

# SARPROZ

*The SAR, InSAR, PSInSAR, ... PROcessor by periz*

*copyright: Daniele Perissin, 2009, [tool.periz@gmail.com](mailto:tool.periz@gmail.com)*

Dragon 3 Land Training course, SAR Practical, day 6

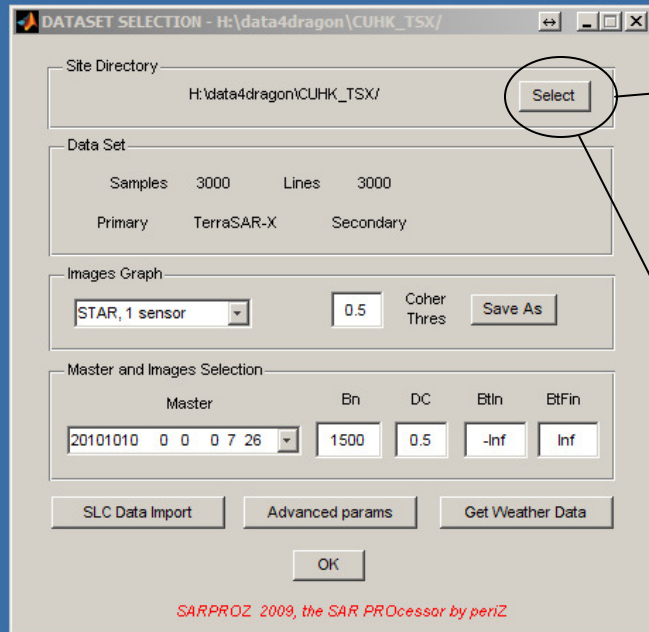
Part II

How to separate movement,  
residual height, orbital inaccuracies  
and Atmospheric Delay?

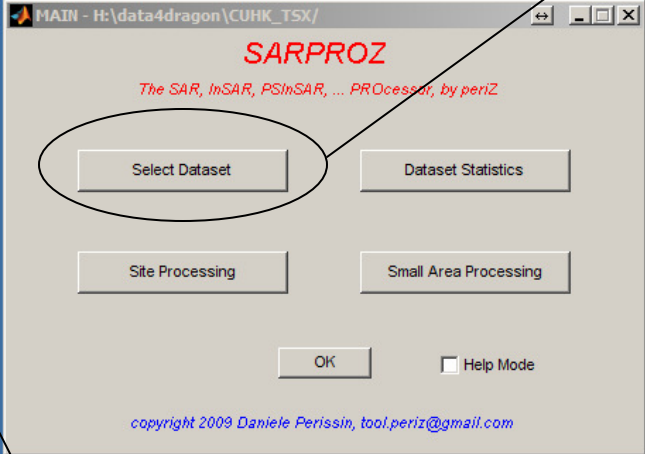
The Permanent Scatterers Technique,  
implemented by SARPROZ

Exercise 2, PSInSAR example

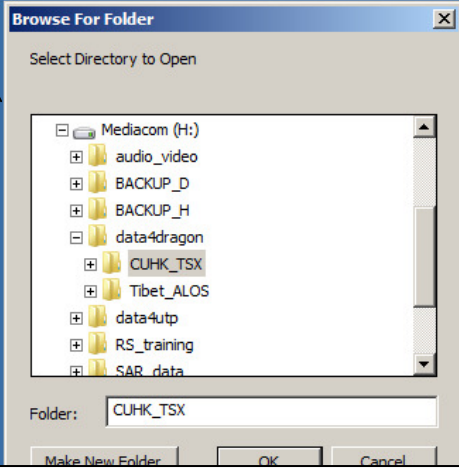
TerraSAR-X data in Hong Kong



Press "Select DataSet"  
And then "Select"

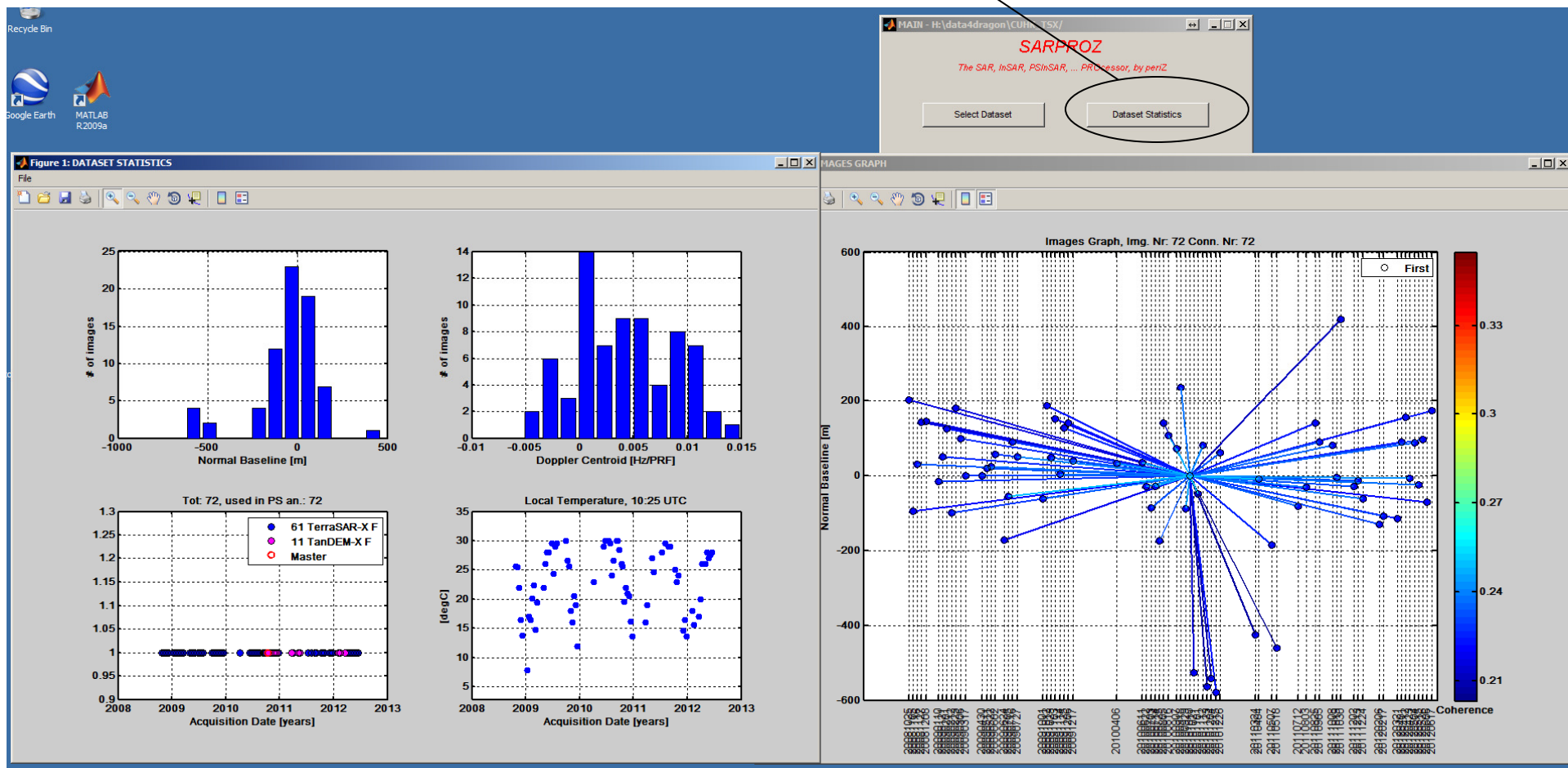


```
main
Failed in reading the image params in H:\data4dragon\CUHK_TSX/
load_image: files H:\data4dragon\CUHK_TSX\IMAGES\20101010\Image.conf and H:\data4dragon\CUHK_TSX\IMAGES\20101010\Image.conf.mat not found
Failed in reading the image params in H:\data4dragon\CUHK_TSX/
An error occurred and was saved in the file lasterror.mat, directory D:\SAR\matlab\compiled
If you need assistance, please include the file lasterror.mat
You may include also file 18_Sep_2012_10_47_26_sarproz.log
Here a glimpse:
Output argument "DataSet" (and maybe others) not assigned during call to "C:\Users\periz\AppData\Local\Temp\periz\mcrCache7.10\main_C0\SAR\matlab\guide\selezione_immagini.m>selezione_immagini".
directories of other sensors not found
one-sensor STAR graph
```

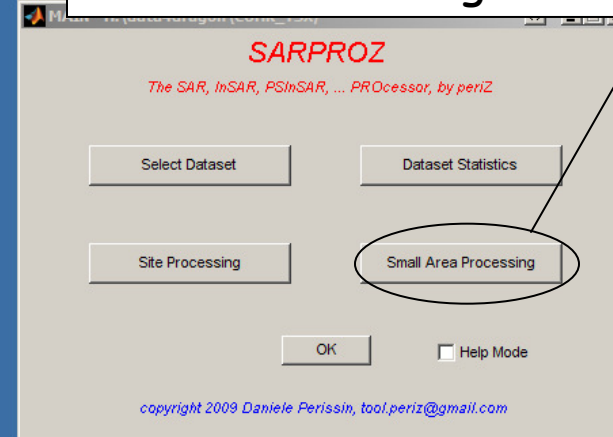
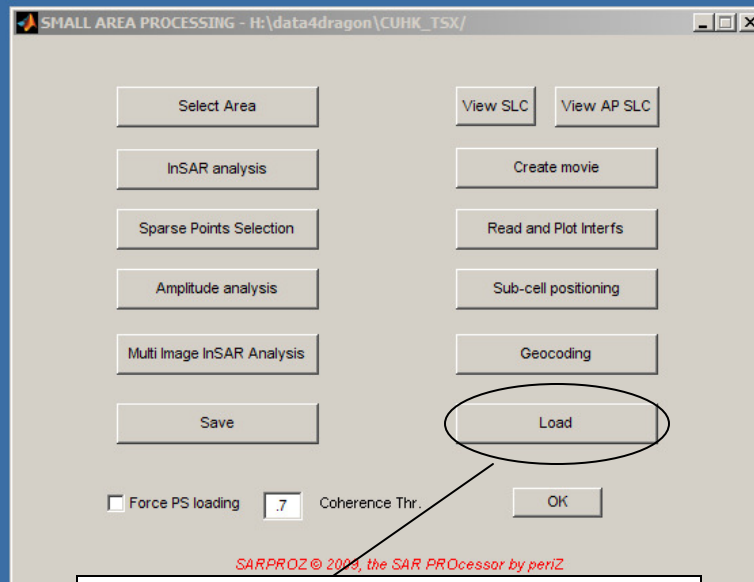


Select the directory "CUHK\_TSX"

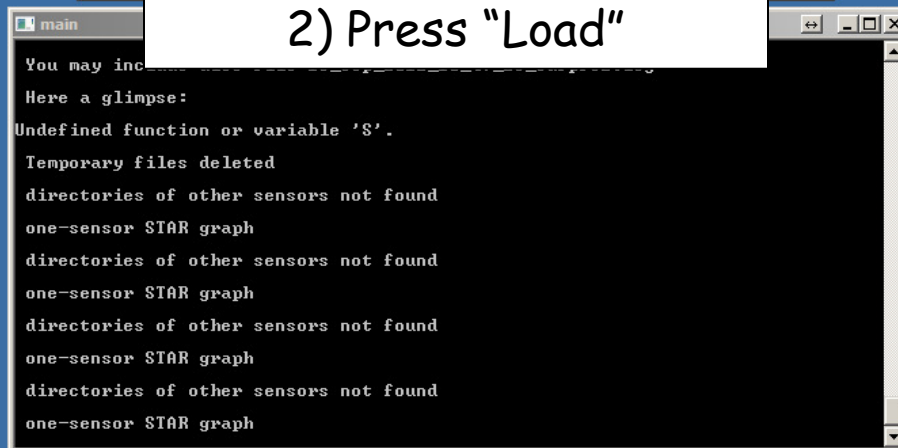
Press "DataSet Statistics" to visualize the main parameters



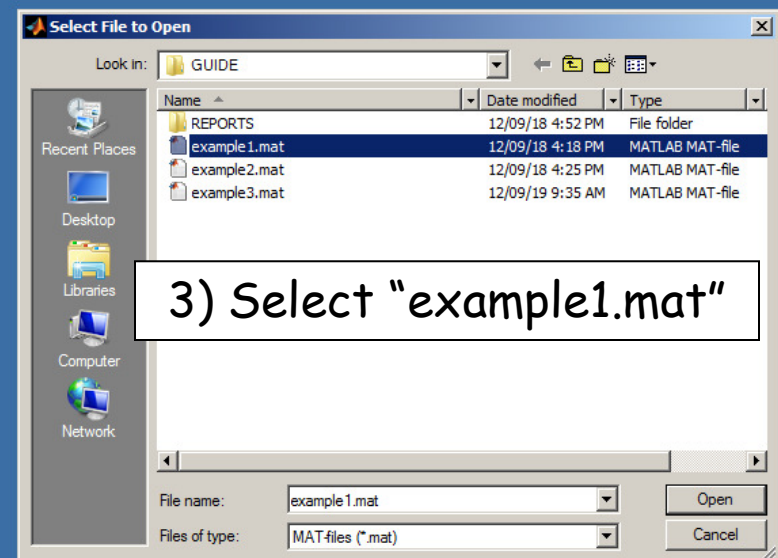
1) Press "Small Area Processing"

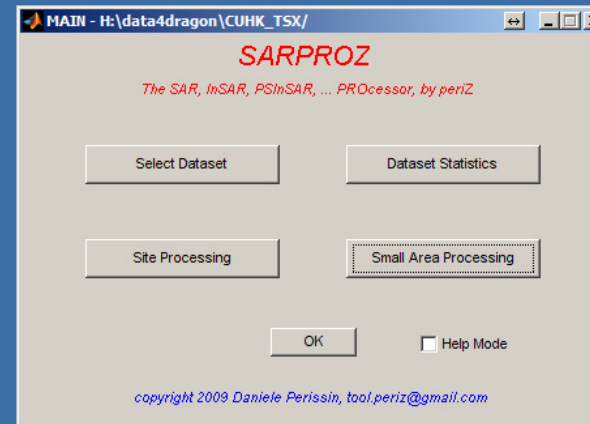
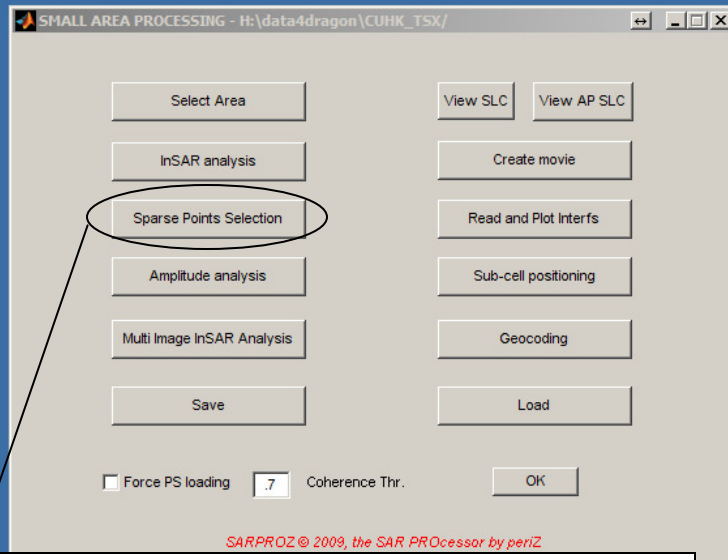


2) Press "Load"



3) Select "example1.mat"





Press "Sparse Points Selection"

```

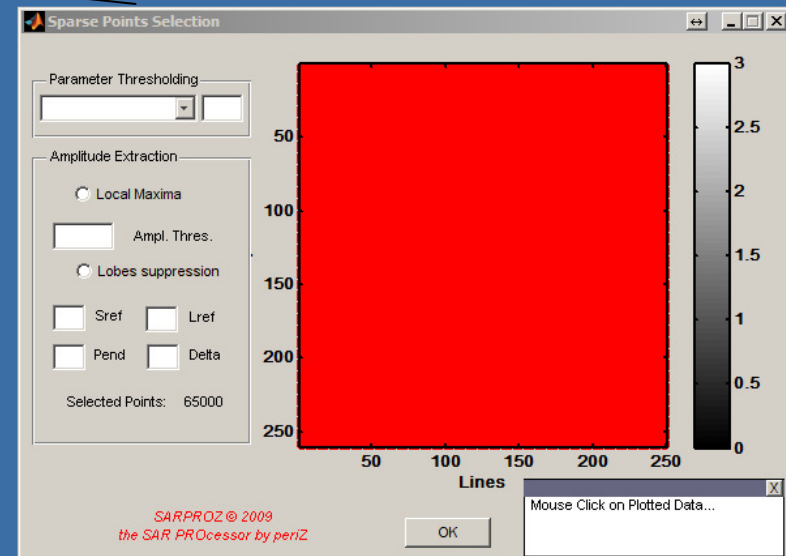
an error occurred and was saved in the file lasterror.mat, directory D:\SAR\mat
lab\compiled

If you need assistance, please include the file lasterror.mat
You may include also file 18_Sep_2012_10_47_26_sarproz.log
Here a glimpse:

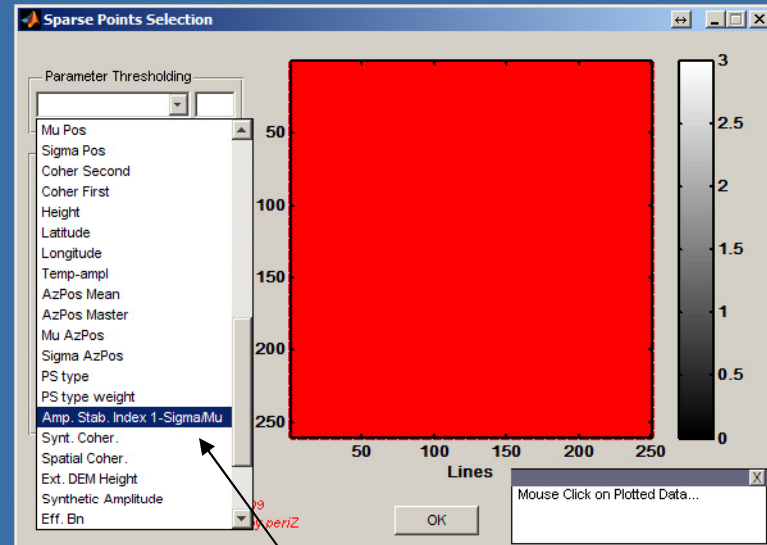
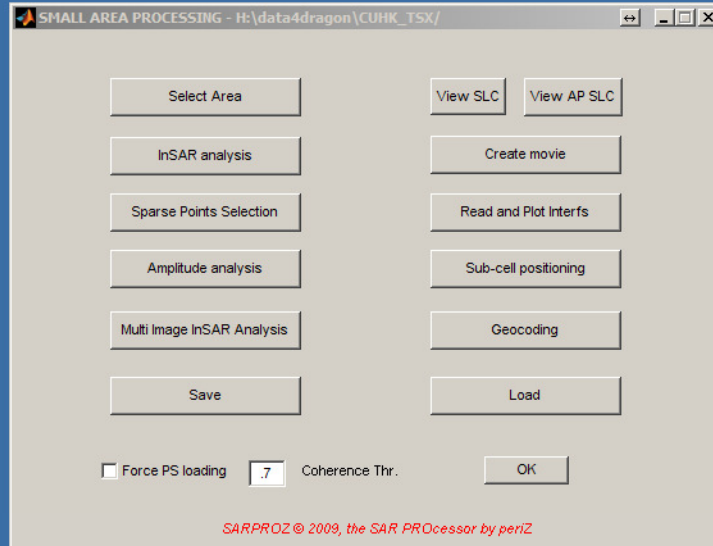
Output argument "DataSet" (and maybe others) not assigned during call to "C:\Use
rs\periz\AppData\Local\Temp\periz\ncrCache7.10\main_CB\SAR\matlab\guide\selezi
a_immagini.m">seleziona_immagini".

directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph

```



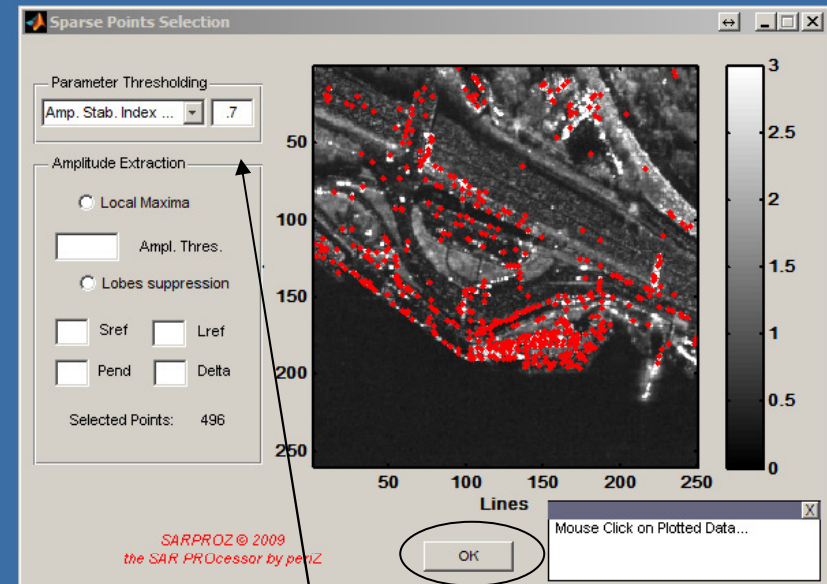
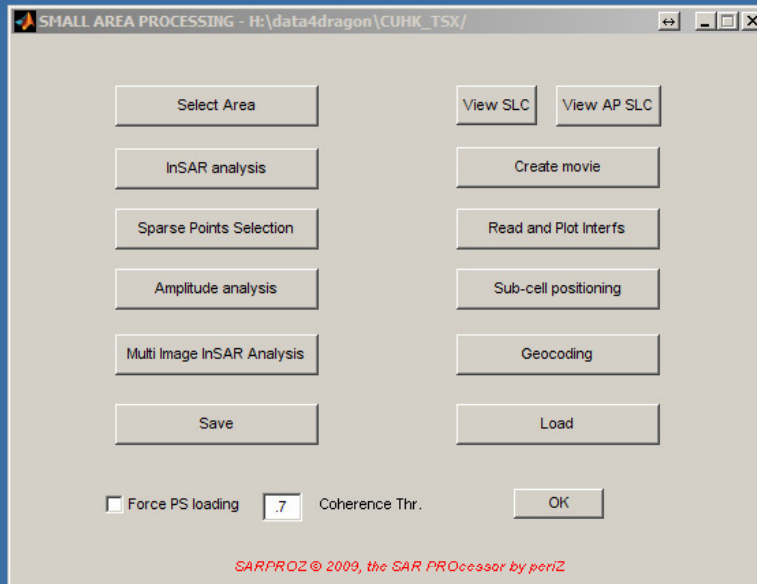
main



```
main
An error occurred and was saved in the file lasterror.mat, directory D:\SAR\matlab\compiled
If you need assistance, please include the file lasterror.mat
You may include also file 18_Sep_2012_10_47_26_sarproz.log
Here a glimpse:
Output argument "DataSet" (and maybe others) not assigned during call to "C:\Users\periz\AppData\Local\Temp\periz\mcrCache7.10\main_C0\SAR\matlab\guide\selezione_a_immagini.m">seleziona_immagini".
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
```

Choose a Parameter for PSC selection, e.g. "Amplitude Stability Index"





```
main
You may include also file 18_Sep_2012_10_47_26_sarproz.log
Here a glimpse:
Output argument "DataSet" (and maybe others) not assigned during call to "C:\Us
rs\periz\AppData\Local\Temp\periz\mcrCache7.10\main_C0\SAR\matlab\guide\selezio
a_immagini.m>seleziona_immagini".
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
mask loading
496 points with Amp. Stab. Index 1-Sigma/Mu > 0.70 , in window from 1711 to 19
70 samples, from 1161 to 1410 lines
```

Set a Threshold, e.g. 0.7, and press "Tab" on the keyboard. Press "Ok" to close the window.





**Sparse Points Multi-Image InSAR Analysis**

Reference Point  
Parameter: Refl. map    Coher: 0  
 Manual Selection    Go    APS: none

PS Processing  
Estimate    Read    Neglect    Parameters range

Linear Trend	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-100	100
Height	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-100	100
Az. Pos.	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-1	1
Phase Gap	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-pi	pi
Seasonal trend	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-4	4

Ext. DEM    Smart: 0    Nmin iter.: 50

Scattering Centers: 1    Polynomial Order: 1

Matr. Coher. Win: 15    15    Weights:  None     Coher     Amps

Visualization: Results    Phase Series  
 Matrix    R: 1    r0: 1    ds: 2    OK

Actions: Go    Write Results

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Press "Multi Image InSAR analysis"

```
main
rs\periz\AppData\Local\Temp\periz\ncrCache7.10\main_C0\SAR\matlab\guide\selezione
a_immagini.m>seleziona_immagini".
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
mask loading
496 points with Amp. Stab. Index 1-Sigma/Mu > 0.70 , in window from 1711 to 19
70 samples, from 1161 to 1410 lines
not considering birth and death dates
files H:\data4dragon\CUHR_TSX\RESULTS\Coer and H:\data4dragon\CUHR_TSX\RESULTS\
Coer.mat not found
```

dragon\CUHR\_TSX/

Select Area    View SLC    View AP SLC

InSAR analysis    Create movie

Sparse Points Selection    Read and Plot Interfs

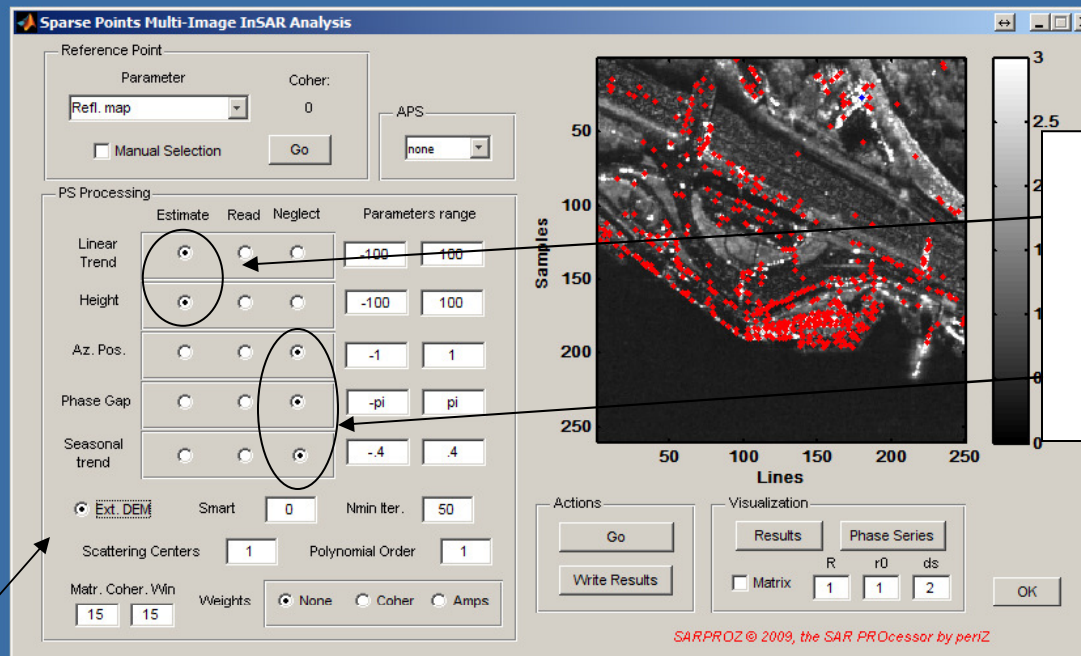
Amplitude analysis    Sub-cell positioning

**Multi Image InSAR Analysis**    Geocoding

Save    Load

Force PS loading    .7    Coherence Thr.    OK

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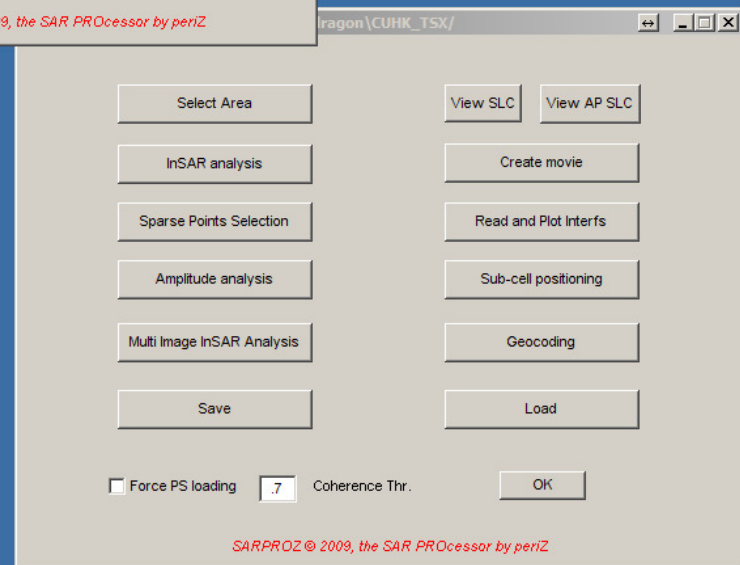


We choose to estimate "Linear Trend" and "Height" and we neglect the other parameters

We also use the "External DEM"

```

ps\periz\AppData\Local\Temp\periz\mcrCache7.10\main_C0\SAR\matlab\guide\seleziona_immagini.m>seleziona_immagini".
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
directories of other sensors not found
one-sensor STAR graph
mask loading
496 points with Amp. Stab. Index 1-Sigma/Mu > 0.70 , in window from 1711 to 1970 samples, from 1161 to 1410 lines
not considering birth and death dates
files H:\data4dragon\CUHK_TSX\RESULTS\Coer and H:\data4dragon\CUHK_TSX\RESULTS\Coer.mat not found
  
```



**Sparse Points Multi-Image InSAR Analysis**

Reference Point  
 Parameter: Refl. map Coher.: 0  
 Manual Selection  APS: none

PS Processing

	Estimate	Read	Neglect	Parameters range	
Linear Trend	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-100	100
Height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-100	100
Az. Pos.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-1	1
Phase Gap	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-pi	pi
Seasonal trend	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-.4	.4

Ext. DEM Smart: 0 Nmin Iter.: 50  
 Scattering Centers: 1 Polynomial Order: 1  
 Matr. Coher. WIn: 15 15 Weights:  None  Coher  Amps

Visualization  
   
 Matrix R: 1 r0: 1 ds: 2

Actions

After setting the desired options, press "Go"

Phase series processing 8% completed.

```

main
referring to Master acquisition
neglecting the atmosphere
APS empty
ignoring the atmosphere
reading phase-height coefficients
reading <single scattering center> synt height
loading the dataset by considering the images graph
Compensating for <single scattering center> height <Kdem>,
neglecting the atmosphere
calculating phases with respect to a reference point
loading dataset for the estimate
loading the dataset by considering the images graph
  
```

dragon\CUHK\_TSX/

Select Area

InSAR analysis

Sparse Points Selection

Amplitude analysis

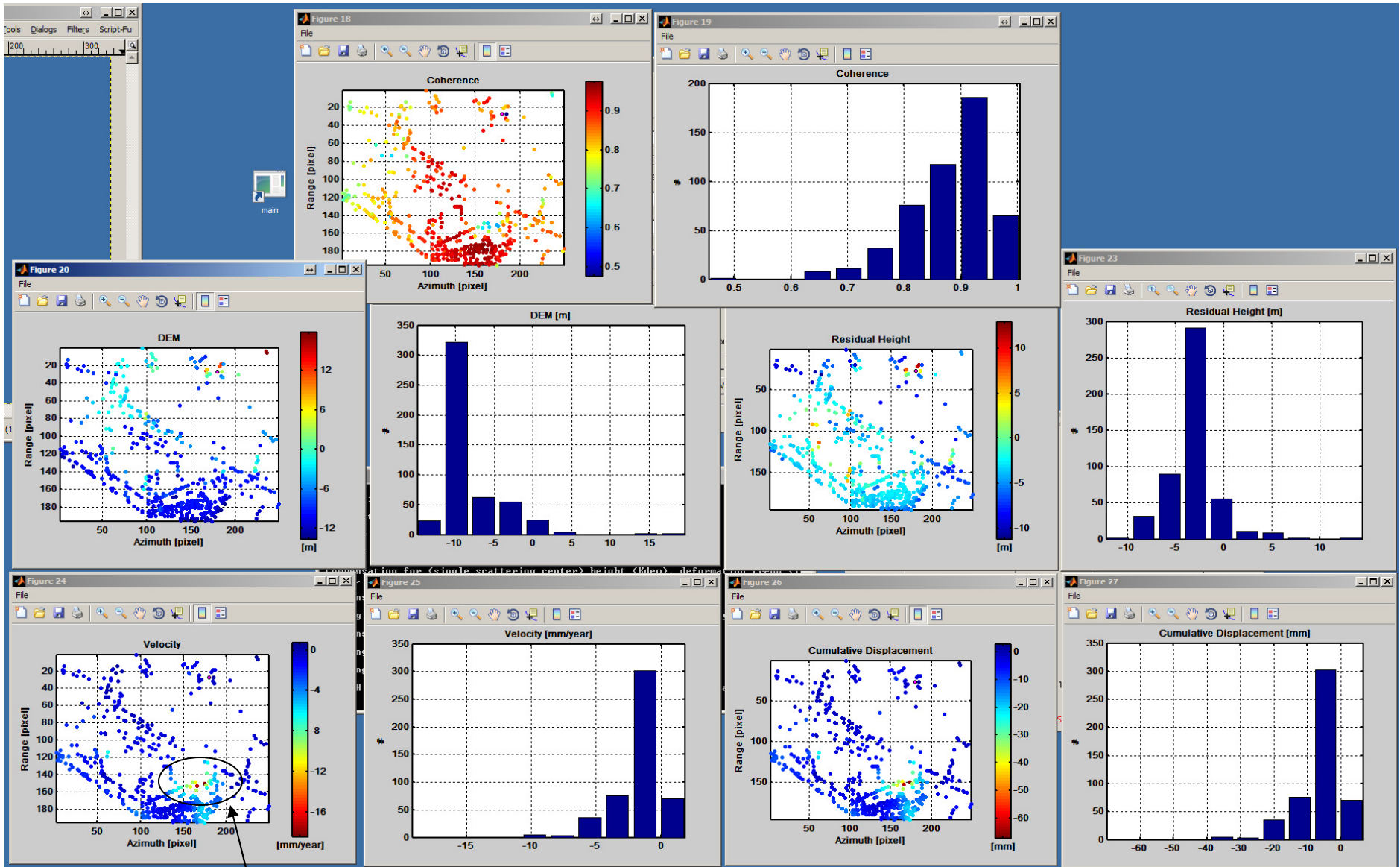
Multi Image InSAR Analysis

Save

Force PS loading  Coherence Thr.

When the processing terminates, press "Results" in the "Visualization" Panel

# The Results



The detected movement