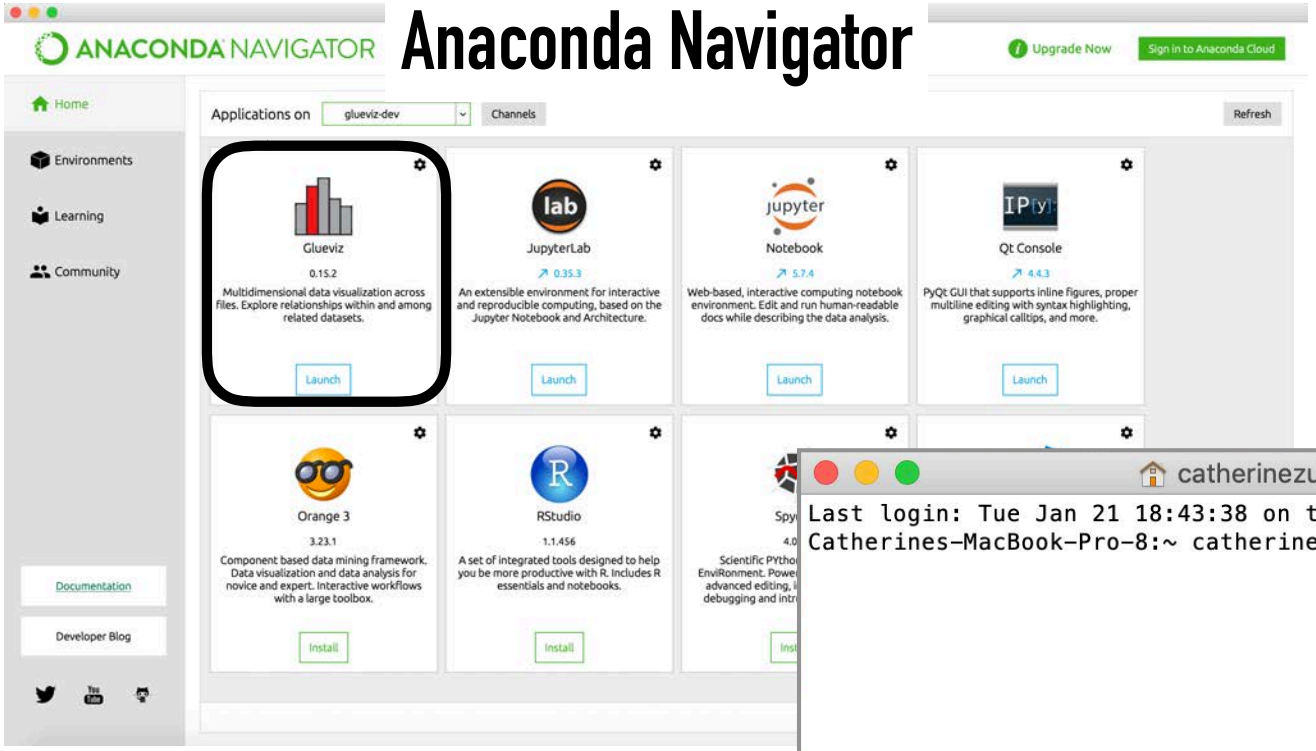
Starting up glue

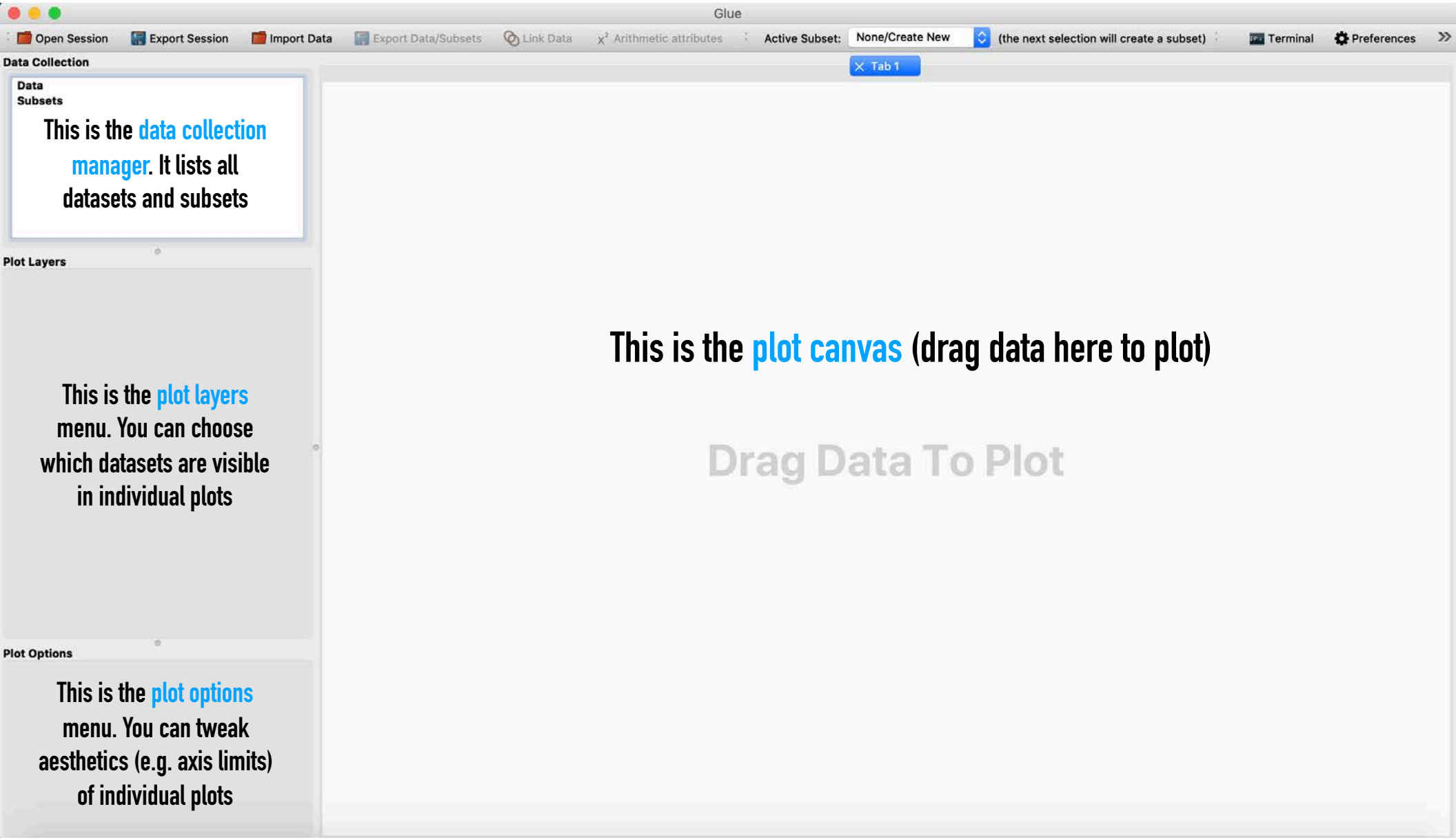
To start up glue, you can click the glue icon in the anaconda navigator application, or open up a terminal and type “glue”

Anaconda Navigator



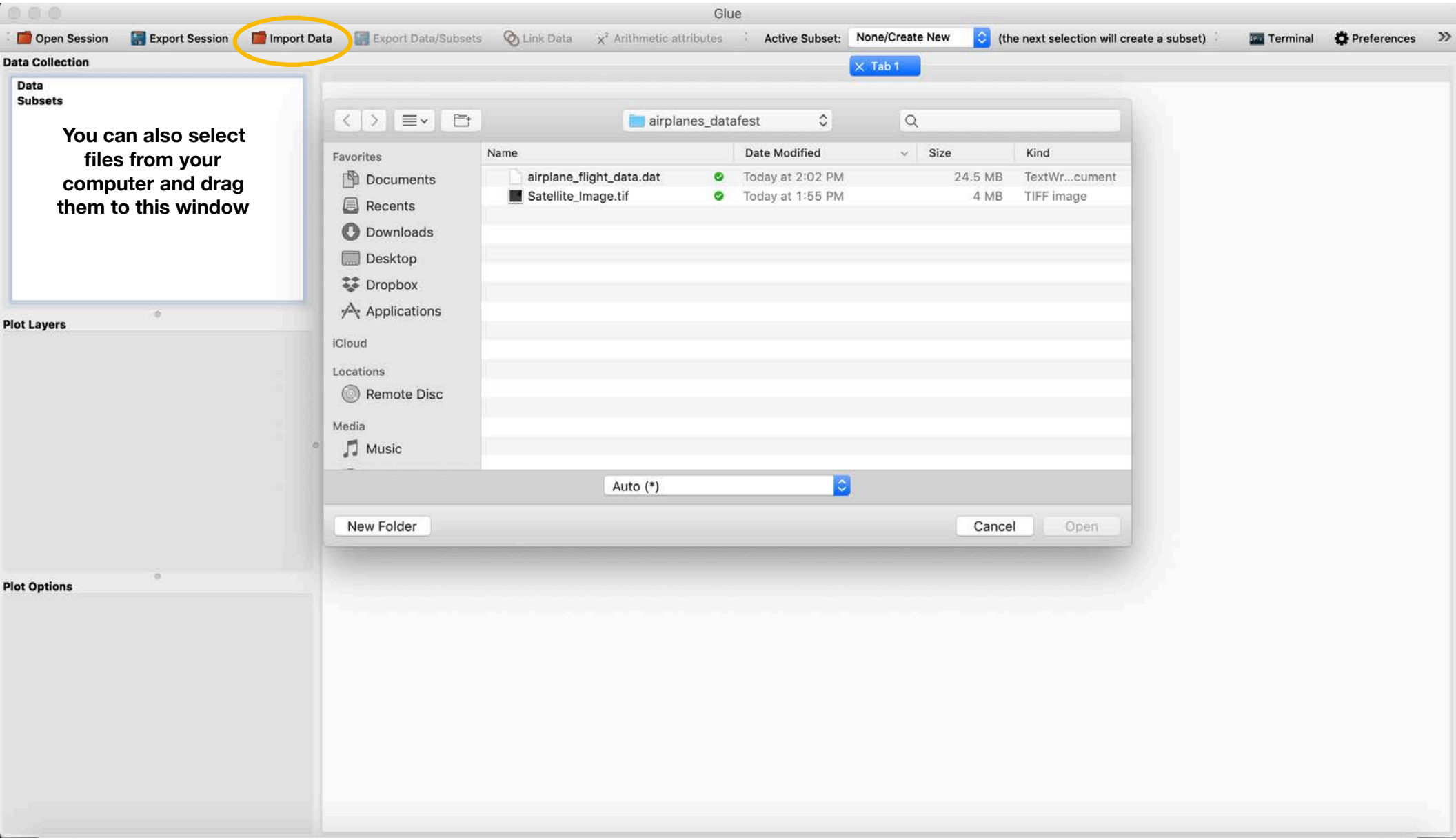
Terminal

Your glue dashboard



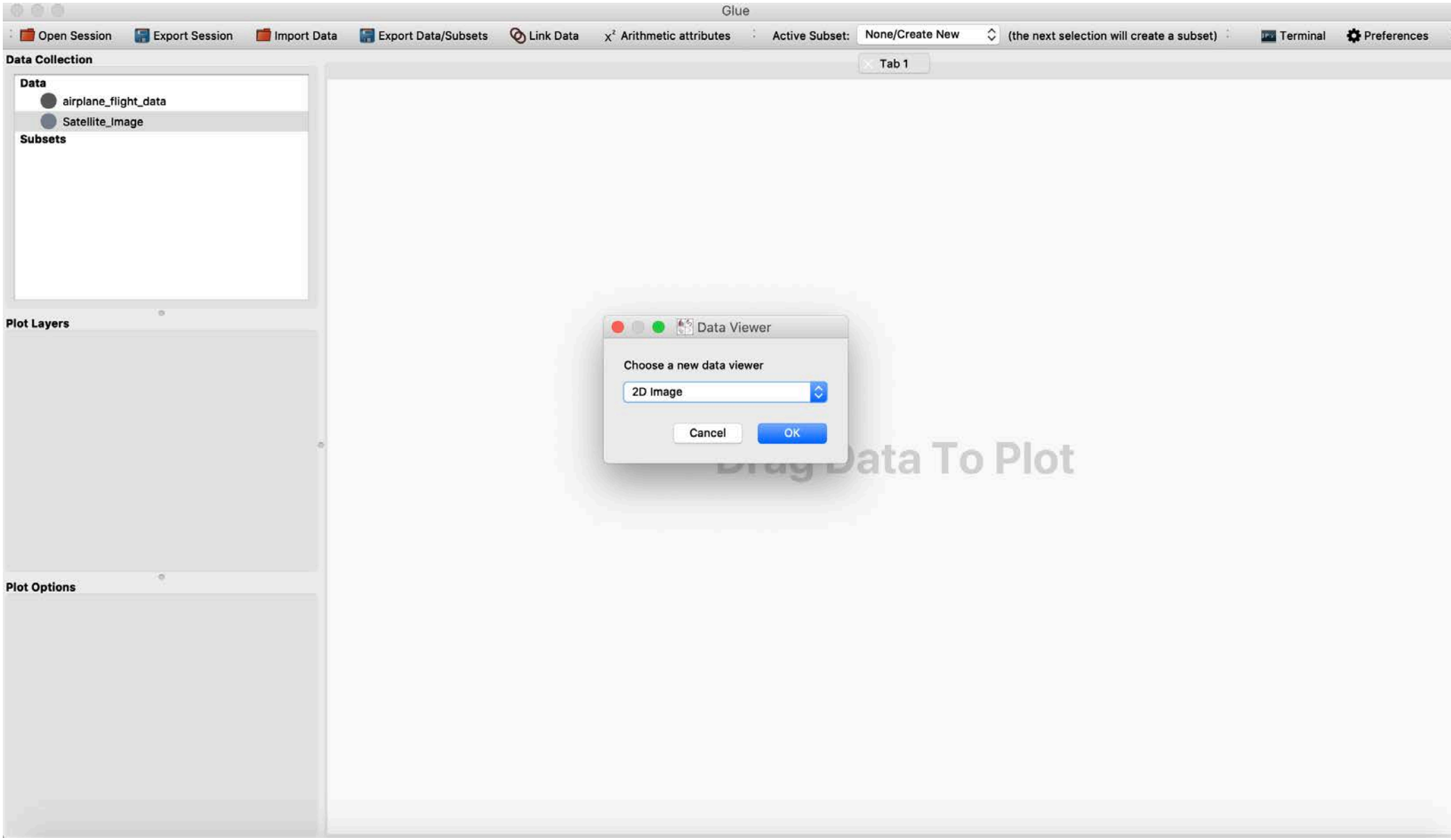
Loading Data

To load data, click on the "Import Data" button and select the datasets to load. Alternatively, you can drag and drop files into the Data Collection window



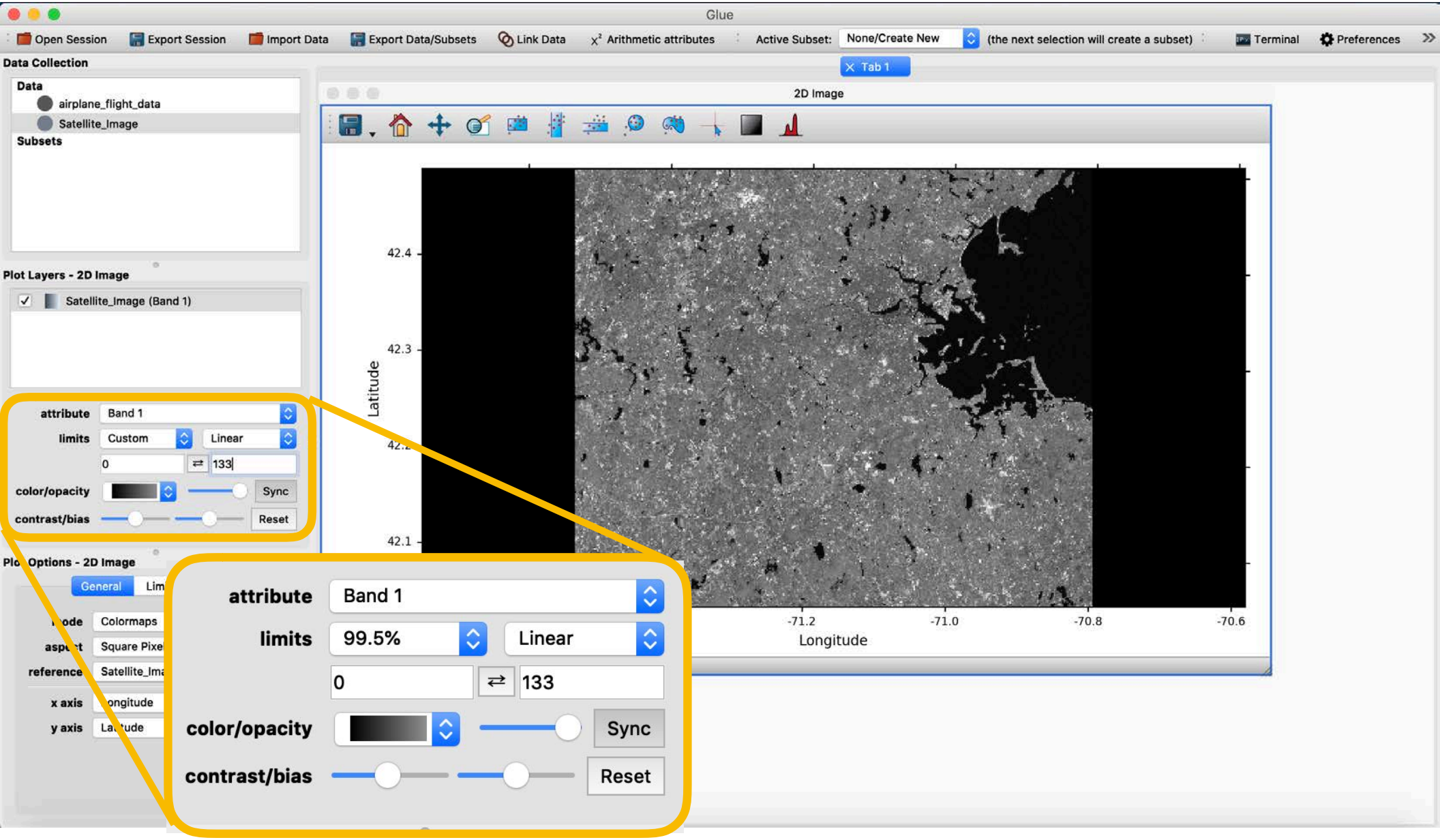
Plotting Data

Click on the “Satellite_Image” dataset in the Data Collection Manager. Drag it onto the plot canvas and select “2D Image” as your data viewer



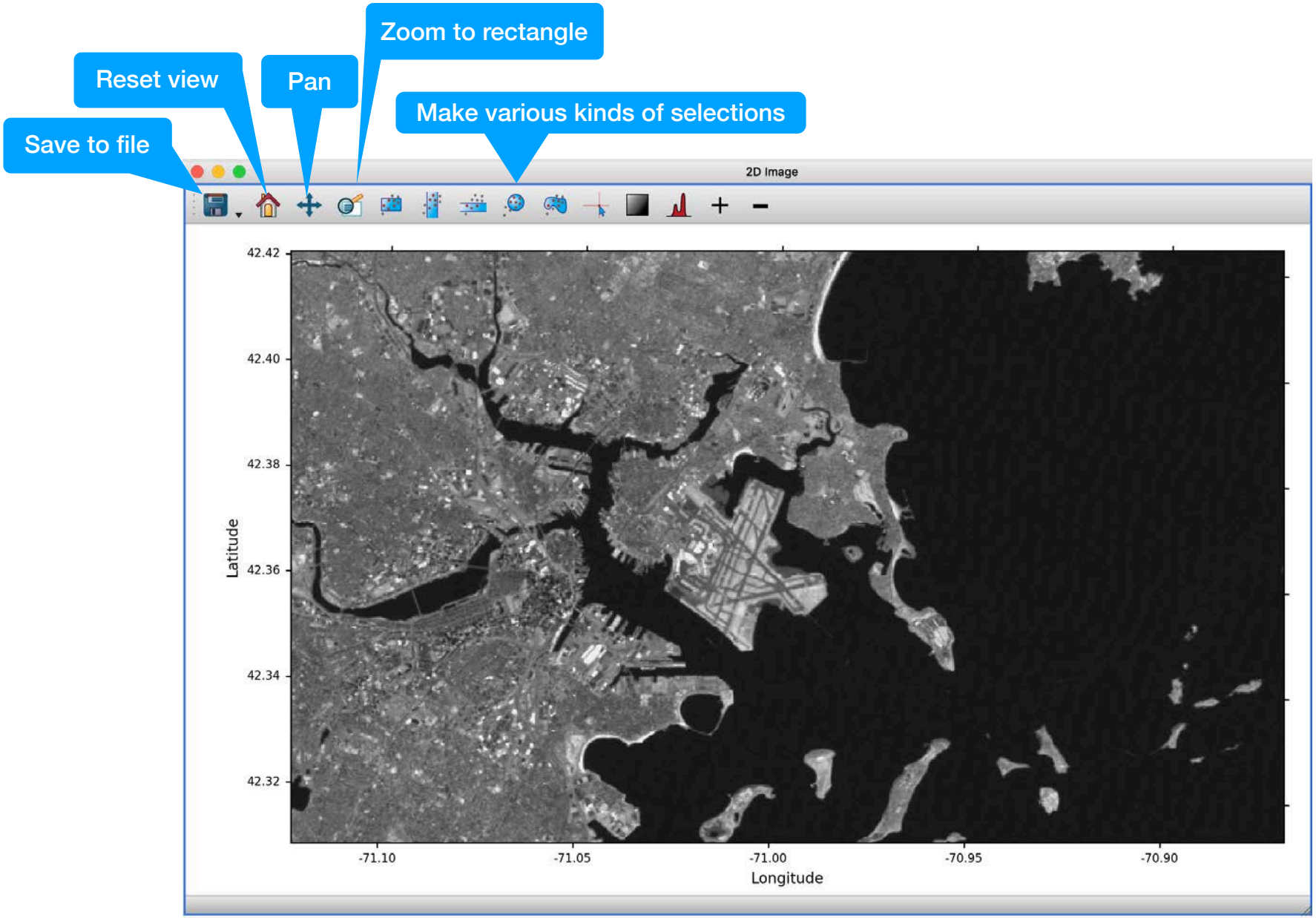
Play around with plot layers menu

Once you create your 2D image viewer, you can adjust the colormap, the stretch and limits of the colormap, and the opacity of the color map with the plot layers menu. We only have one layer (the Satellite_Image dataset) active at the moment, but we will add more layers soon…stay tuned!



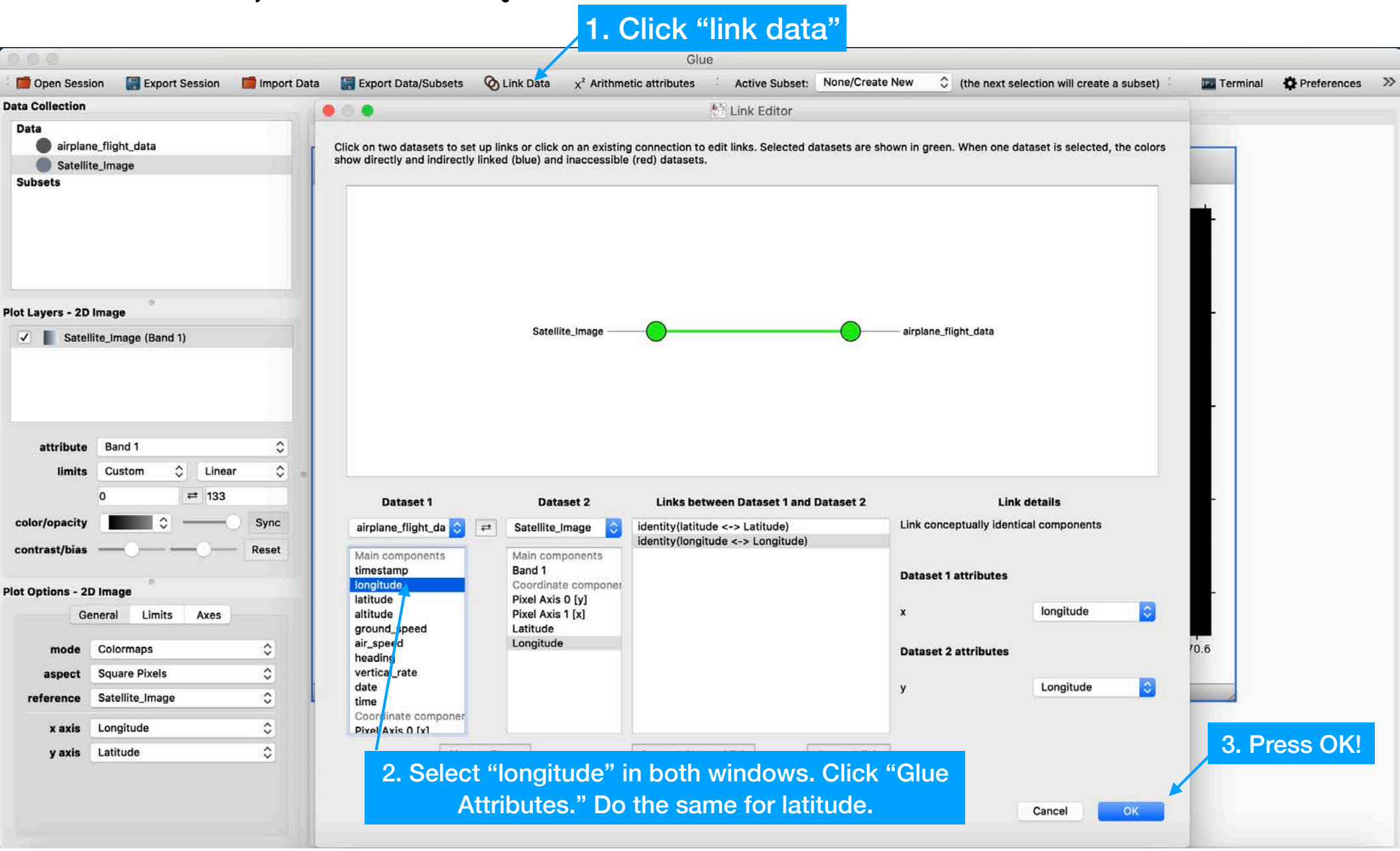
Use the "in-viewer" controls

Each type of viewer (e.g. 2D image viewer, histogram, 3D scatter plot) has its own set of "in-viewer" buttons to control (e.g. zoom in/out, reset to original display, pan). This is also the way you will make selections (we will get to that in a bit!). For now, just try them out!



Hmmm…shouldn't we be glue-ing things together?

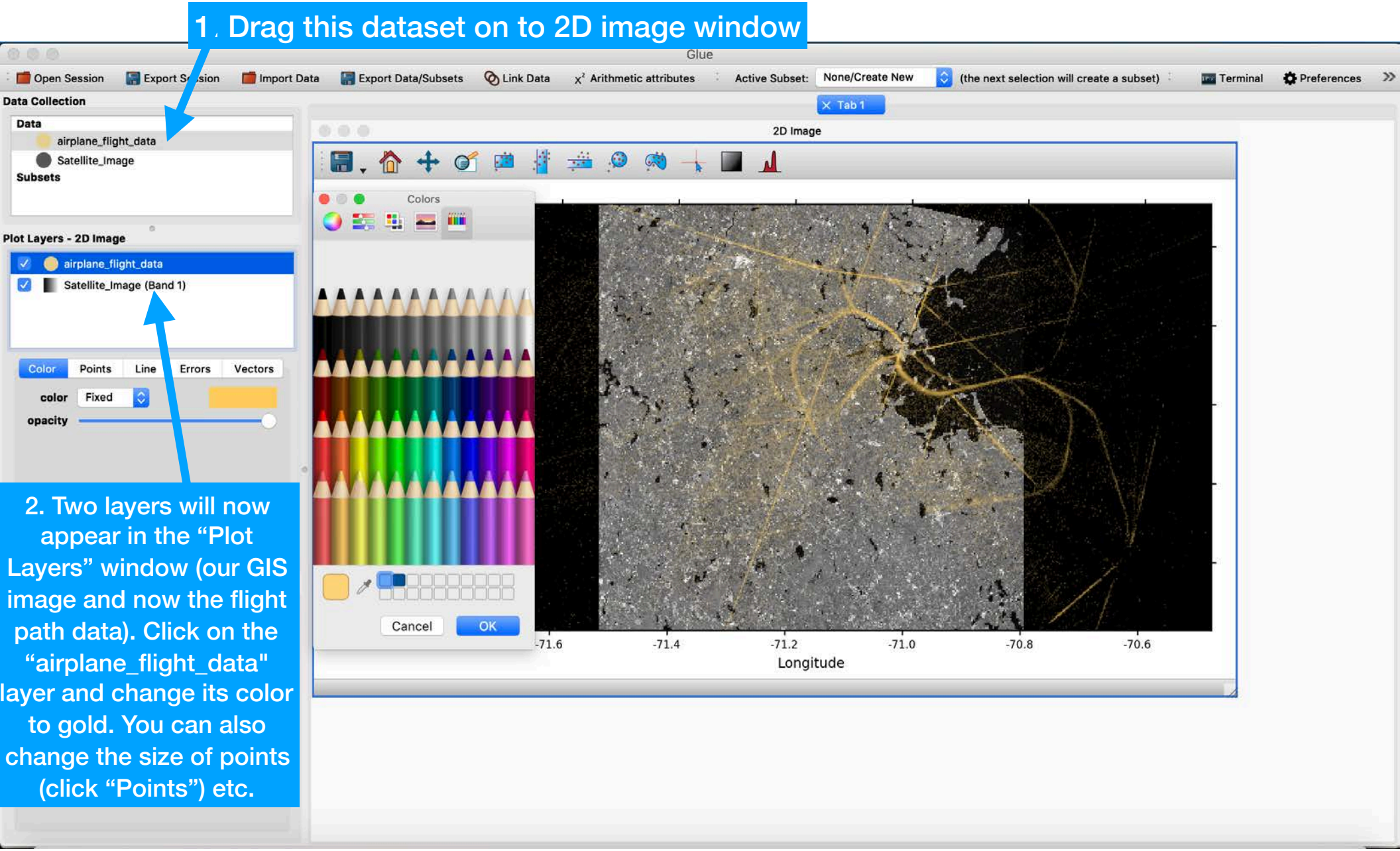
Next, we are going to link two datasets that have like attributes. The first dataset ("Satellite_Image") is a GIS image of the Boston area. Our second dataset will be the "airplane_flight_data" file, which is a catalog of data on flight positions, speeds, headings, etc for airplanes. Both datasets share the same spatial information — i.e. they both use "latitude" and "longitude." We will link these two attributes so the both datasets can be visualized in the same viewer.



Visualize Two Datasets in the Same Plot!

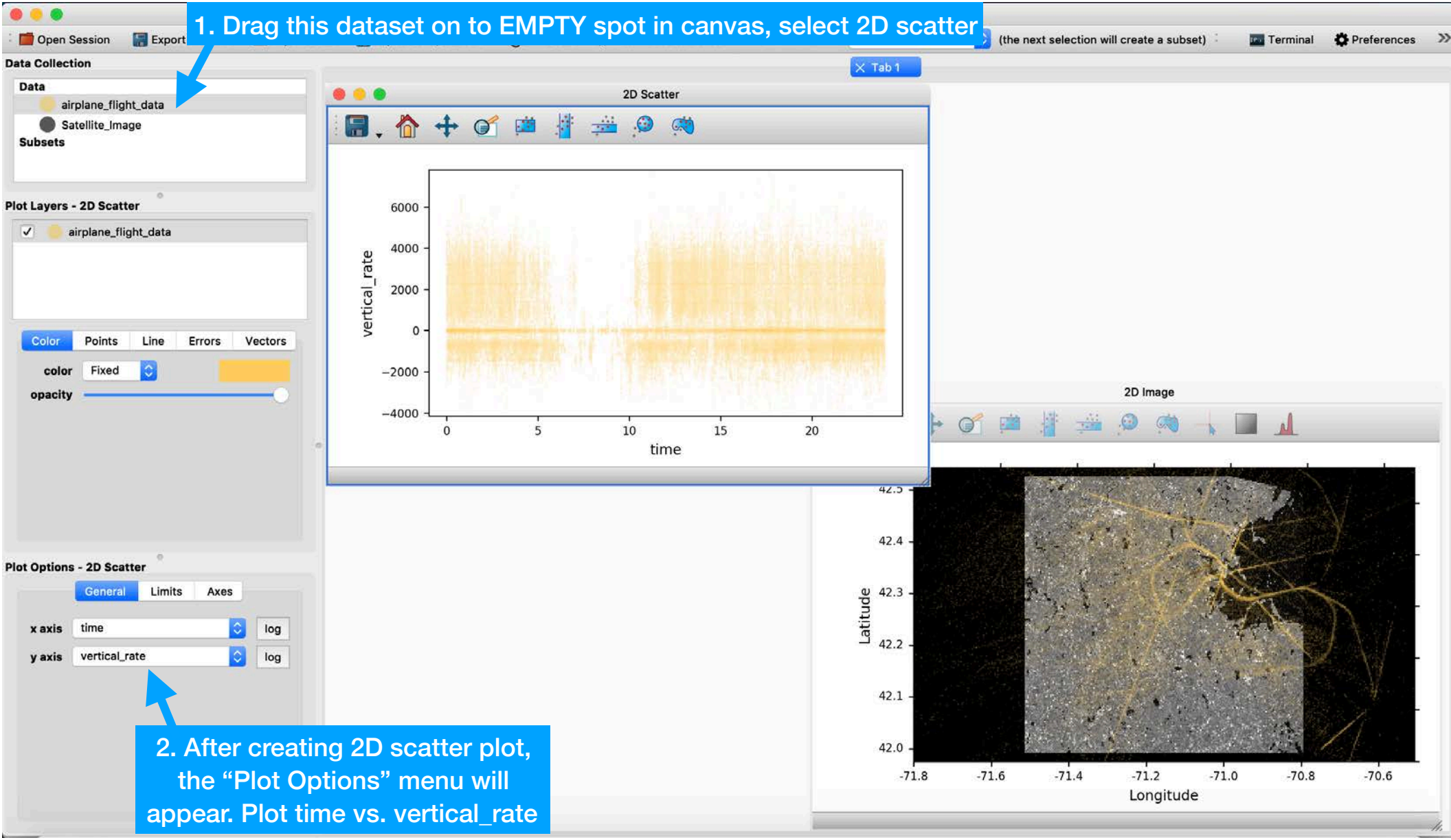
First, drag “airplane_flight_data” from the data collection manager on to the 2D image window to see the airplane positions on top of the satellite image.

Two layers should now appear in the “plot layers” window. Click on the “airplane_flight_data” layer and click on “Color” to change its color to yellow.



Let's make a second plot, to visualize the flight path data

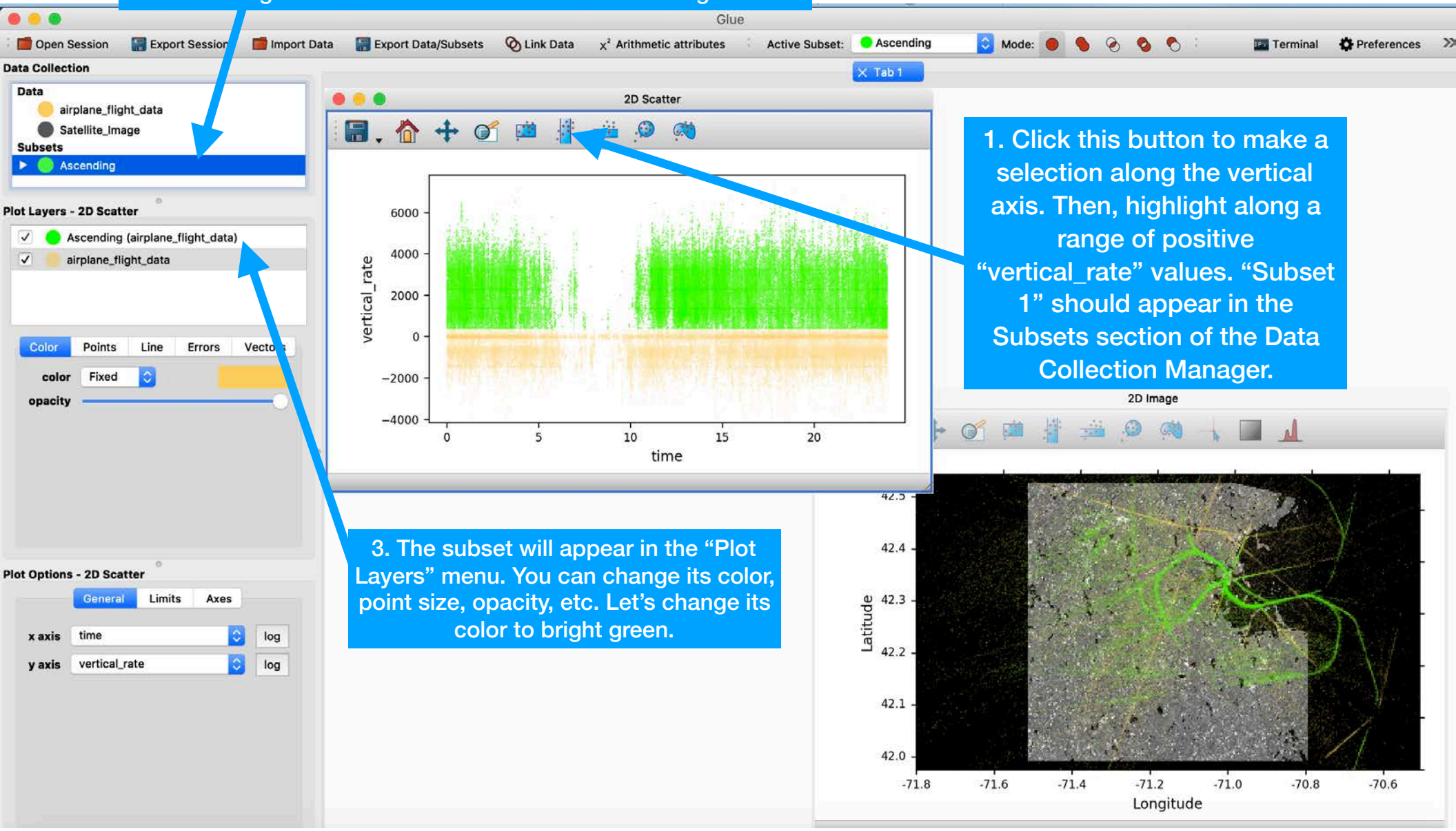
To make a second plot, select "airplane_flight_data" in the Data Collection manager, and drag it onto an EMPTY space on the canvas. Select "2D scatter" plot as the plot option. Then use the Plot Options window to change the variables plotted on the x and y axis. Select "time" as the x variable and "vertical rate" as the y variable.



Now, let's make a selection!

A selection is an interesting subset of the data you want to explore. Since data are linked across plots, selections in one plot will propagate to other plots. We are going to select data points with positive “vertical_ rate” in the 2D scatter viewer. Those planes are ascending! The selection will propagate across both viewers. Yay!

2. Double-click on the newly created subset in the Subset list. Change its name from "Subset 1” to “Ascending”.

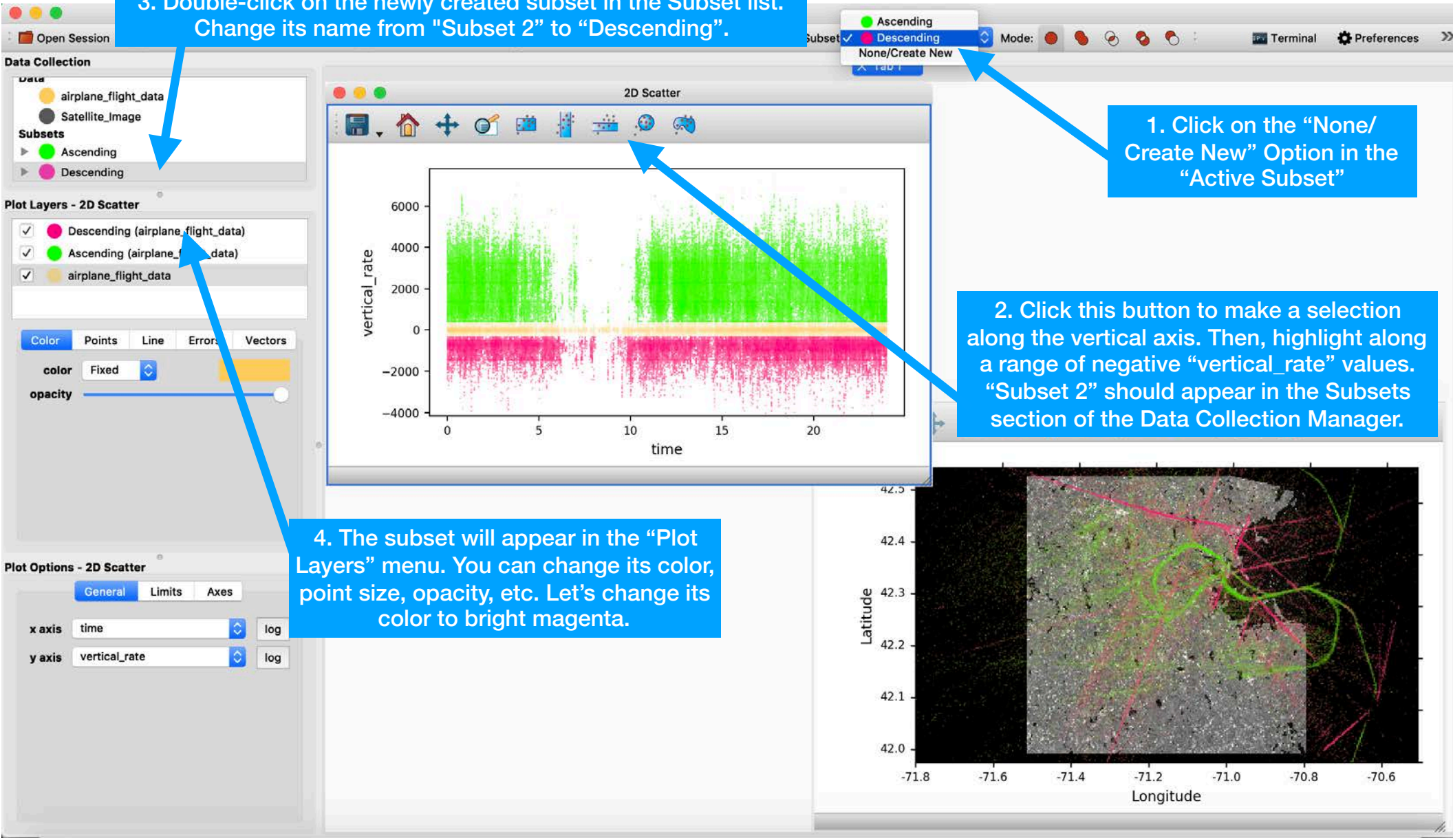


1. Click this button to make a selection along the vertical axis. Then, highlight along a range of positive “vertical_rate” values. “Subset 1” should appear in the Subsets section of the Data Collection Manager.

3. The subset will appear in the “Plot Layers” menu. You can change its color, point size, opacity, etc. Let’s change its color to bright green.

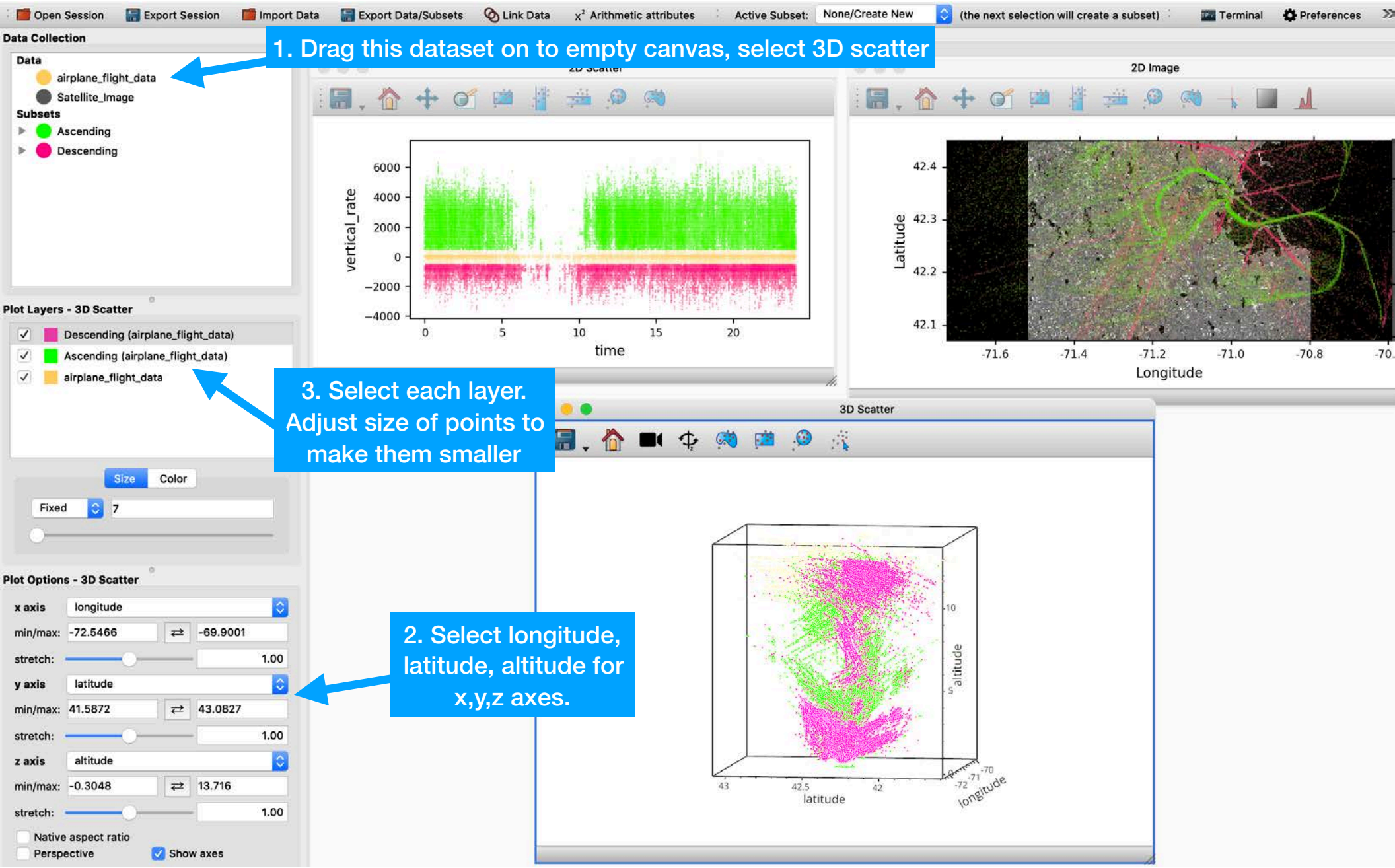
And another selection!

Follow the same process as the previous slide, except now select NEGATIVE vertical_rate in the 2D scatter viewer. Call it “Descending” and make it magenta! Again, the selection will propagate across both viewers!



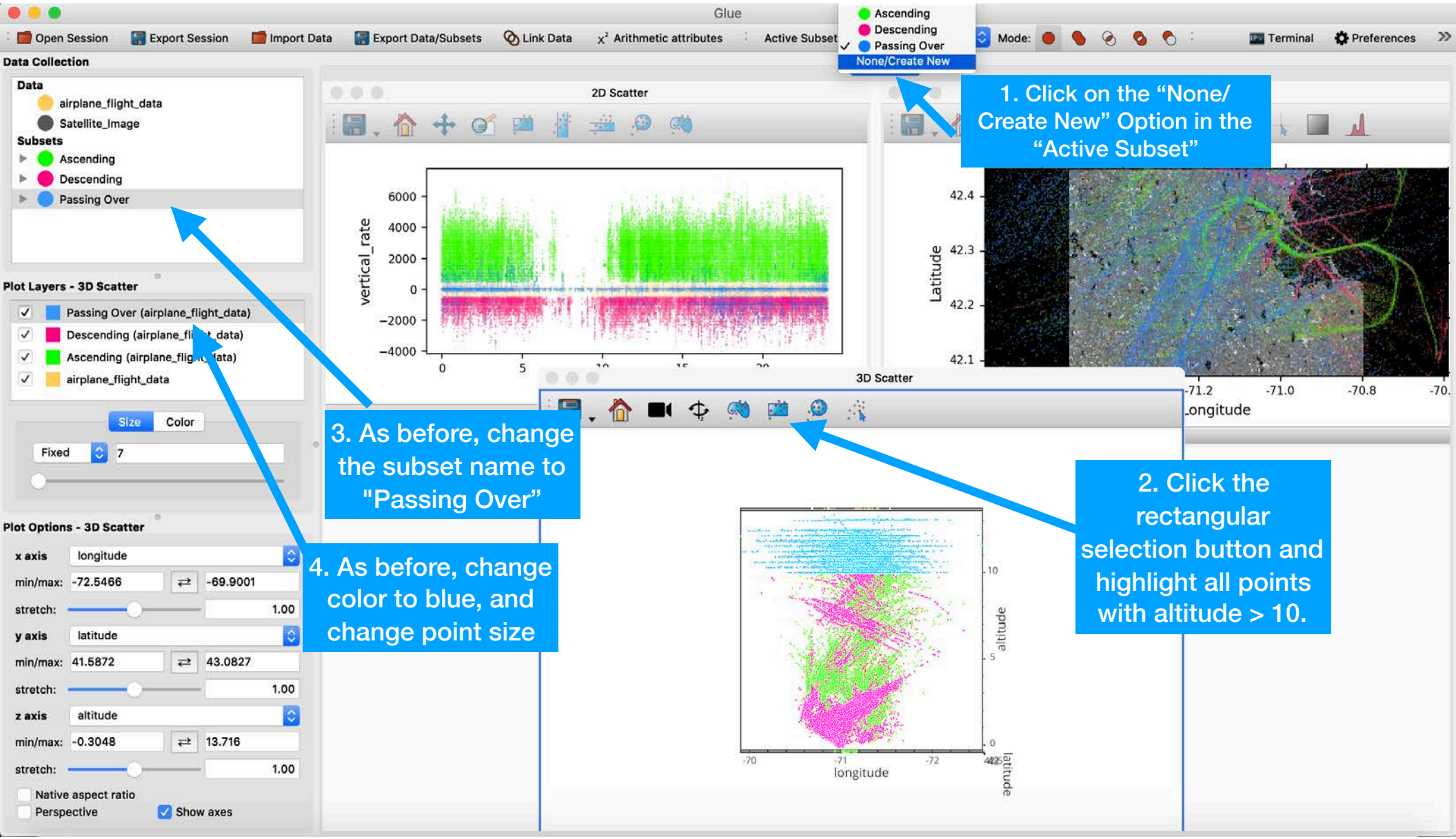
2D is cool. . .but what about 3D?!?!?!?!

Next, let's make a 3D scatter plot of the flight data. We will drag our airplane flight data onto the EMPTY canvas again and select 3D scatter plot. Select "longitude, latitude, altitude" as the "x,y,z" axes variables. Then, for each layer, adjust the size of the points.



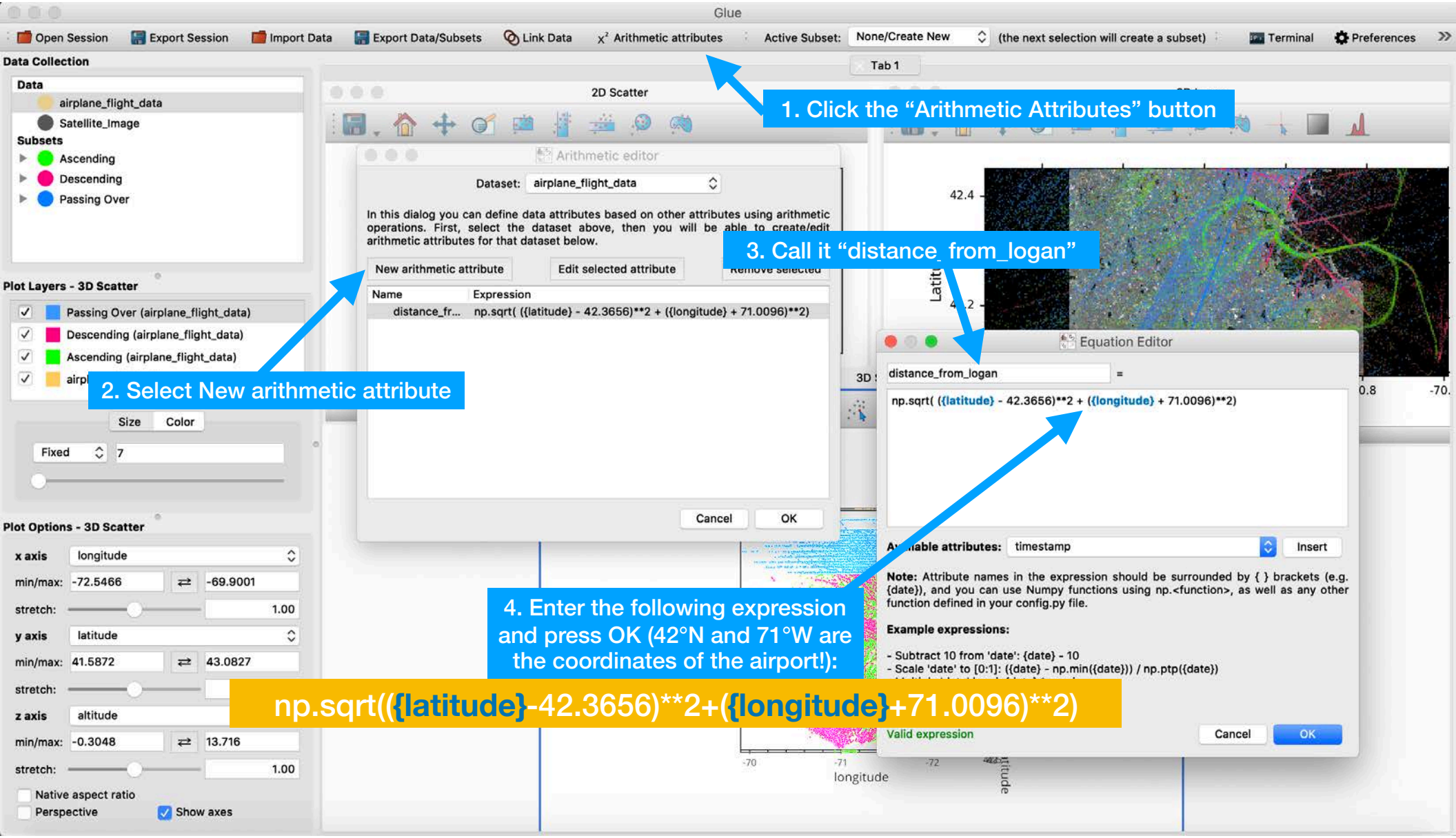
Make a 3D selection

Next, we are going to make an interesting selection in the 3D scatter plot. Specifically, we want to highlight all the flight paths where the altitude remains constant over its flight path. Those are the planes that are just passing over (not landing at Boston Logan!). They have ~ zero vertical rate!



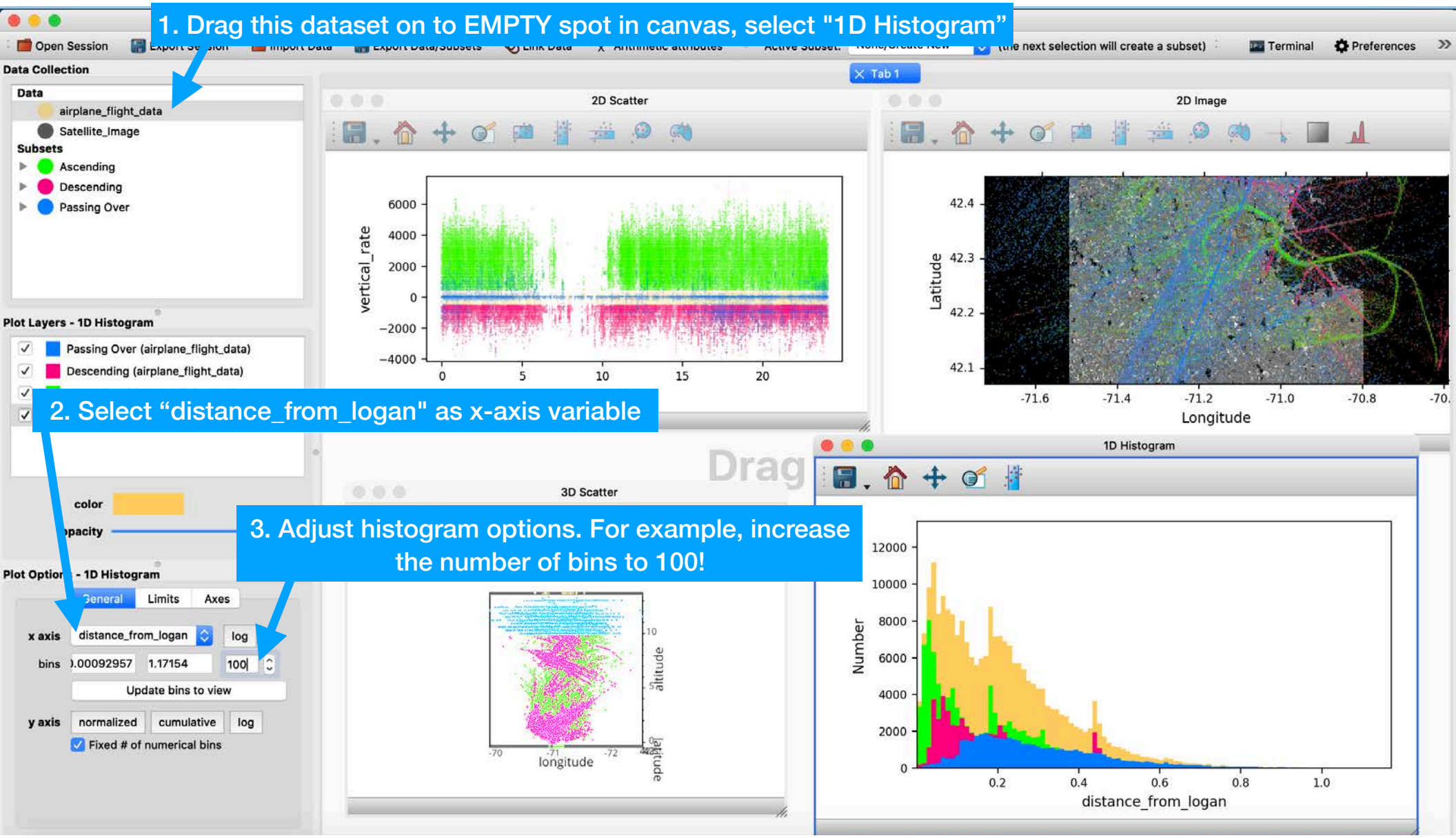
Create new data attribute

What if we want to explore another facet of our data, but it's not currently in our dataset? We can create a new data attribute and it will be immediately available to plot! We will compute the angular distance of each plane from Logan Airport.



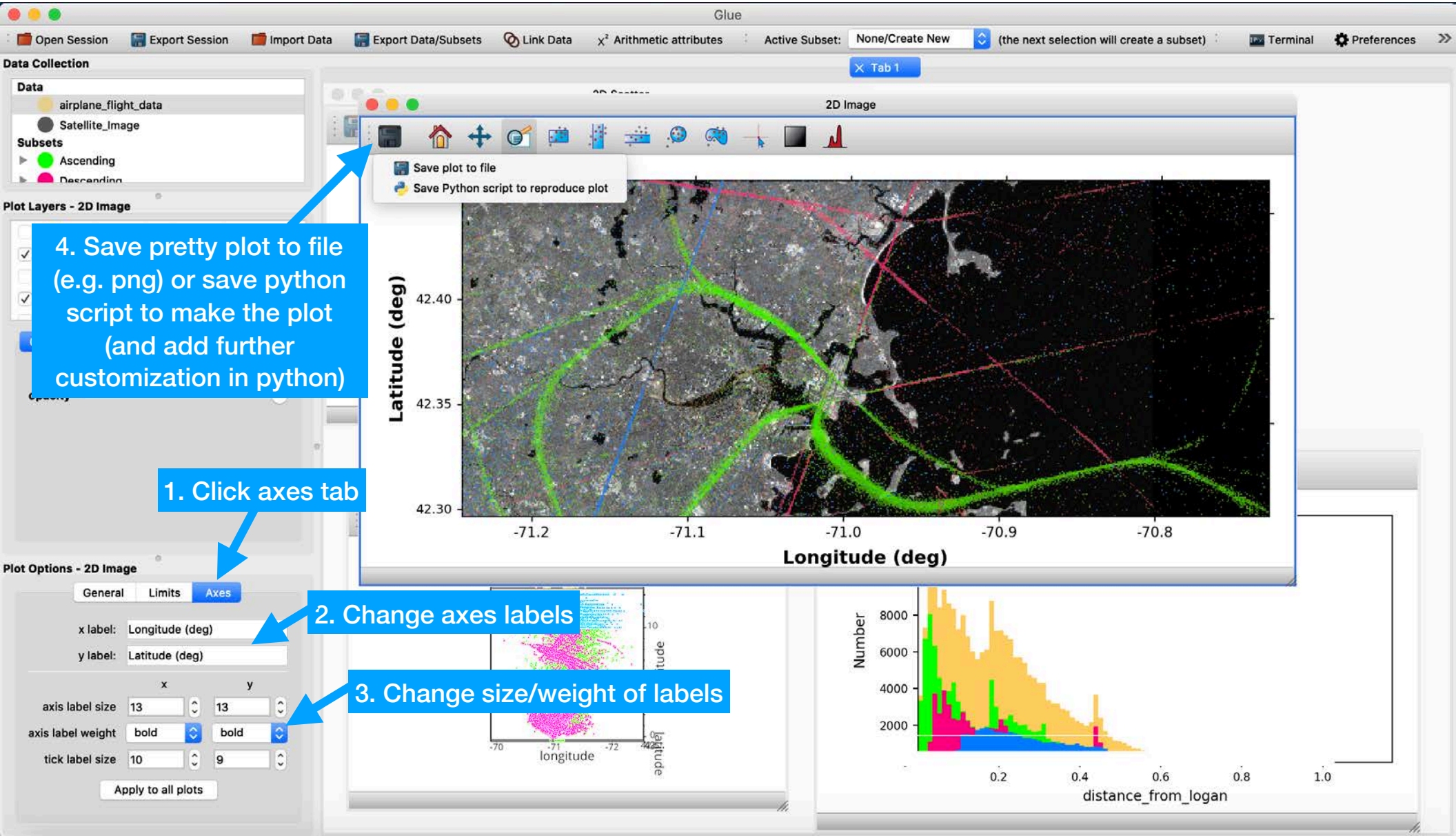
Now visualize your new attribute

We are going to make a histogram of the “distance_from_logan” variable. Planes "Passing over” tend to be a farther distance from Logan, as you would expect!



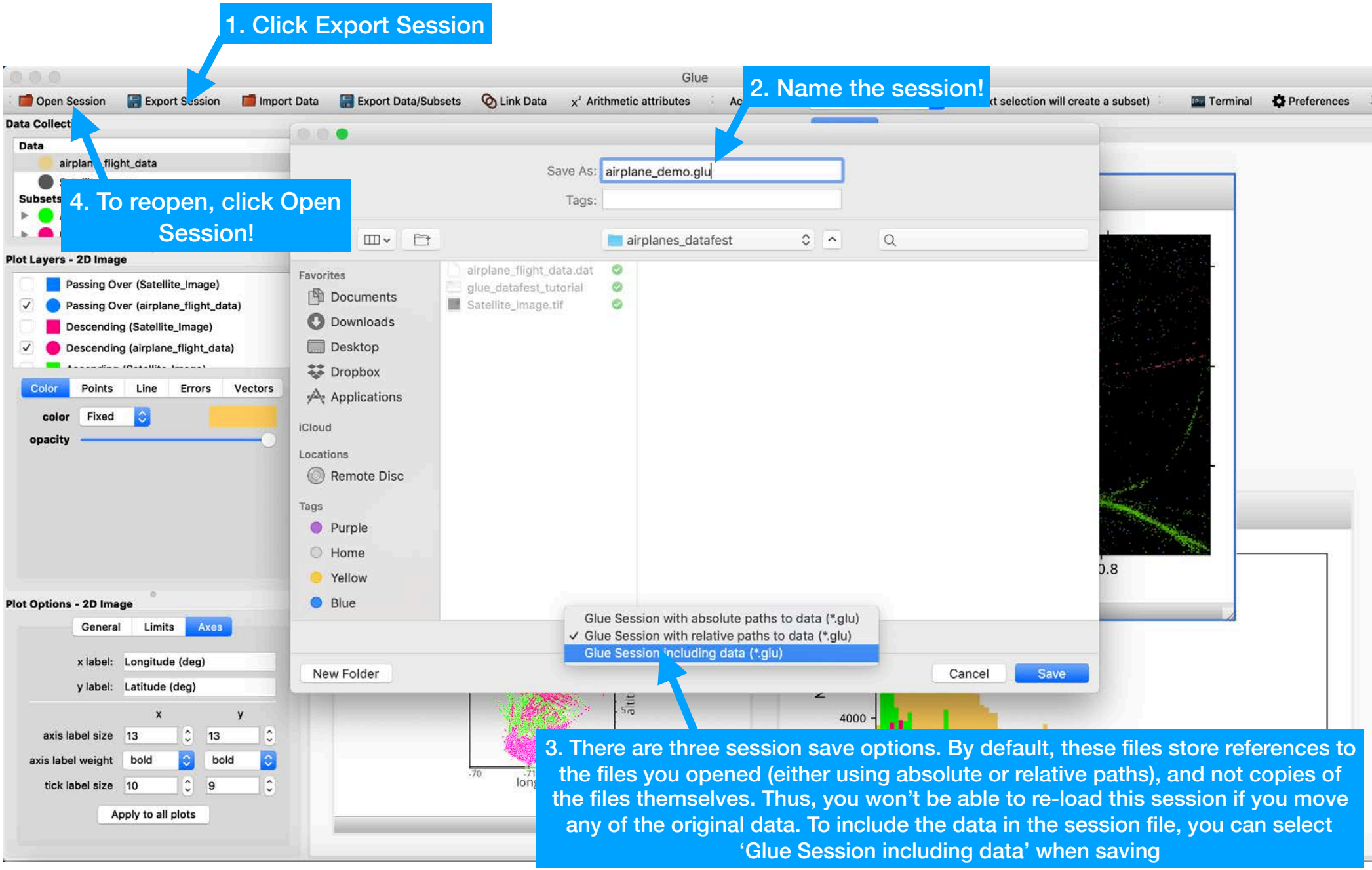
Make publication-quality figures.

glue can make publication-quality figures, and export those figures (and the code to make them) to file! Let's do this with our 2D image viewer, which shows the flight paths (ascending, descending, passing over) on top of the GIS image



Save session

Let's save the current state of our session (including state of data, selection, plots, newly created attributes, etc.)



BONUS: WorldWide Telescope Viewer

glue also has the ability to link TOOLS together. WorldWide Telescope is a "virtual observatory" software package that allows you to view a variety of Earth and Space based data in the context of real images of Earth and our Universe. Let's use WorldWide Telescope to view our airplane flight path data on the globe!