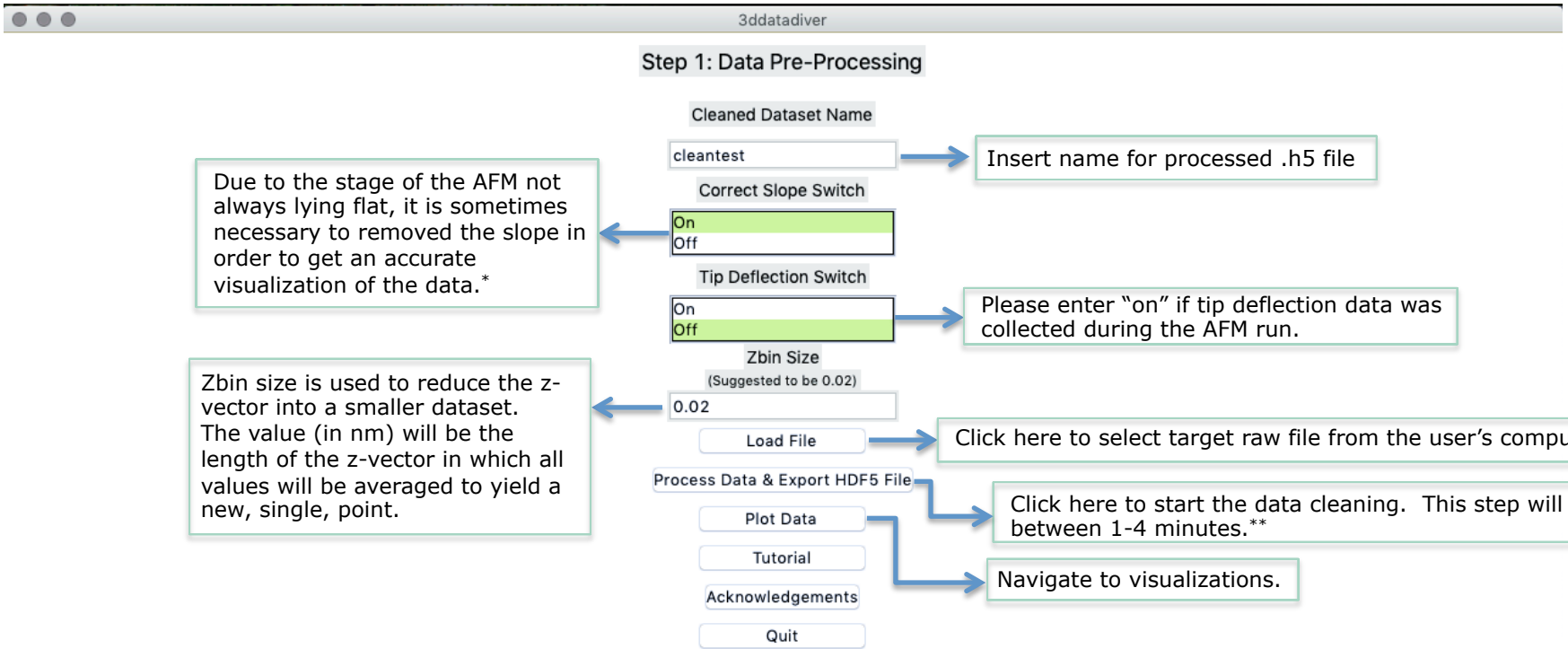
Step 1: Data Pre-Processing

In the first dialogue box, the user can load the raw dataset, determine if they would like the z-plane slope corrected, and the Zbin size (in nm).

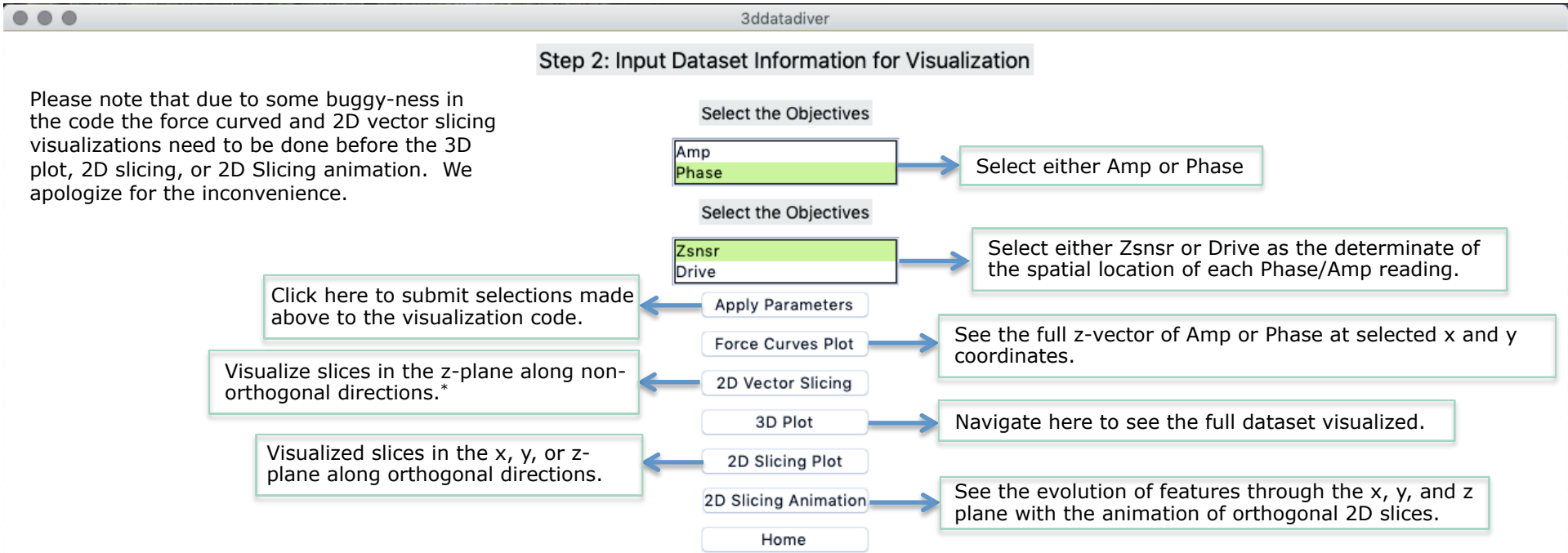


*The correct slope function finds the mean of first layer of values in the Zsnsr/Drive array in each of the x rows and y columns. Next, the function subtracts those values from the entire z-vector at each x and y coordinate.

**Once this step is completed a .h5 file as name in the first box will be generated in the folder the user is currently "in". This .h5 file will have Zsnsr, Drive, Phase, and Amp data processed to the user's specifications.

Step 2: Input Dataset Information for Visualization

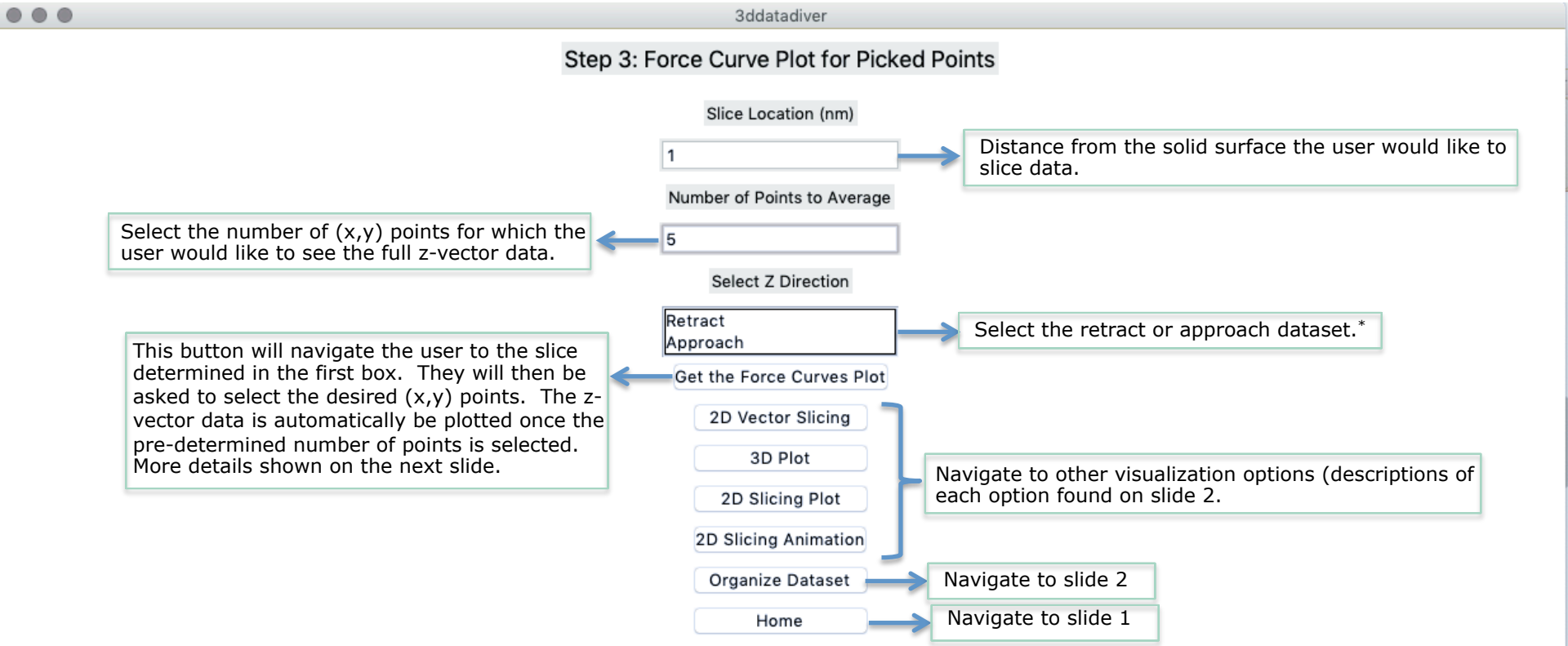
Here the user can select whether they would like to visualize the Amp or Phase data in relation to Zsnsr or Drive. There are a total of 4 combinations available.



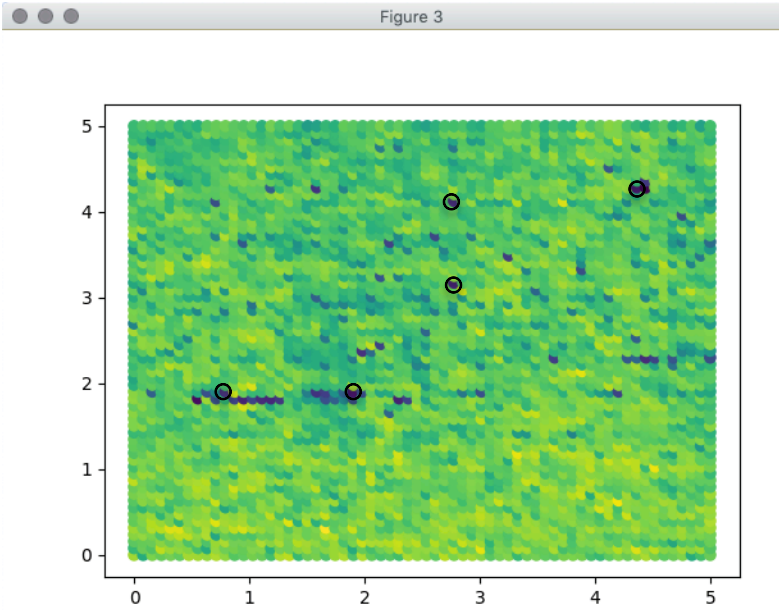
*This feature was added to allow the user to slice along interesting directions depending on unit cell geometry.

Step 3: Force Curve Plot for Picked Points

In this step the user can choose a slice location in the z-plane, input how many points they would like to average, and see the full z-vector Amp/Phase (depending on what was selected in step 2) values plotted concurrently. This feature also includes an average of all the selected curves (shown as a black solid line).

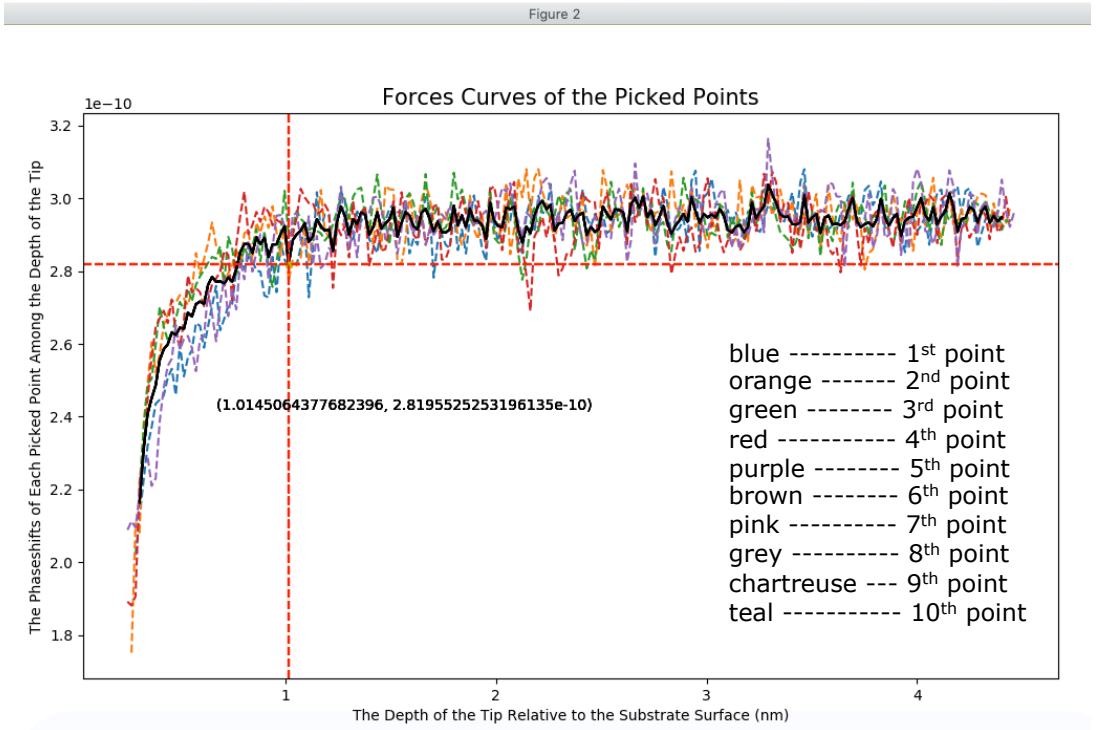


*The full dataset collected Amp/Phase data as the tip approaches the solid surface and as the tip is retracted from the solid surface.



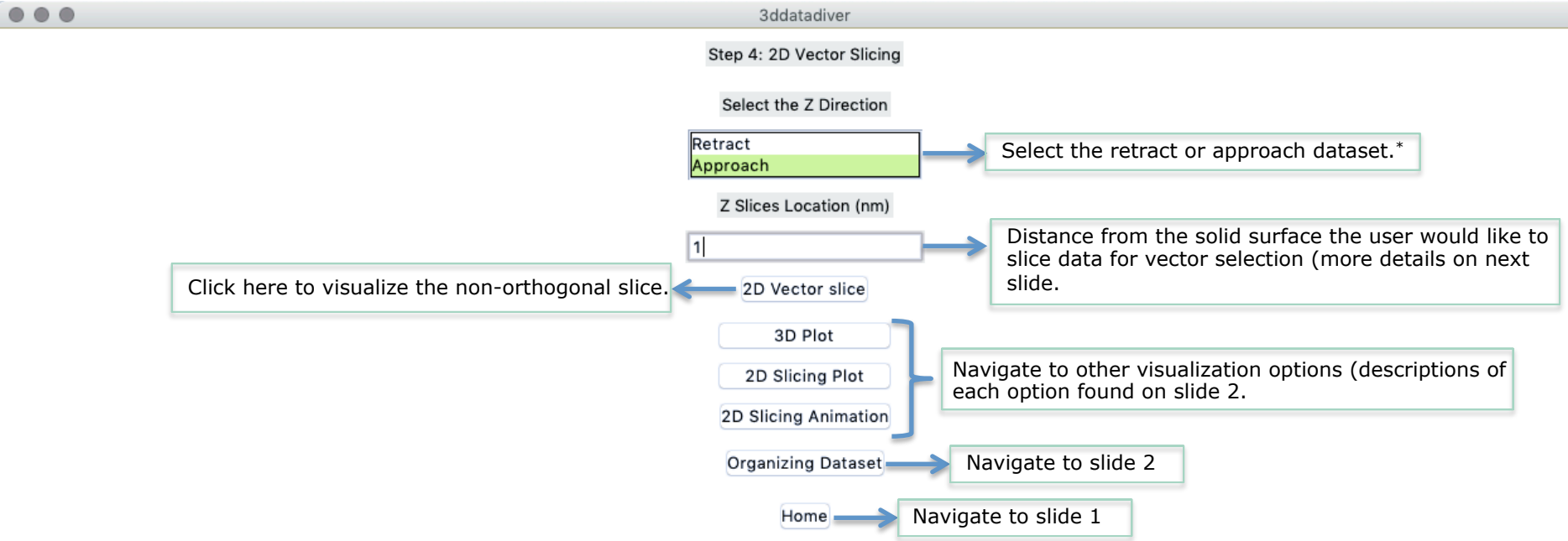
First, the user will be shown the z-plane slice at the location selected. Using their mouse, they can select the number of pre-determined points. After selected all of the points (in this example, 5) the full z-vector data for each point will be visualized in a separate plot.

This is an example of the type of plot the user will see once all the points are selected. A few things to note. The surface is at the origin, the black line is the average of all the points, and the crosshairs mark where the z-plane slice was taken from on the average curve. Please take a moment to look at the legend as the (x, y) point z-vector data is color coded depending on the order in which the point was picked.

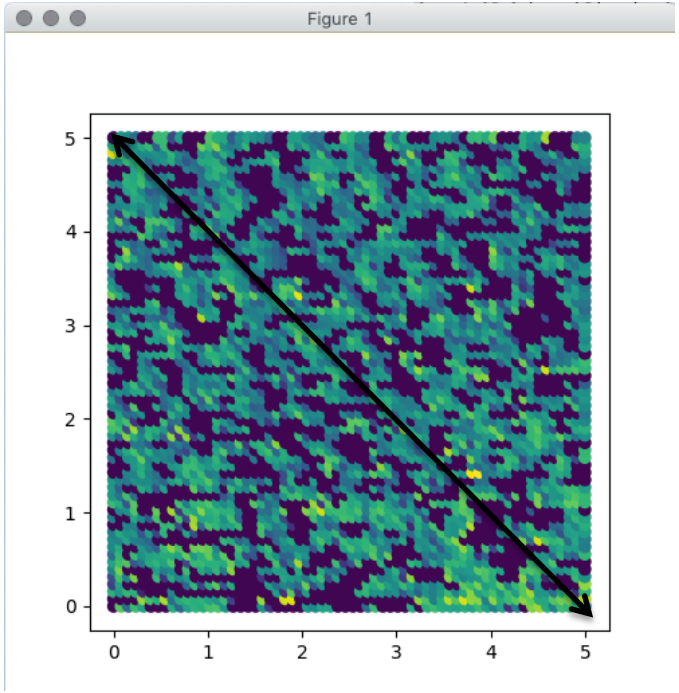


Step 4: 2D Vector Slicing

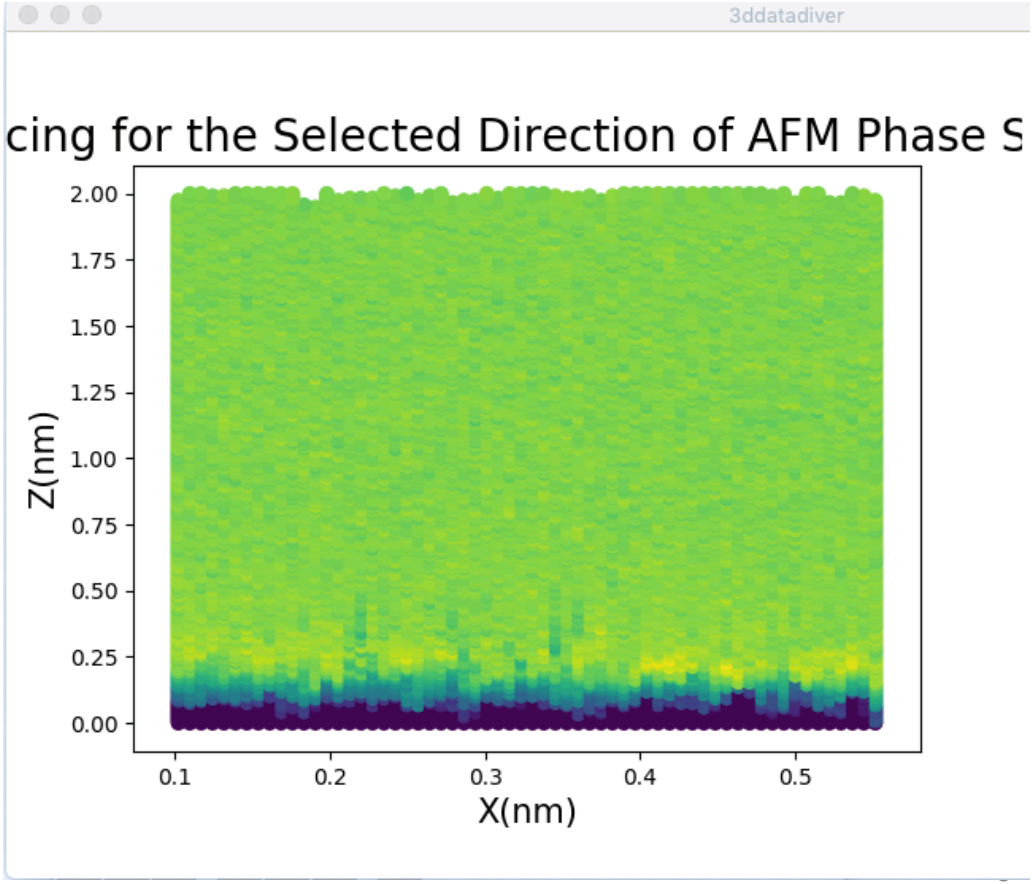
Here the user can choose a non-orthogonal slicing direction and visualize the data in the x/y plane.



*The full dataset collected Amp/Phase data as the tip approaches the solid surface and as the tip is retracted from the solid surface.

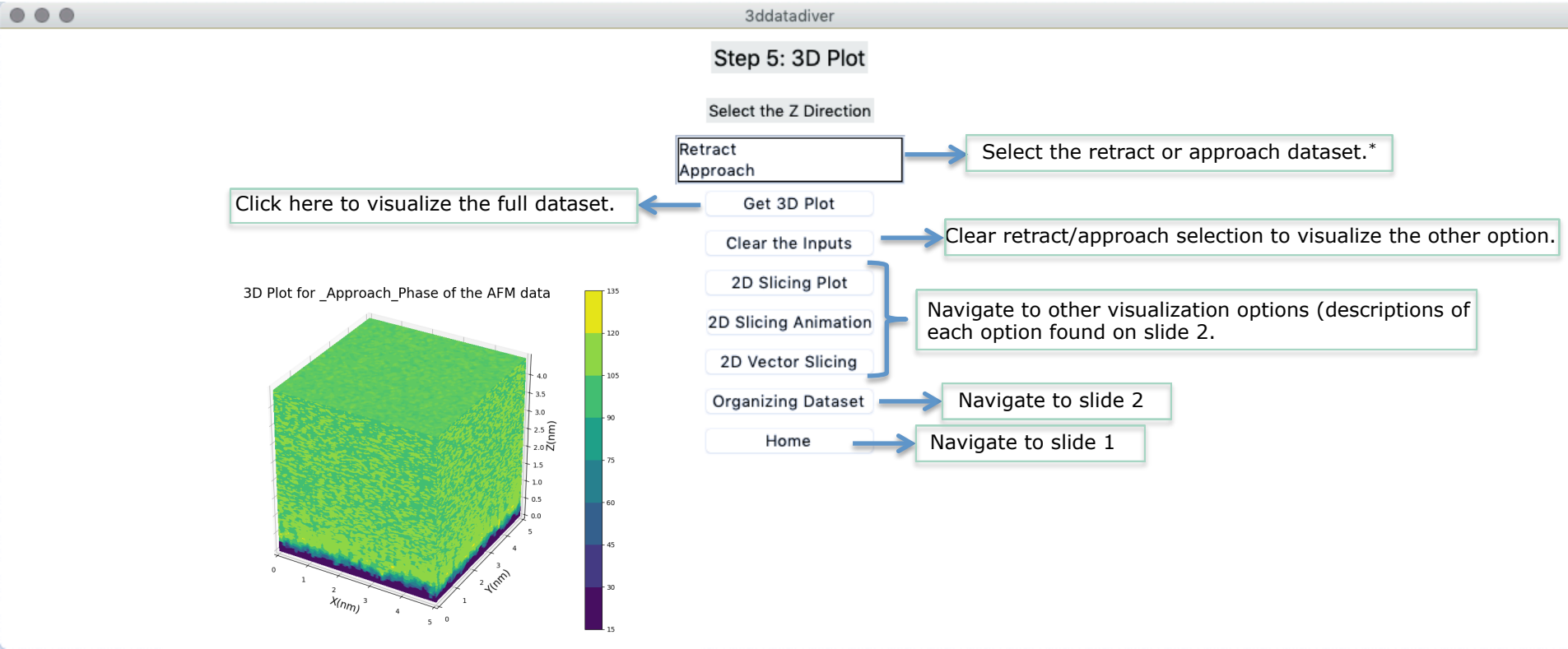


First, the user will be shown the z-plane slice at the location selected. Using their mouse, they can select two points through which a slice in the x/y plane with be pulled. The visualization to the right is automatically generated after the second click.



Step 5: 3D Plot

Plot the full dataset.

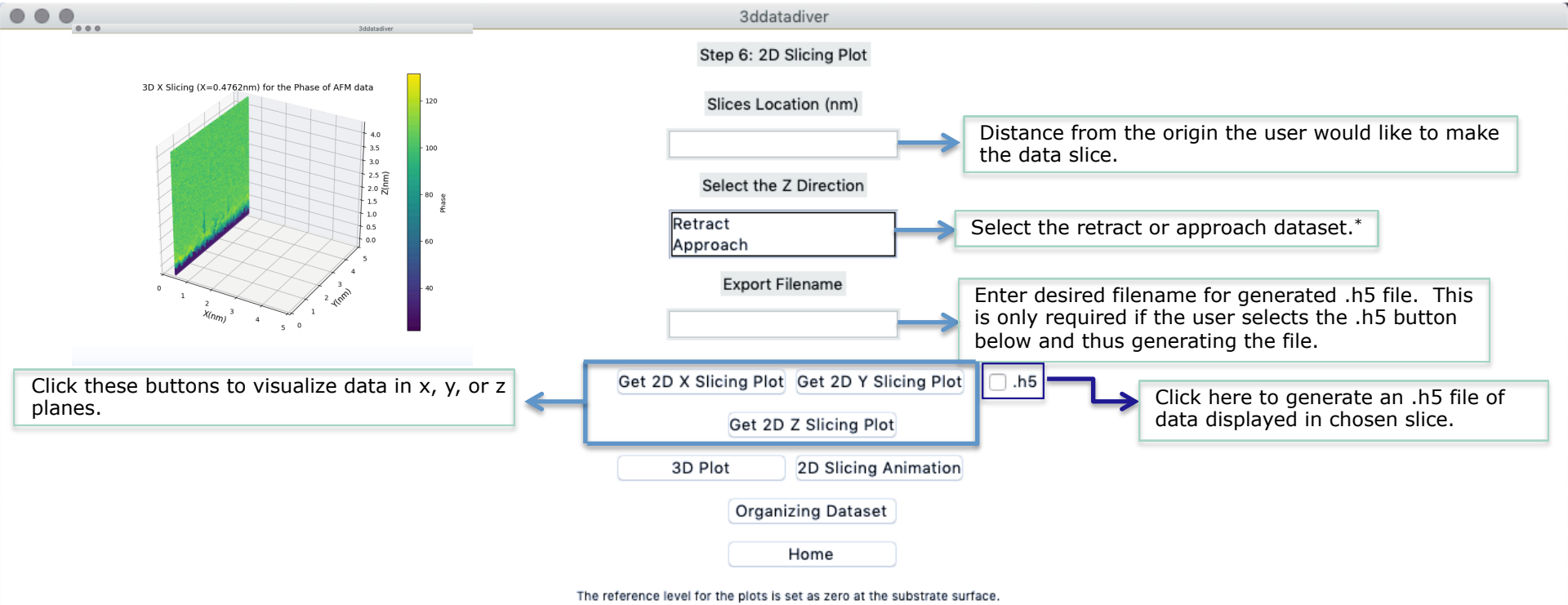


Sample of full data visualization.

*The full dataset collected Amp/Phase data as the tip approaches the solid surface and as the tip is retracted from the solid surface.

Step 6: 2D Orthogonal Slicing

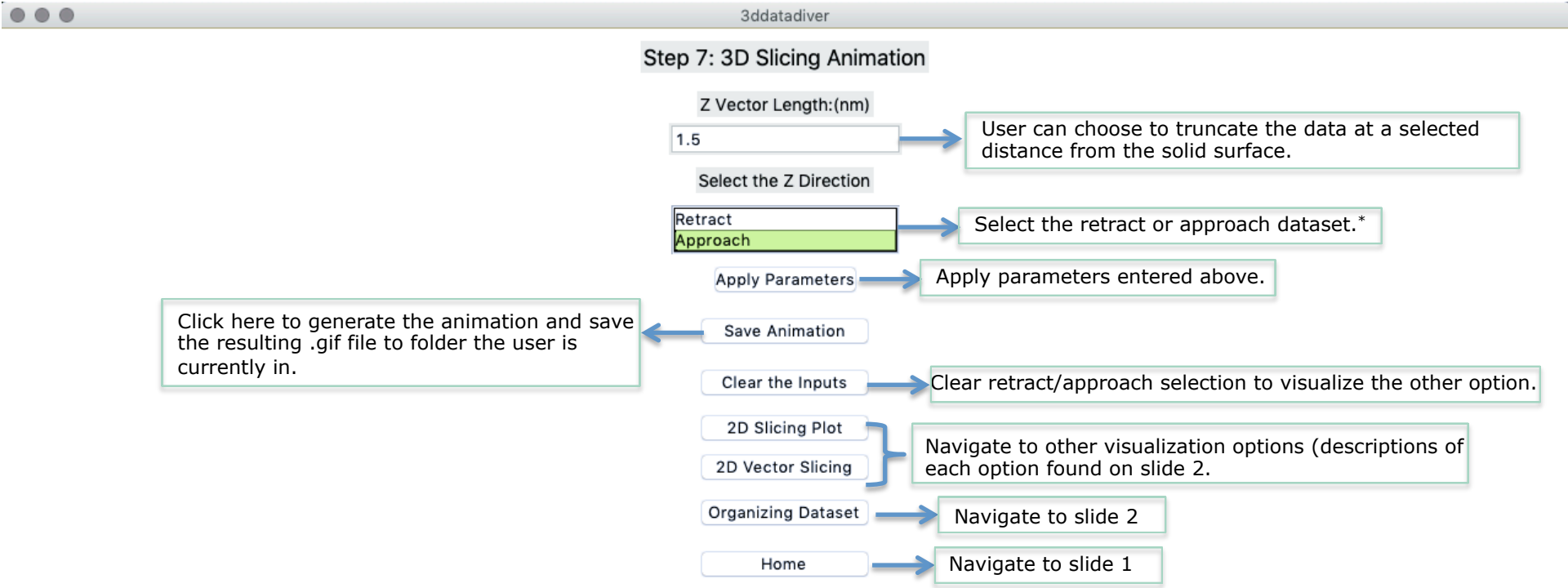
In this window the user can pull slices at different locations from the x, y, or z plane. There is also an option here to generate .h5 files containing just the data visualized in the slice.



*The full dataset collected Amp/Phase data as the tip approaches the solid surface and as the tip is retracted from the solid surface.

Step 7: Slicing Animation

For the final function available in 3dDataDiver, the user can see the evolution of features through the animation of 2D orthogonal slices through the x, y, and lastly, z-plane.



*The full dataset collected Amp/Phase data as the tip approaches the solid surface and as the tip is retracted from the solid surface.

This concludes the manual, please enjoy using 3dDataDiver!