

Sarproz Release 2017.5

Author	Posts	Favorite
October 19, 2017 at 7:45 pm		EDIT CLOSE STICK MERGE TRASH SPAM REPLY QUOTE #2534
periz	<p>The new release presents a new <i>optional</i> module, in between the APS processing module and the MISP one.</p> <p>The new module is called "Graph Analysis and Refinement" and it can be used for two main tasks.</p> <ul style="list-style-type: none">* 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. <p>More infos can be found here http://sarproz.com/manual/graph_refinement.html</p>	

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

APS Processing - D:\data\CUHK_TSX_short\

Images Combination
 STAR, 1 sensor Plot Graph Images Nr. 28 Conn. Nr. 28 Missing APS: 0 Update Mode APS pre-removal

Sparse Points Selection
 Parameter Thresh. DS DL PSC Nr:
 20 0

Graph Creation
 Auto Flowers (Centers) Min Nr Min R Max R Connections Nr:
 10 30 150

Processing Parameters

	Estimate	Read	Neglect	Parameters Range	
Linear Trend	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-100	100
Height	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-100	100
Azimuth Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1	1
Phase Shift	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-pi	pi
Thermal expans.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-.4	.4

Ext. DEM UW Smart N min Gen

Scattering Centers Polynomial Order Recover

Matr. Coher. Win Weights None Coher Amps

Connections processing

Connections coherence

Non-Linear Weighting
 m p M

Reference Point
 Auto Nr 0
 S: , L:

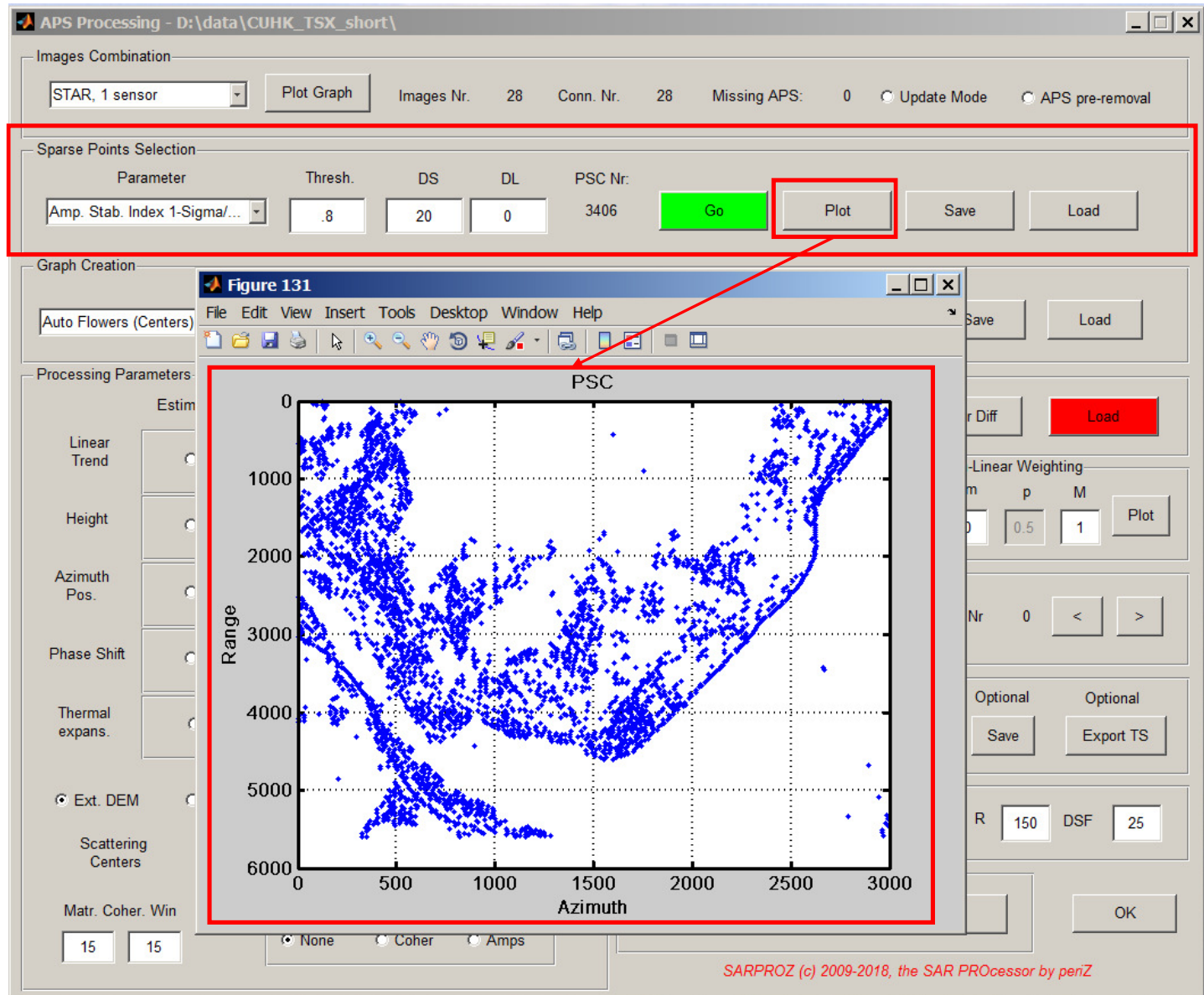
Estimated Parameters
 R r0 ds Flatten Optional

APS options
 Type Stratif. R DSF

APS Estimate

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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

APS Processing - D:\data\CUHK_TSX_short\

Images Combination
STAR, 1 sensor Plot Graph Images Nr. 28 Conn. Nr. 28 Missing APS: 0 Update Mode APS pre-removal

Sparse Points Selection
Parameter Thresh. DS DL PSC Nr.
Amp. Stab. Index 1-Sigma/... .8 20 0 3406 Go Plot Save Load

Graph Creation
Delaunay Min Nr. 10 Min R. 30 Max R. Inf Connections Nr. 10198 Go Plot Save Load

Processing Parameters
Linear Trend Height Azimuth Pos. Phase Shift Thermal expans. Ext. DEM Scattering Centers Matr. Coher. Win 15 15

Figure 132
File Edit View Insert Tools Desktop Window Help

Graph
Range 0 1000 2000 3000 4000 5000 6000
Azimuth 0 500 1000 1500 2000 2500 3000

Diff Load
Linear Weighting p M 0.5 1 Plot
r 0 < >
Optional Optional Save Export TS
R 150 DSF 25
OK
Processor by perZ

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

The screenshot displays the SARPROZ software interface with the following sections and settings:

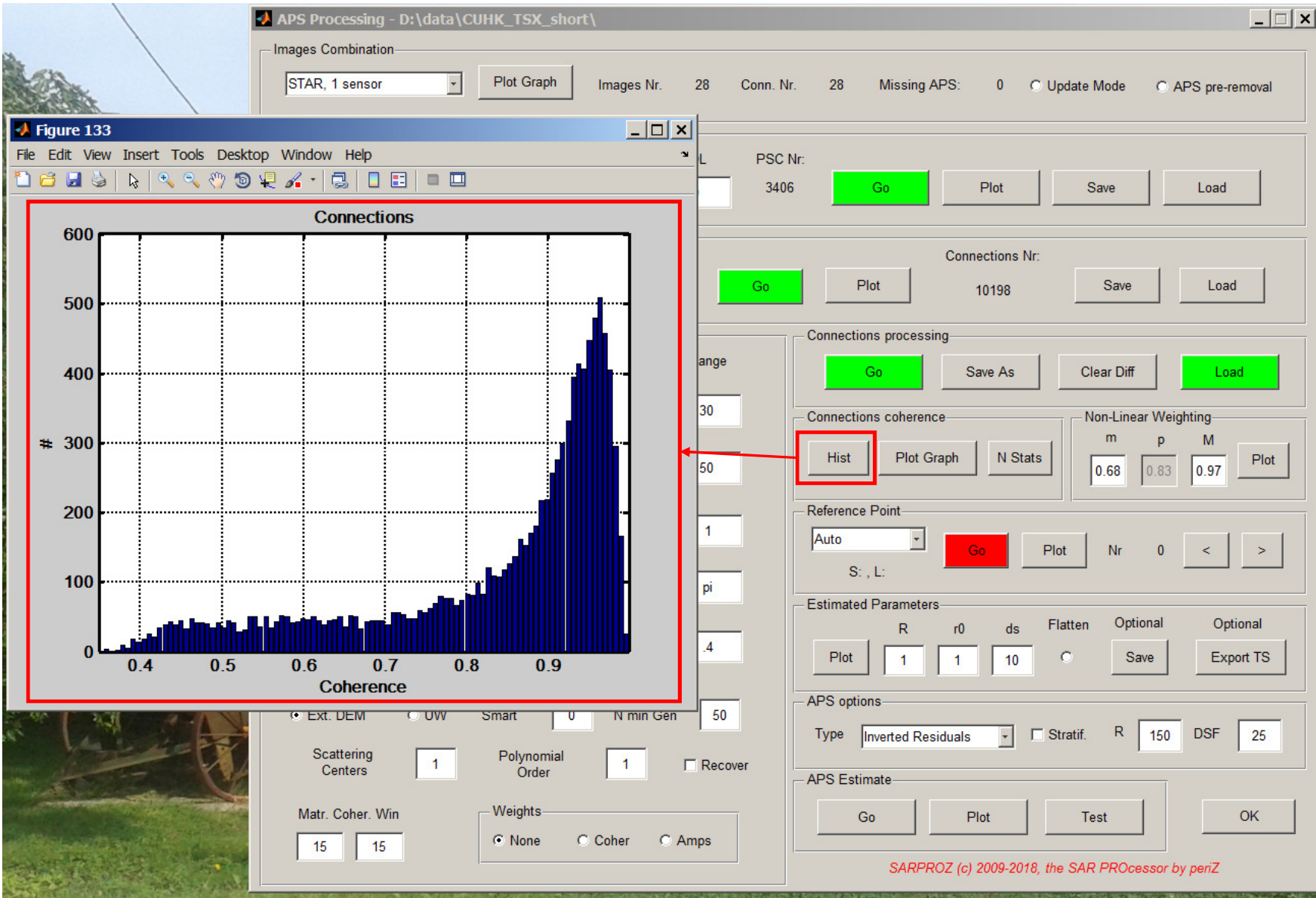
- Images Combination:** STAR, 1 sensor; Images Nr. 28; Conn. Nr. 28; Missing APS: 0; Update Mode (selected); APS pre-removal (selected).
- Sparse Points Selection:** Parameter: Amp. Stab. Index 1-Sigma/...; Thresh. .8; DS 20; DL 0; PSC Nr. 3406; Go (green button); Plot; Save; Load.
- Graph Creation:** Delaunay; Min Nr 10; Min R 30; Max R Inf; Go (green button); Plot; Connections Nr. 10198; Save; Load.
- Processing Parameters (highlighted with a red box):**

	Estimate	Read	Neglect	Parameters Range
Linear Trend	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-30 to 30
Height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-50 to 50
Azimuth Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1 to 1
Phase Shift	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-pi to pi
Thermal expans.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-.4 to .4

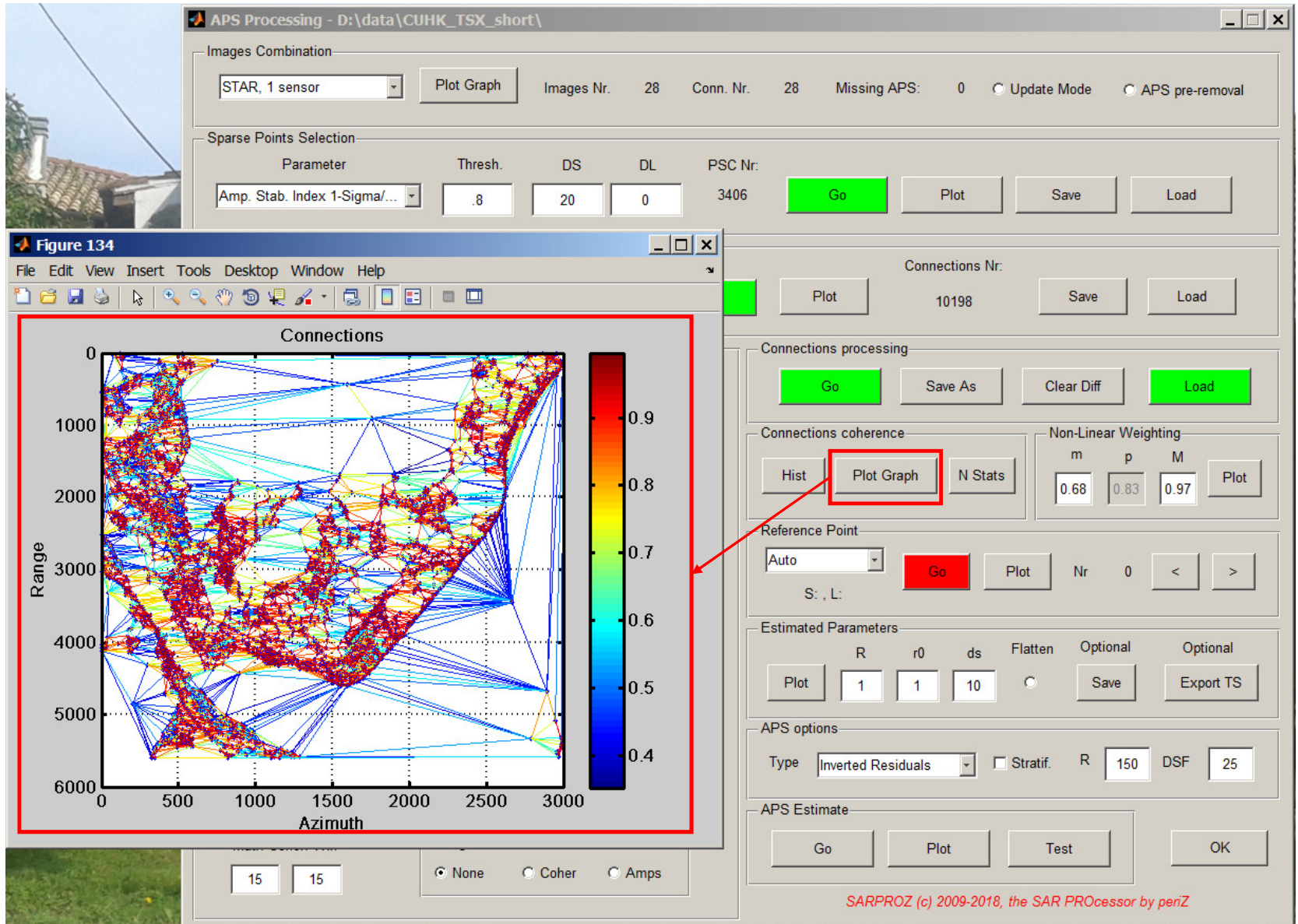
Ext. DEM (selected), UW (selected), Smart 0, N min Gen 50, Scattering Centers 1, Polynomial Order 1, Recover (unchecked), Matr. Coher. Win 15 15, Weights: None (selected), Coher, Amps.
- Connections processing:** Go (red button), Save As, Clear Diff, Load (red button).
- Connections coherence:** Runtime: 19s - ETA: 501.9...; Graph Processing 3%; Non-Linear Weighting: p 0.5, M 1; Plot.
- Reference Point:** Auto; Go (red button), Plot, Nr 0, <, >.
- Estimated Parameters:** Plot, R 1, r0 1, ds 10, Flatten (selected), Optional Save, Optional Export TS.
- APS options:** Type Inverted Residuals, Stratif. (unchecked), R 150, DSF 25.
- APS Estimate:** Go, Plot, Test, OK.

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We look at the histogram of the estimated temporal coherence



We look at coherence of the graph connections

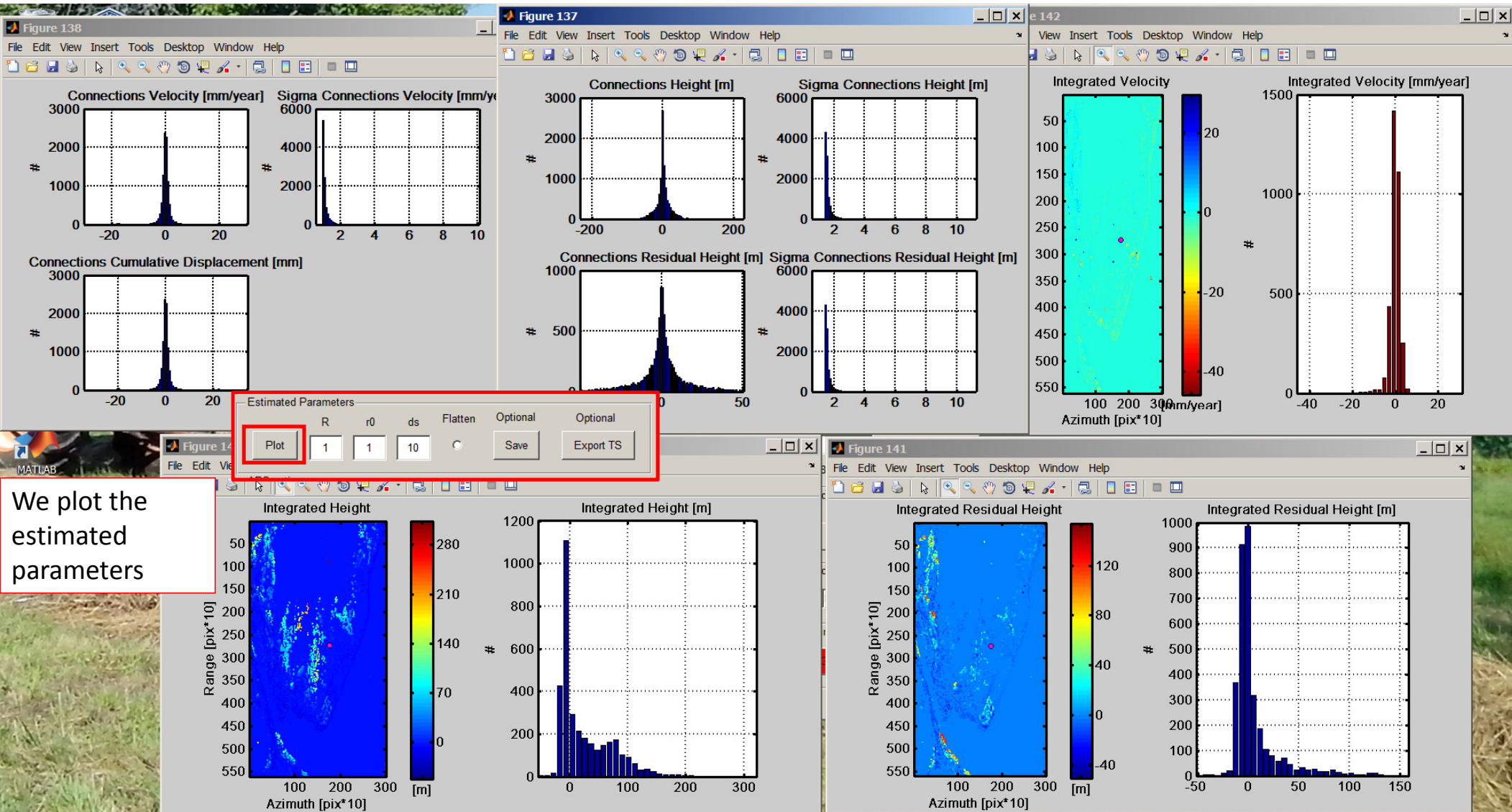


If needed, we adjust the minimum of the NL weights, then we launch the automatic selection of the reference point and we plot it

The screenshot displays the SARPROZ software interface. The main window, titled "Figure 131", shows a scatter plot of PSC (Phase Scatter Coefficient) data. The x-axis is labeled "Azimuth" and ranges from 0 to 3000. The y-axis is labeled "Range" and ranges from 0 to 6000. The plot shows a dense distribution of blue points forming a curved shape. A red dot marks a reference point at approximately (1763, 2728). The software interface includes several control panels:

- Images Combination:** STAR, 1 sensor; Images Nr. 28; Conn. Nr. 28; Missing APS: 0; Update Mode; APS pre-removal.
- Sparse Points Selection:** Parameter: Amp. Stab. Index 1-Sigma/...; Thresh.: .8; DS: 20; DL: 0; PSC Nr.: 3406; Go; Plot; Save; Load.
- Connections processing:** Go; Save As; Clear Diff; Load.
- Connections coherence:** Hist; Plot Graph; N Stats.
- Non-Linear Weighting:** m: 0.8; p: 0.89; M: 0.97; Plot.
- Reference Point:** Auto; Go; Plot; Nr: 1; < >.
- Estimated Parameters:** Plot; R: 1; r0: 1; ds: 10; Flatten; Optional: Save; Optional: Export TS.
- APS options:** Type: Inverted Residuals; Stratif.; R: 150; DSF: 25.
- APS Estimate:** Go; Plot; Test; OK.

At the bottom right, the text "SARPROZ (c) 2009-2018, the SAR PROcessor by periZ" is visible.



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)

The screenshot shows the APS Processing software interface with the following sections:

- Images Combination:** STAR, 1 sensor (dropdown), Plot Graph (button), Images Nr. 28, Conn. Nr. 28, Missing APS: 0, Update Mode (radio), APS pre-removal (radio).
- Sparse Points Selection:** Parameter: Amp. Stab. Index 1-Sigma/..., Thresh. .8, DS 20, DL 0, PSC Nr. 3406, Go (green button), Plot (button), Save (button), Load (button).
- Graph Creation:** Delaunay (dropdown), Min Nr 10, Min R 30, Max R Inf, Go (green button), Plot (button), Connections Nr. 10198, Save (button), Load (button).
- Processing Parameters:**

	Estimate	Read	Neglect	Parameters Range	
Linear Trend	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-30	30
Height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-50	50
Azimuth Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1	1
Phase Shift	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-pi	pi
Thermal expans.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-.4	.4

Ext. DEM (radio), UW (radio), Smart 0, N min Gen 50, Scattering Centers 1, Polynomial Order 1, Recover (checkbox), Matr. Coher. Win 15 15, Weights: None (radio), Coher (radio), Amps (radio).
- Connections processing:** Go (green button), Save As (button), Clear Diff (button), Load (green button).
- Connections coherence:** Hist (button), Plot Graph (button), N Stats (button), Non-Linear Weighting: m 0.8, p 0.89, M 0.97, Plot (button).
- Reference Point:** Auto (dropdown), Go (green button), Plot (button), Nr 1, < (button), > (button), S: 2728, L: 1763.
- Estimated Parameters:** Plot (button), R 1, r0 1, ds 10, Flatten (radio), Optional Save (button), Optional Export TS (button).
- APS options:** Type: Inverted Residuals (dropdown), Stratif. (checkbox), R 150, DSF 25.
- APS Estimate:** Go (red button), Plot (button), Test (button), OK (button, highlighted with a red box).

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

SITE PROCESSING - D:\data\CUHK_TSX_short

Current Images Graph One-sensor STAR	Auxiliary analysis Multi-Temporal Adaptive Mask <input type="button" value="Go"/> Change detection <input type="button" value="Go"/> Multi-Channel Change detection <input type="button" value="Go"/> Image classification <input type="button" value="Go"/>	Sparse points selection Load Mask <input type="button" value="Go"/> Custom Mask Generation <input type="button" value="Go"/>	Post-analysis Geographic Corrections <input type="button" value="Go"/> DEM post-analysis <input type="button" value="Go"/> PS classification <input type="button" value="Go"/> Time Series Module <input type="button" value="Go"/> Multi-sensor analysis <input type="button" value="Go"/>
Preliminary analysis Reflectivity map and amplitude stability index <input type="button" value="Go"/> Mask for sparse points selection <input type="button" value="Go"/>	InSAR processing InSAR Params <input type="button" value="Go"/> Reset flat/height constants <input type="button" value="Go"/> Full Graph Coherence estimation <input type="button" value="Go"/> Residual fringes estimation and removal <input type="button" value="Go"/> Interferograms processing <input type="button" value="Go"/> Coherence Map generation <input type="button" value="Go"/> Single Interferogram processing <input type="button" value="Go"/>	Amplitude processing Images fine equalization <input type="button" value="Go"/> Amplitude time series analysis <input type="button" value="Go"/> Sub-pixel positions analysis <input type="button" value="Go"/>	Visualization tools Histograms <input type="button" value="Go"/> Scatter Plots <input type="button" value="Go"/> View parameters <input type="button" value="Go"/> View interferograms <input type="button" value="Go"/>
Preliminary geocoding External DEM selection Current: SRTM <input type="button" value="Go"/> DEM visualization <input type="button" value="Go"/> GCP selection <input type="button" value="Go"/> External DEM and synthetic amplitude in SAR coordinates <input type="button" value="Go"/> Coregistration Refinement (optional) <input type="button" value="Go"/>	Multi Image InSAR processing APS estimation <input type="button" value="Go"/> Graph Analysis and Refinement <input type="button" value="Go"/> Sparse Points processing <input type="button" value="Go"/>	Results exporting Extended data export (kml-geotiff) <input type="button" value="Go"/> Sparse data export (kml-csv) <input type="button" value="Go"/>	
Sub-dataset extraction Selection and extraction <input type="button" value="Go"/>			

SARPROZ (c) 2009-2018, the SAR PROcessor by periz NO security prompt Running in Normal Mode

In the GAR, we load the AutoConnex.mat

The screenshot shows the Graph Analysis and Refinement (GAR) software interface. A file explorer window titled "Select File to Open" is overlaid on the main application. The file explorer shows a list of files in the directory "D:\data\CUHK_TSX_short\RESULTS\MATLAB". The file "AutoConnex.mat" is selected and highlighted. A red box highlights the "AutoConnex.mat" file in the file explorer, and a red arrow points from this box to the "Load" button in the "Initial Graph" section of the GAR interface. The GAR interface includes sections for "Images Combination" (STAR, 1 sensor), "Clusters Processing" (Thresh. 0.7), "Processing Parameters (2)" (Ext. DEM, Scattering Centers, Matr. Coher. Win), and "Connections processing".

Name	Date modified	Type
RefPoint.mat	2/15/2018 4:13 PM	MAT FI
AutoConnex.mat	2/15/2018 3:48 PM	MAT FI
SPMRAutoSave.mat	2/15/2018 2:48 PM	MAT FI
SPMRAutoSave2.mat	2/15/2018 2:03 PM	MAT FI
SiteParam.mat	2/15/2018 11:38 AM	MAT FI
AutoMISP-PRJ-Atmo.mat	10/21/2017 11:38 ...	MAT FI
AutoMISP-PRJ-Diff.mat	10/21/2017 11:38 ...	MAT FI
AutoMISP-PRJ-Results.mat	10/21/2017 11:38 ...	MAT FI
AutoPSC_MISP.mat	10/21/2017 11:28 ...	MAT FI
AutoGraph.mat	10/21/2017 11:08 ...	MAT FI
InSarParam.mat	10/21/2017 7:46 AM	MAT FI
RefPointt.mat	9/22/2017 6:15 PM	MAT FI

We can plot again the graph and the coherence histogram

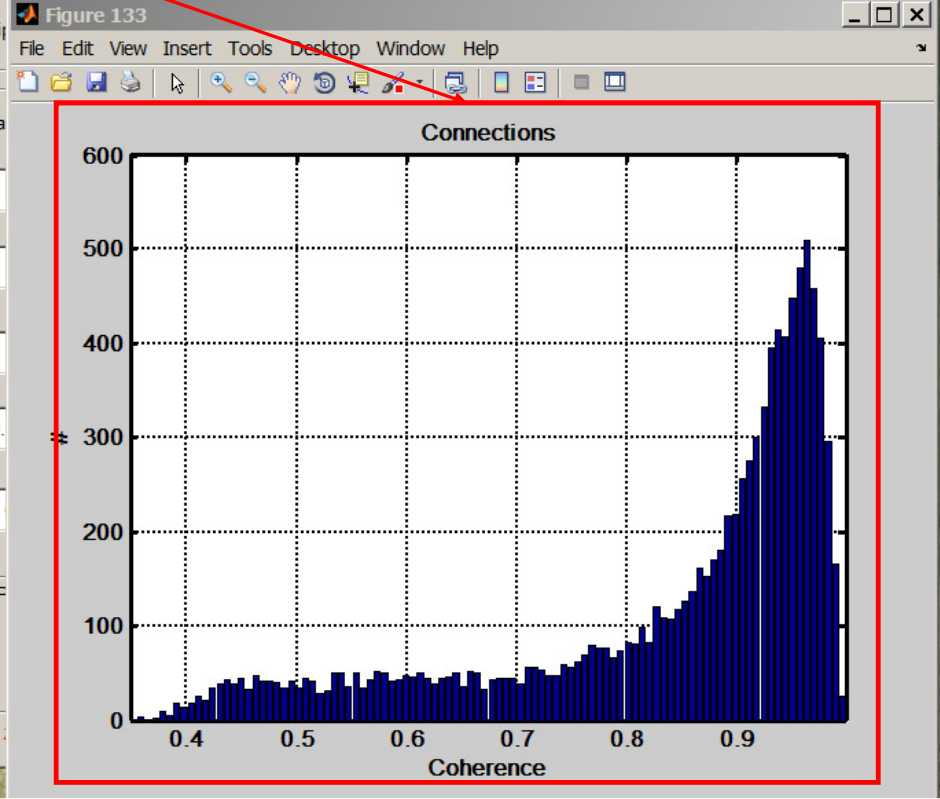
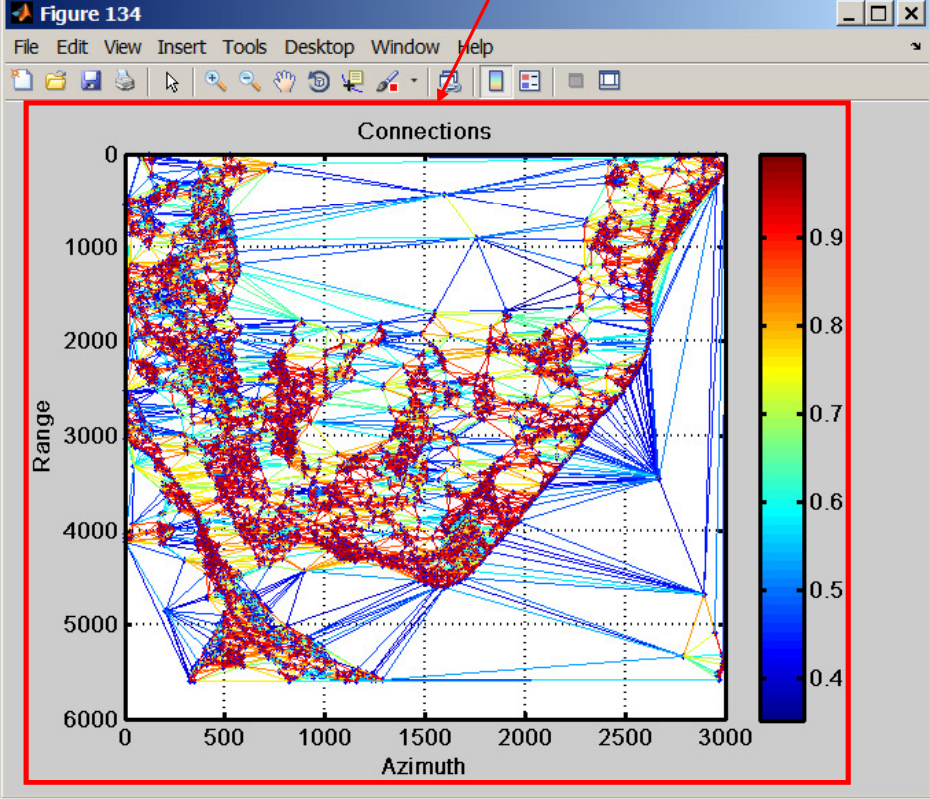
Graph Analysis and Refinement - D:\data\CUHK_TSX_short\

Images Combination: STAR, 1 sensor [Plot Graph] Images Nr. 28 Conn. Nr. 28 Update Mode APS pre-removal

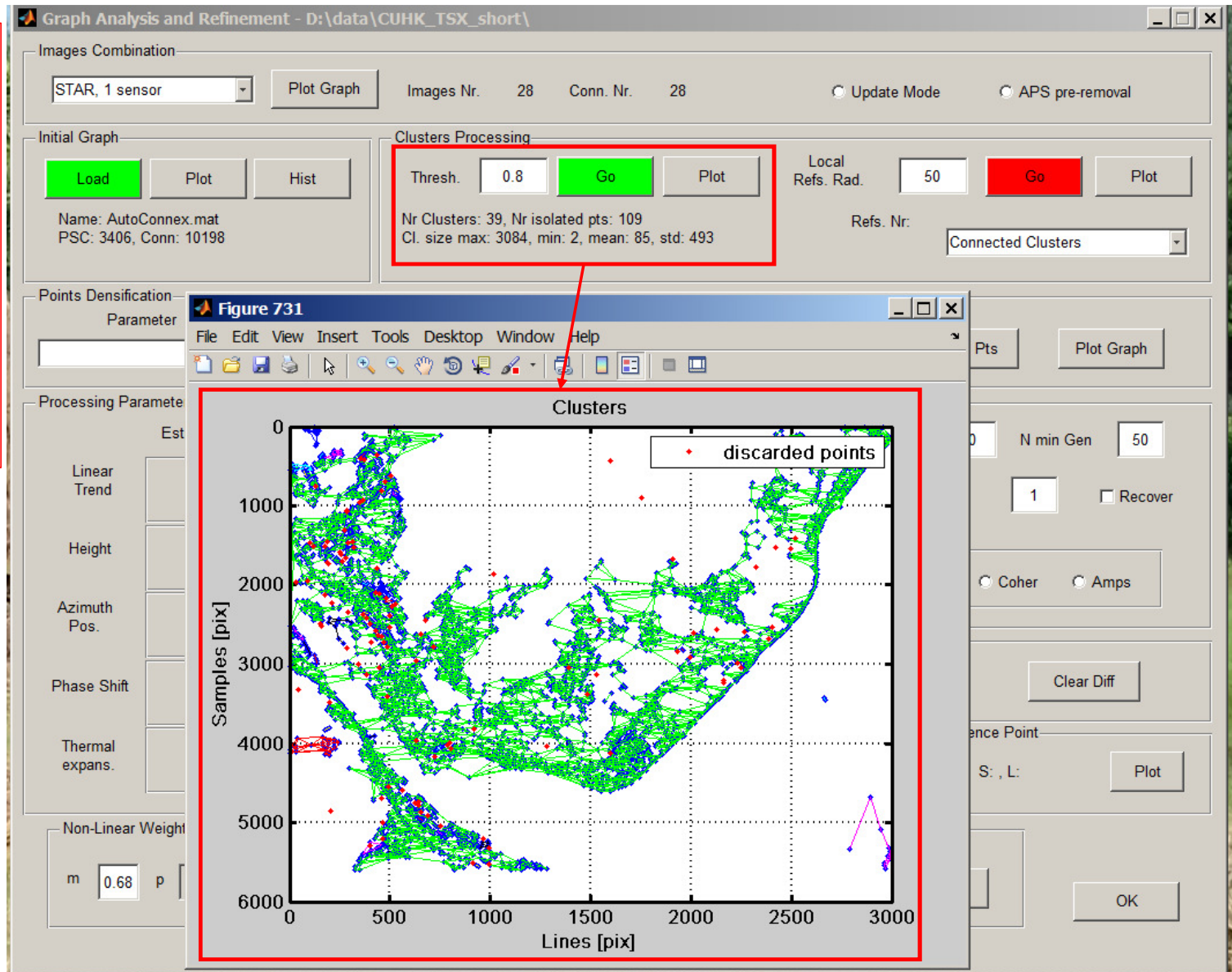
Initial Graph: [Load] [Plot] [Hist] Clusters Processing: Thresh. 0.68 [Go] [Plot] Local Refs. Rad. 50 [Go] [Plot] Refs. Nr. Connected Clusters

Name: AutoConnex.mat PSC: 3406, Conn: 10198

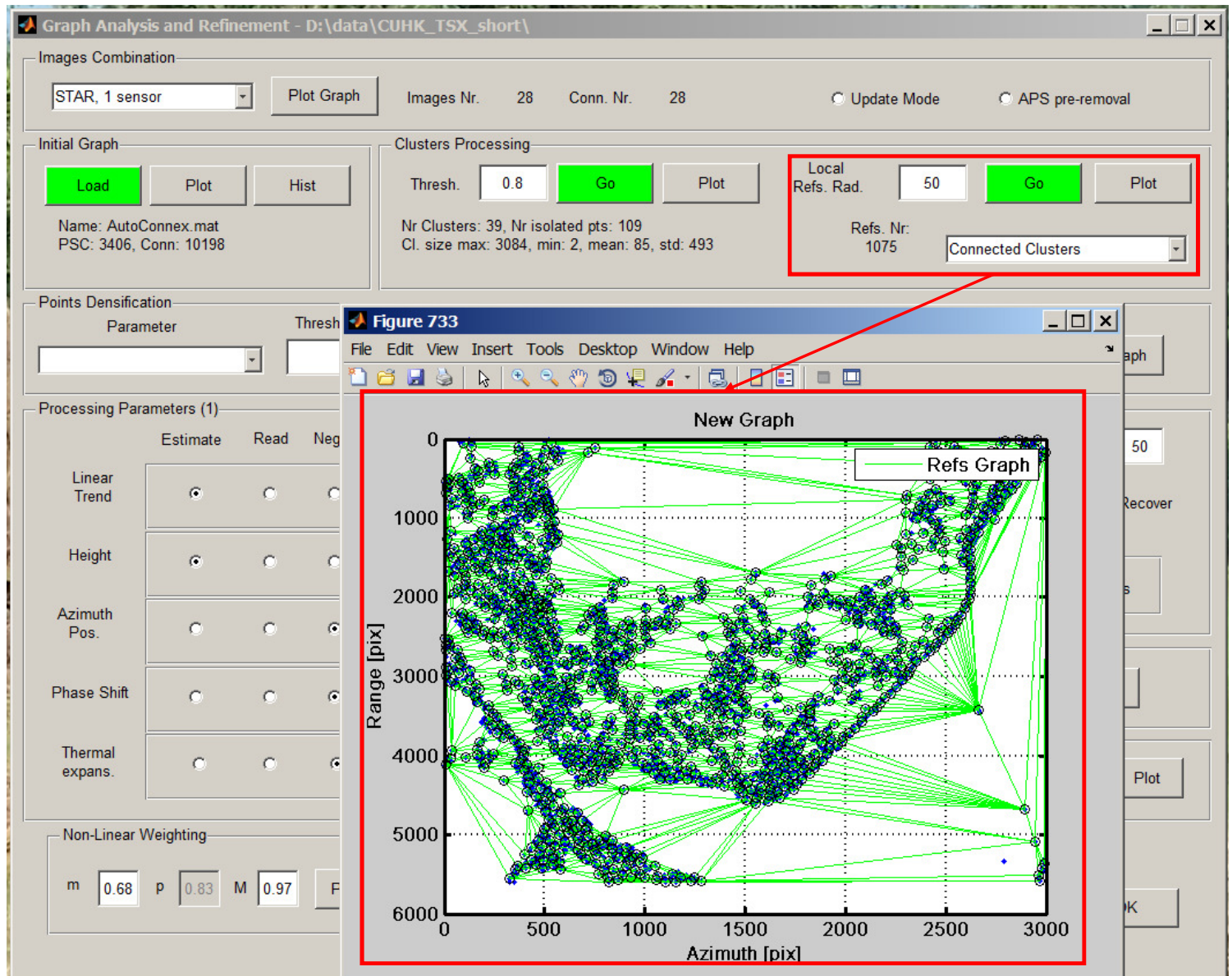
Points Densification: Parameter Thresh. Max Dist New Pts. Nr.



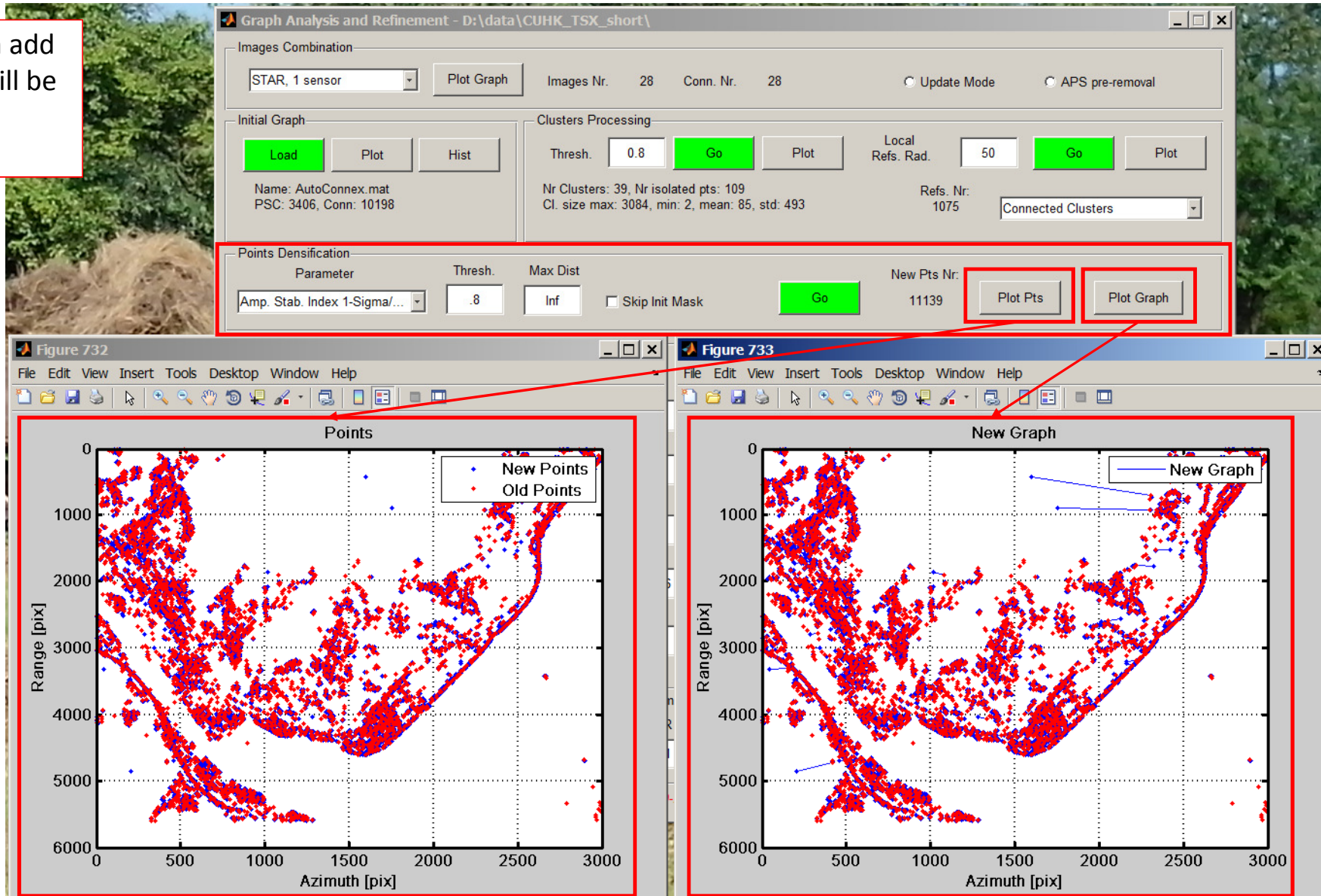
By placing a rigid coherence threshold, we split the graph into multiple clusters and we analyze the connectivity. Clusters are plotted with different colors, PSC that do not have connections over the threshold are discarded



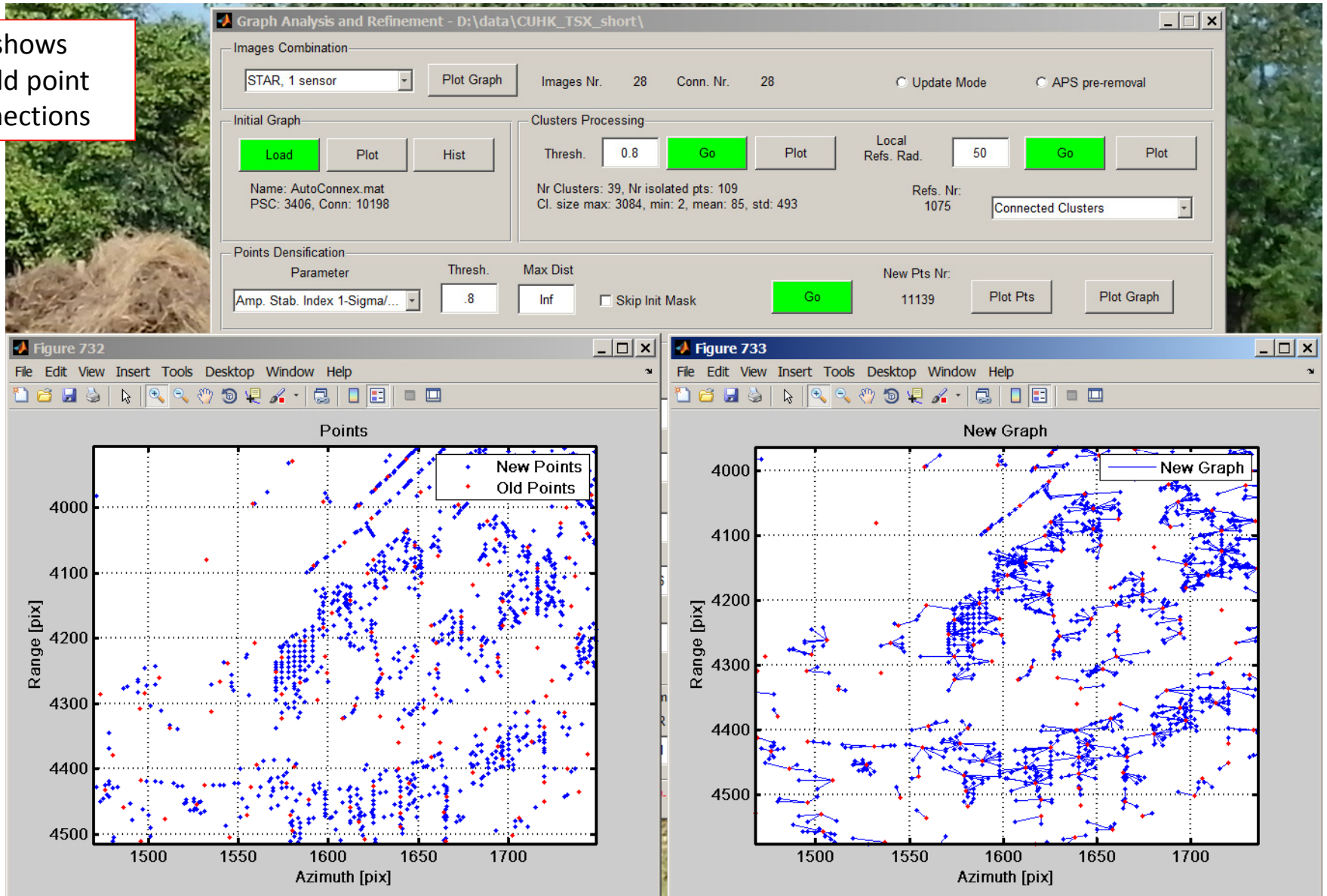
Most common option:
we want to process
connected clusters.
Thus, we try to connect
separate clusters by
creating a new graph.
The new graph is built
based on a set of local
references. Local
references are selected
based on the temporal
coherence previously
estimated. The radius
sets the minimum
distance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

Graph Analysis and Refinement - D:\data\CUHK_TSX_short\

Images Combination: STAR, 1 sensor | Plot Graph | Images Nr. 28 | Conn. Nr. 28 | Update Mode | APS pre-removal

Initial Graph: Load | Plot | Hist | Name: AutoConnex.mat | PSC: 3406, Conn: 10198

Clusters Processing: Thresh. 0.8 | Go | Plot | Local Refs. Rad. 50 | Go | Plot | Nr Clusters: 39, Nr isolated pts: 109 | Cl. size max: 3084, min: 2, mean: 85, std: 493 | Refs. Nr: 1075 | Connected Clusters

Points Densification: Amp. Stab. Index 1-Sigma/... | Thresh. .8 | Max Dist Inf | Skip Init Mask | Go | New Pts Nr: 11139 | Plot Pts | Plot Graph

Processing Parameters (1):

	Estimate	Read	Neglect	Parameters Range	
Linear Trend	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-30	30
Height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-50	50
Azimuth Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1	1
Phase Shift	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-3.1416	3.1416
Thermal expans.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-0.4	0.4

Processing Parameters (2): Ext. DEM | UW | Smart 0 | N min Gen 50 | Scattering Centers 1 | Polynomial Order 1 | Recover | Matr. Coher. Win 15 15 | Weights: None | Coher | Amps

Connections processing: Go | Save As | Clear Diff

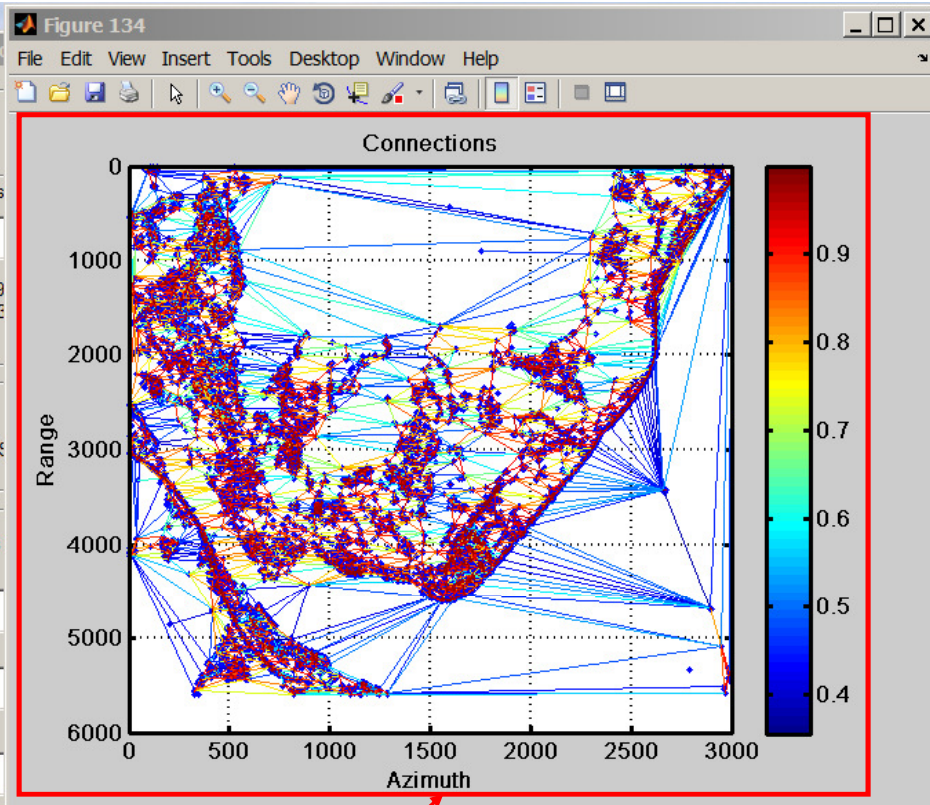
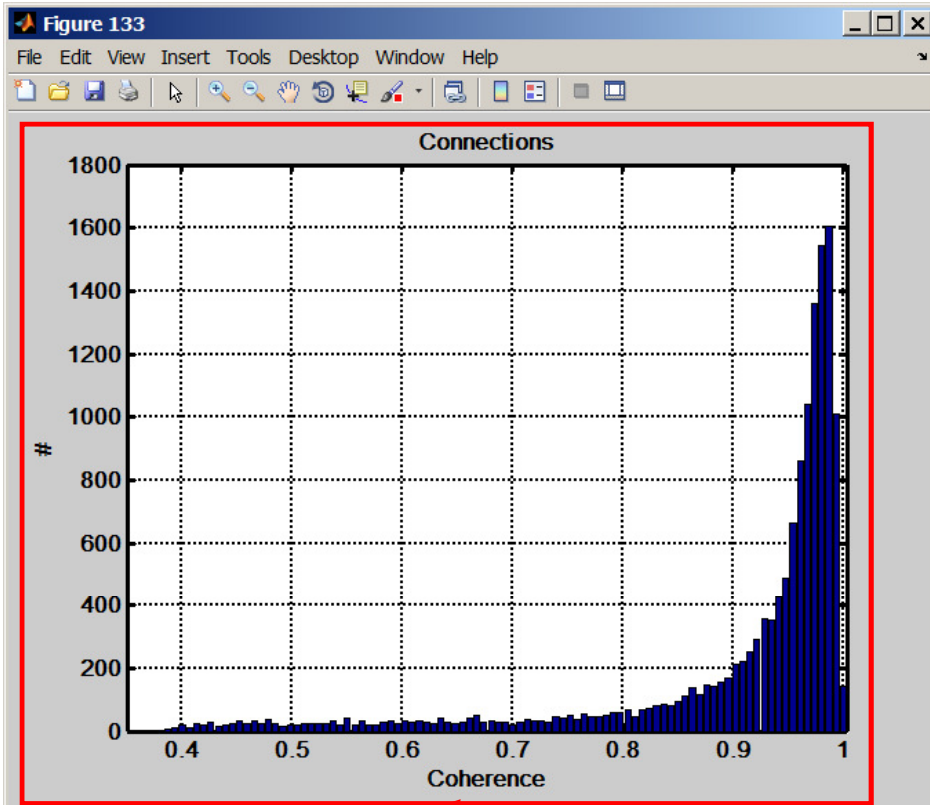
Connections coherence: Hist | Plot Graph | N Stats

Reference Point: S: 2728, L: 1763 | Plot

Non-Linear Weighting: m 0.68 | p 0.83 | M 0.97 | Plot

Estimated Parameters: Plot | R 1 | r0 1 | ds 10 | Flatten | Optional Save | Optional Export TS | OK

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

Phase Shift: -3.1416 3.1416

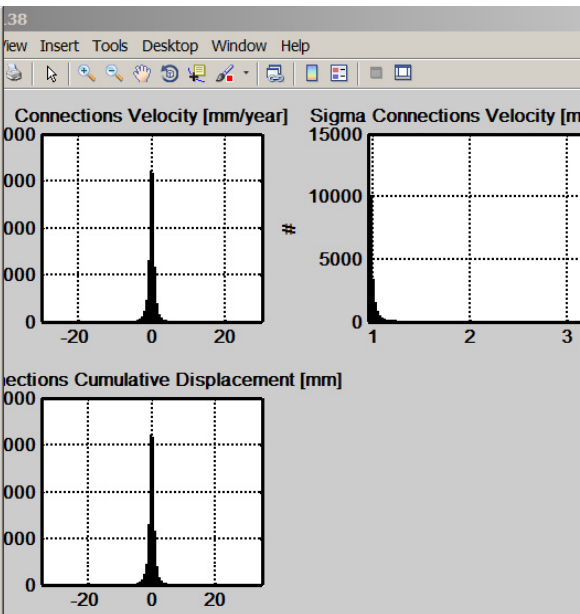
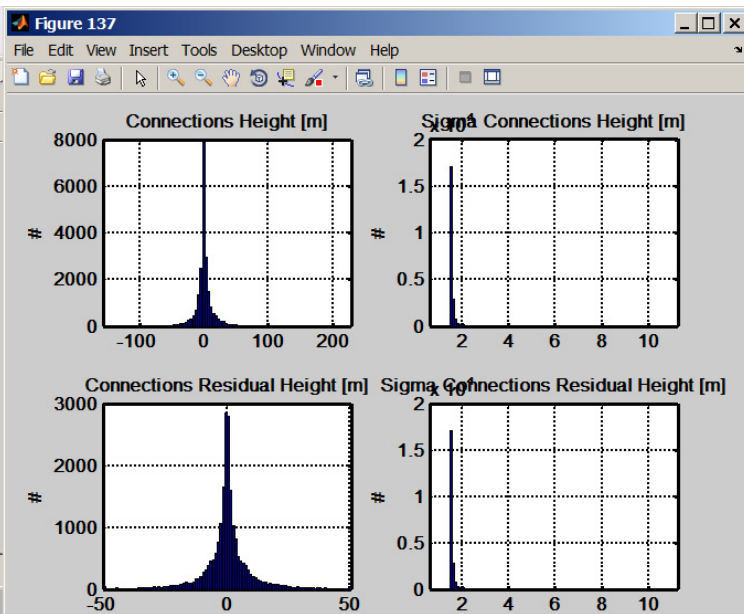
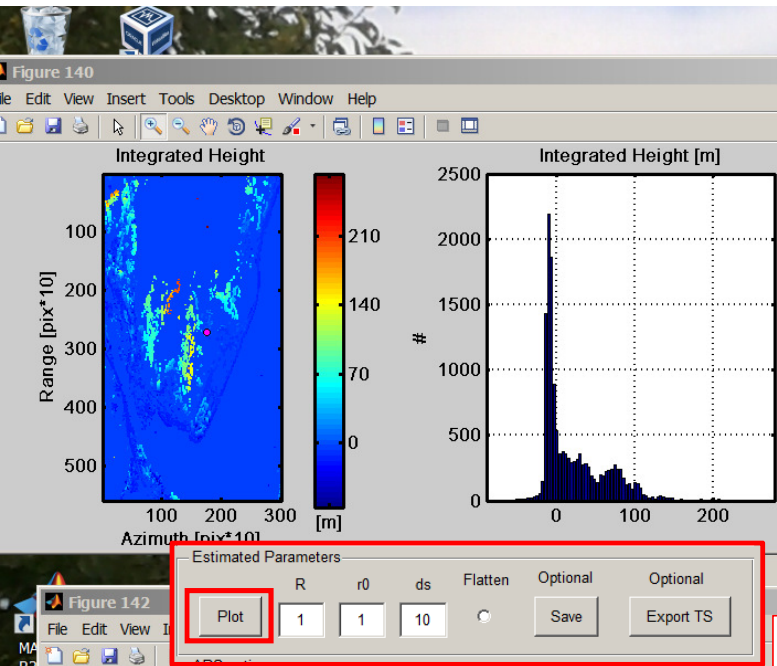
Thermal expans.: -0.4 0.4

Connections coherence:

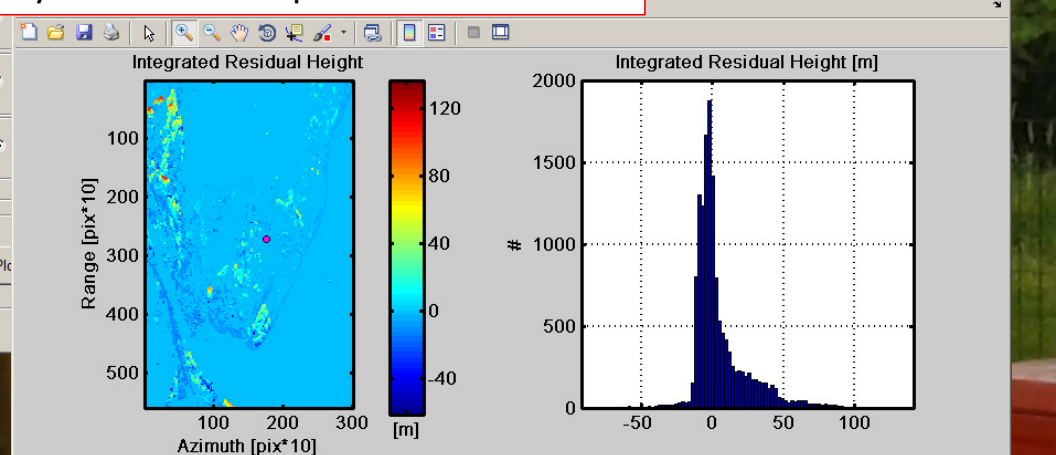
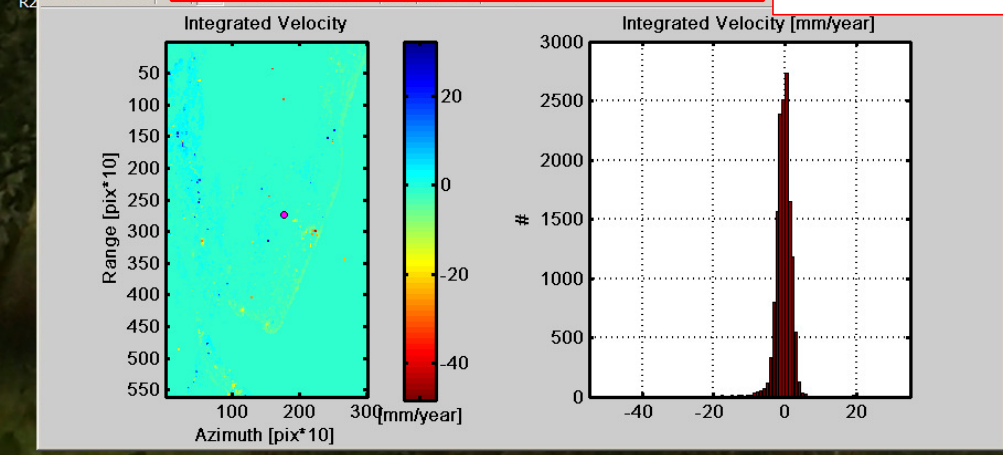
Reference Point: S: 2728, L: 1763

Non-Linear Weighting: m: 0.68 p: 0.83 M: 0.97

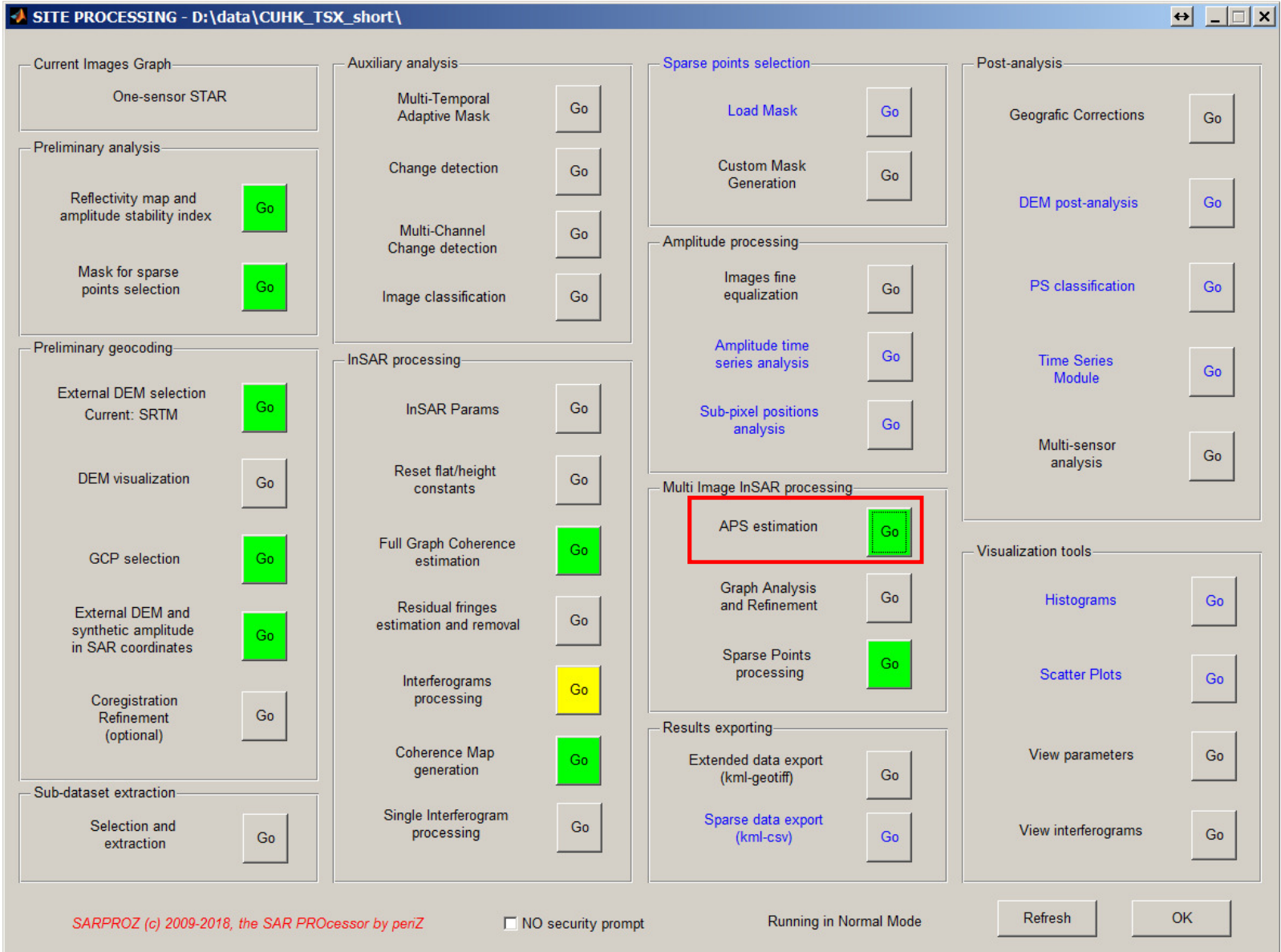
Estimated Parameters: R: 1 r0: 1 ds: 10 Flatten: Optional:



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



APS Processing - D:\data\CUHK_TSX_short\

Select File to Open

Computer > Data (D:) > data > CUHK_TSX_short > RESULTS > MATLAB

Name	Date modified	Type
SPMRAutoSave.mat	2/15/2018 4:34 PM	MAT File
RefPoint.mat	2/15/2018 4:12 PM	MAT File
AutoConnex.mat	2/15/2018 3:48 PM	MAT File
SPMRAutoSave2.mat	2/15/2018 2:03 PM	MAT File
SiteParam.mat	2/15/2018 11:38 AM	MAT File
AutoMISP-PRJ-Atmo.mat	10/21/2017 11:38 ...	MAT File
AutoMISP-PRJ-Diff.mat	10/21/2017 11:38 ...	MAT File
AutoMISP-PRJ-Results.mat	10/21/2017 11:38 ...	MAT File
AutoPSC_MISP.mat	10/21/2017 11:28 ...	MAT File
AutoGraph.mat	10/21/2017 11:08 ...	MAT File
InSarParam.mat	10/21/2017 7:46 AM	MAT File
RefPointt.mat	9/22/2017 6:15 PM	MAT File

File name: SPMRAutoSave.mat

Open Cancel

APS: 0 Update Mode APS pre-removal

Plot Save Load

Connections Nr: Save Load

Save As Clear Diff Load

Non-Linear Weighting

m	p	M	Plot
0	0.5	1	

Go Plot Nr 0 < >

APS options

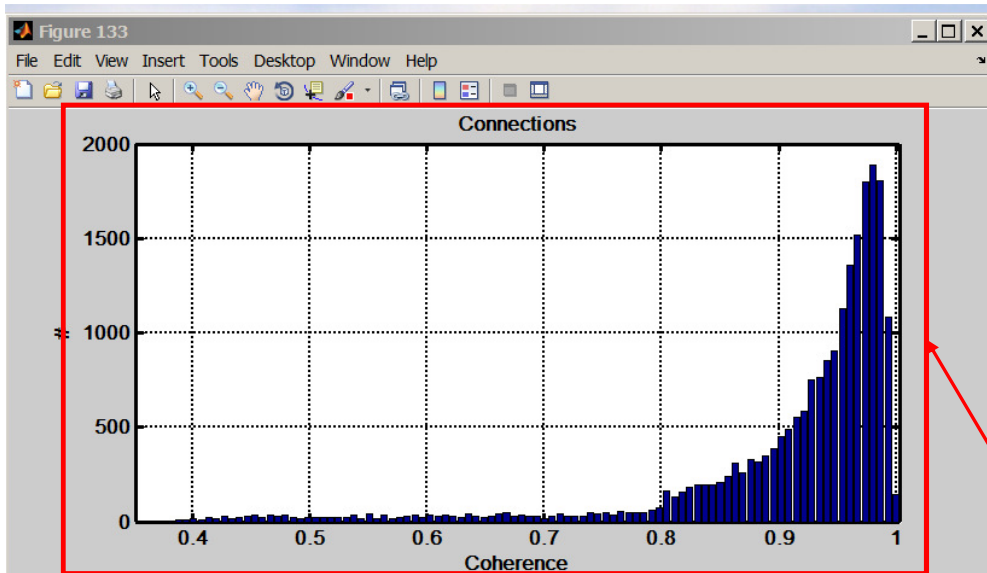
Type: Inverted Residuals Stratif. R: 150 DSF: 25

APS Estimate

Go Plot Test OK

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



Conn. Nr. 28 Missing APS: 0 Update Mode APS pre-removal

PSC Nr: 14436

Connections Nr: 21645

Connections processing:

Connections coherence:

Non-Linear Weighting: m: 0.68 p: 0.83 M: 0.97

Reference Point: Auto Nr: 0

S, L:

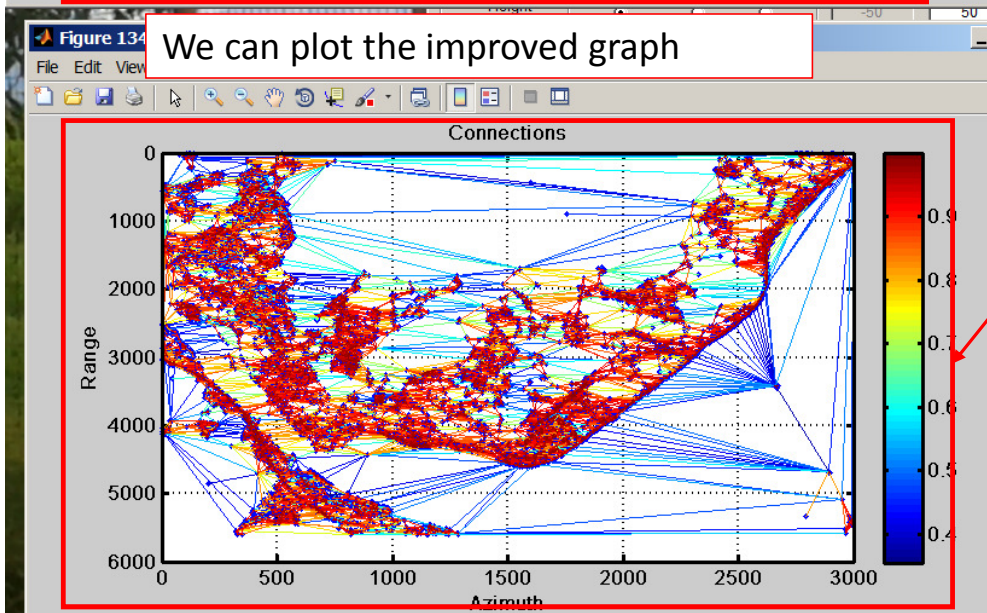
Estimated Parameters: R: 1 r0: 1 ds: 10 Flatten: Optional:

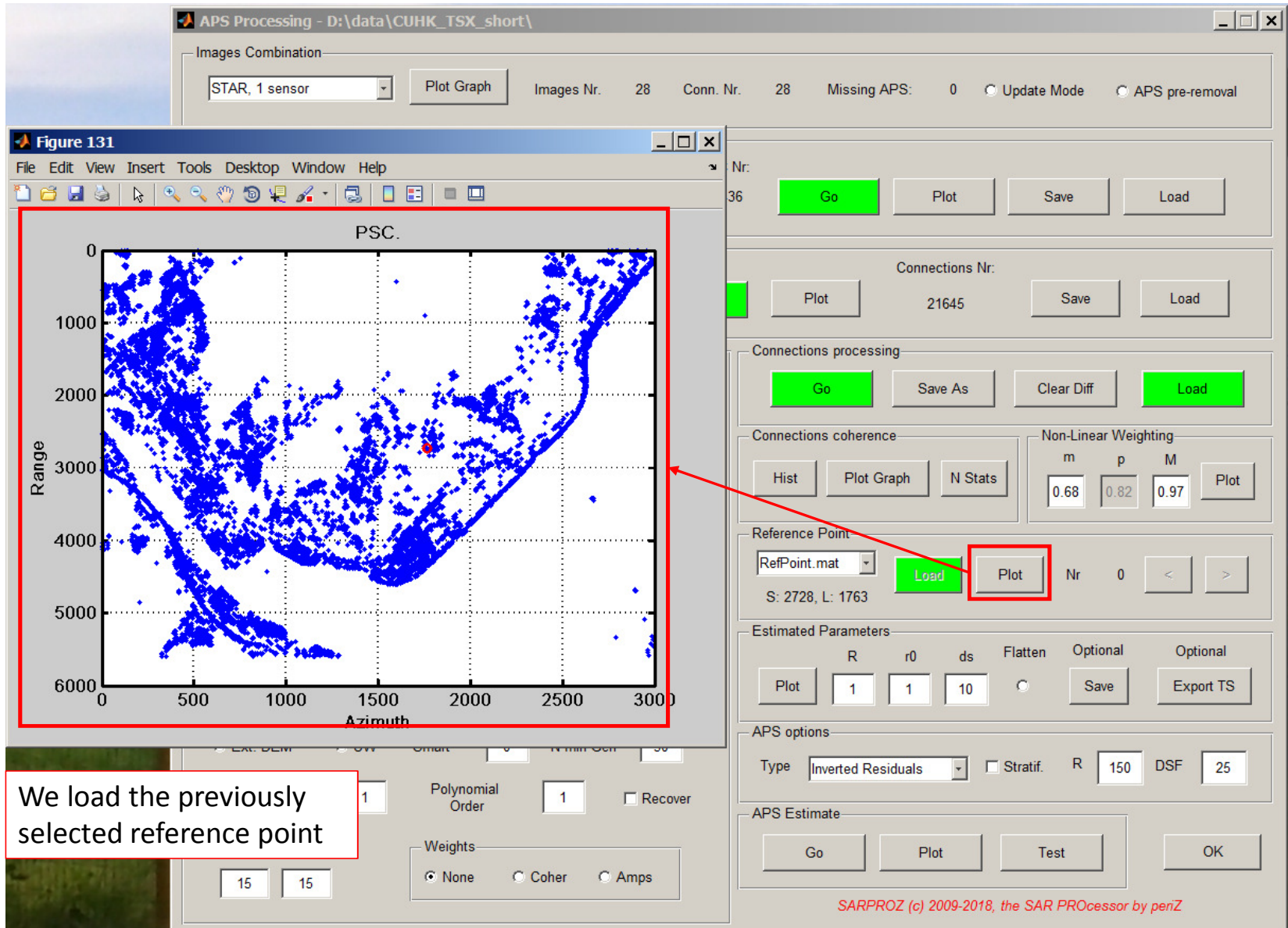
APS options: Type: Inverted Residuals Stratif. R: 150 DSF: 25

APS Estimate:

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We can plot the improved graph





Finally, we estimate the APS

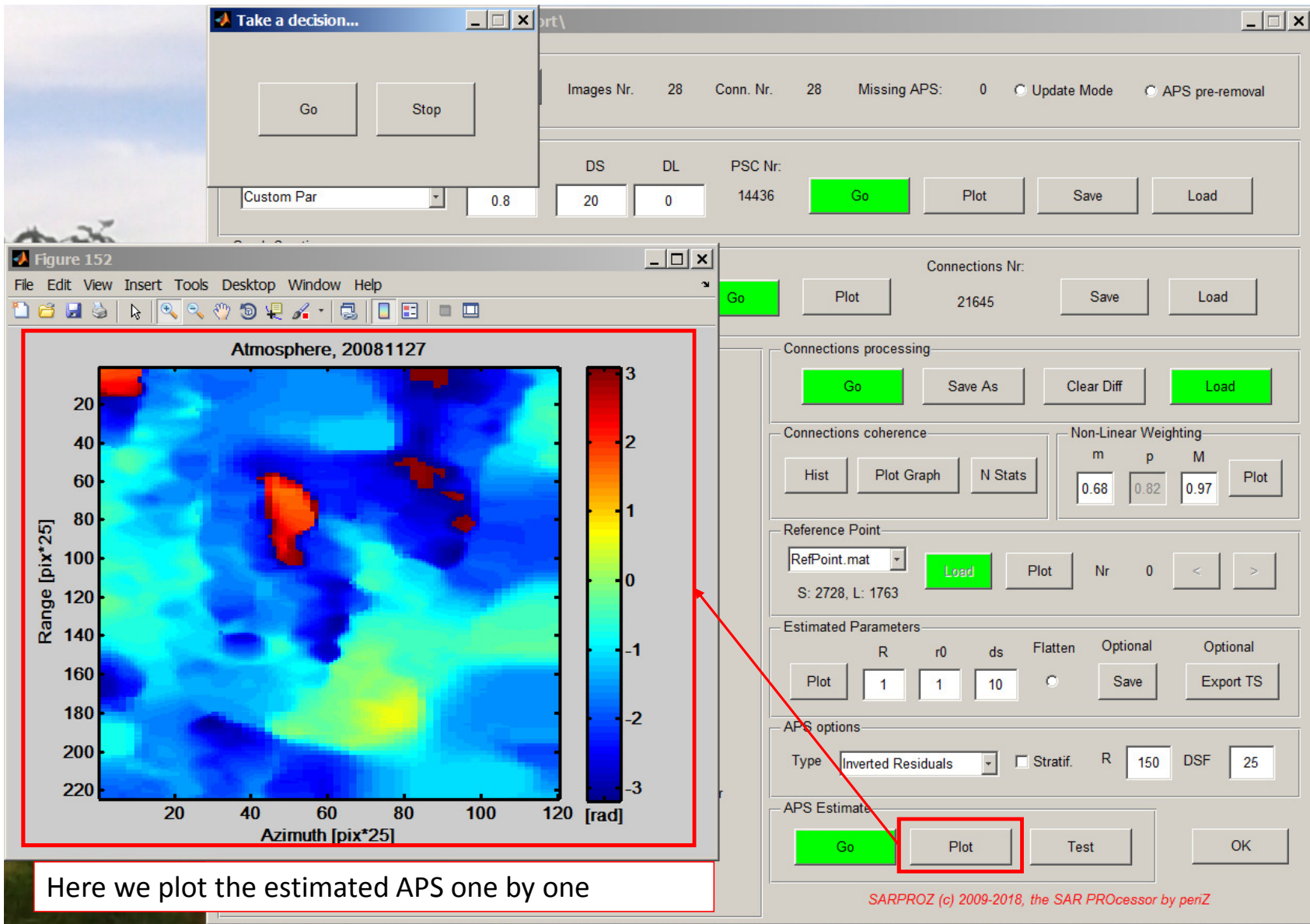
The screenshot shows the 'APS Processing' software interface with the following sections and settings:

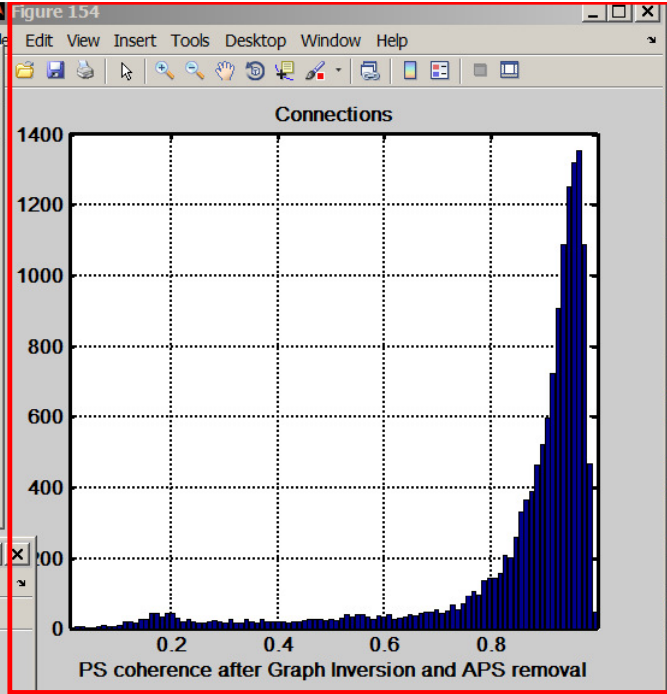
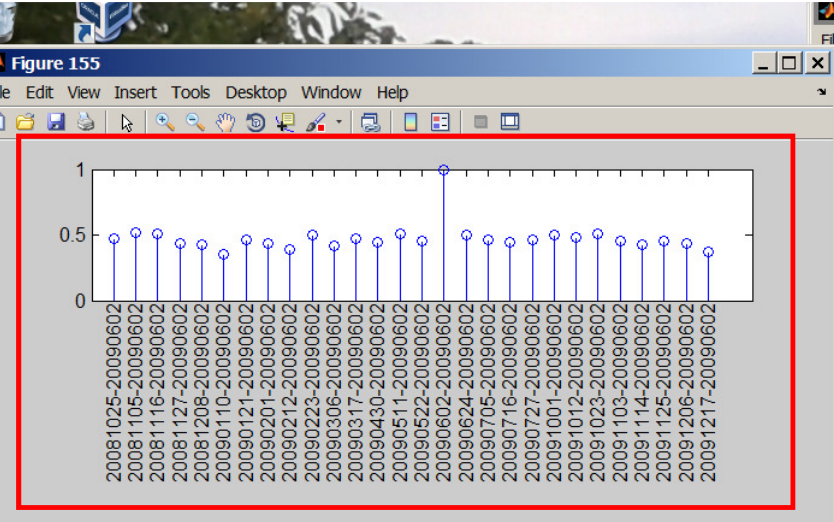
- Images Combination:** STAR, 1 sensor; Plot Graph; Images Nr. 28; Conn. Nr. 28; Missing APS: 0; Update Mode; APS pre-removal.
- Sparse Points Selection:** Custom Par; Thresh. 0.8; DS 20; DL 0; PSC Nr. 14436; Go; Plot; Save; Load.
- Graph Creation:** Custom Graph; Min Nr 10; Min R 30; Max R 150; Go; Plot; Connections Nr. 21645; Save; Load.
- Processing Parameters:**

	Estimate	Read	Neglect	Parameters Range	
Linear Trend	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-30	30
Height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-50	50
Azimuth Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1	1
Phase Shift	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-3.1416	3.1416
Thermal expans.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-0.4	0.4

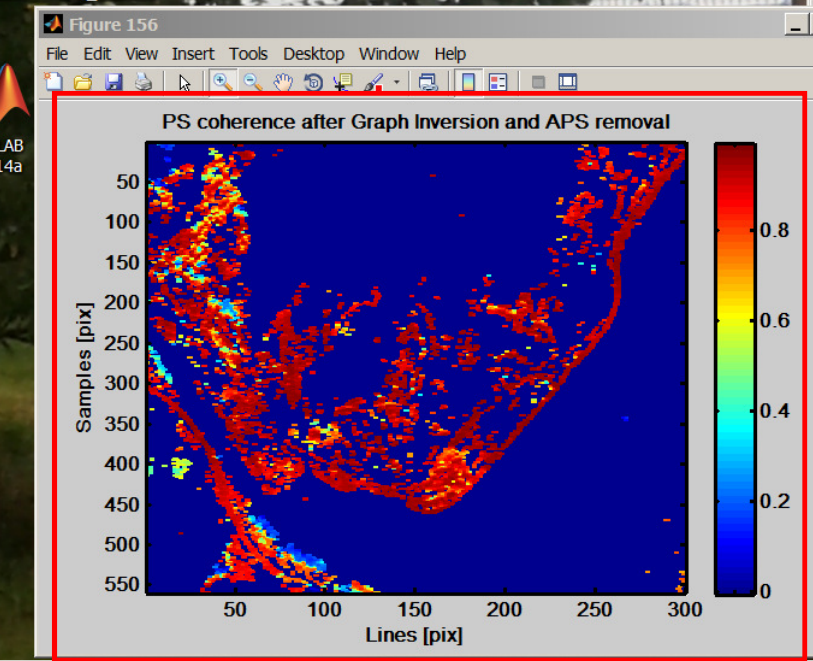
Ext. DEM UW Smart 0 N min Gen 50
Scattering Centers 1 Polynomial Order 1 Recover
Matr. Coher. Win 15 15 Weights: None Coher Amps
- Connections processing:** Go; Save As; Clear Diff; Load.
- Connections coherence:** Hist; Plot Graph; N Stats; Non-Linear Weighting: m 0.68, p 0.82, M 0.97; Plot.
- Reference Point:** RefPoint.mat; Load; Plot; Nr 0; S: 2728, L: 1763.
- Estimated Parameters:** Plot; R 1; r0 1; ds 10; Flatten ; Optional Save; Optional Export TS.
- APS options:** Type Inverted Residuals; Stratif. ; R 150; DSF 25.
- APS Estimate:** Go (highlighted); Plot; Test; OK.

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Software control panel for APS estimation. It includes buttons for "Go", "Plot", "Save", "Load", and "Test". A red box highlights the "Test" button.



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.