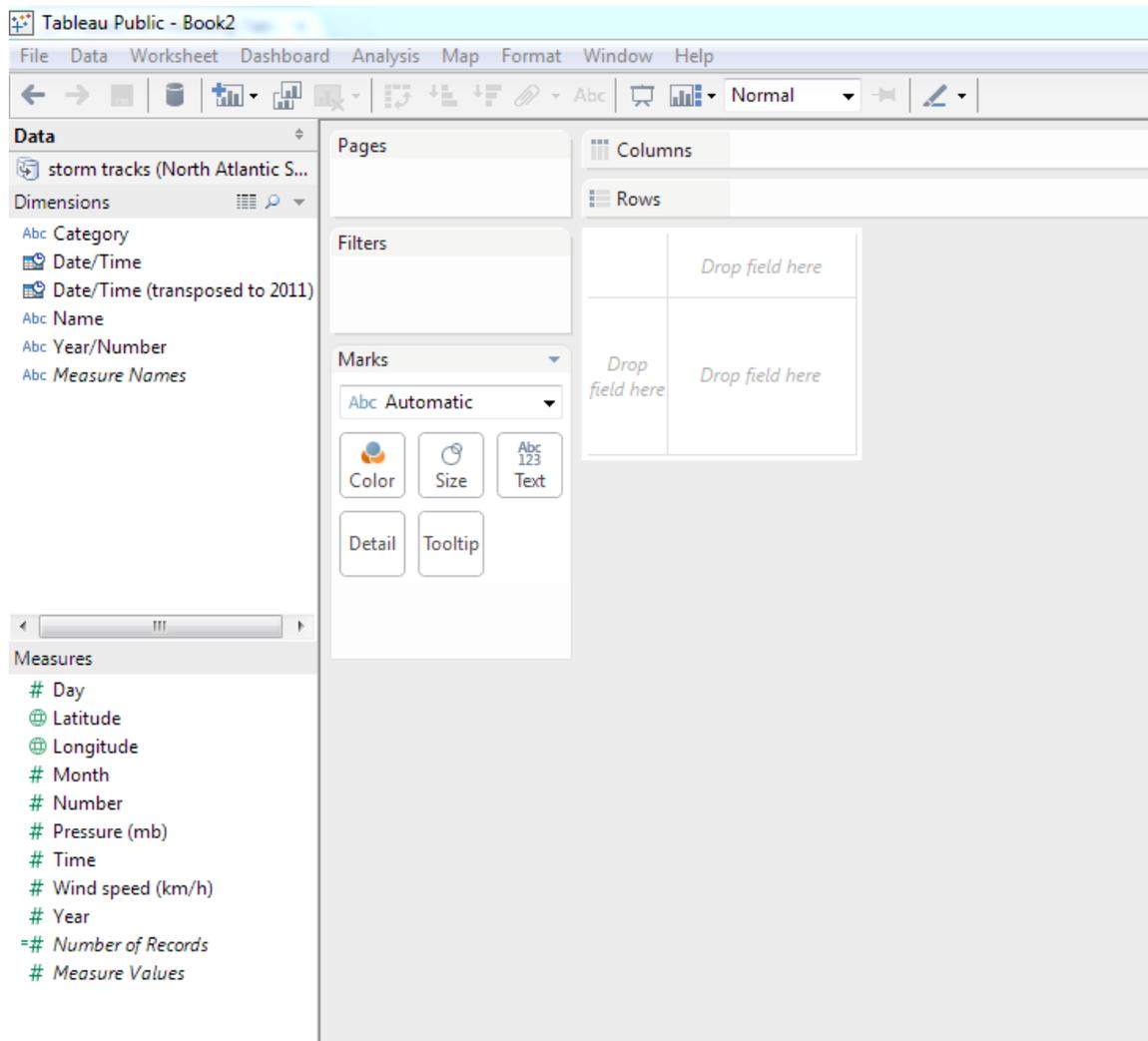


The image shows a screenshot of the 'Excel Workbook Connection' dialog box in Tableau. The dialog is titled 'Excel Workbook Connection' and has a close button in the top right corner. It is divided into three steps:

- Step 1: Select an Excel workbook:** A text box contains the file path '\2012-13\Week 7\North Atlantic Storms (1990-2011).xlsx' and a 'Browse...' button is to its right.
- Step 2: Select the worksheet (table) to analyze:** Three radio buttons are present: 'Single Table' (which is selected), 'Multiple Tables', and 'Custom SQL'. Below these is a list box containing the text 'storm tracks', which is highlighted in blue.
- Step 3: Does the data include field names in the first row?** Two radio buttons are present: 'Yes, the first row has field names in it.' (which is selected) and 'No, automatically generate names for the fields.'

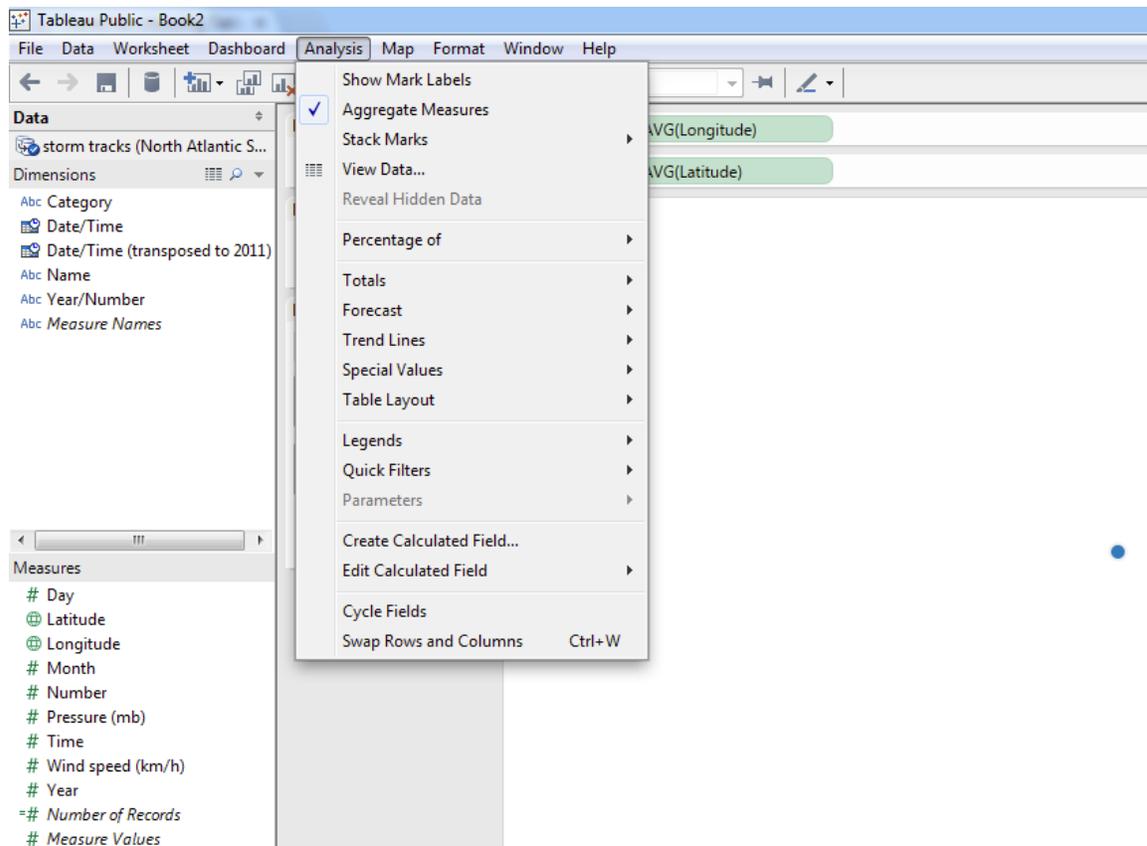
At the bottom of the dialog, there is a link that reads 'Read if this is your first time connecting' and two buttons: 'OK' and 'Cancel'.

Tableau organizes the fields containing dates and text under **Dimensions** and those containing numerical values under **Measures**, so the screen will now look like this:

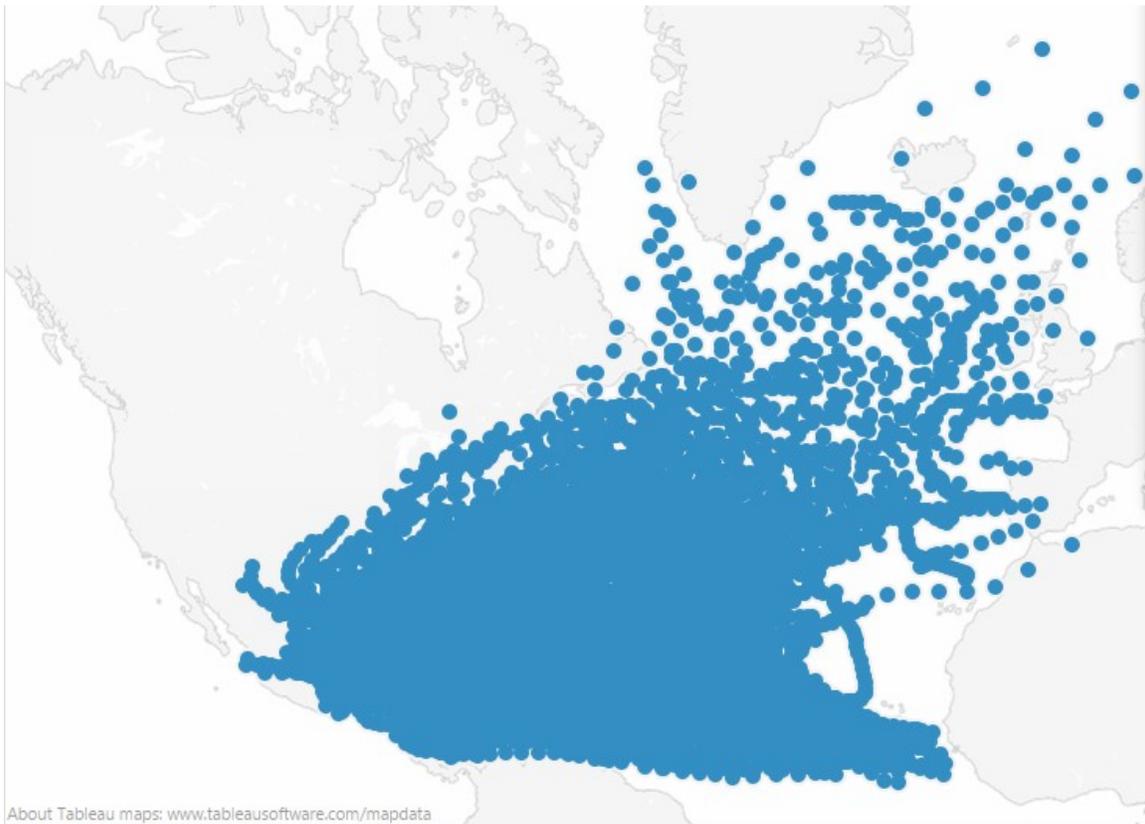


Map the tracks of each storm

Drag **Longitude** into the **Columns** shelf and **Latitude** into the **Rows** shelf. The default setting for measures is to compute an aggregate statistic, in this case the **Average**, and this just gives a single point somewhere out in the Atlantic. Correct this by unchecking **Aggregate Measures** under the **Analysis** menu.



The map will now look like this:

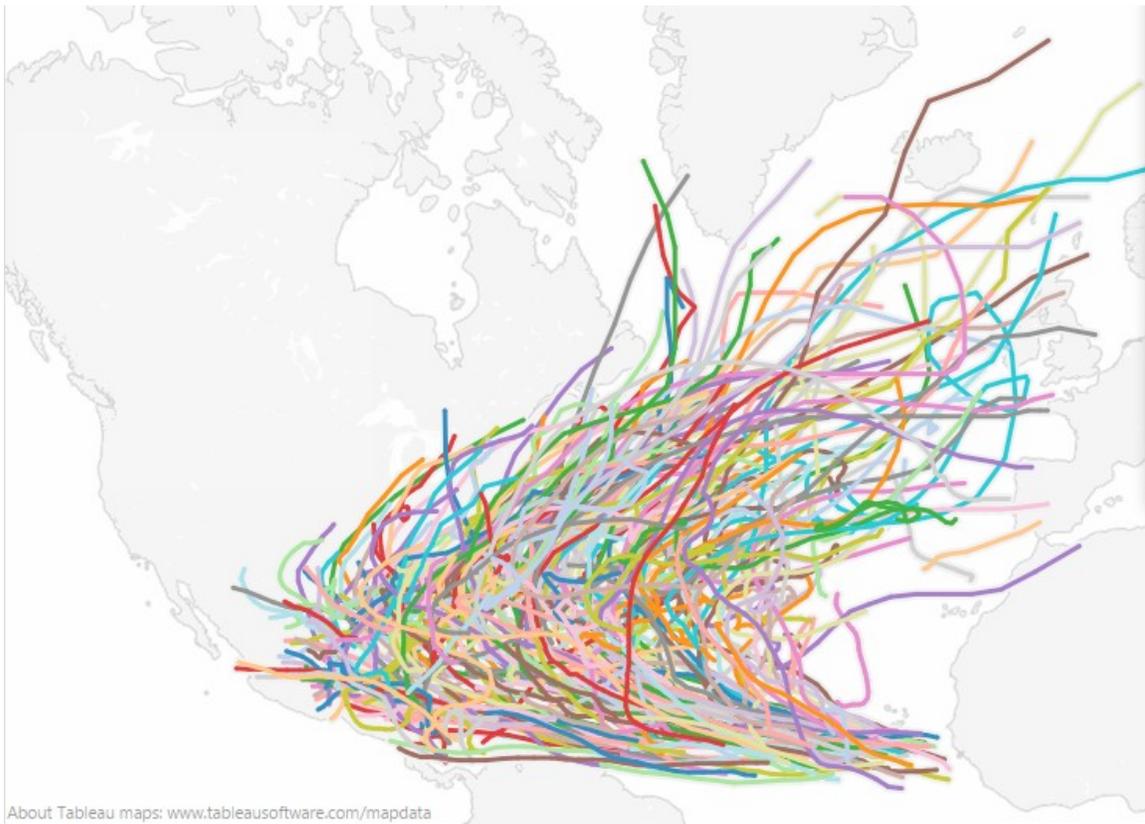


We want to map tracks, not points, so go to the **Marks** shelves and select **Line** instead of **Automatic**. See that the default is to draw a line connecting all the points from left to right.

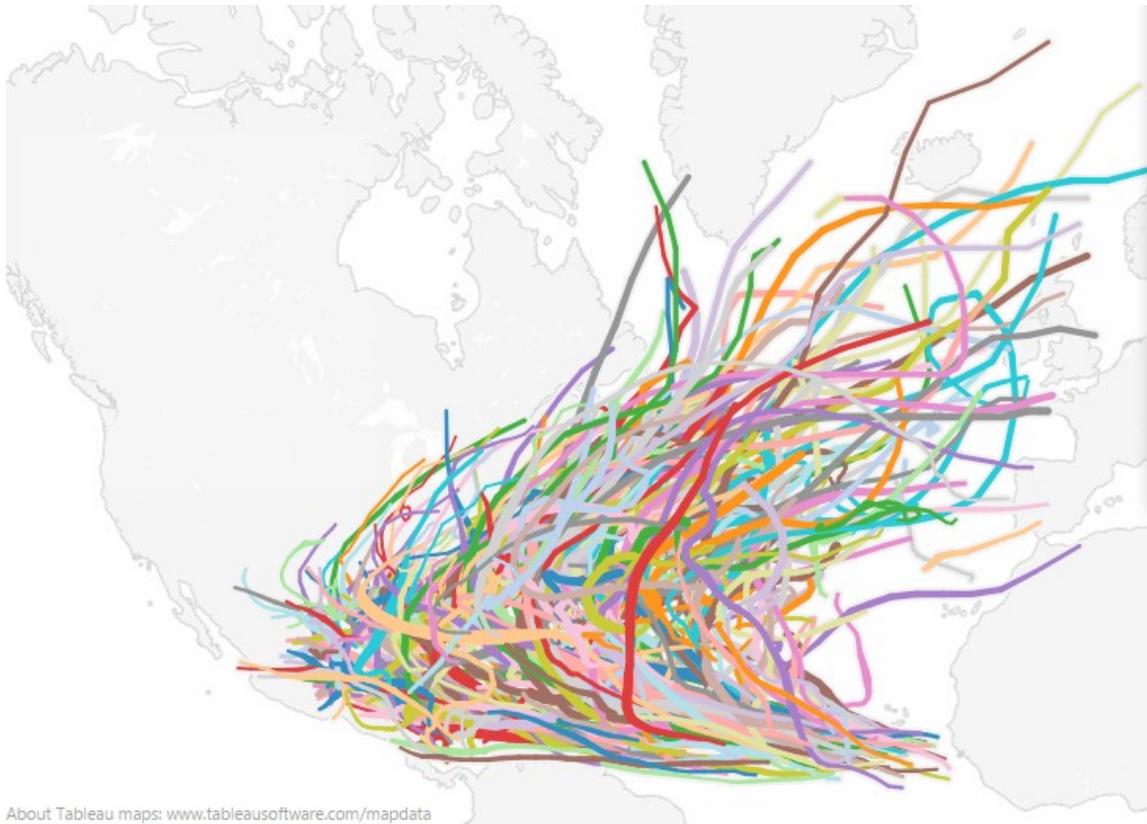
To tell Tableau that we want to map by storm we can drop the identifier for each storm, **Year /Number**, into the **Color** shelf.

Now drop **Date/Time** into the **Path** shelf, so that the software draws the path of each storm over time. The default setting may be to take the **Year** value for each field; we need to select **Exact date**:

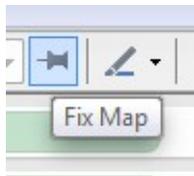
The map should now look like this:



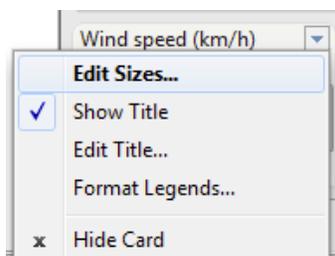
Drop **Wind Speed (kmh)** into the **Size** shelf (here the default of **Sum** is fine; **Average**, **Median**, **Minumum** and **Maximum** will also give the same result, as there's only one value for each point on the track). The map should now look like this:



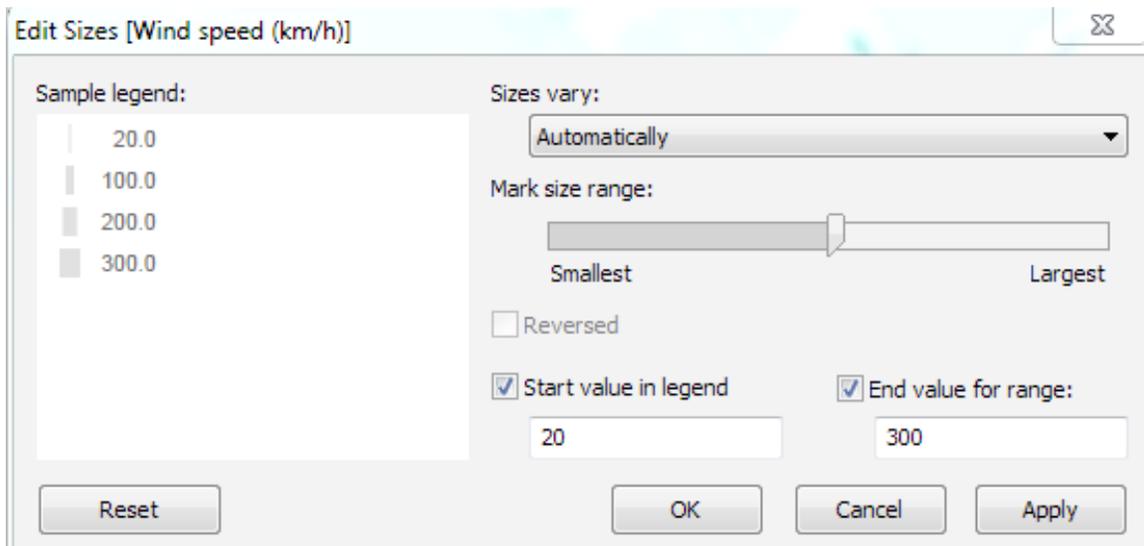
Before we apply a filter to replace the multicolored spaghetti with a view of each year's storms, we want to fix the map so that it doesn't zoom in on the storm tracks for each year. Do this by clicking the pin on the top ribbon:



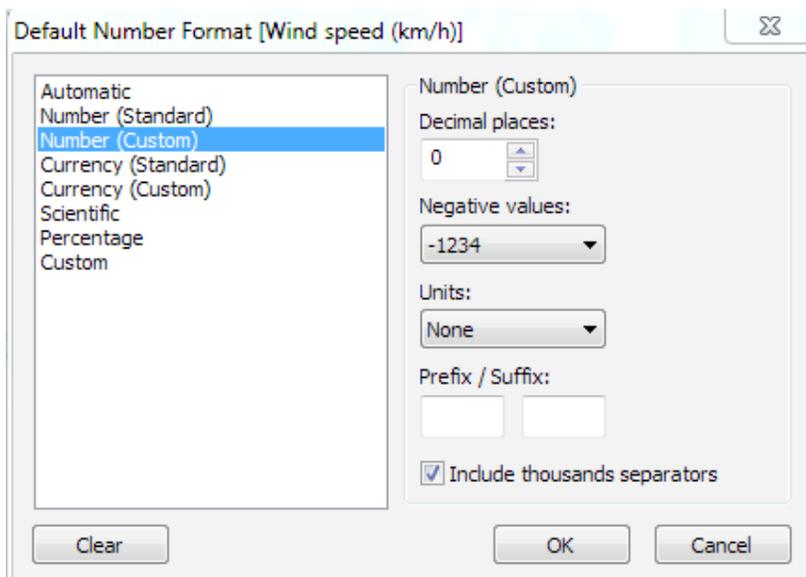
Similarly, we want the scale for **Wind speed** to remain constant in each filtered view. So select **Edit sizes** on the legend at bottom left:



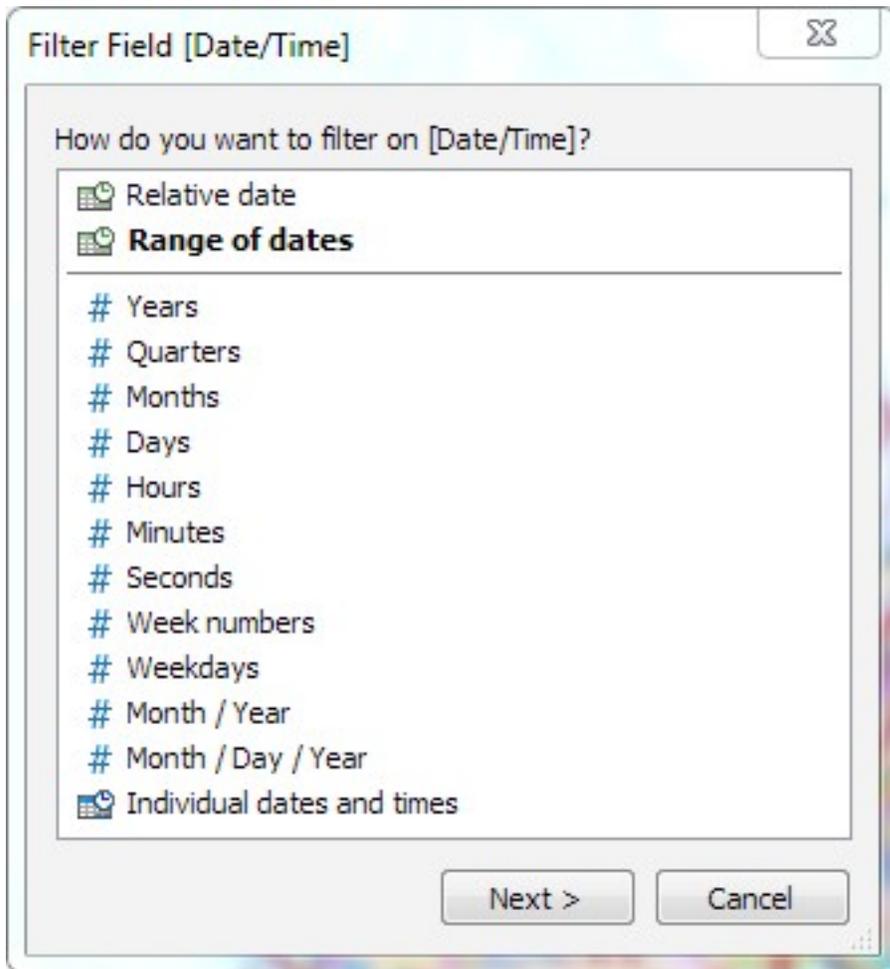
Check the **Start value in legend** and **End value for range** boxes, selecting appropriate values, and hit the **OK** button:



Notice that the wind speeds all have a single decimal, which is a spurious level of accuracy as the speeds are actually measured to the nearest 5 km /h. To fix this, right click on **Wind Speed (km /h)** in the Measures panel, select **Default Properties>Number format**, and customize as follows:



Now we'll filter the map by year. Drop **Date and time** into the **Filters** shelf and select **Years** at this dialog box:



Select **All** at the next dialog box and hit the **OK** button:

Filter [Year of Date/Time]

General Condition Top

Select from List Custom Value List Use All

Enter Text to Search

- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002

All None Exclude

Summary

Field: [Year of Date/Time]
Selection: Selected 22 of 22 values
Wildcard: All
Condition: None
Limit: None

Reset OK Cancel Apply

Then select **Show quick filter**:

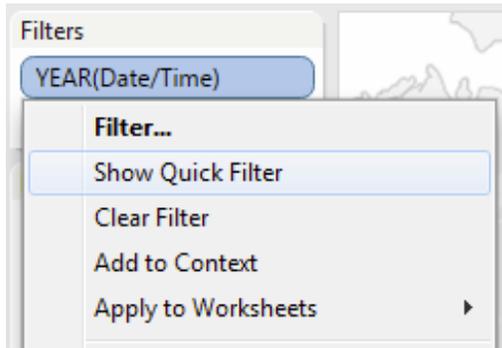
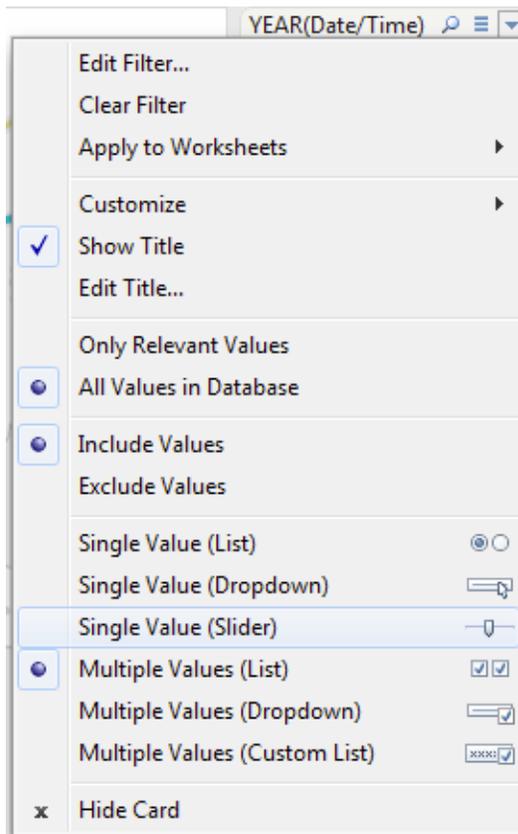
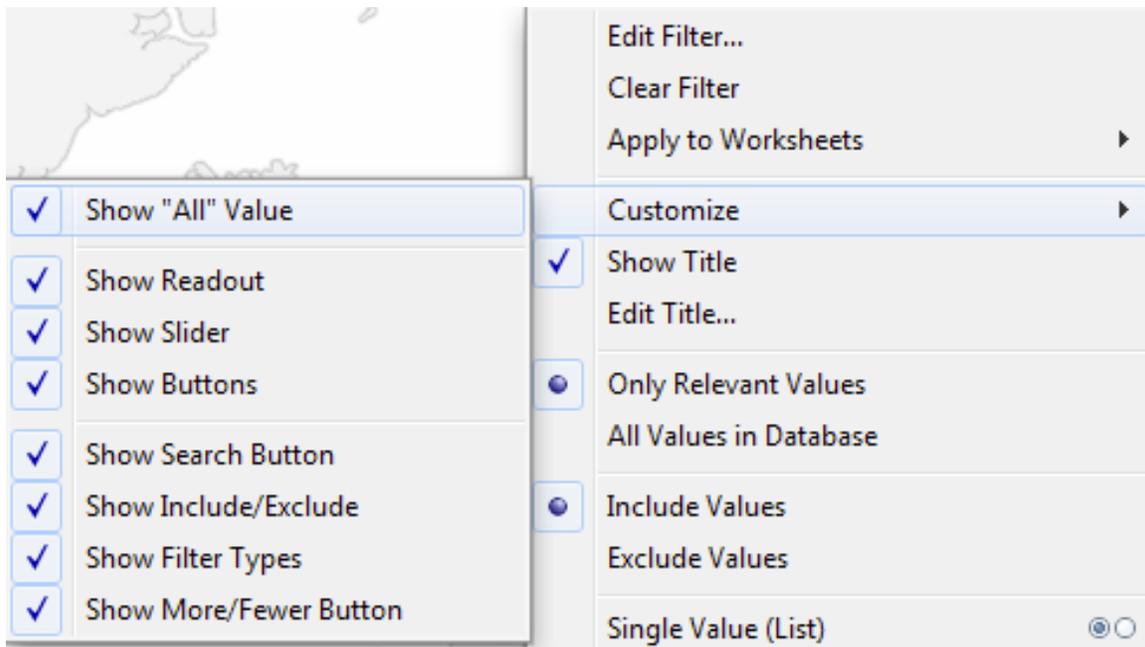


Tableau can create a variety of different types of filter (see examples at <http://www.peteraldhous.com/multimedia.html>). In this case we want a slider control to move through the years. On the legend that's now been created at right (You may need to hide the **Show Me** menu first by clicking on those words), select **Slider**:



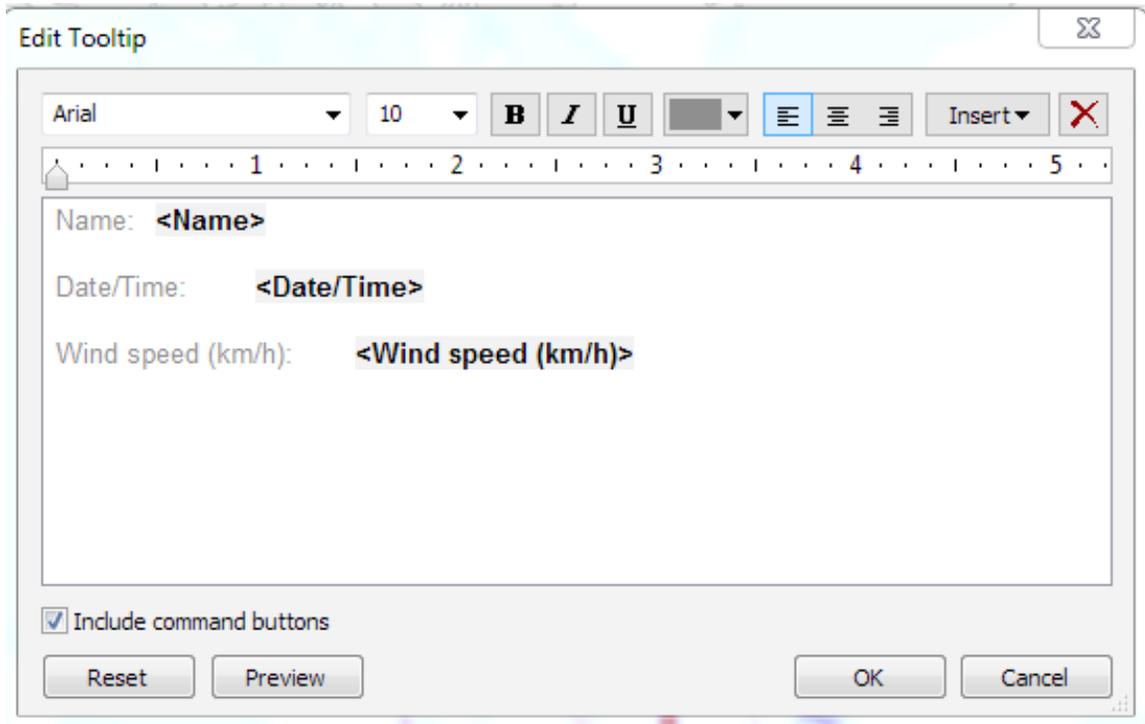
Then select **Customize** and uncheck **Show “All” Values**, to remove the multi-year spaghetti view:



TIP! Note that Tableau’s filters are great for performing exploratory data analysis. Essentially, they allow you to run database queries and see the results as graphs, maps and other visualizations. As a result, Tableau can be a valuable reporting tool, as well as being something used for presenting the final results of your analysis.

Now let's edit the information that will appear when a user rolls over one of the tracks. Select **Worksheet>Tooltip** from the top menu, and edit as desired.

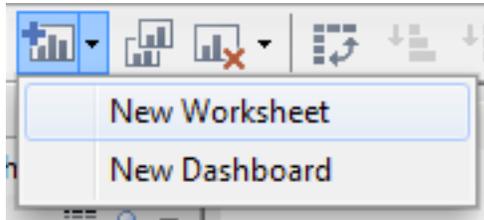
(If any of the fields you want to include – **Name**, in this case – are not present, drop them into the **Tooltip** shelf before editing the Tooltip.)



Finally, double click on the tab for this sheet at bottom left and **Rename Sheet** as **Storm tracks**.

Make a graph showing wind speeds for each storm over time

Create a new worksheet using the control on the top ribbon:

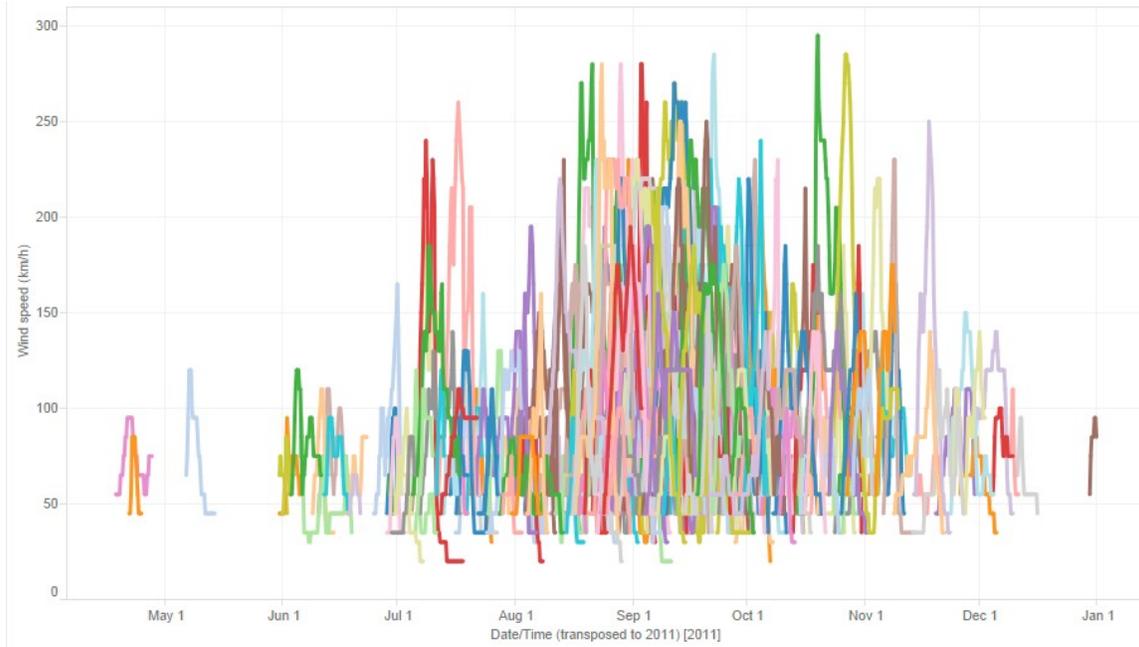


In this new sheet, drop **Date/Time (transposed to 2011)** into the **Columns** shelf, again selecting **Exact Date** as for the map.

Drop **Wind speed (km /h)** into the **Rows** shelf. Again, having done that we'll select **Analysis** from the top menu and uncheck **Aggregate Measures**, so we'll see the actual wind speeds, rather than the default calculation selected by Tableau.

Drag and drop **Year/Number** into the **Color** shelf, selecting **Line** rather than **Automatic** if necessary.

The graph should now look like this:



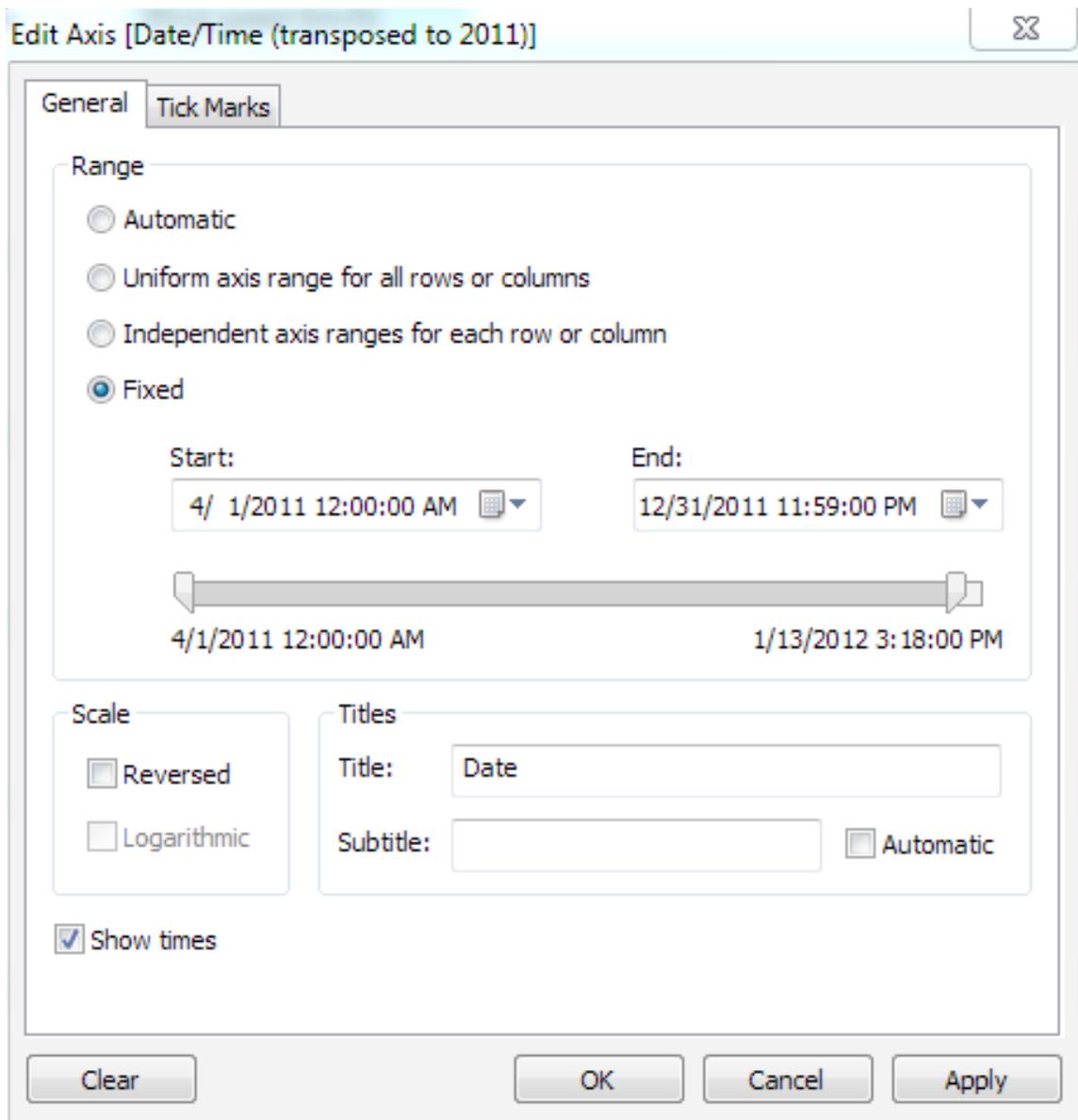
In this case the graph type we wanted came up automatically. If it doesn't, click on the **Show Me** tab at top right to see the available graph types and select the one you want.

Now we need to fix the values of the Y axis, so it doesn't redraw with different values for years with storms with slower wind speeds.

Right click on the axis and select **Edit Axis**, then select the **Fixed** button, edit as follows, and hit **OK**:

The image shows a dialog box titled "Edit Axis [Wind speed (km/h)]". It has two tabs: "General" and "Tick Marks". The "General" tab is active. Under the "Range" section, there are four radio buttons: "Automatic", "Uniform axis range for all rows or columns", "Independent axis ranges for each row or column", and "Fixed". The "Fixed" radio button is selected. To the right of these options is a checked checkbox labeled "Include zero". Below the radio buttons are two input fields: "Start:" with the value "0" and "End:" with the value "300". Below these fields is a horizontal slider with a vertical bar and arrows at both ends. The slider is positioned at 0 on the left and 310 on the right. Below the slider are two sections: "Scale" and "Titles". The "Scale" section has two checkboxes: "Reversed" and "Logarithmic", both of which are unchecked. The "Titles" section has a "Title:" field containing "Wind speed (km/h)" and a "Subtitle:" field which is empty. To the right of the "Subtitle:" field is a checked checkbox labeled "Automatic". At the bottom of the dialog box are four buttons: "Clear", "OK", "Cancel", and "Apply".

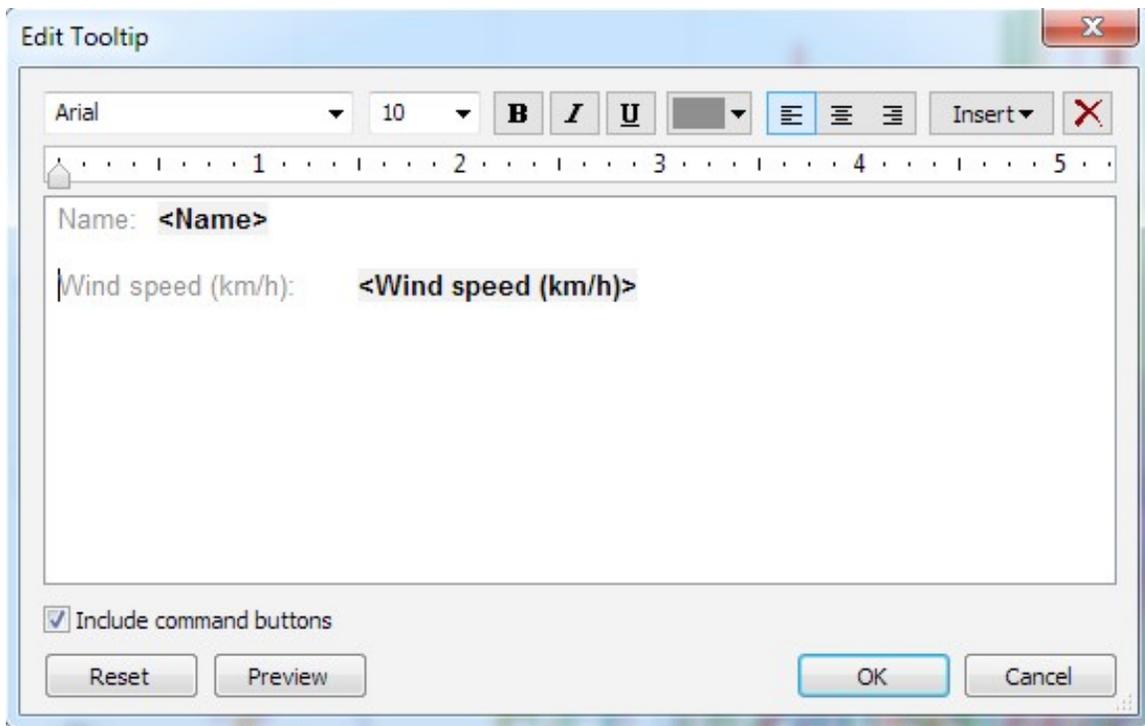
Similarly, edit the date range on the X axis:



Note we've edited the **Title** and unchecked the **Automatic Subtitle** to clean up the axis labels.

Again, select **Worksheet>Tooltip** from the top menu to customize what appears when users roll over the lines on the graph.

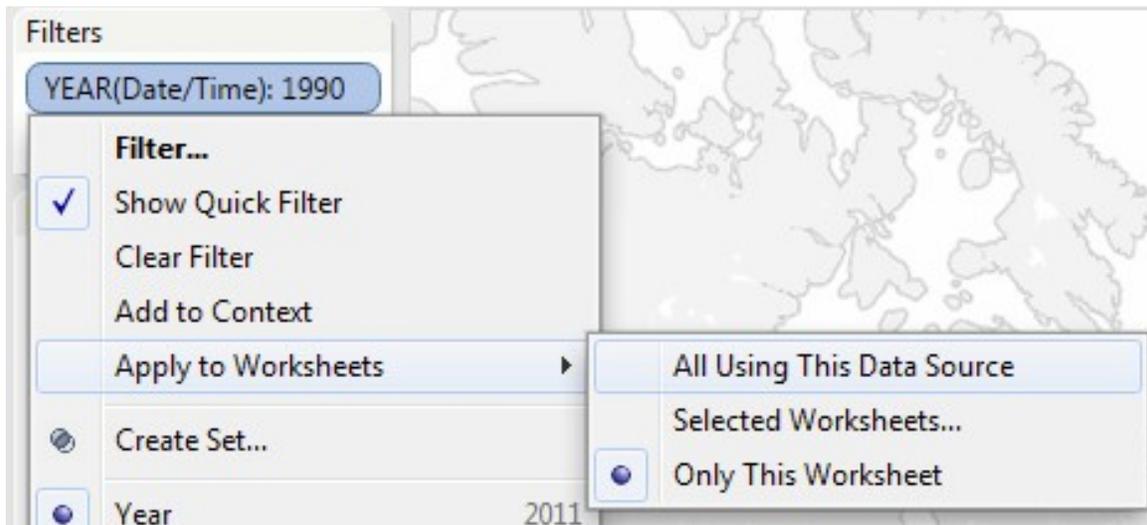
(Remove the date field so it doesn't throw up confusing 2011 dates for other years. Again, we need to put **Name** into the **Tooltip** shelf before that can be used.)



Finally, drop **Date/Time** into the **Filters** shelf, following the same instructions as we did previously for the **Storm tracks** map.

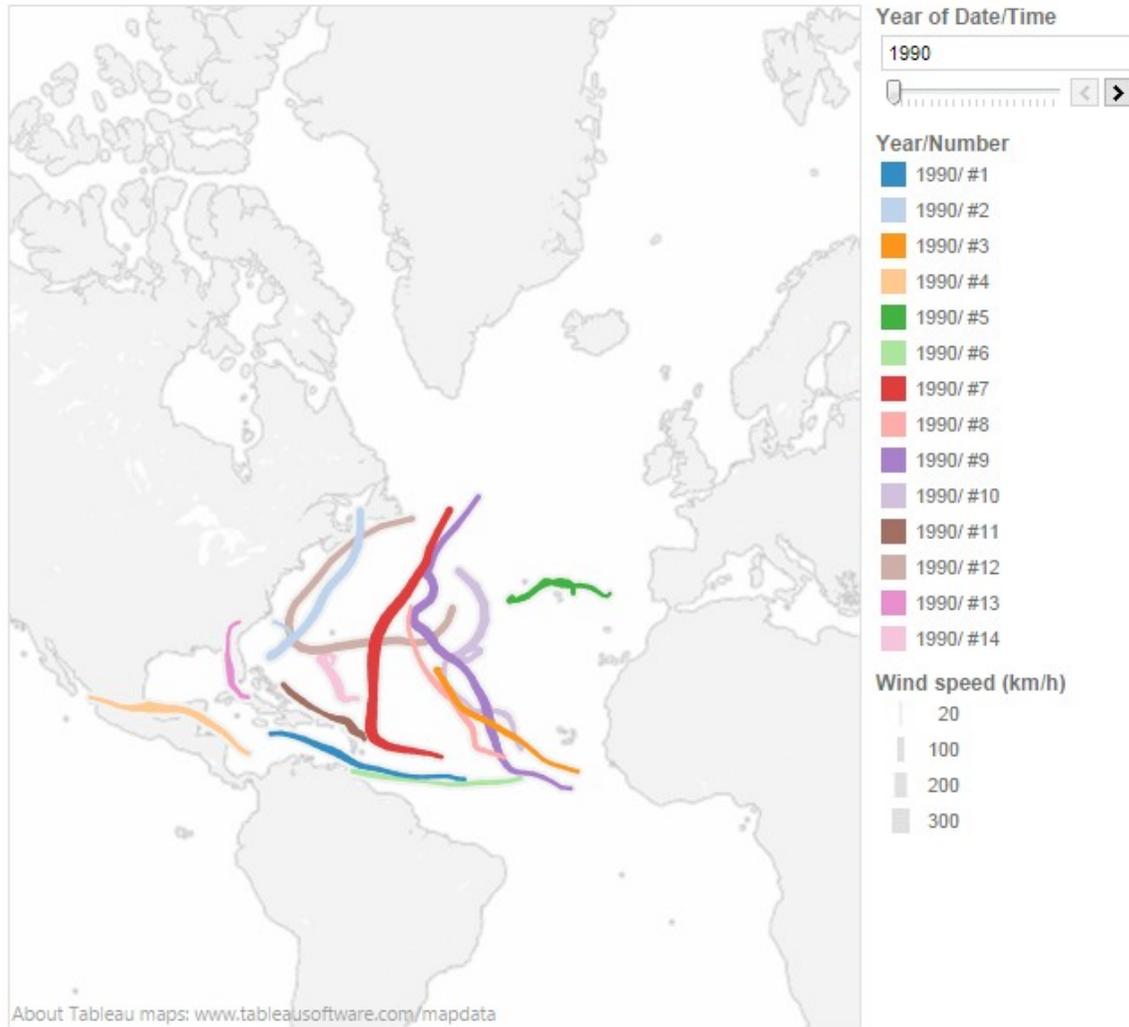
This time, there's no need to show a quick filter, as we're going to make the filter in the map control both views simultaneously. So rename the second sheet **Wind speeds** and go back to the **Storm tracks** map.

Here, simply select **Apply to worksheets>All Using This Data Source** on the filter, and now it will control both views:

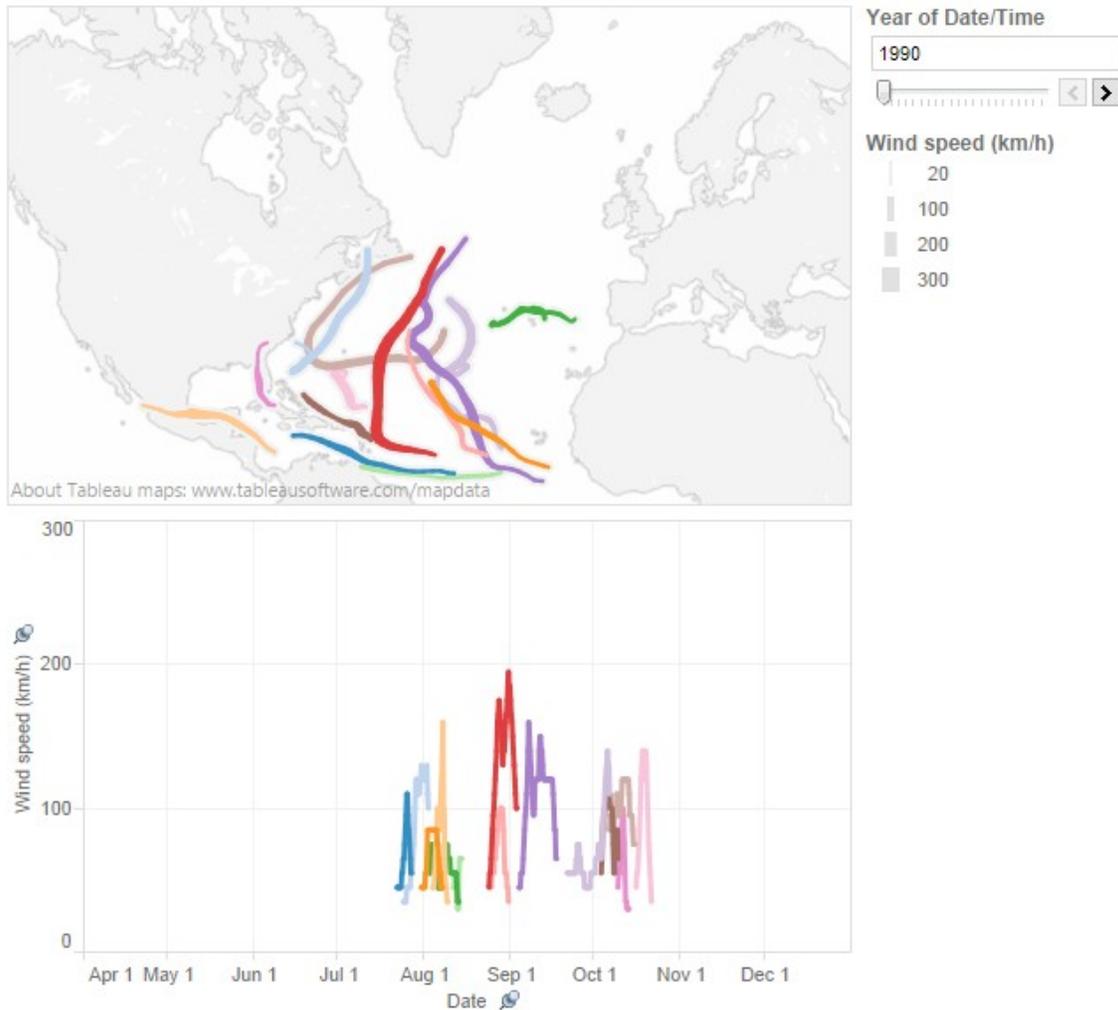


Make a dashboard to show both views

Select **Dashboard>New Dashboard** on the top menu. Drag and drop the **Storm tracks** sheet onto the dashboard, then right click on the Title bar and select **Hide Title**:



Drag and drop the **Wind speeds** sheet below the map, remove the title again and the dashboard should look like this:

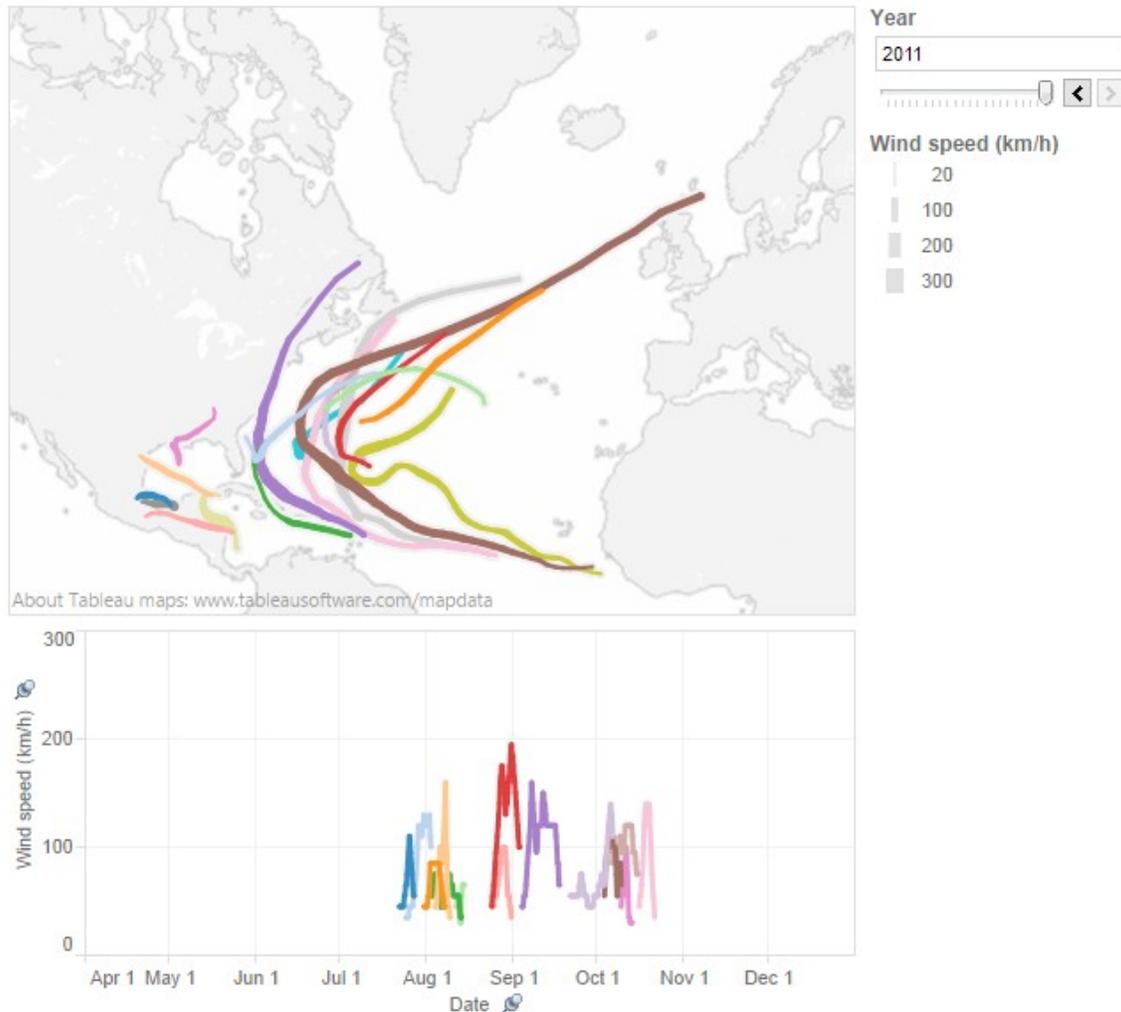


Now let's tidy up before we save to the web. The **Year/Number** legend adds little, so click on that container and click the **x** that appears at top right to delete it.

Then click on the slider container, click on the downwards-pointing triangle at Top right, and **Edit title** to **Year**. Move the slider over to 2011 so that this is the first view that appears after we save.

Save to the web

Adjust the size of the dashboard as desired using the **Dashboard** controls at bottom left. Having done so, adjust the sizes of the containers to get the best looking view:



Then select **File>Save to Web** from the top menu. Enter a name for the visualization, leaving **Show Sheets as Tabs** unchecked, because we want to show only one view. (Here is an example where the tabs option was used. <http://www.newscientist.com/embedded/nuclear-reactor-map>). At this point you will be asked for your Tableau Public login.

Embed on your website

Select the **Share** option at the bottom of the **Preview**, copy the embed code and paste it into the html of your web page.

Explore the possibilities

The great thing about Tableau is the large variety of possible visualizations. To learn more, download the workbooks of examples (see <http://www.tableausoftware.com/public/gallery>, <http://www.tableausoftware.com/public/community/in-the-wild> and <http://www.peteraldhous.com/multimedia.html>) to see how they were made.