SARPROZ

The SAR, InSAR, PSInSAR, … PROcessor by periZ

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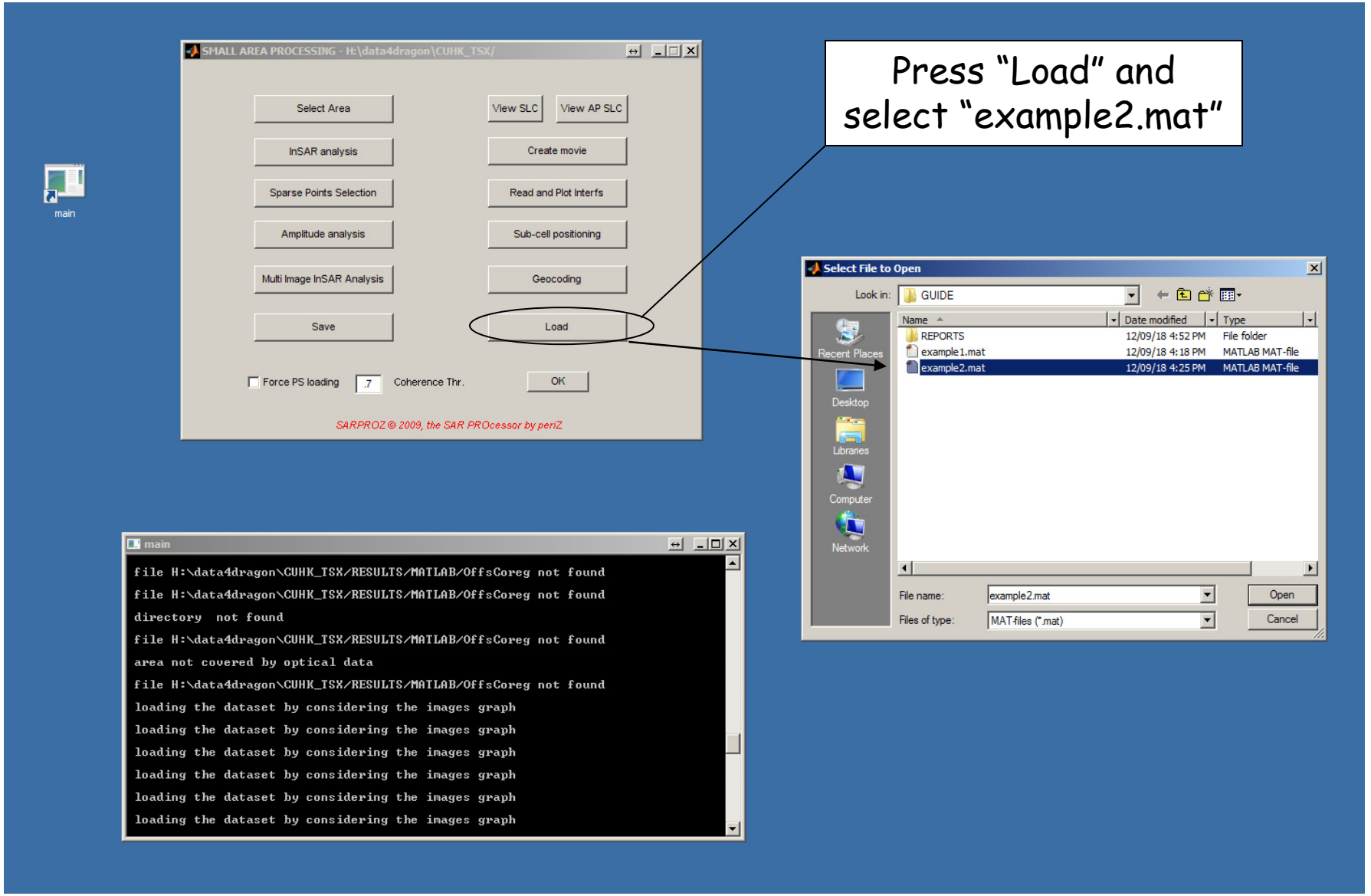
Dragon 3 Land Training course, SAR Practical, day 6

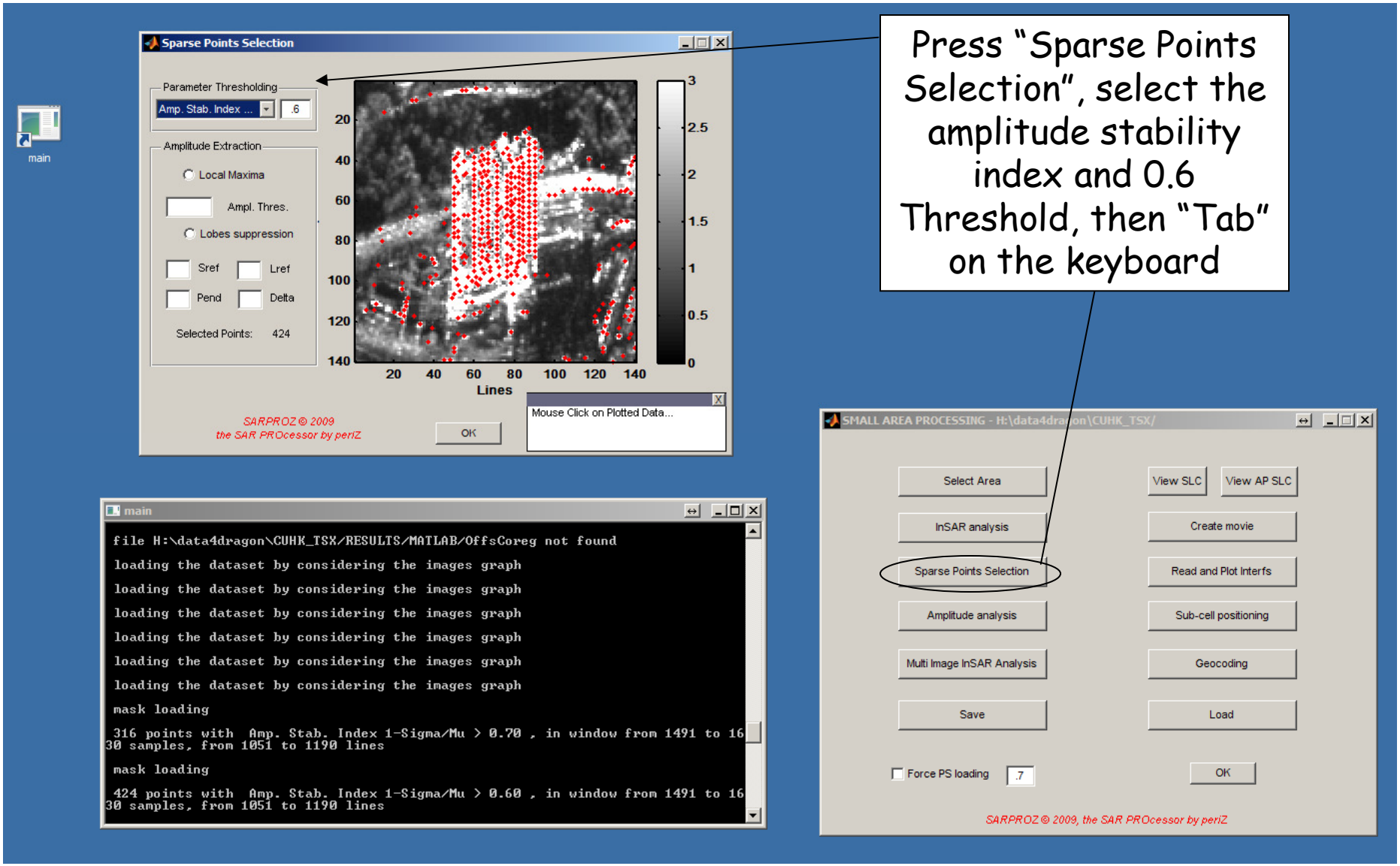
Part IV

The Permanent Scatterers Technique, implemented by SARPROZ

Exercise 3, PSInSAR example

TerraSAR-X data in Hong Kong


main
SMALL AREA PROCESSING - H:\data4dragon\CUHK_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
SARPROZ © 2009, the SAR PROcessor by periZ
Press "Load" and select "example2.mat"
Select File to Open
Look in:
GUIDE
Recent Places
Desktop
Libraries
Computer
Network
Name
Date modified
Type
REPORTS
12/09/18 4:52 PM
File folder
example1.mat
12/09/18 4:18 PM
MATLAB MAT-file
example2.mat
12/09/18 4:25 PM
MATLAB MAT-file
File name:
example2.mat
Open
Files of type:
MAT-files (*.mat)
Cancel
main
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
directory not found
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
area not covered by optical data
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
loading the dataset by considering the images graph
loading the dataset by considering the images graph
loading the dataset by considering the images graph
loading the dataset by considering the images graph
loading the dataset by considering the images graph
loading the dataset by considering the images graph


Sparse Points Selection
Parameter Thresholding
Amp. Stab. Index ...
.6
Amplitude Extraction
Local Maxima
Ampl. Thres.
Lobes suppression
Sref
Lref
Pend
Delta
Selected Points: 424
Lines
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the SAR PROcessor by periZ
OK
Mouse Click on Plotted Data...
Press "Sparse Points Selection", select the amplitude stability index and 0.6 Threshold, then "Tab" on the keyboard
main
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
loading the dataset by considering the images graph
mask loading
316 points with Amp. Stab. Index 1-Sigma/Mu > 0.70 , in window from 1491 to 16
30 samples, from 1051 to 1190 lines
mask loading
424 points with Amp. Stab. Index 1-Sigma/Mu > 0.60 , in window from 1491 to 16
30 samples, from 1051 to 1190 lines
SMALL AREA PROCESSING - H:\data4dragon\CUHK_TSX/
Select Area
InSAR analysis
Sparse Points Selection
Amplitude analysis
Multi Image InSAR Analysis
Save
View SLC
View AP SLC
Create movie
Read and Plot Interfs
Sub-cell positioning
Geocoding
Load
Force PS loading
.7
OK
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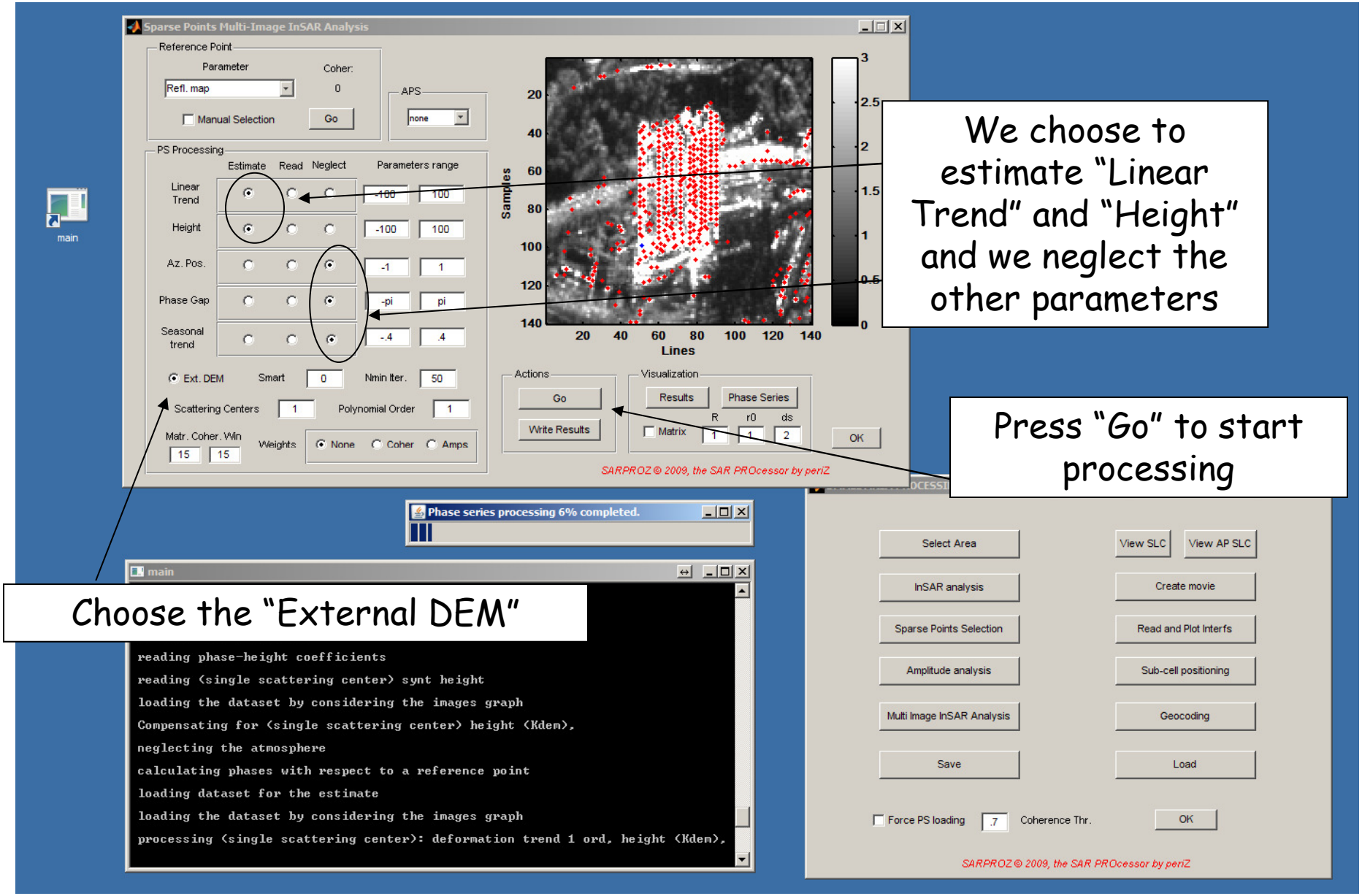
Sparse Points Multi-Image InSAR Analysis
Reference Point
Parameter
Coher:
Refl. map
0
Manual Selection
Go
APS
none
PS Processing
Estimate
Read
Neglect
Parameters range
Linear Trend
Height
Az. Pos.
Phase Gap
Seasonal trend
-100
100
-1
1
-pi
pi
-.4
.4
Ext. DEM
Smart
0
Nmin Iter.
50
Scattering Centers
1
Polynomial Order
1
Matr. Coher. Win
15
15
Weights
None
Coher
Amps
Samples
Lines
Actions
Go
Write Results
Visualization
Results
Phase Series
Matrix
R
r0
ds
OK
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We choose to estimate "Linear Trend" and "Height" and we neglect the other parameters
Press "Go" to start processing
Phase series processing 6% completed.
main
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
processing (single scattering center): deformation trend 1 ord, height (Kdem),
Choose the "External DEM"
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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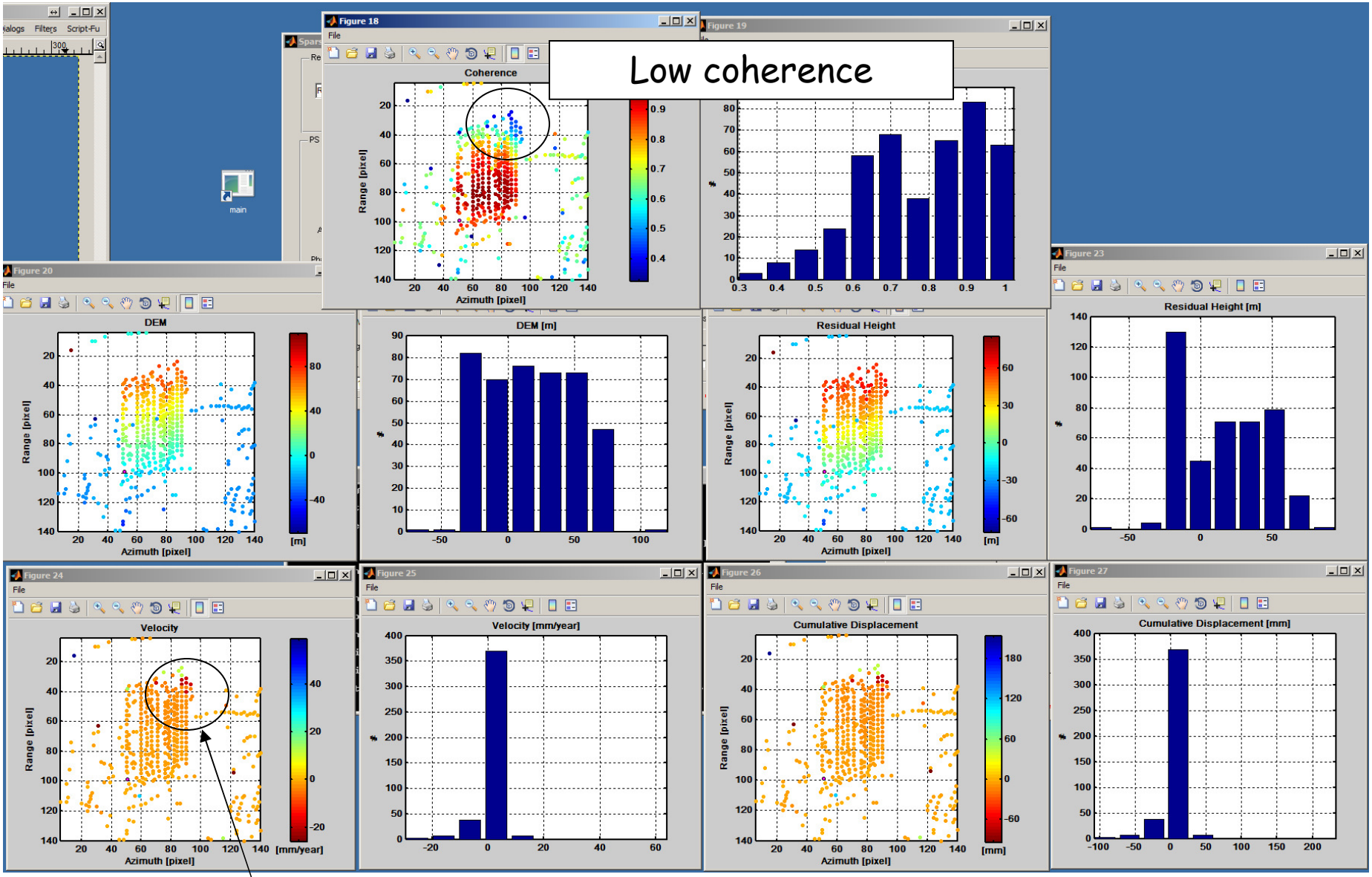
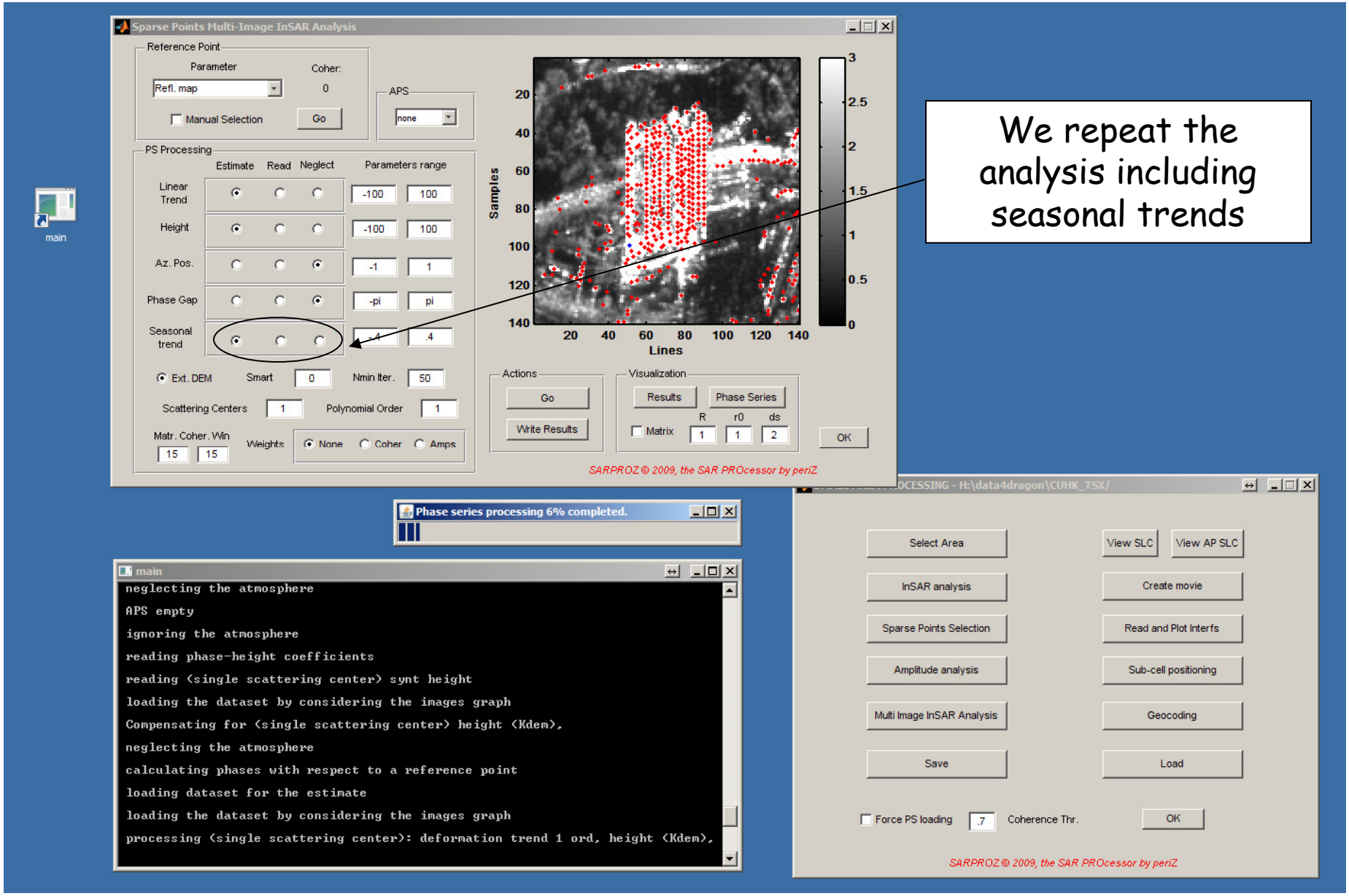
The results



Errors


Sparse Points Multi-Image InSAR Analysis
Reference Point
Parameter
Coher:
Refl. map
0
Manual Selection
Go
APS
none
PS Processing
Estimate
Read
Neglect
Parameters range
Linear Trend
Height
Az. Pos.
Phase Gap
Seasonal trend
-100
100
-1
1
-pi
pi
.4
Ext. DEM
Smart
0
Nmin Iter.
50
Scattering Centers
1
Polynomial Order
1
Matr. Coher. Win
15
Weights
None
Coher
Amps
Samples
Lines
Actions
Go
Write Results
Visualization
Results
Phase Series
Matrix
R
r0
ds
OK
SARPROZ © 2009, the SAR PROcessor by periZ
We repeat the analysis including seasonal trends
Phase series processing 6% completed.
main
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
processing (single scattering center): deformation trend 1 ord, height (Kdem),
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
SARPROZ © 2009, the SAR PROcessor by periZ

The results

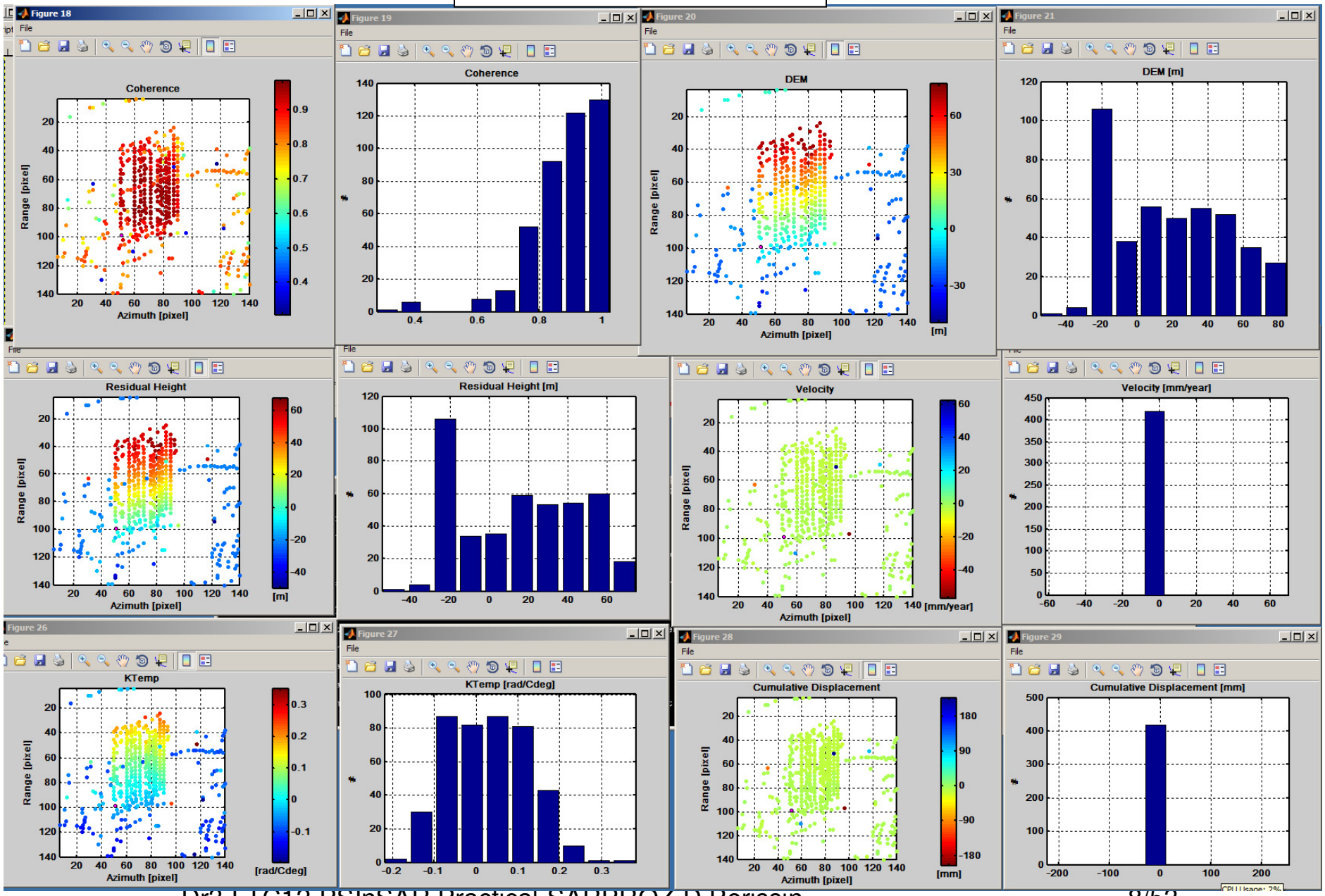
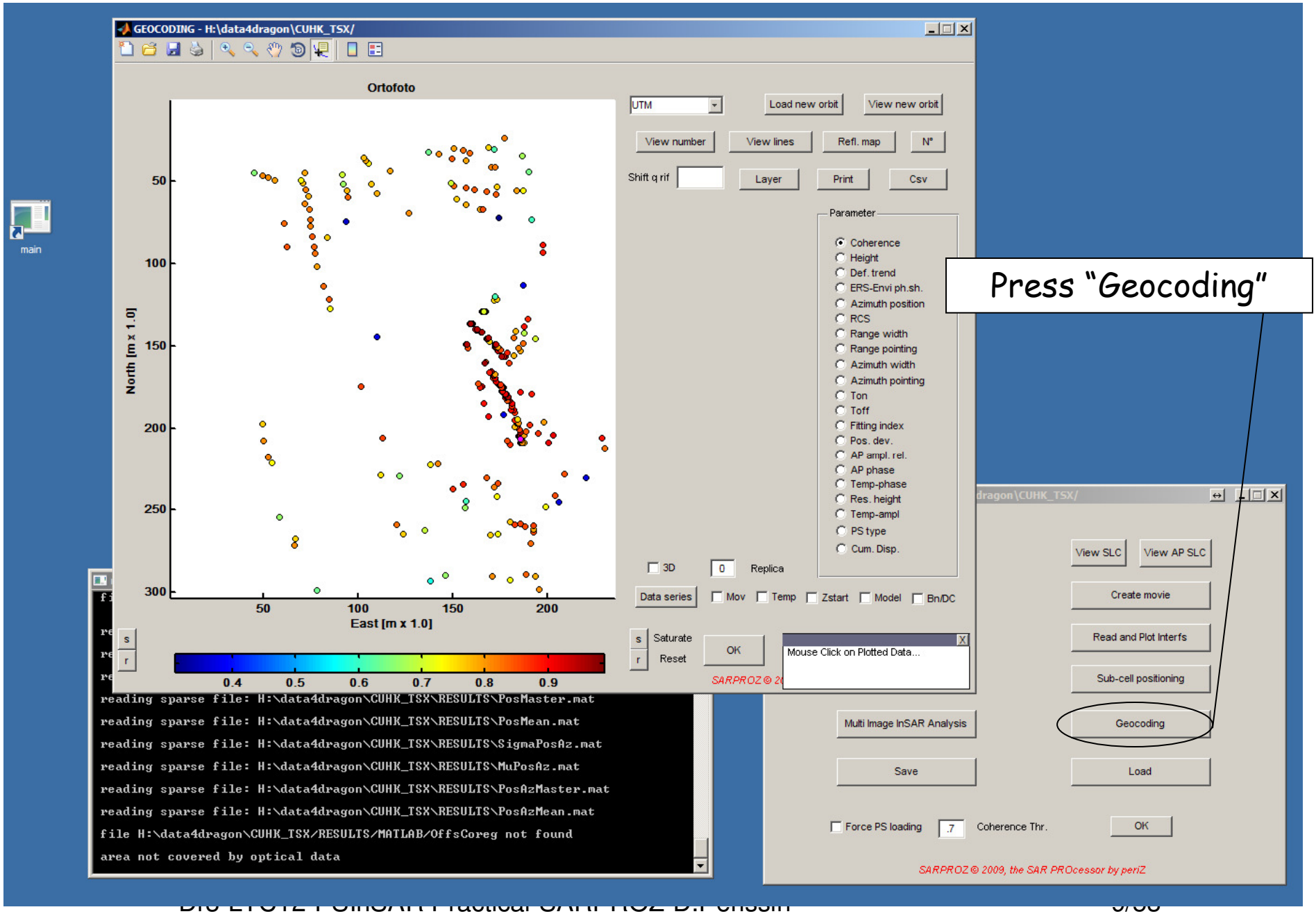
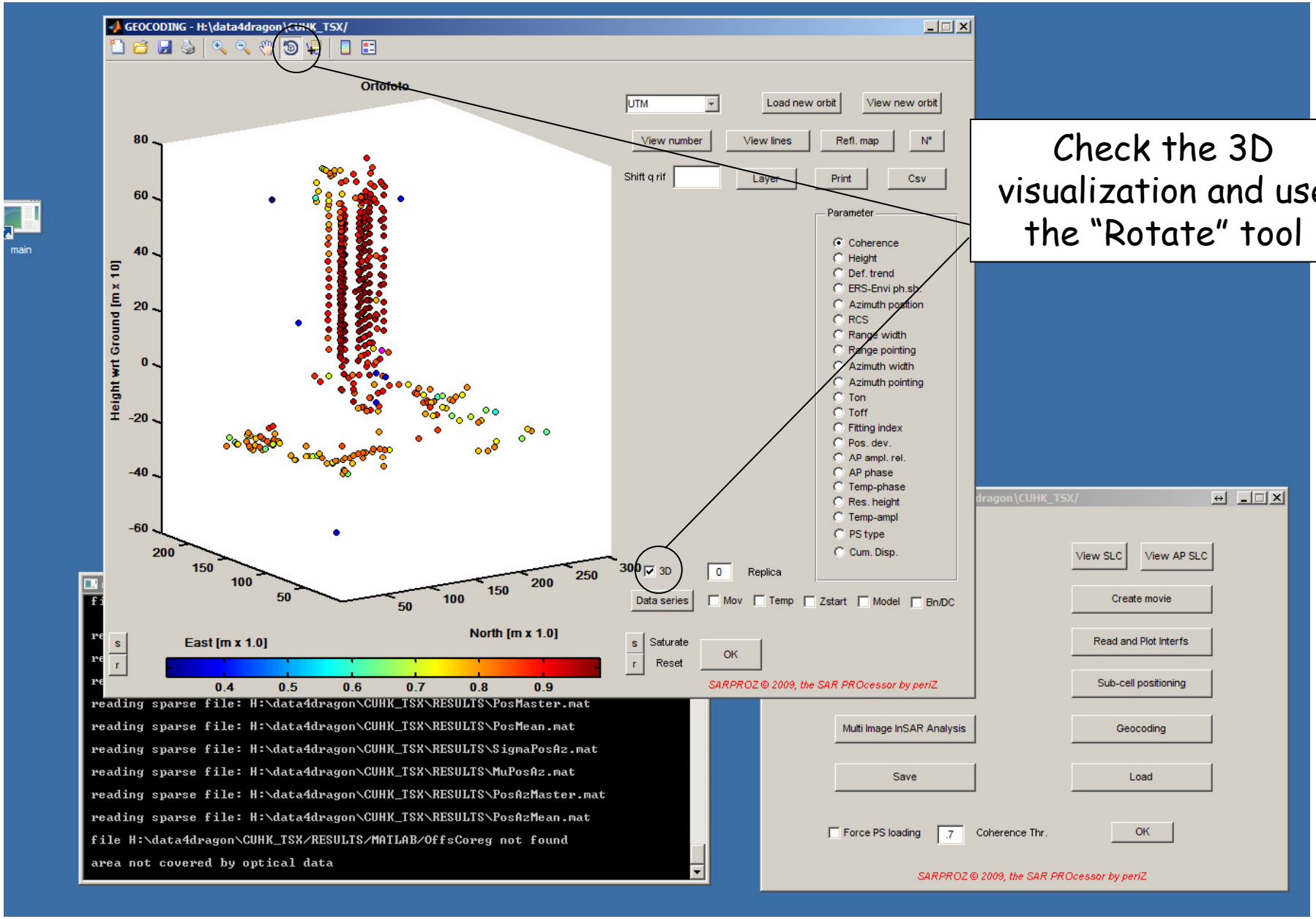
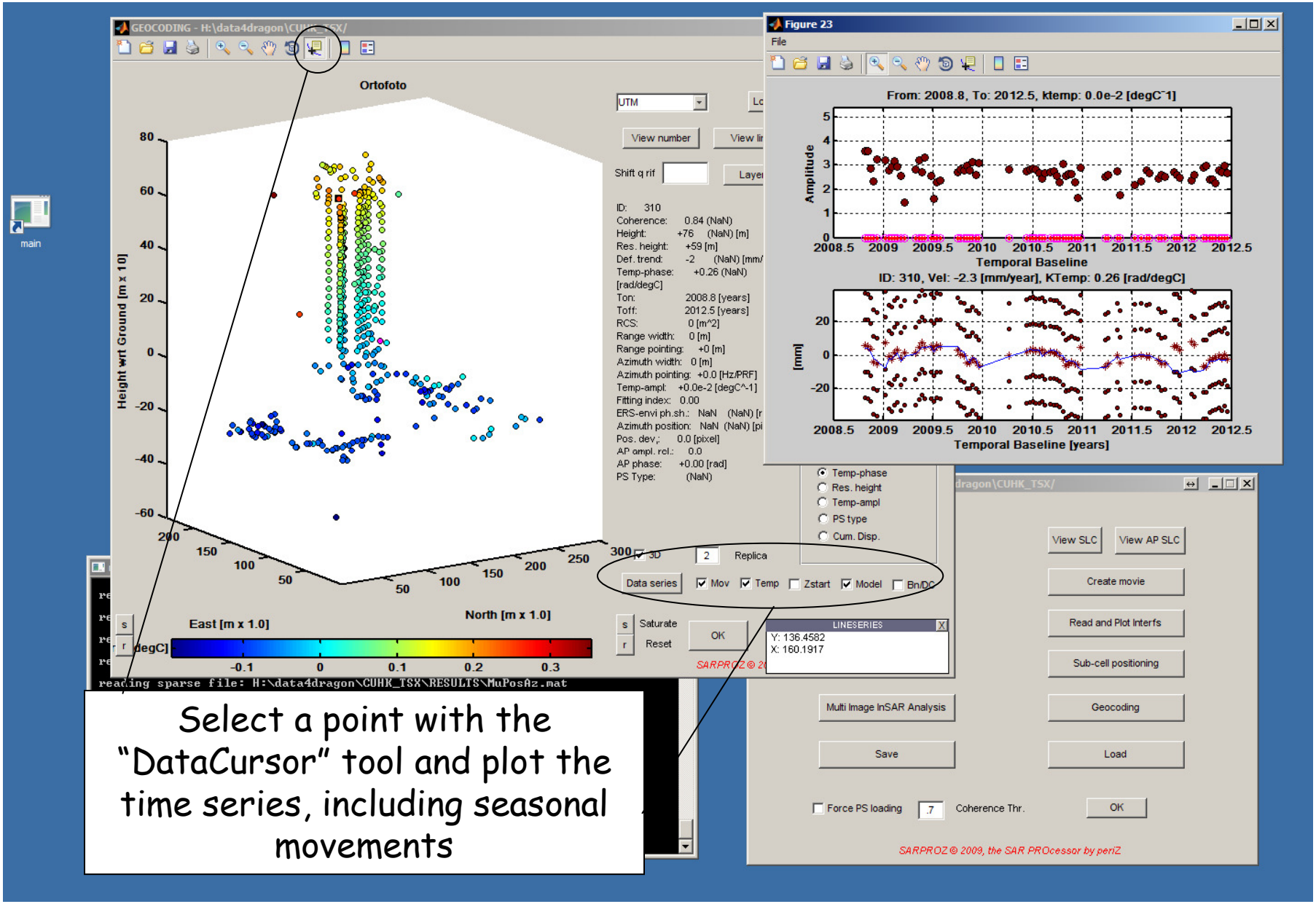


Figure 18
Coherence
Range [pixel]
Azimuth [pixel]
Figure 19
Coherence
Figure 20
DEM
Range [pixel]
Azimuth [pixel]
[m]
Figure 21
DEM [m]
Residual Height
Range [pixel]
Azimuth [pixel]
[m]
Residual Height [m]
Velocity
Range [pixel]
Azimuth [pixel]
[mm/year]
Velocity [mm/year]
Figure 26
KTemp
Range [pixel]
Azimuth [pixel]
[rad/Cdeg]
Figure 27
KTemp [rad/Cdeg]
Figure 28
Cumulative Displacement
Range [pixel]
Azimuth [pixel]
[mm]
Figure 29
Cumulative Displacement [mm]


GEOCODING - H:\data4dragon\CUHK_TSX/
Ortofoto
North [m x 1.0]
East [m x 1.0]
UTM
Load new orbit
View new orbit
View number
View lines
Refl. map
N°
Shift q rif
Layer
Print
Csv
Parameter
Coherence
Height
Def. trend
ERS-Envi ph.sh.
Azimuth position
RCS
Range width
Range pointing
Azimuth width
Azimuth pointing
Ton
Toff
Fitting index
Pos. dev.
AP ampl. rel.
AP phase
Temp-phase
Res. height
Temp-ampl
PS type
Cum. Disp.
3D
Replica
Data series
Mov
Temp
Zstart
Model
Bn/DC
Saturate
Reset
OK
Mouse Click on Plotted Data...
SARPROZ © 2
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\PosMaster.mat
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\PosMean.mat
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\SigmaPosAz.mat
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\MuPosAz.mat
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\PosAzMaster.mat
reading sparse file: H:\data4dragon\CUHK_TSX\RESULTS\PosAzMean.mat
file H:\data4dragon\CUHK_TSX/RESULTS/MATLAB/OffsCoreg not found
area not covered by optical data
dragon\CUHK_TSX/
View SLC
View AP SLC
Create movie
Read and Plot Interfs
Sub-cell positioning
Geocoding
Multi Image InSAR Analysis
Save
Load
Force PS loading
.7
Coherence Thr.
OK
SARPROZ © 2009, the SAR PROcessor by periZ
main
Press "Geocoding"



Check the 3D visualization and use the "Rotate" tool



Select a point with the "DataCursor" tool and plot the time series, including seasonal movements

Assignments:

1) Carry out a PS analysis using the data stored in the file "examples3.mat" in the CUHK_TSX site. Comment the results

2) Use the "InSAR" module to look at interferograms in the CUHK_TSX site, "examples2.mat". Which signals can be observed from interferograms only?

3) What would be the result of a PS analysis in the ALOS_TIBET site? You can try and comment the result.