# Sarproz Release 2017.5

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October 19, 2017 at 7:45 pm EDIT | CLOSE | STICK | MERGE | TRASH | SPAM | REPLY | QUOTE #2534

periz

The new release presents a new *optional* module, in between the APS processing module and the MISP one.
The new module is called “Graph Analysis and Refinement” and it can be used for two main tasks.

* The first task is the analysis of the (previously processed) APS graph. By applying a threshold on the connections coherence, one can analyze the connectivity of the APS graph, and decide whether to try to connect separated clusters with local reference points (properly chosen based on the estimated coherence and parameters) or to split the graph into single/multiple clusters.

* the second task (optional and independent from the first) is the spatial increase of points. Up to this moment this task was performed via the MISP module. However, the MISP module connects all analyzed points to a single reference. In some cases this is not optimal. For instance, in case of very strong movement (exceeding the unwrapping limit), the MISP analysis may fail. This can also be the case of infrastructures as building or bridges with strong local movements. This module allows adding more points to the APS analysis, connecting them to local references.

More infos can be found here http://sarproz.com/manual/graph_refinement.html

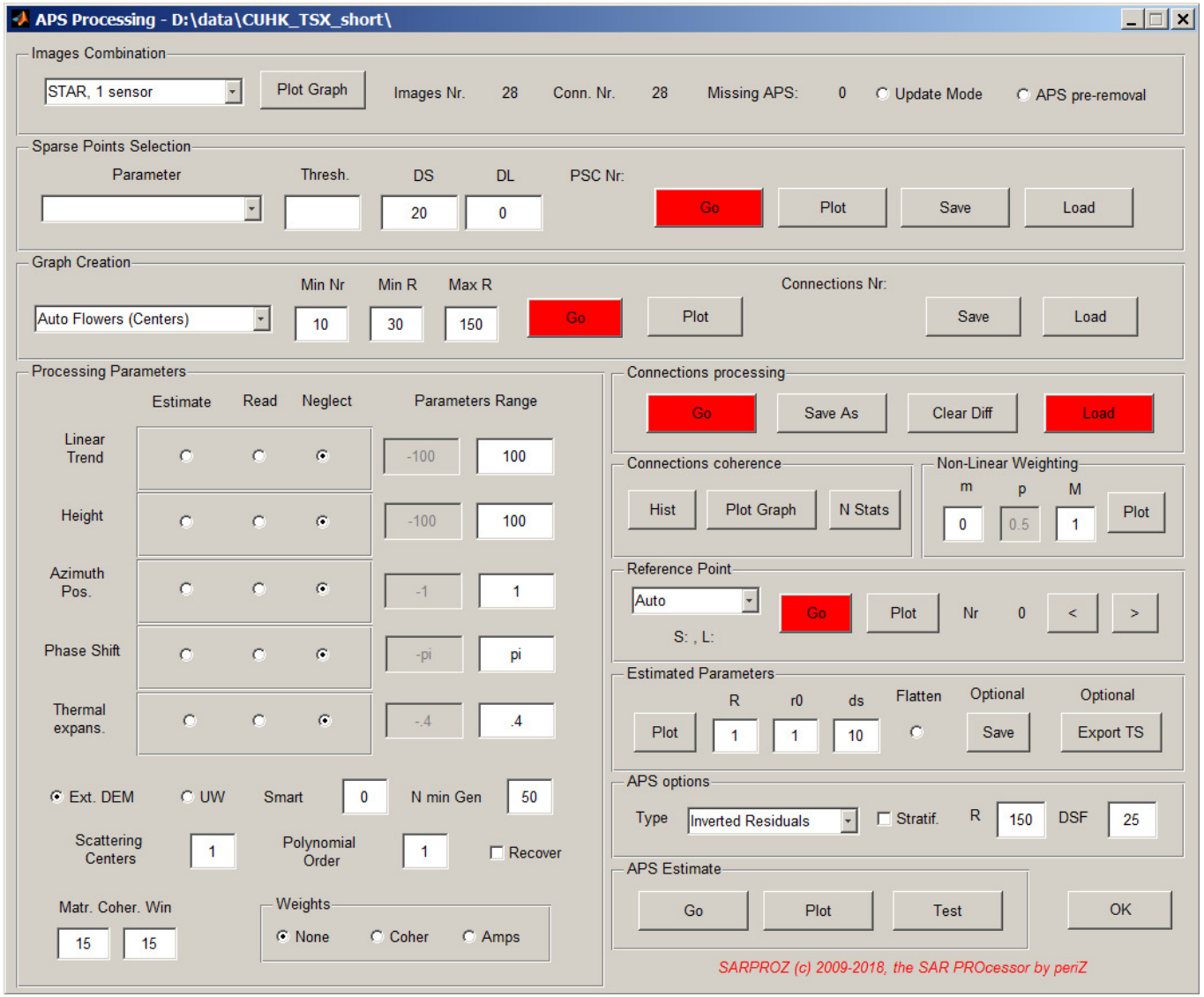
Graph Analysis and Refinement:

This is an optional module that can be used to better analyse and improve the results of the APS module.
Three main tasks can be performed through this module:
1. analysis of the connectivity of the PSC graph (spatial graph among points). The software will split the graph into clusters based on a coherence threshold
2. based on the analysis, the user has 3 options: a. trying to connect clusters in a different way; b. processing only the main cluster; c. processing all clusters separately
3. adding points to the spatial graph by connecting them to local references (this is an alternative way to the MISP module for densifying the set of analyzed points)

How to use it:
0. use the APS module to process connections and to generate an AutoConnex.mat file or equivalent.
1. load the Autoconnex.mat file (or equivalent) using the button "load" in the "initial graph" frame.
2. based on the coherence histogram (you can view it clicking on "Hist" in the "initial graph" frame) choose a threshold for selecting connections.
3. press the button "go" in the "clusters processing" frame to apply the chosen threshold. The software will tell you how many clusters are generated
4. plot the clusters with the "plot" button
5. choose a radius to select local references within clusters and press the "go" button next to it
6. view local references with the "plot" button next to the radius.
7. choose the method to adopt (a. connecting clusters via the local references, b. processing only the main cluster, c. processing clusters separately)
8. you can optionally add more points to the graph using the "points densification" frame: choose a parameter, add a threshold, choose a maximum distance (w.r.t. the existing points), choose whether to use or skip the initial mask, press the button "go"
9. you can optionally display the new points and the new graph with the corresponding buttons
10. choose the connections processing method with the usual options
11. run the processing with button "go" in "connections processing"
12. proceed with results saving/visualization as in the APS processing

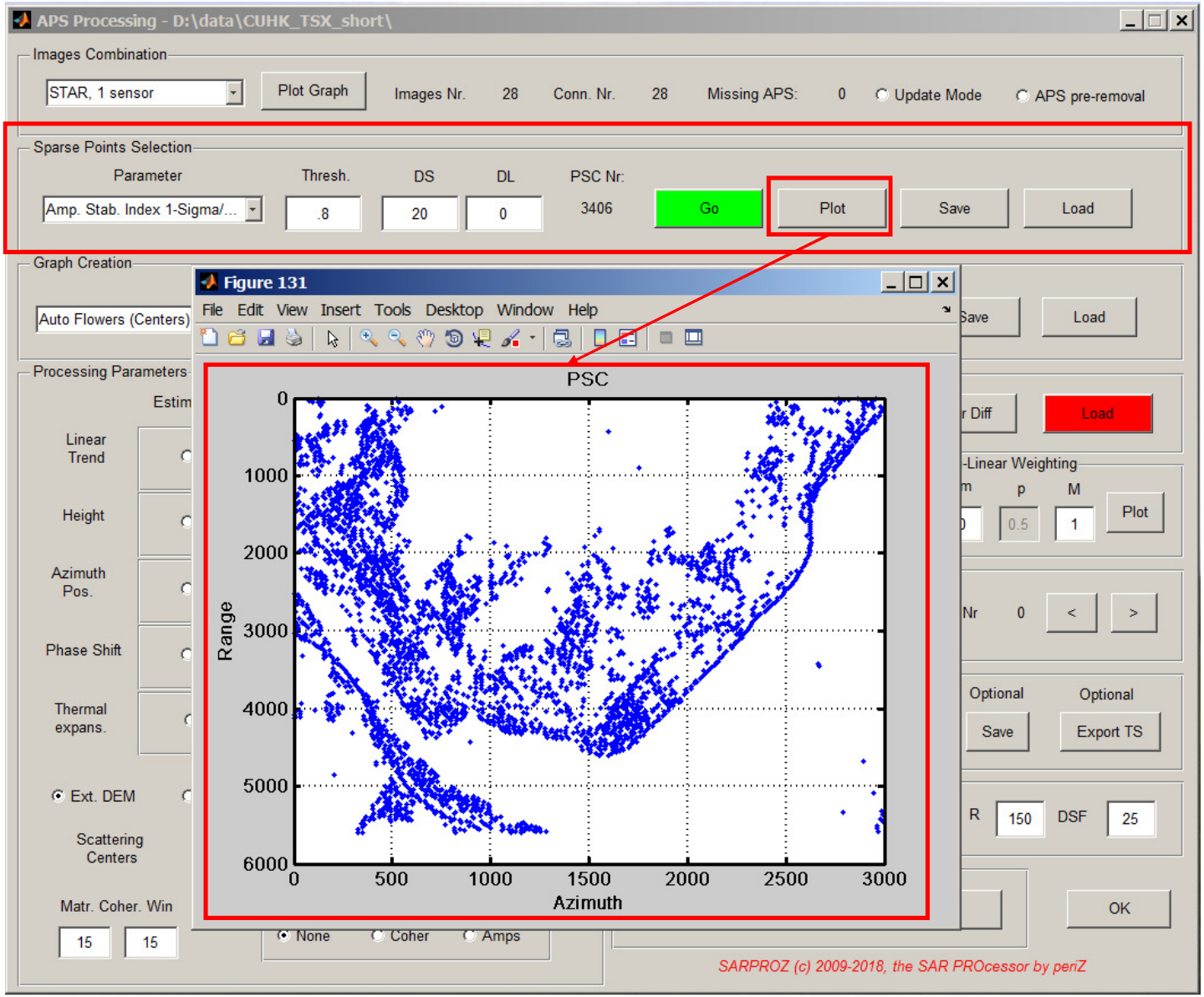
NOTE 1. in this module you cannot process the APS. If you want to refine the APS based on this new analysis, you can load the new connections in the APS module
NOTE 2. this module is automatically saving the results of the connection processing with the name SPMRAutoSave.mat
NOTE 3. you cannot manually select a reference point through this module. The software tries to load an existing reference point. If not found, it is taking automatically a reference point from within the main cluster.
NOTE 4. in this module you can optionally save a time series object. However, for this purpose the atmosphere should have already been estimated in the APS module
NOTE 5. the densification of points is optional, not necessary

We start an APS analysis

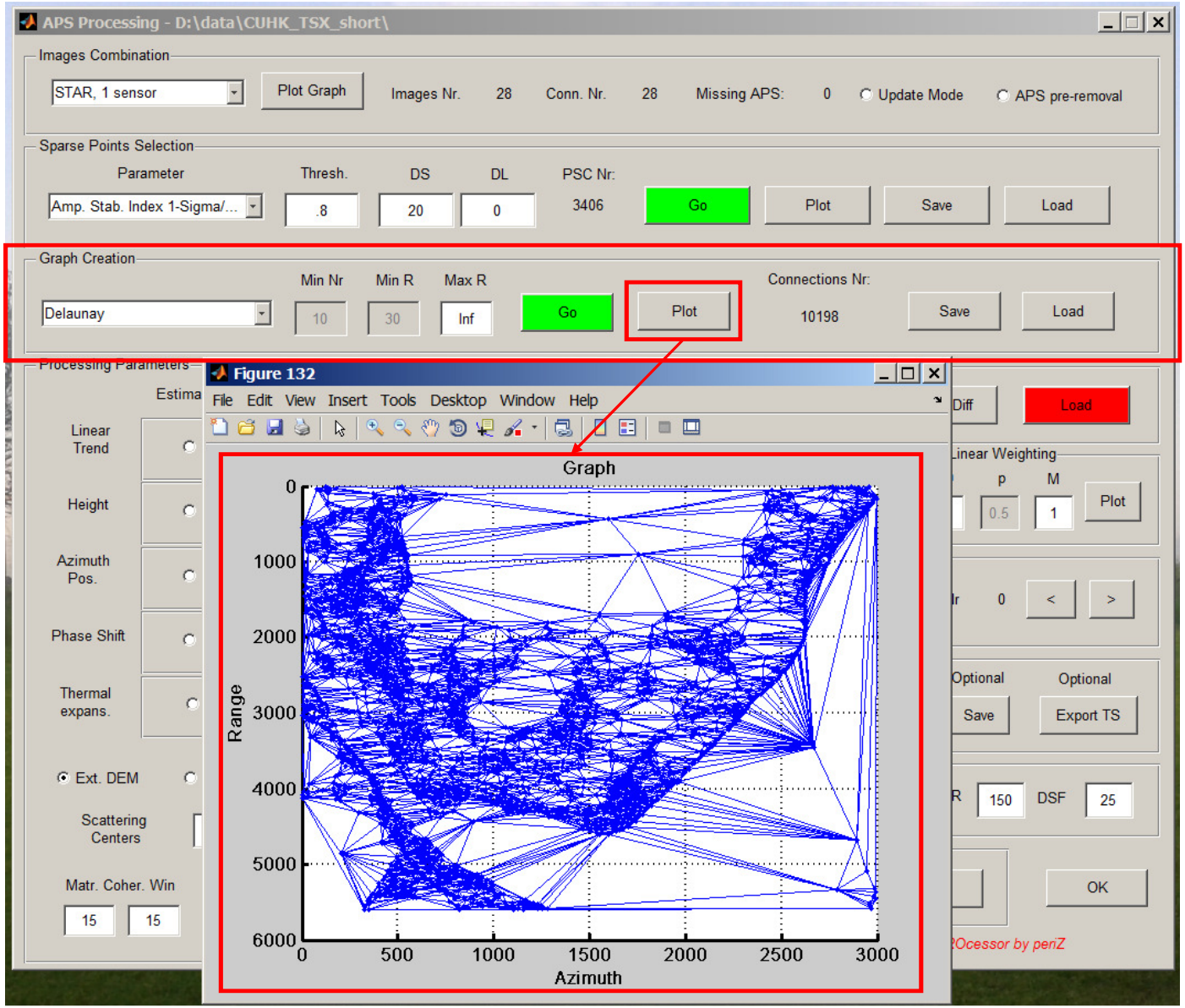


We select PSC based on Amplitude Stability Index >0.8, DS=20

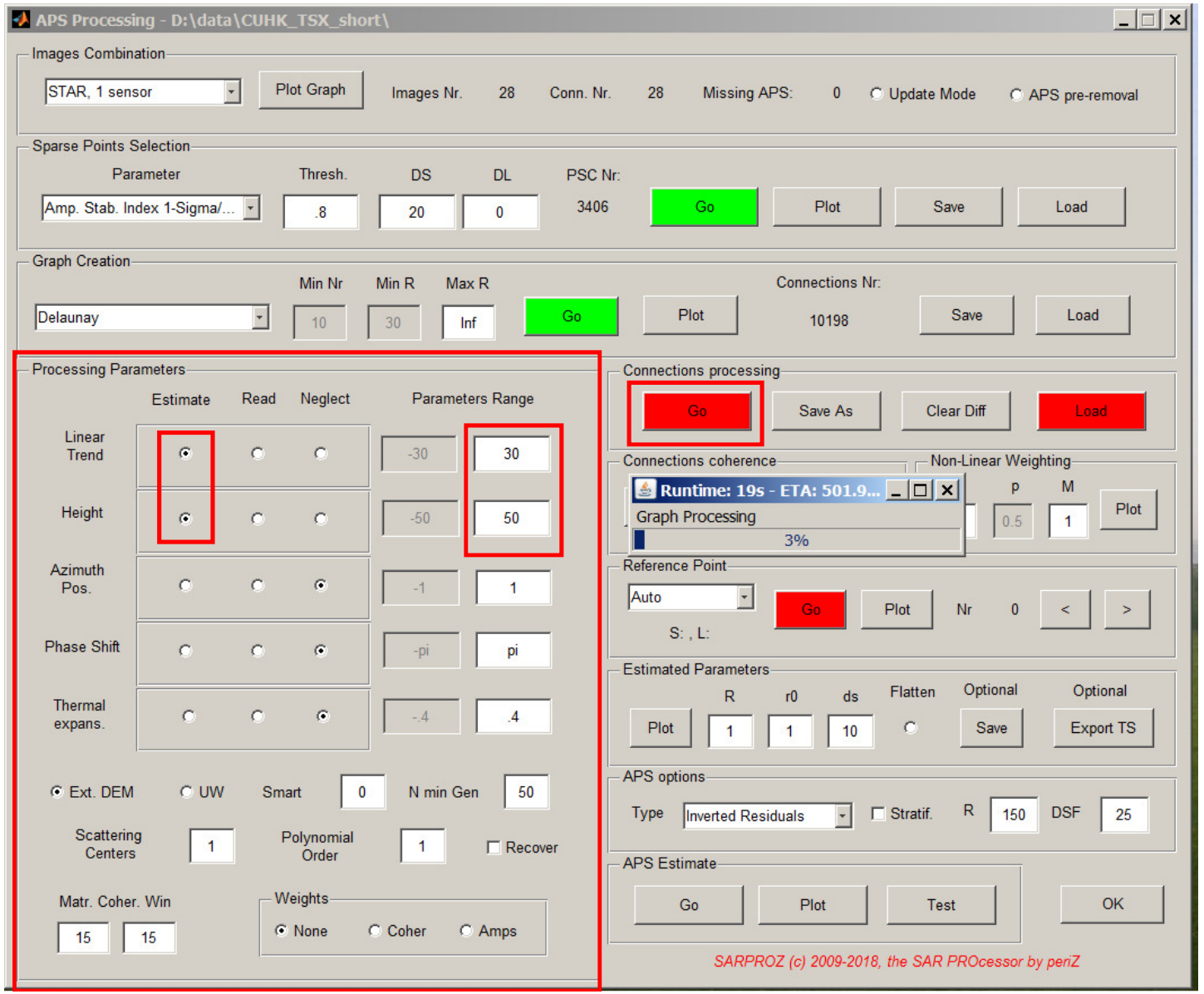
Note: how to select PSC is dependent on number of images and analyzed area



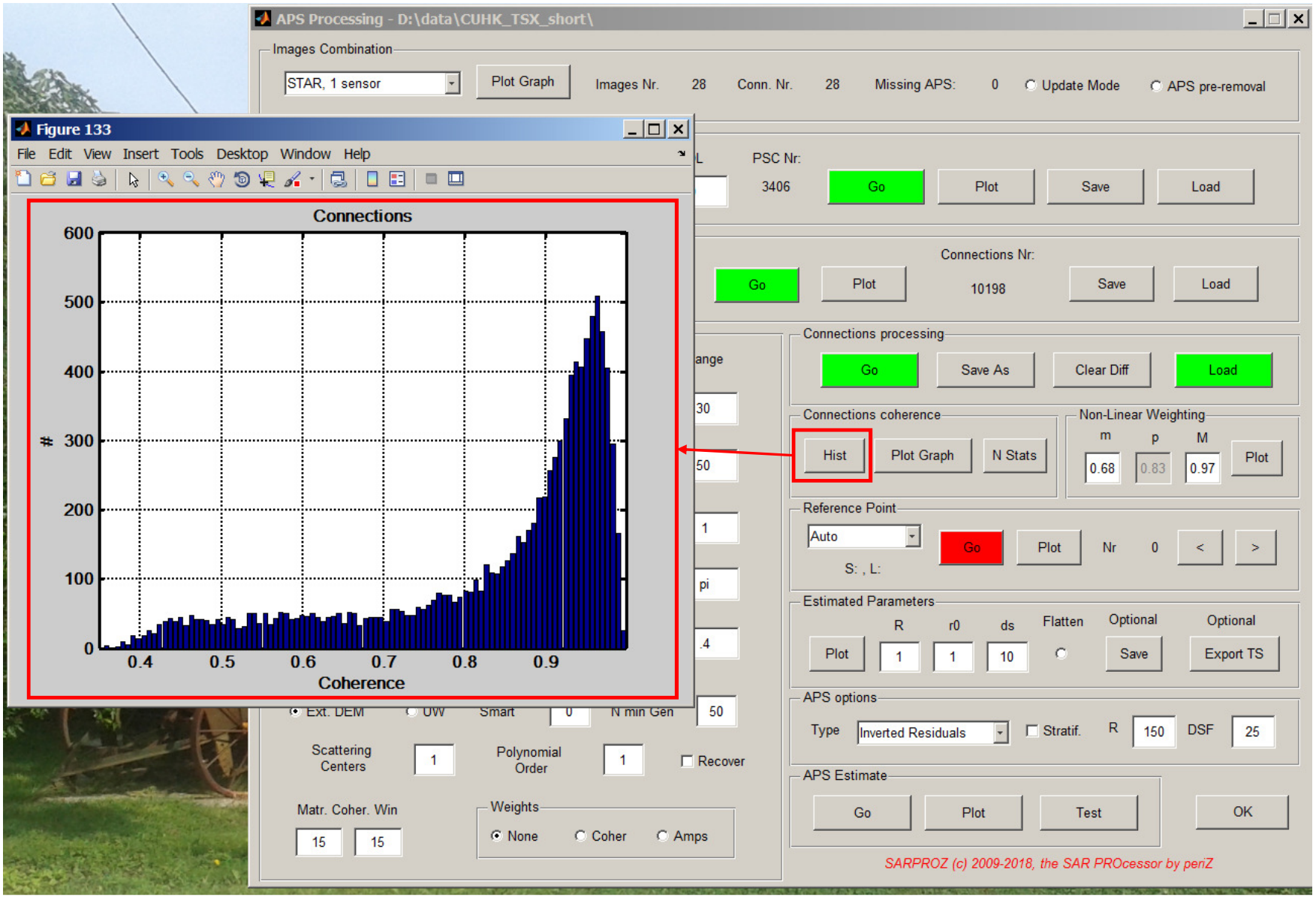
We generate a Delaunay graph connecting the PSC



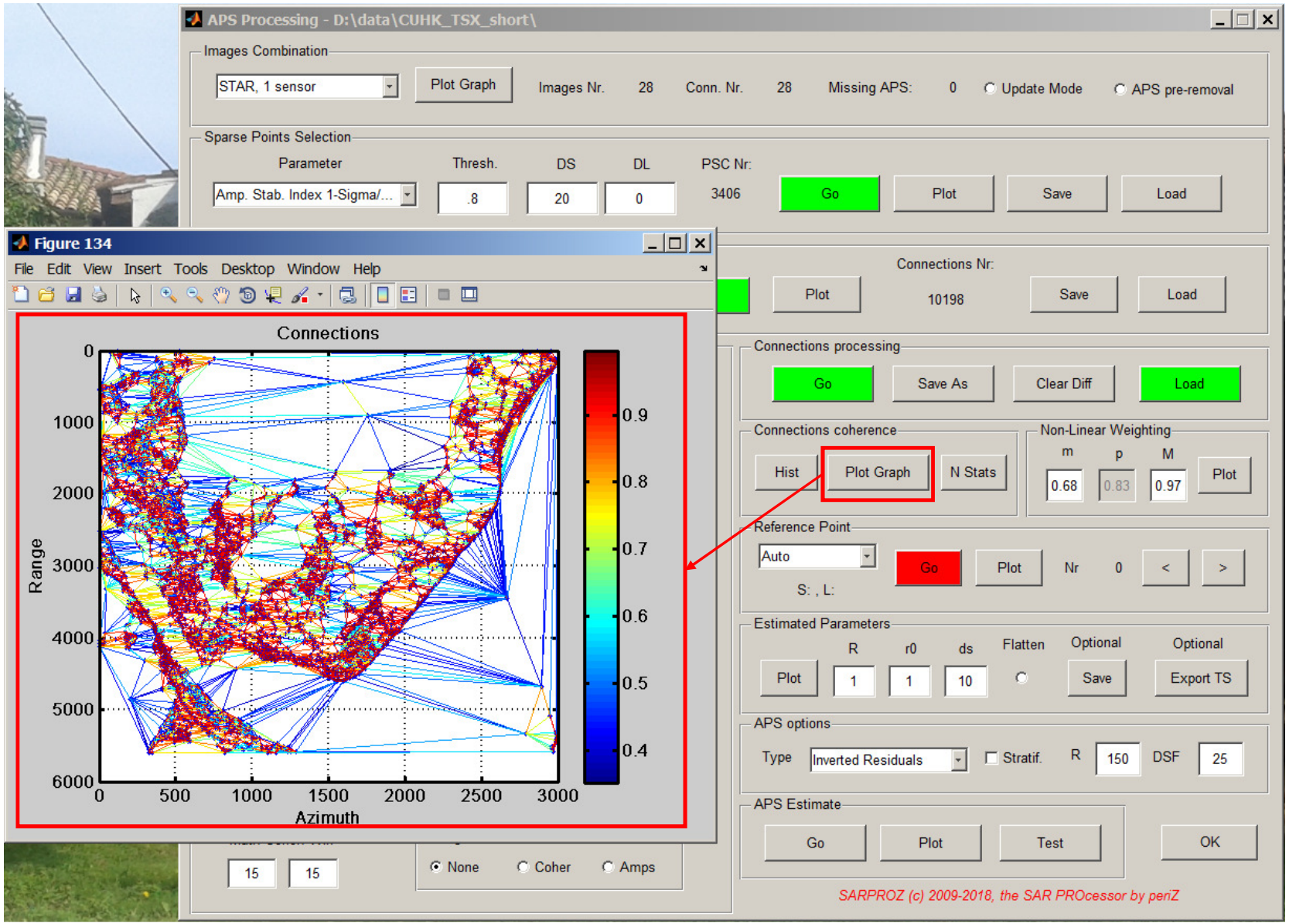
We choose to process residual height and linear velocity and we define the limits.
Then we launch the processing



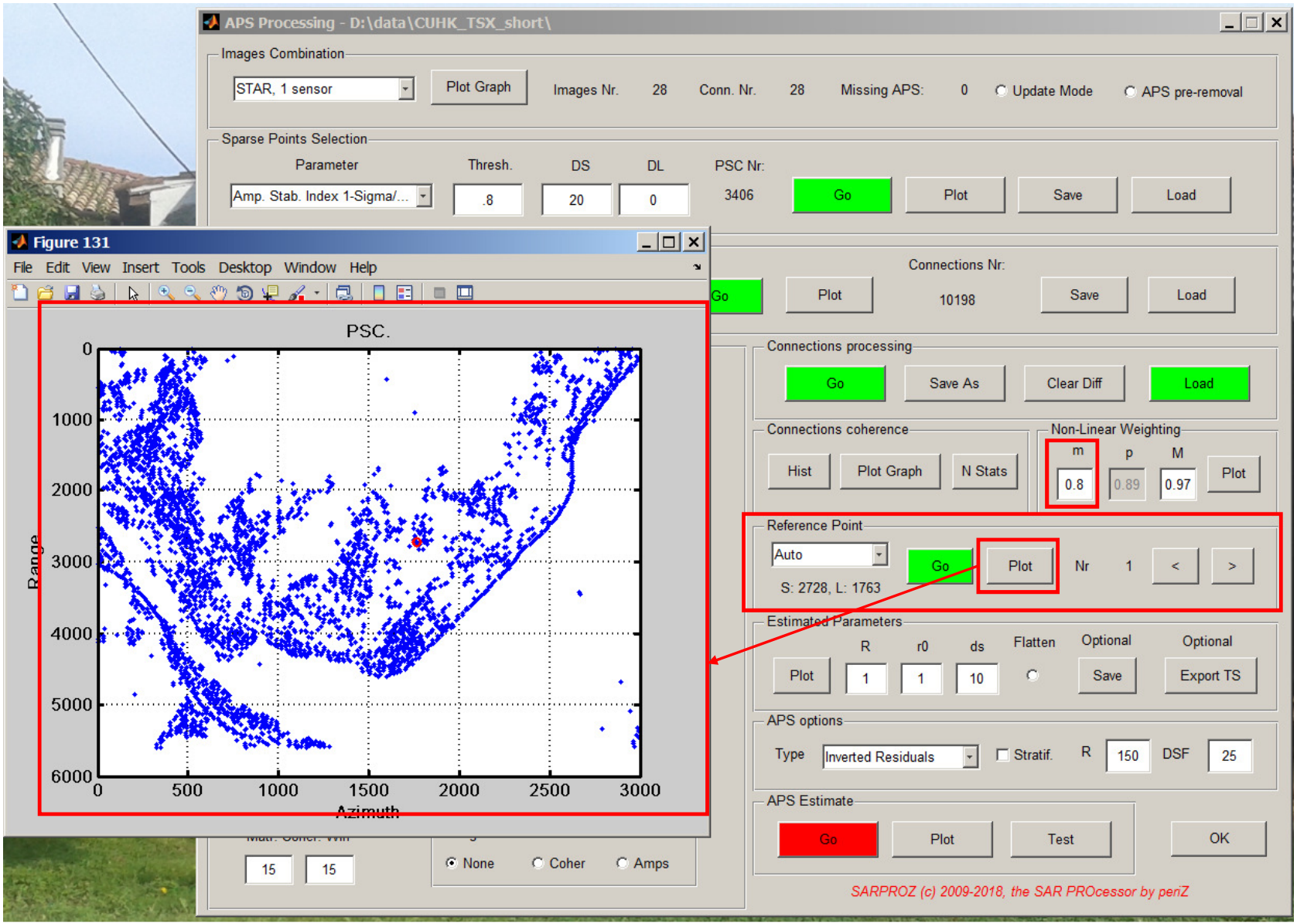
We look at the histogram of the estimated temporal coherence

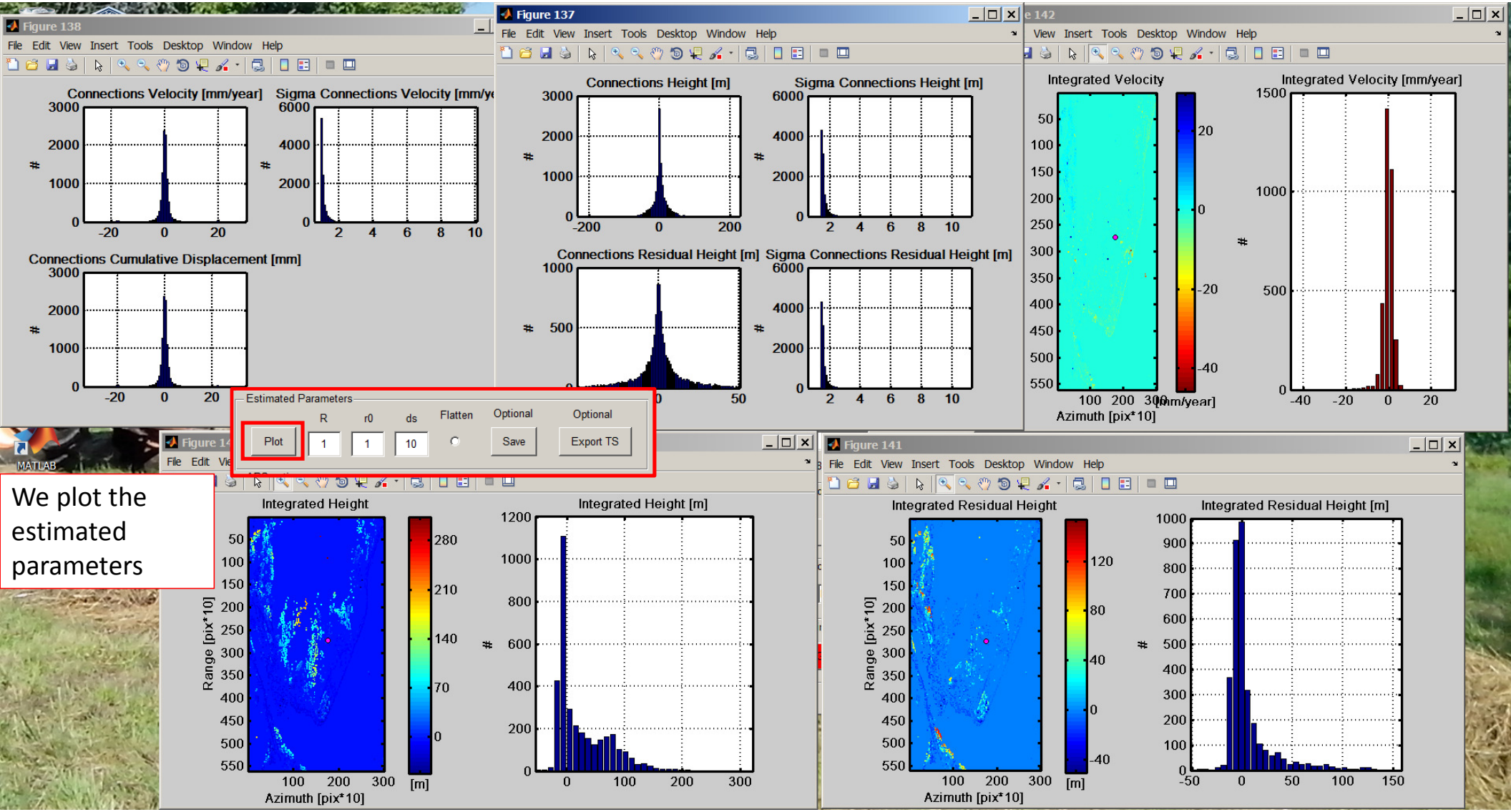


We look at coherence of the graph connections



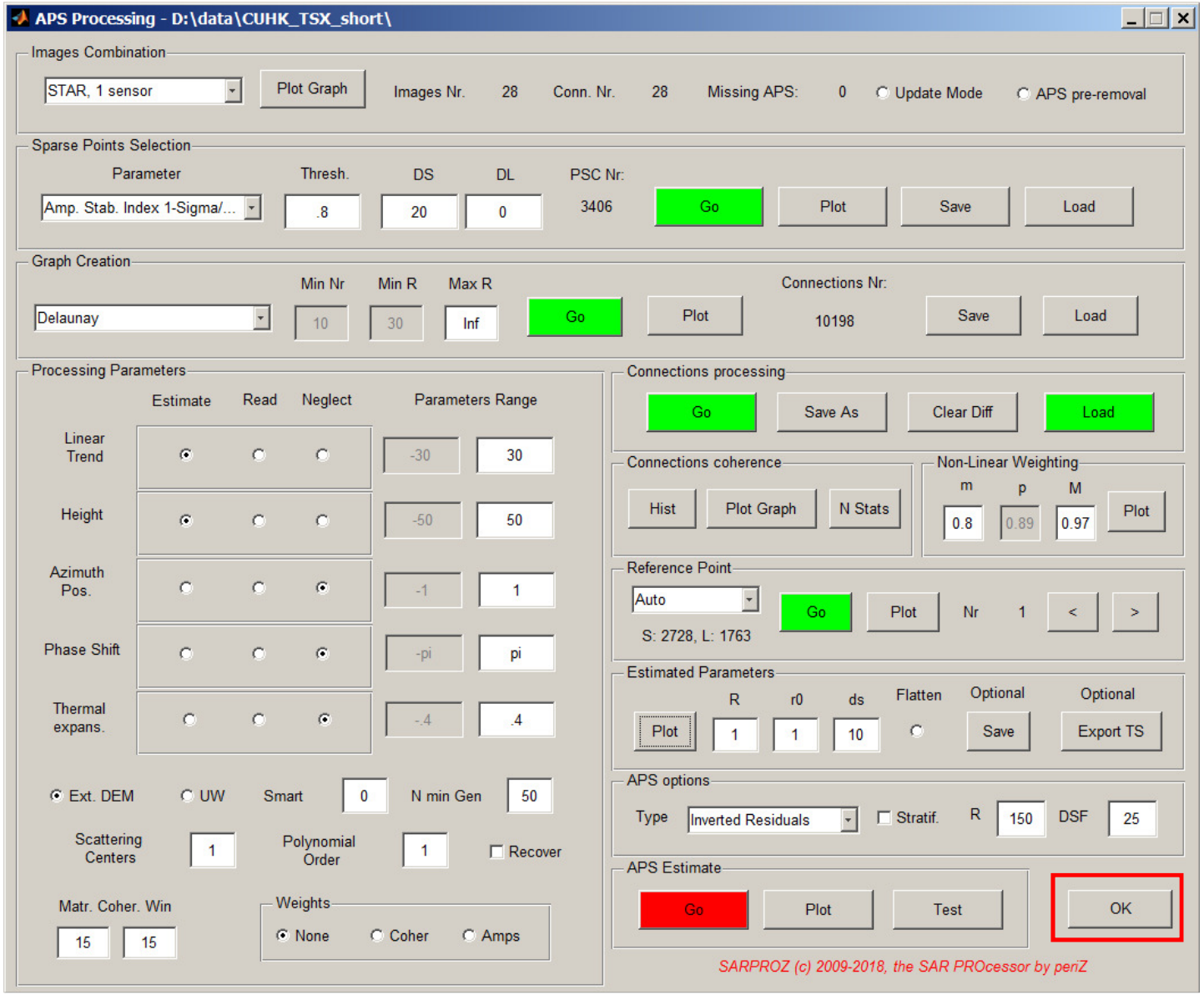
If needed, we adjust the minimum of the NL weights, then we launch the automatic selection of the reference point and we plot it



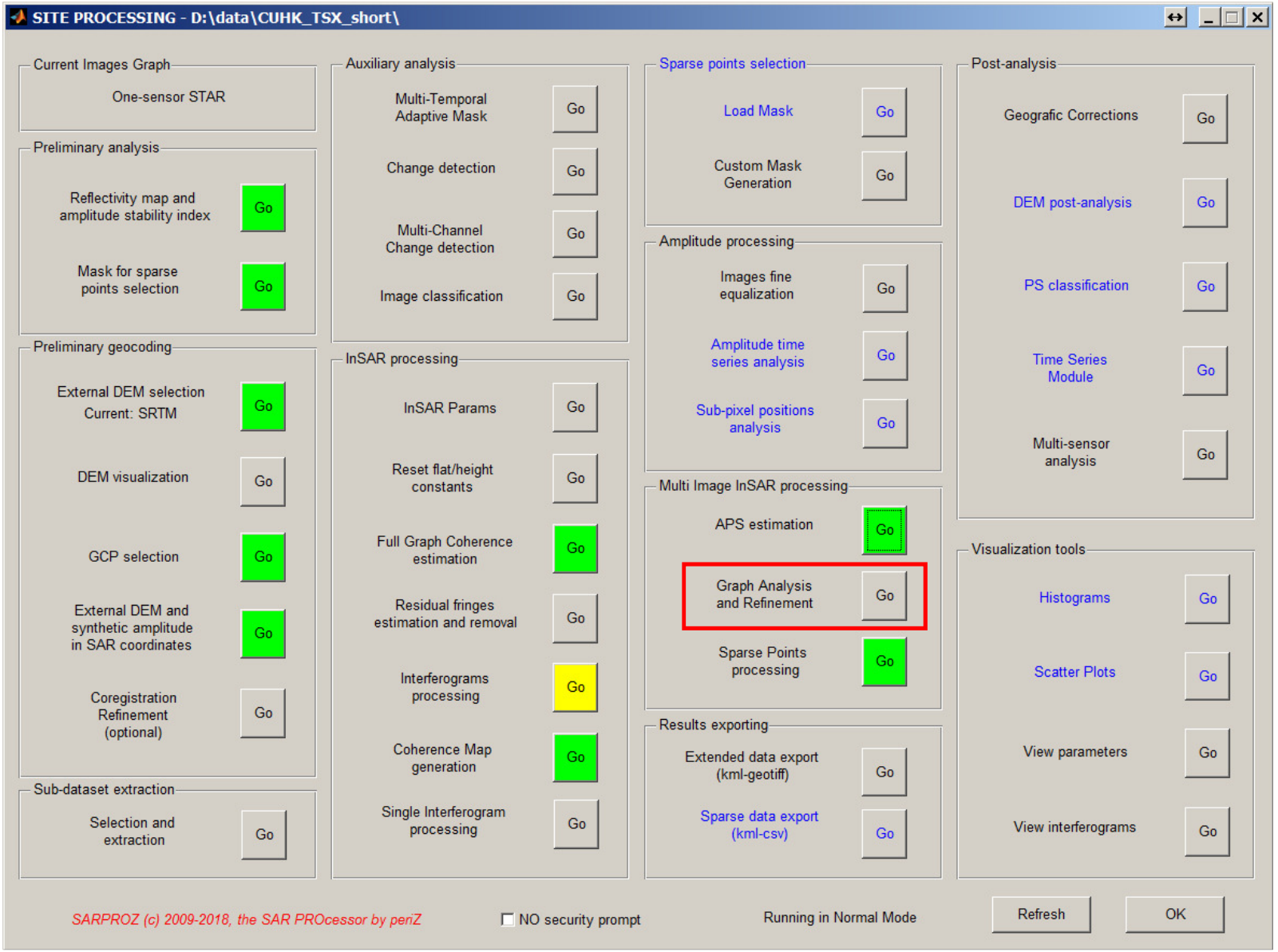


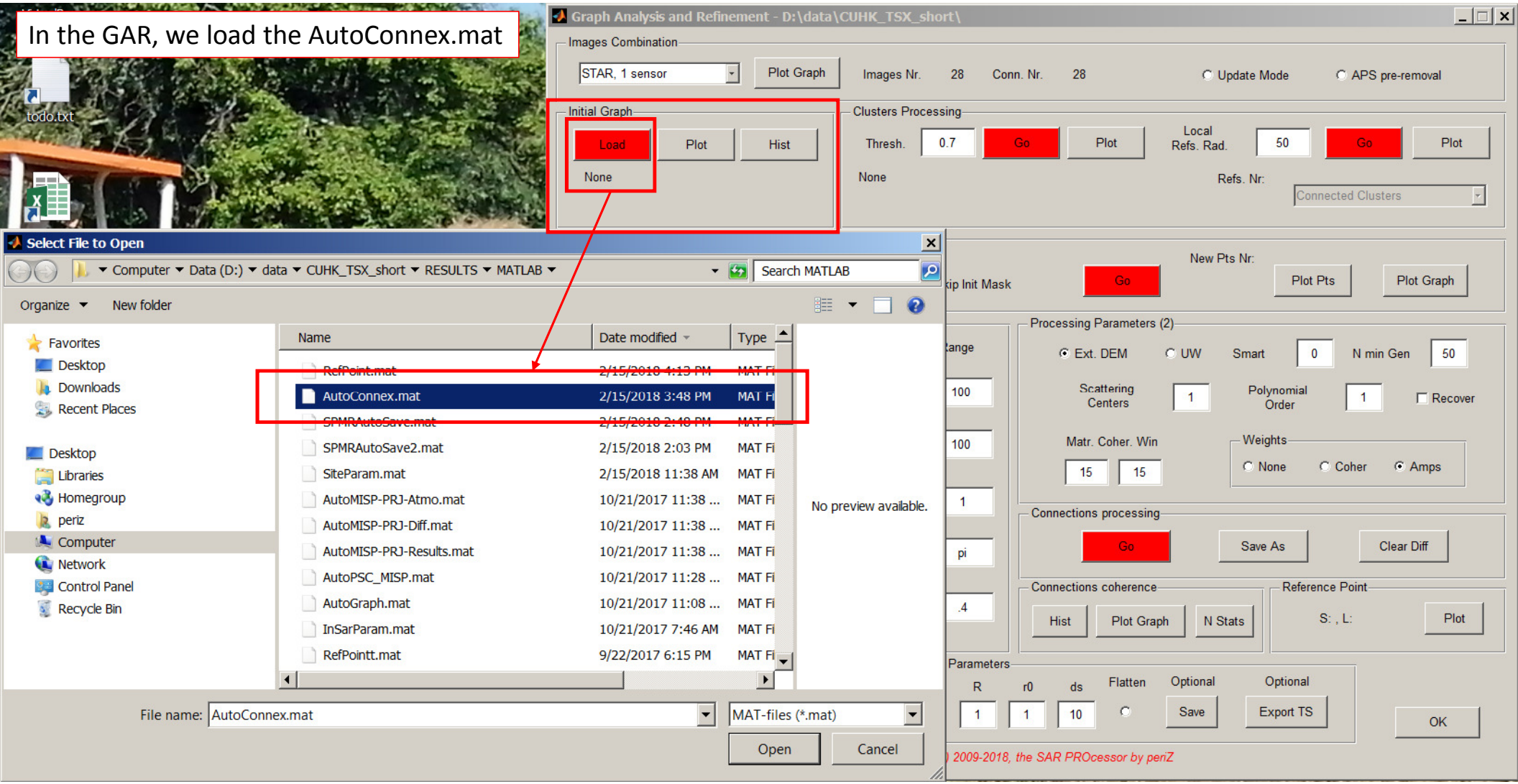

We plot the estimated parameters

Then, if we want to proceed to the graph analysis and refinement, we can close the APS module (the sw automatically saved the AutoConnex.mat file, that contains all outputs and settings of the analysis)



We switch then to the Graph Analysis and Refinement (GAR).




In the GAR, we load the AutoConnex.mat
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AutoGraph.mat 10/21/2017 11:08 ... MAT Fi
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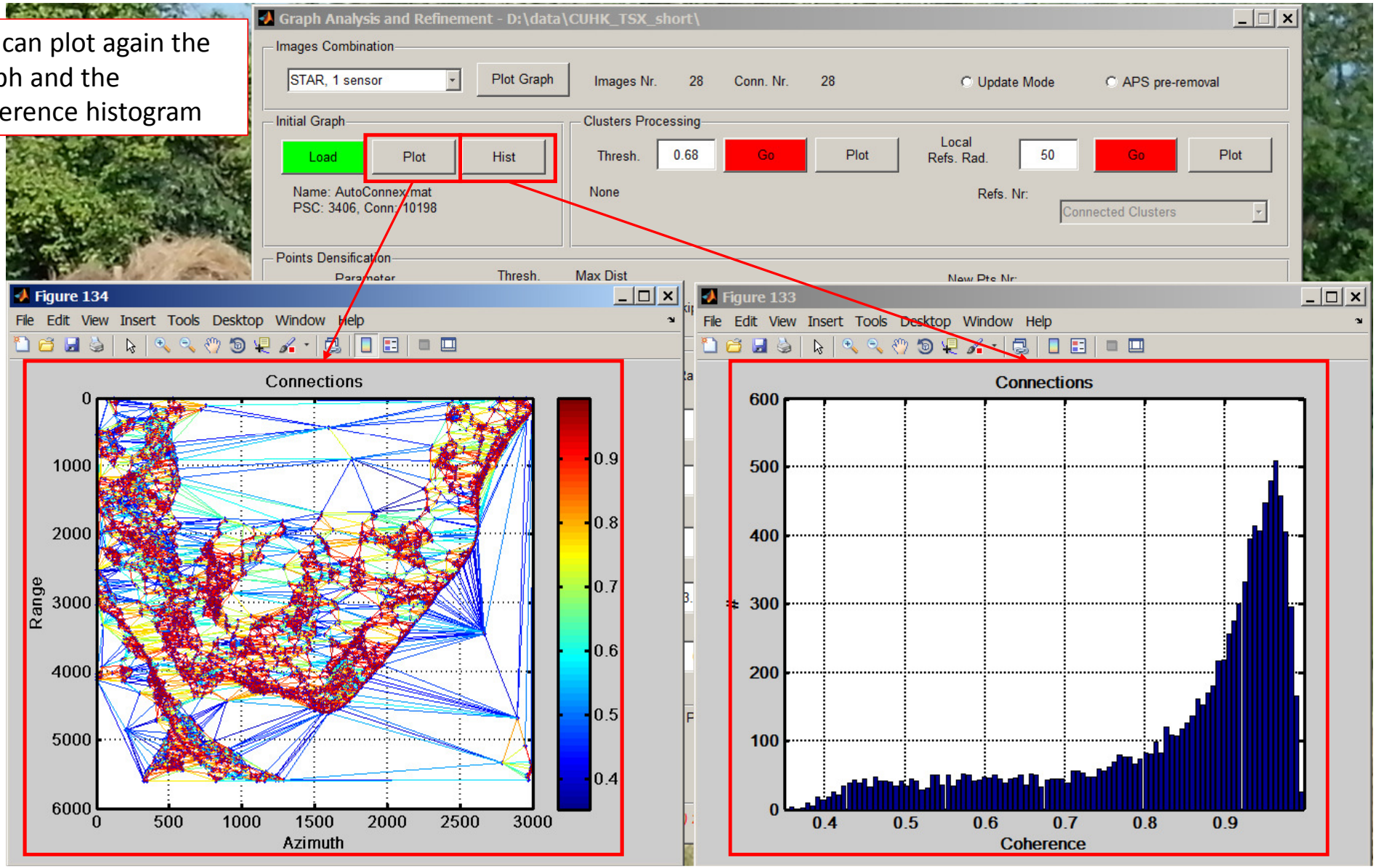
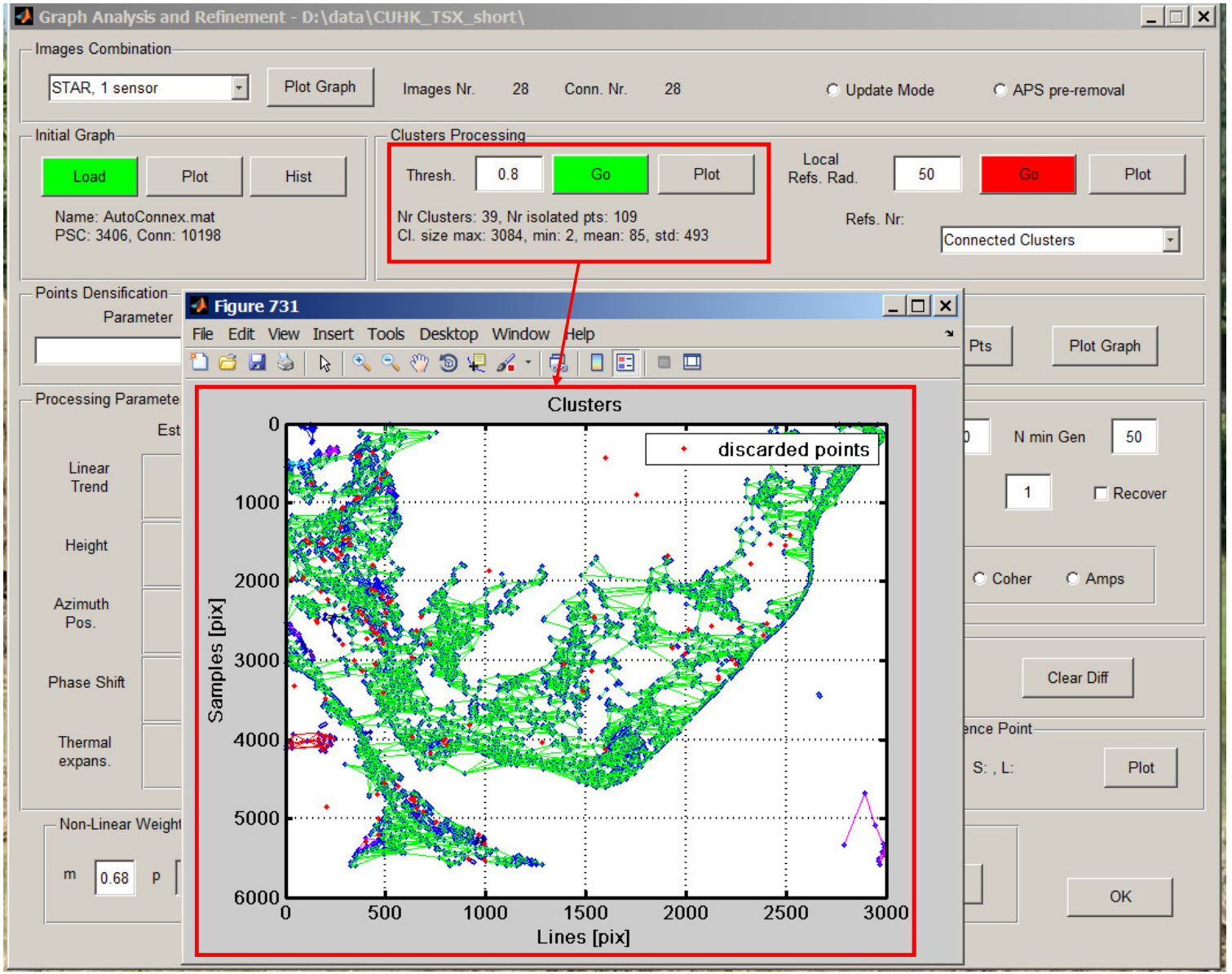
2009-2018, the SAR PROcessor by periZ

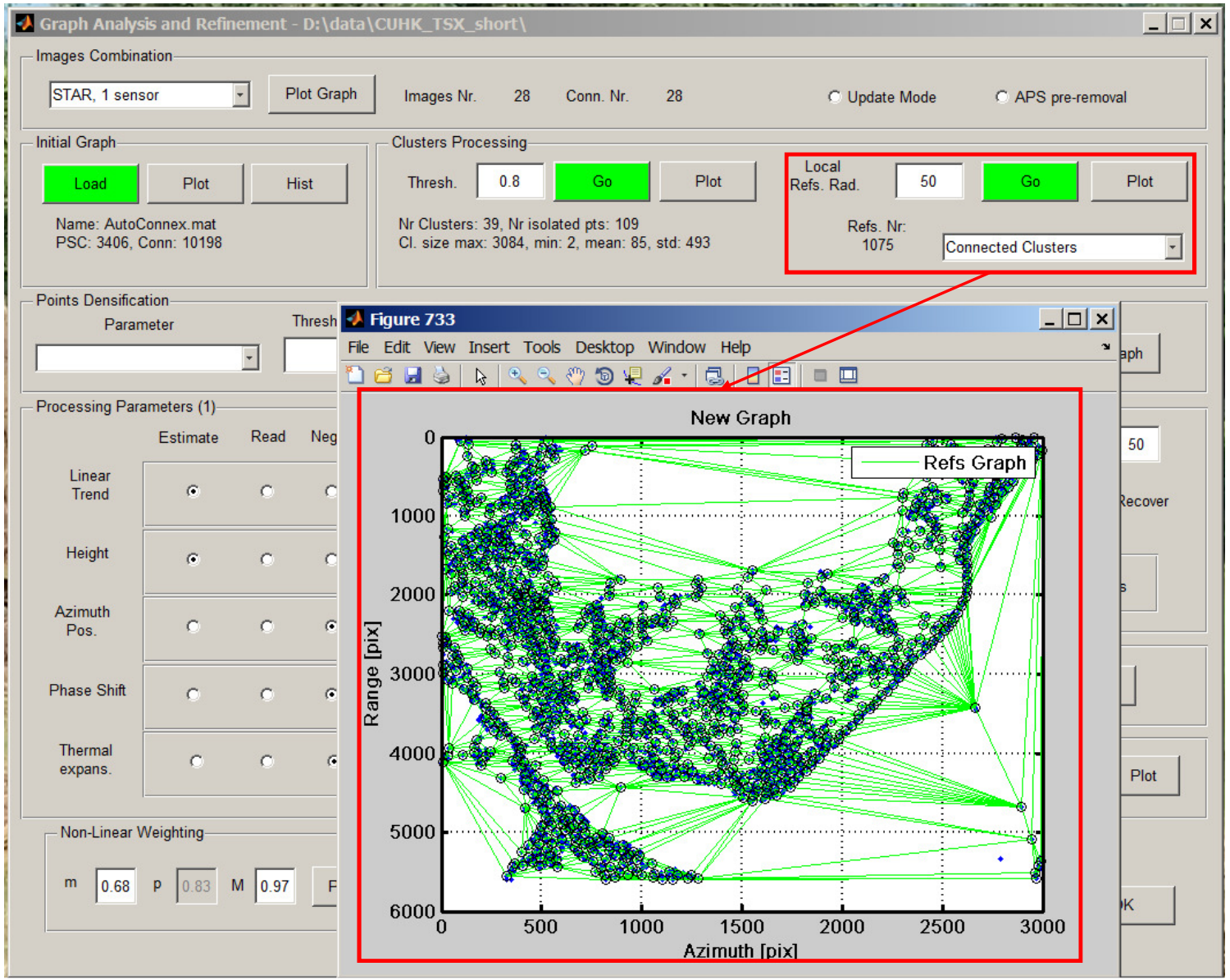
We can plot again the graph and the coherence histogram



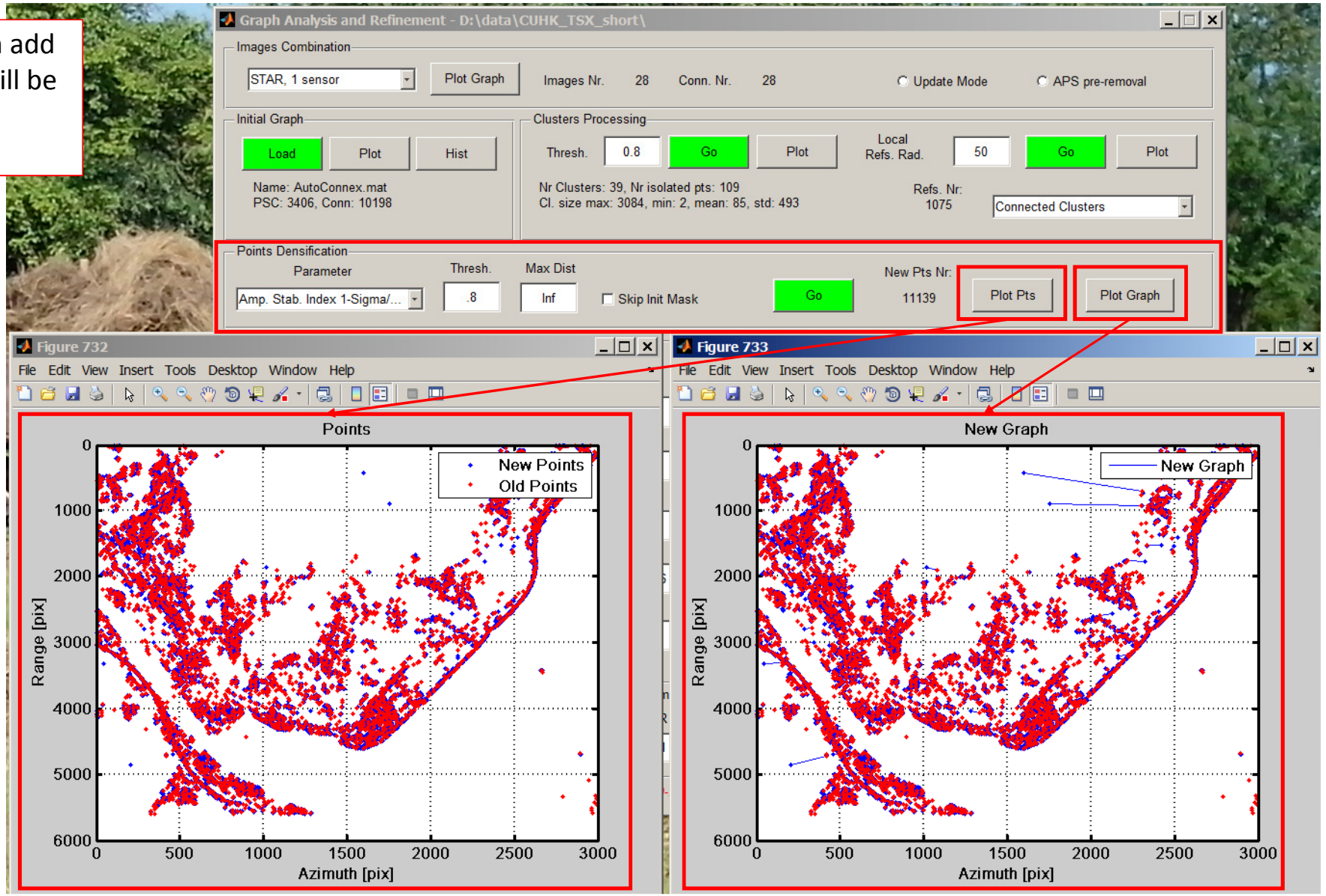
By placing a rigid coherence threshold, we split the graph into multiple clusters and we analyze the connectivity.
Clusters are plotted with different colors, PSC that do not have connections over the threshold are discarded



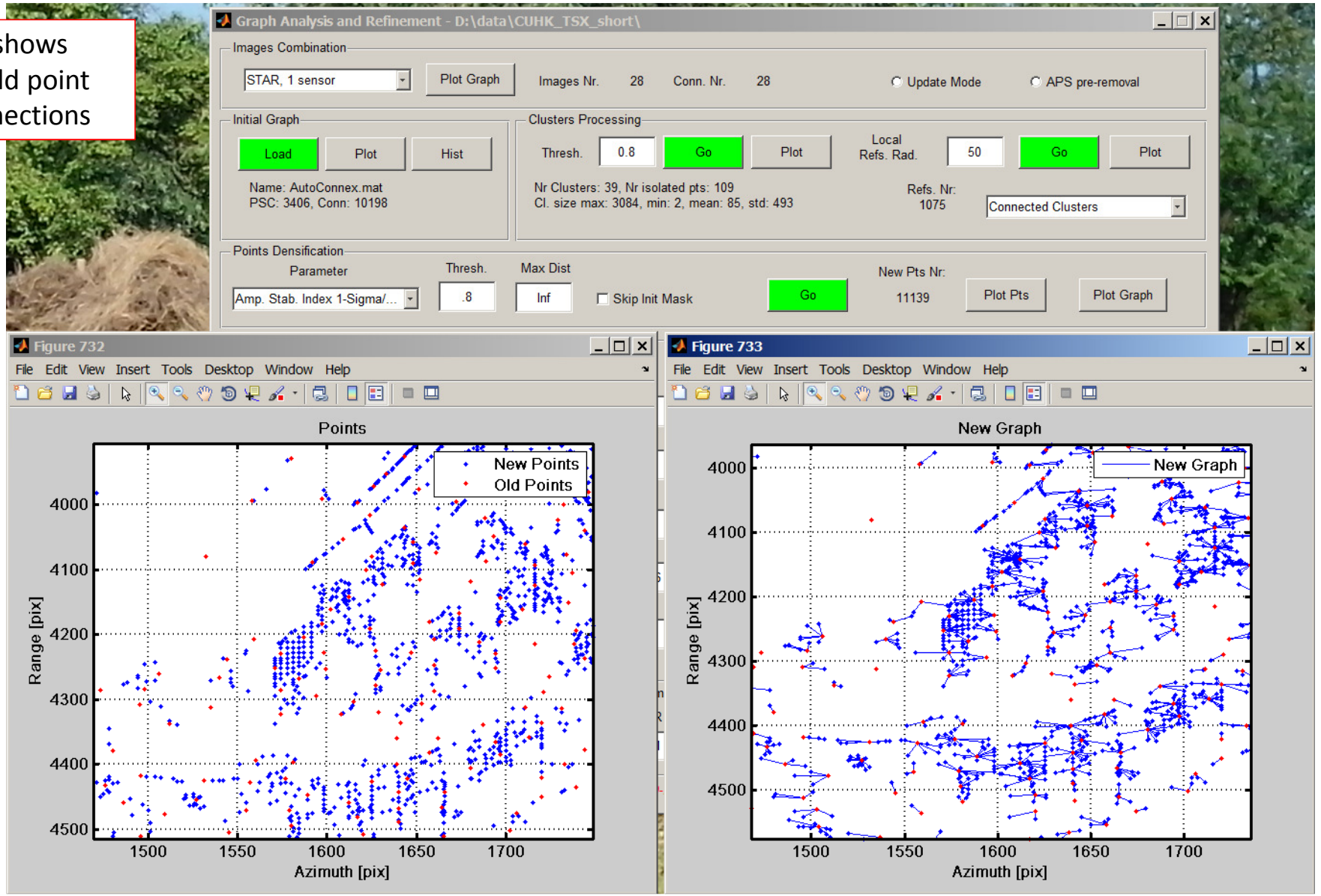
Most common option: we want to process connected clusters. Thus, we try to connect separate clusters by creating a new graph. The new graph is built based on a set of local references. Local references are selected based on the temporal coherence previously estimated. The radius sets the minimum distance between ref points.



Optionally, we can add new points that will be connected to the closest …

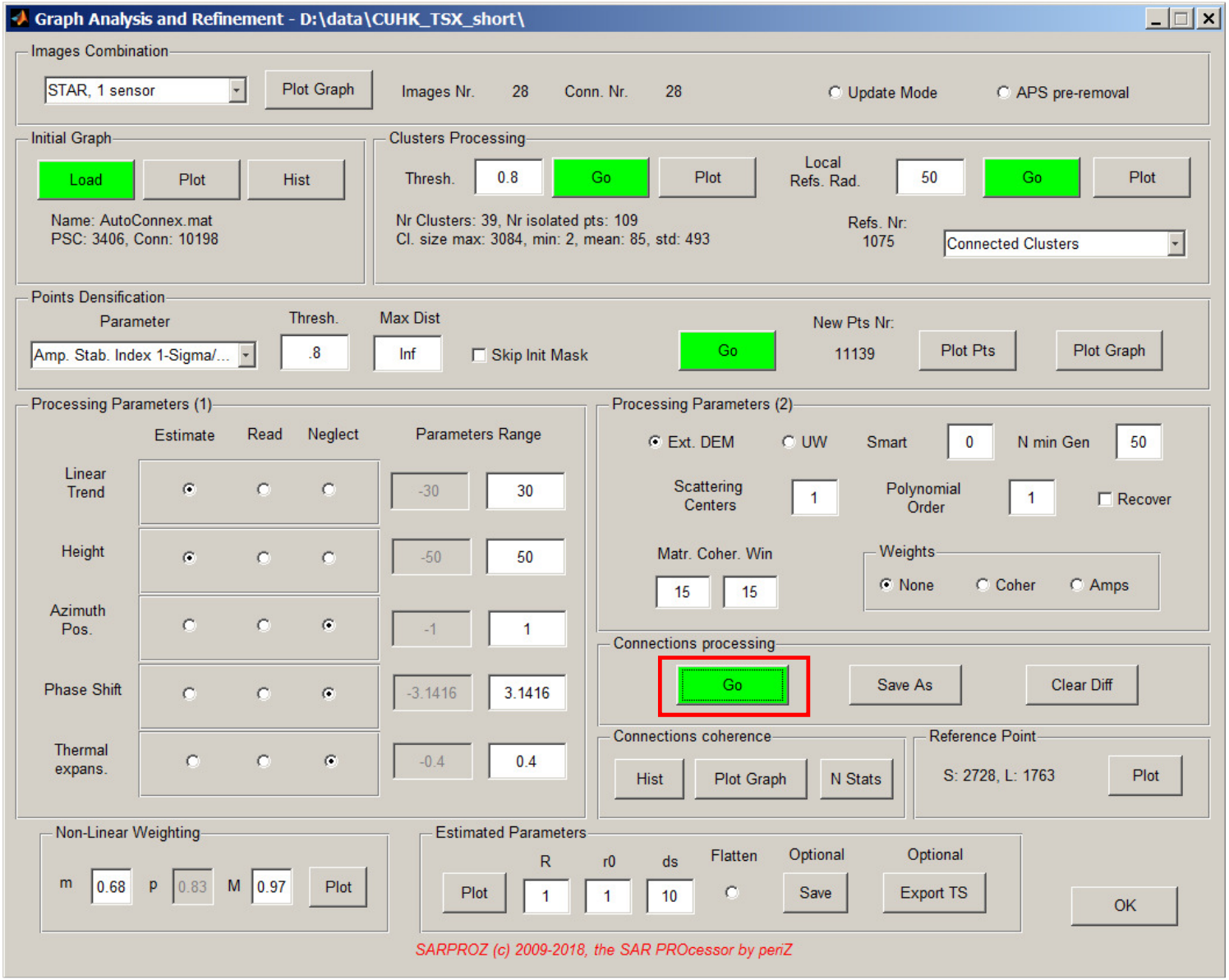


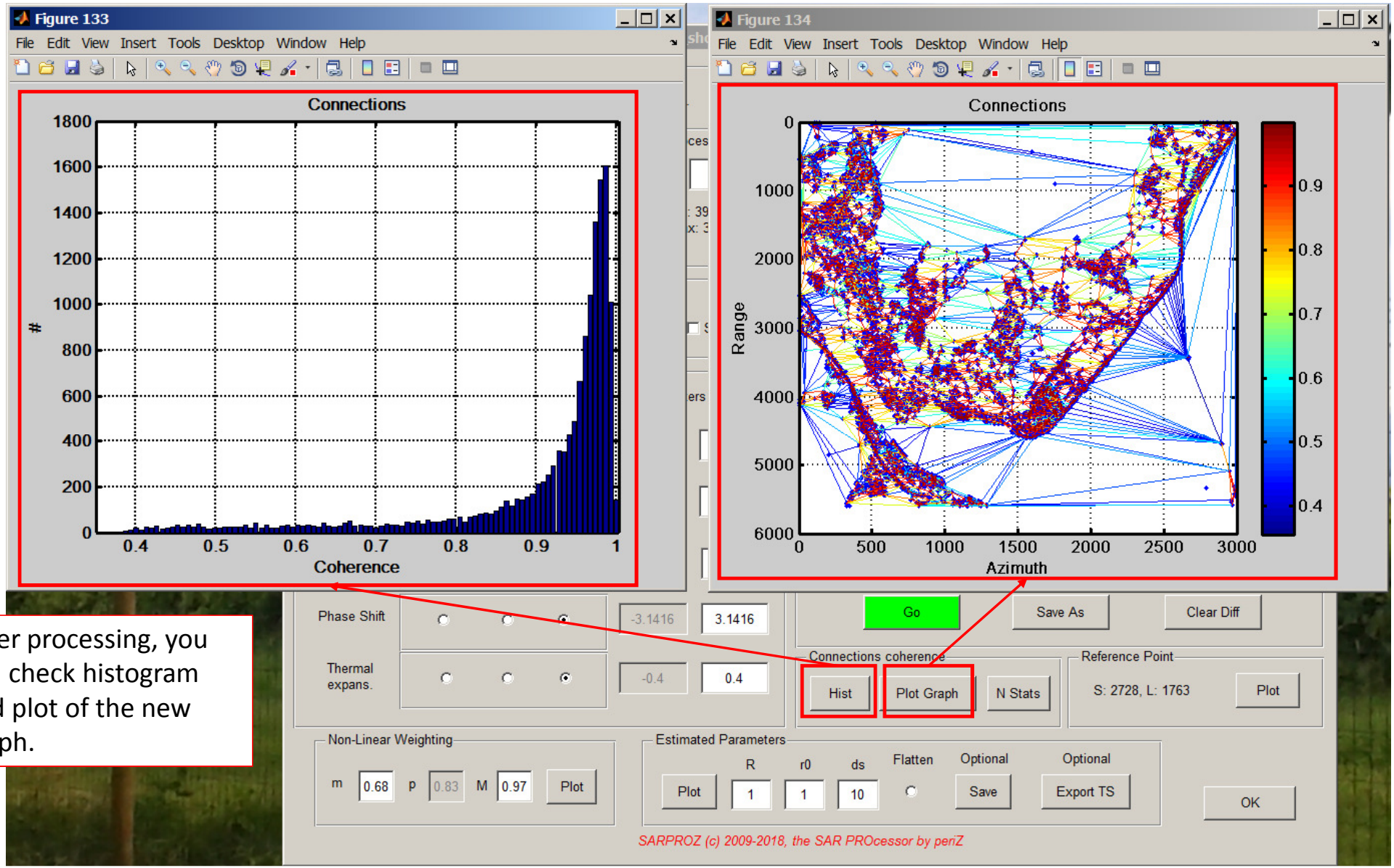
The close up shows new points, old point and new connections



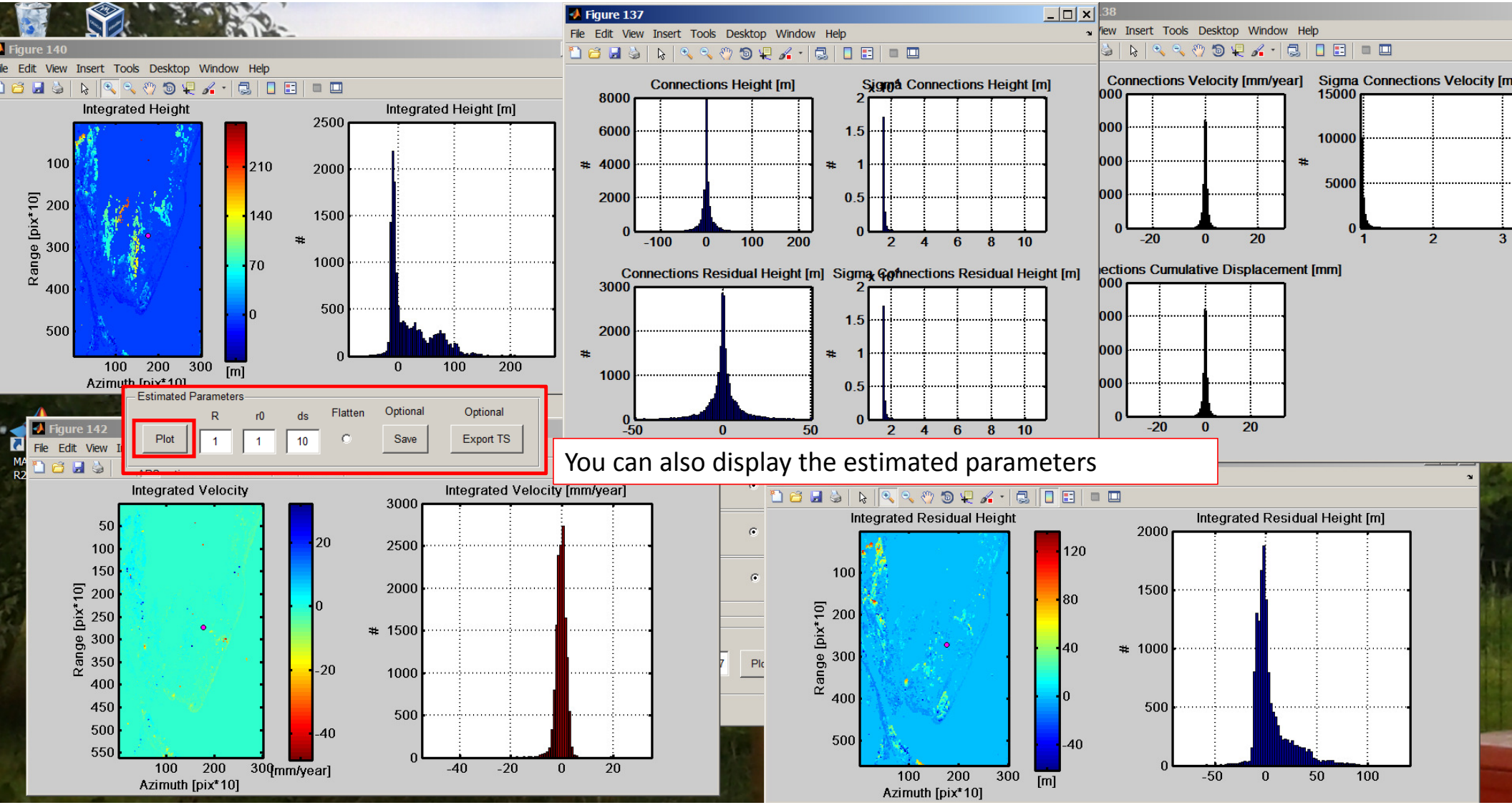
We process the new connections.

Note: here you can decide whether to process new connections with the same options as before or with new options.



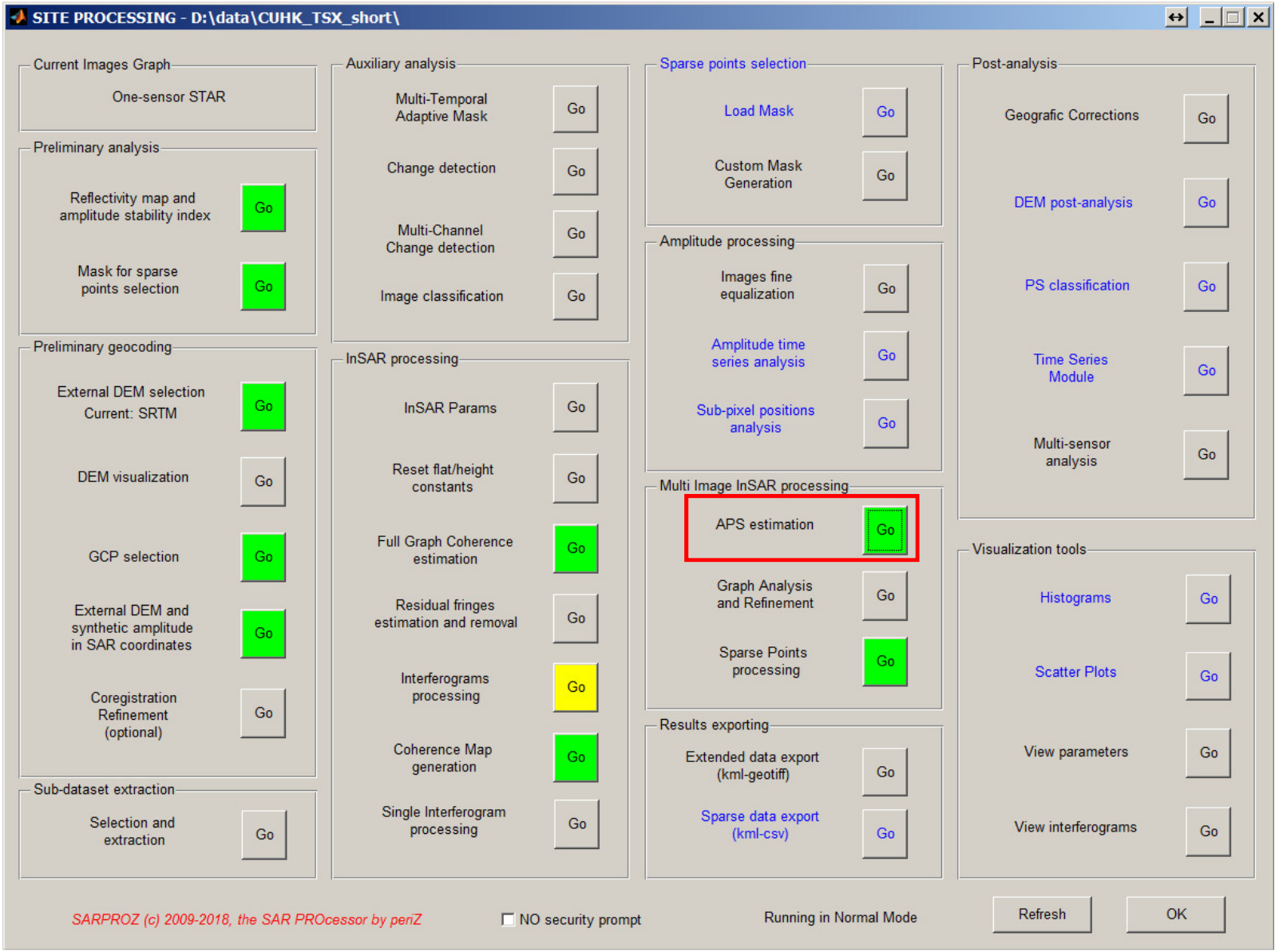


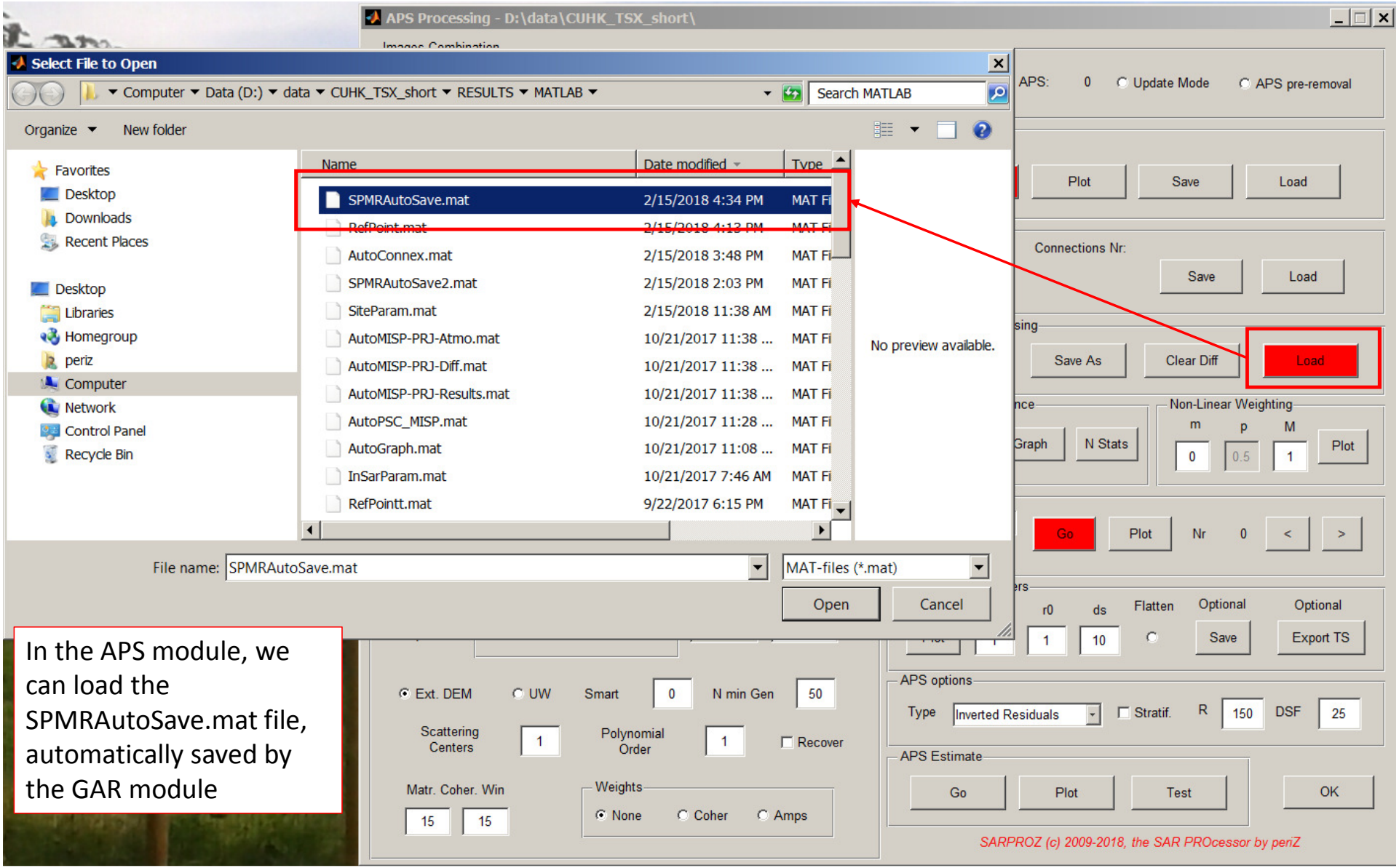

After processing, you can check histogram and plot of the new graph.




You can also display the estimated parameters

Now we want to use the improved graph to estimate the APS.
So, we open again the APS module






In the APS module, we can load the SPMRAutoSave.mat file, automatically saved by the GAR module

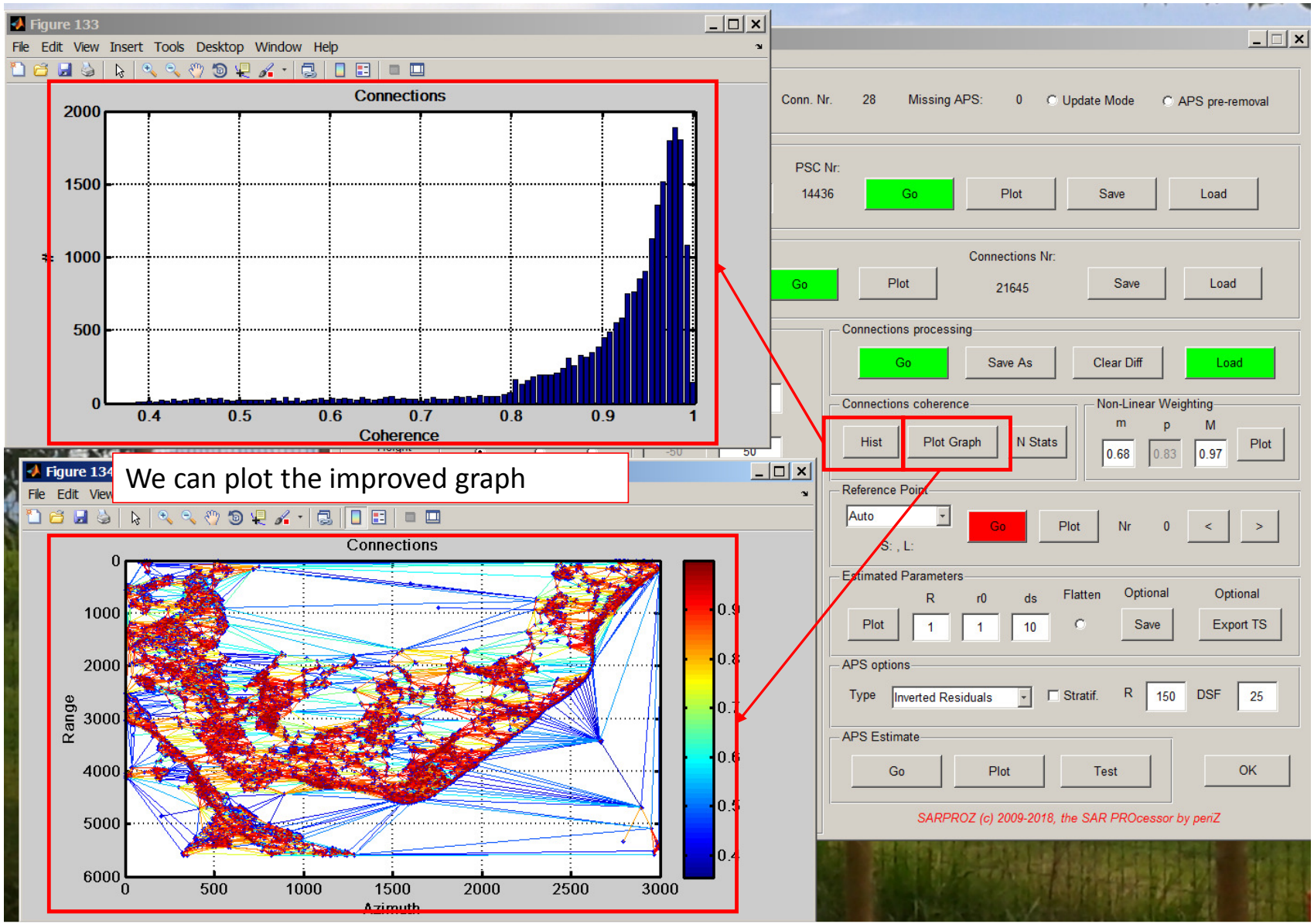


Figure 133
File Edit View Insert Tools Desktop Window Help
Connections
2000
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0.4 0.5 0.6 0.7 0.8 0.9 1
Coherence
We can plot the improved graph
Figure 134
File Edit View
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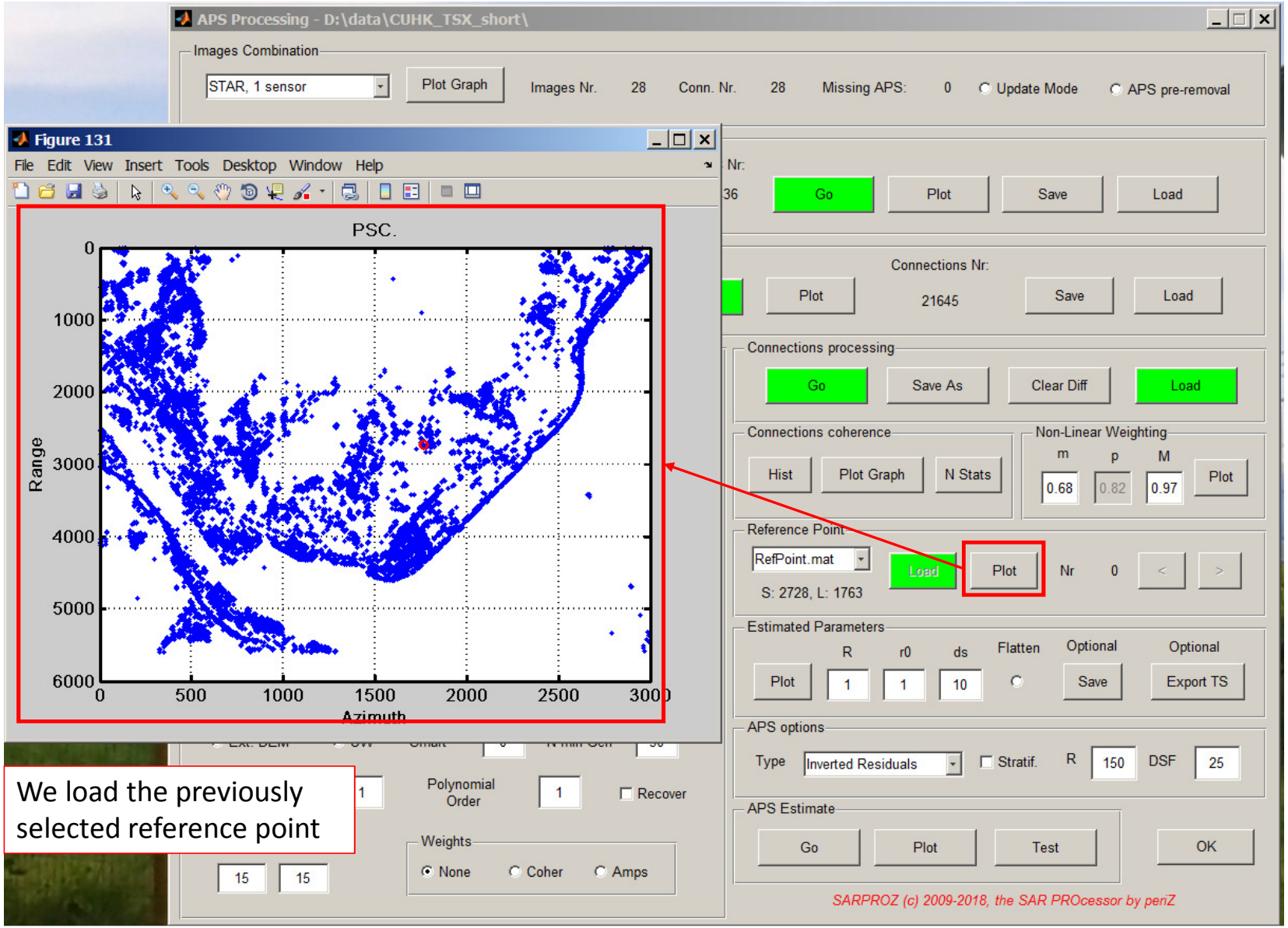
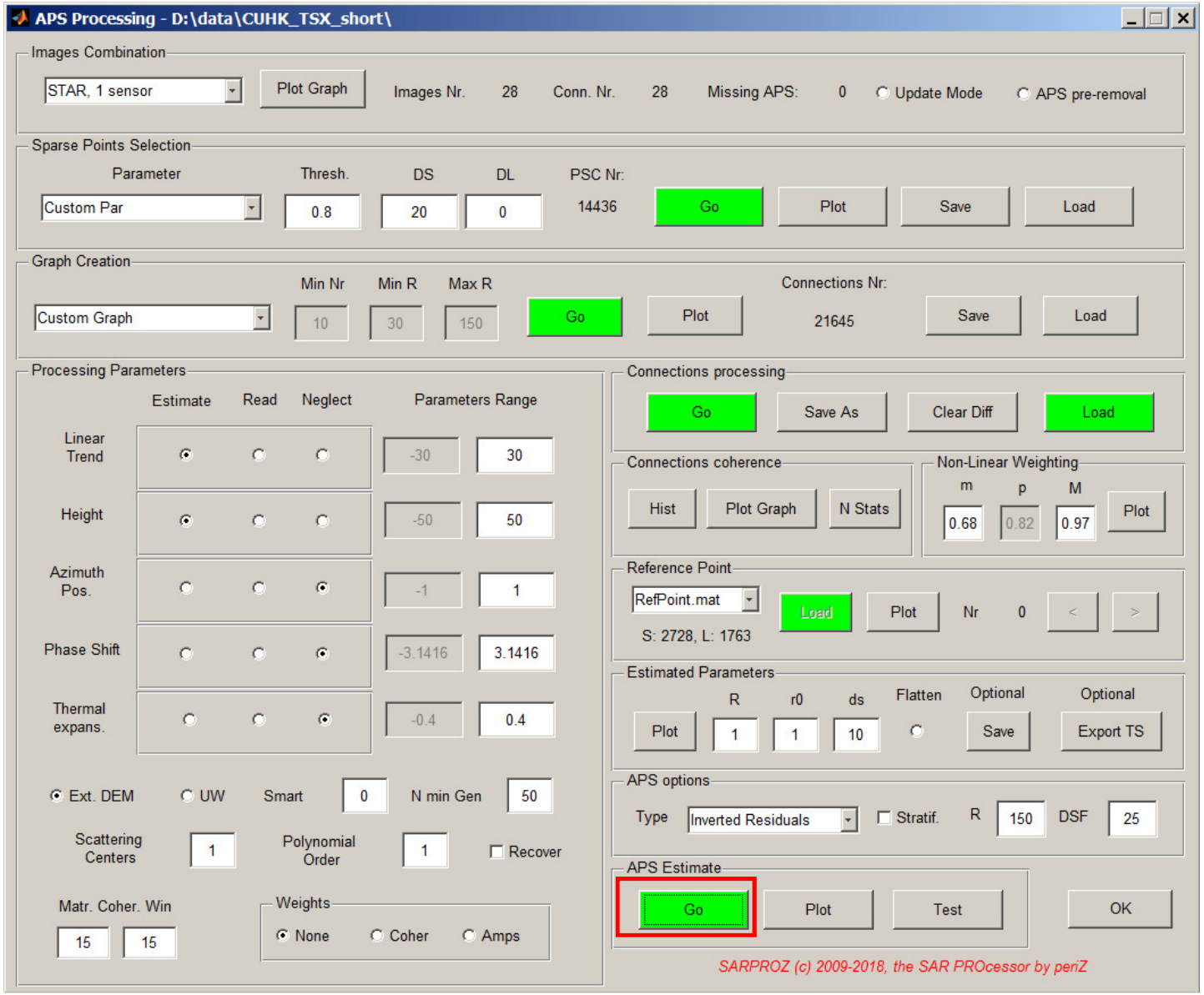
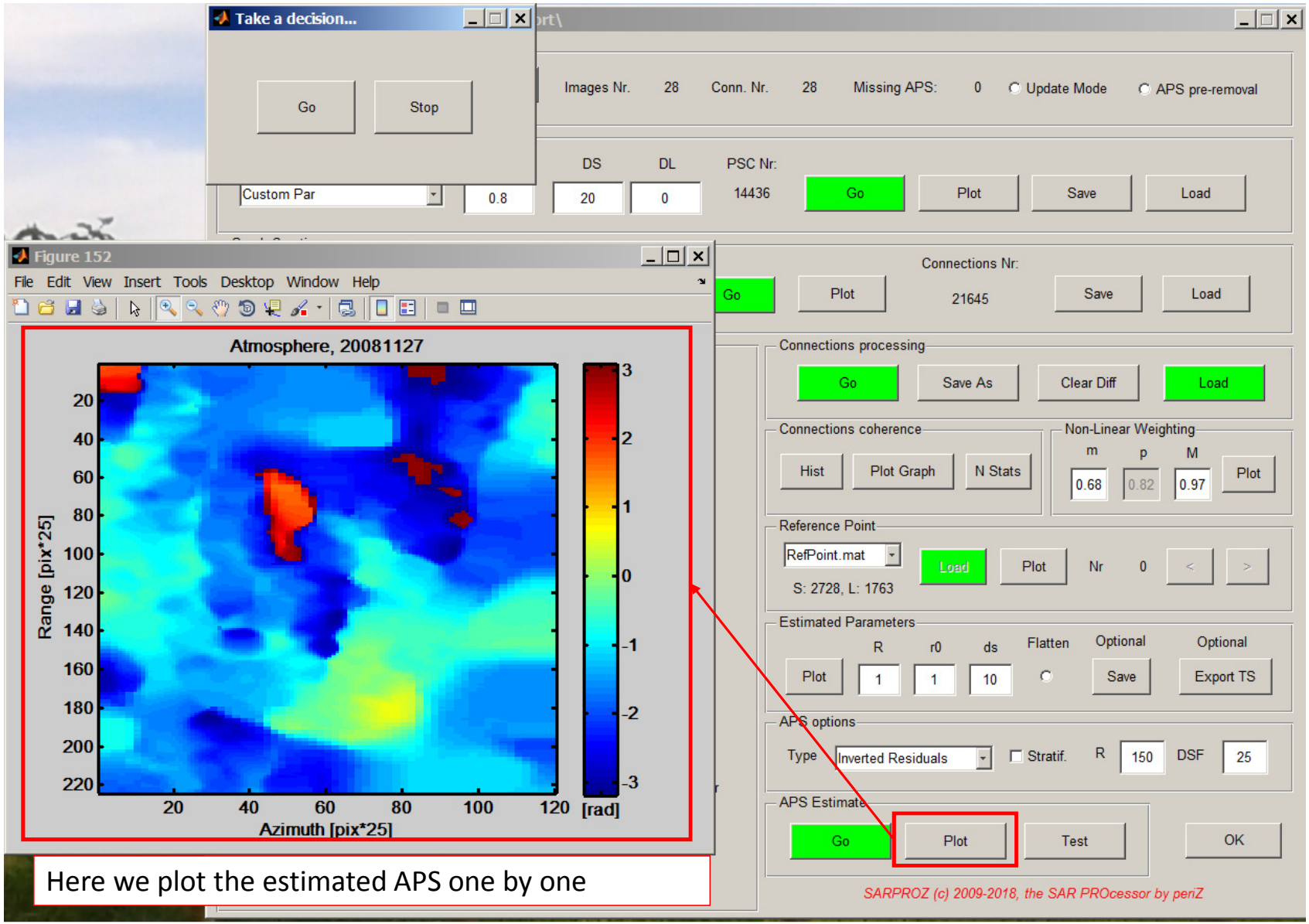
SARPROZ (c) 2009-2018, the SAR PROcessor by periZ



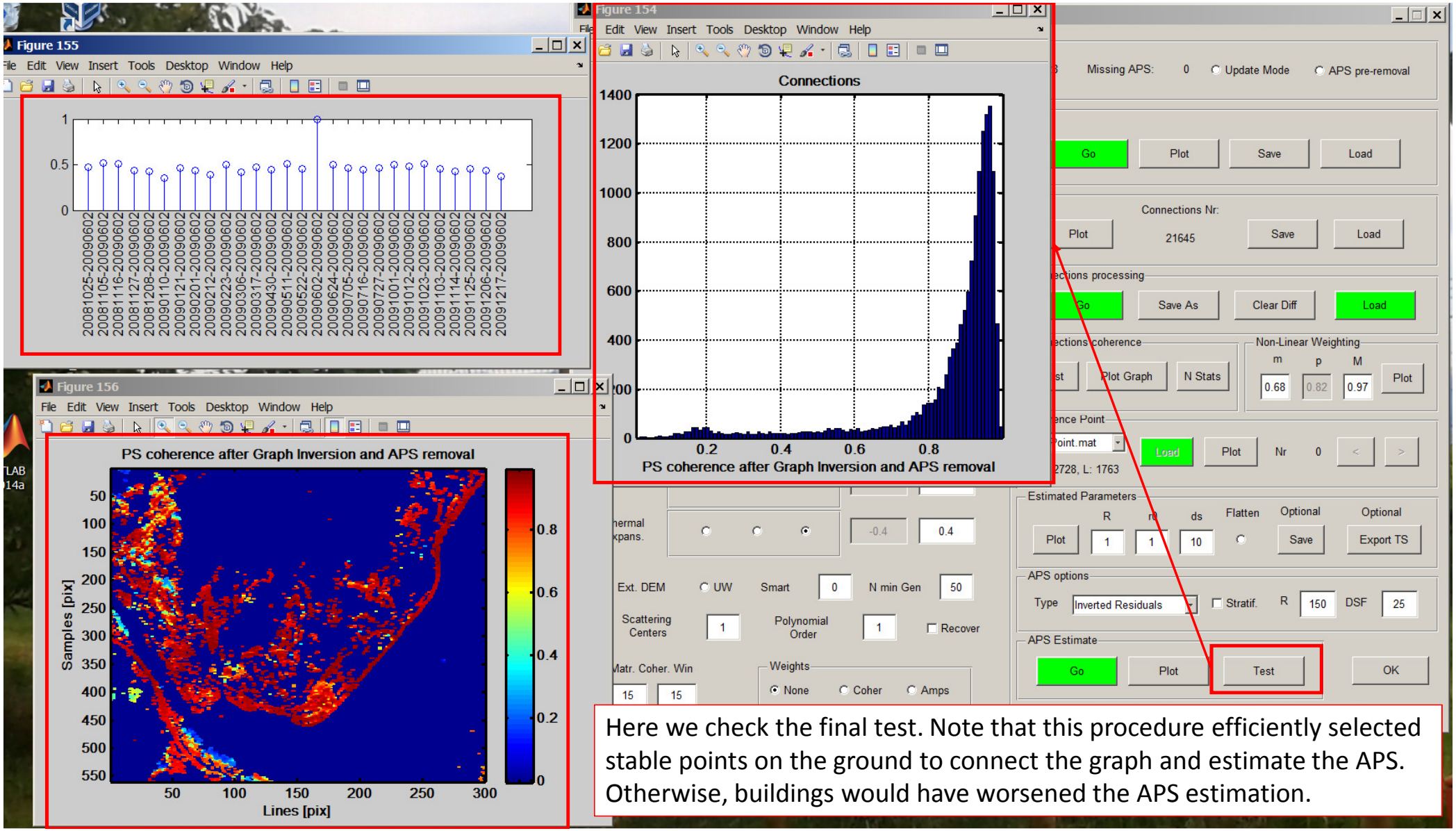

We load the previously selected reference point

Finally, we estimate the APS






Here we plot the estimated APS one by one




Here we check the final test. Note that this procedure efficiently selected stable points on the ground to connect the graph and estimate the APS. Otherwise, buildings would have worsened the APS estimation.