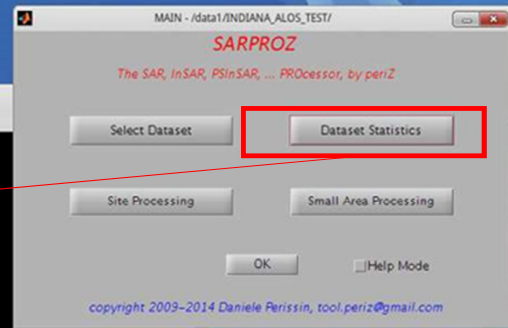


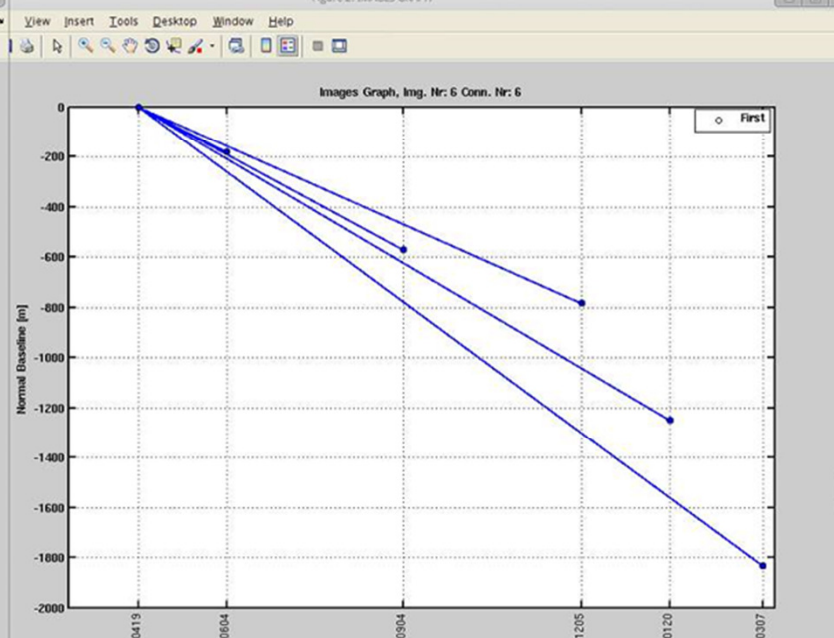
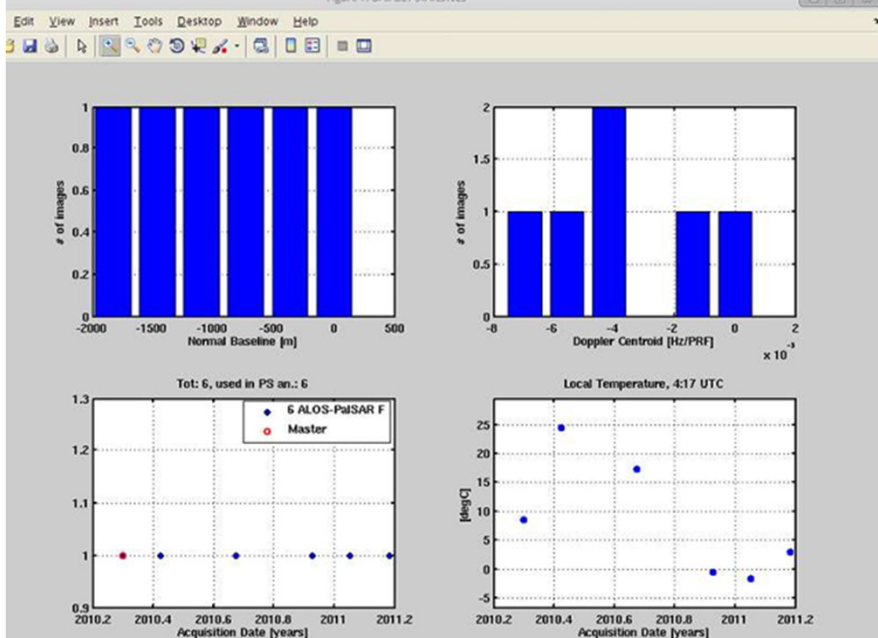
```
INDIANA_ALOS_TEST: csh
File Edit View Bookmarks Settings Help
localhost: /data1/INDIANA_ALOS_TEST > |
```

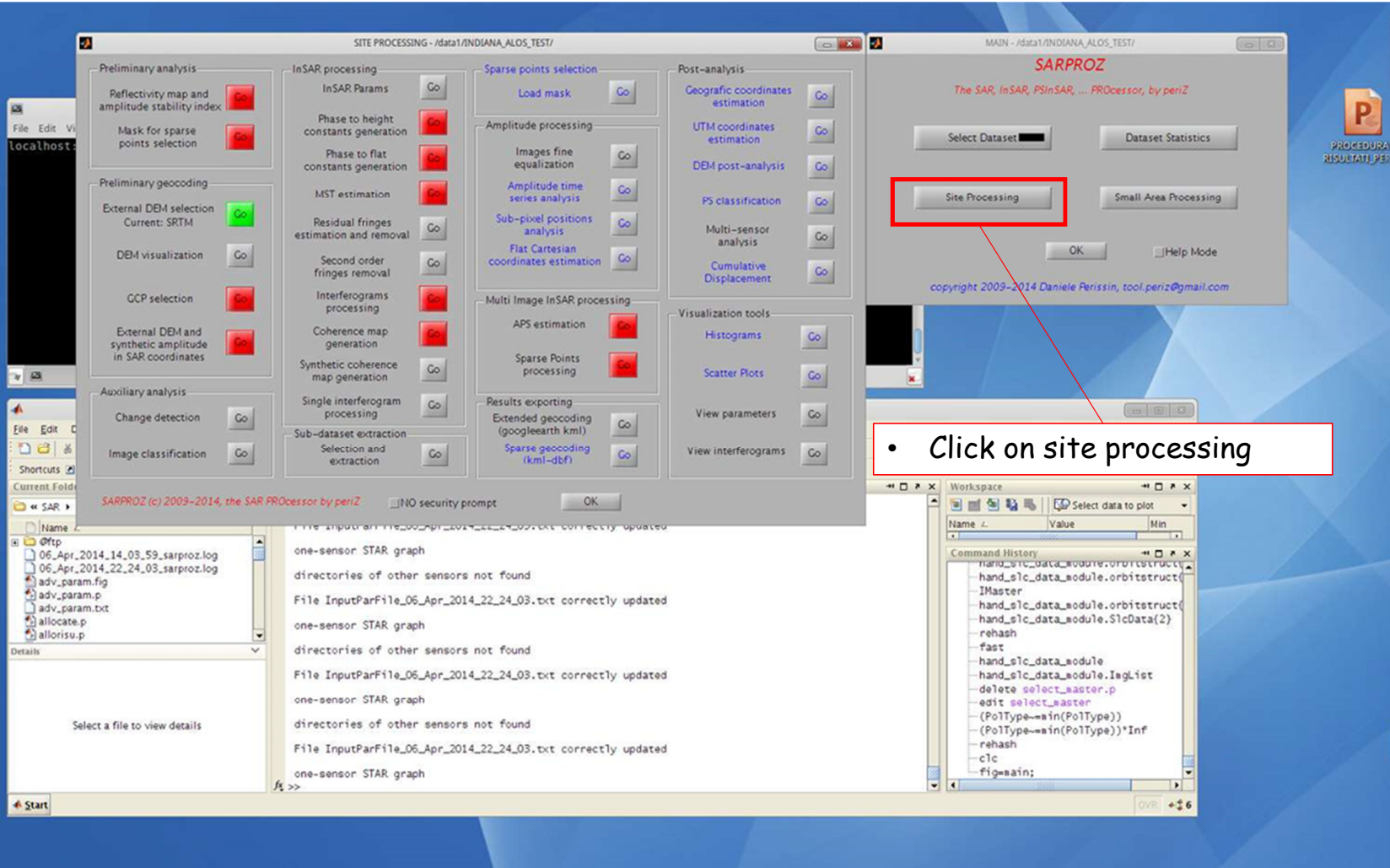


- View the data-set statistics

Figure 1: DATASET STATISTICS

Figure 2: IMAGES GRAPH





• Click on site processing

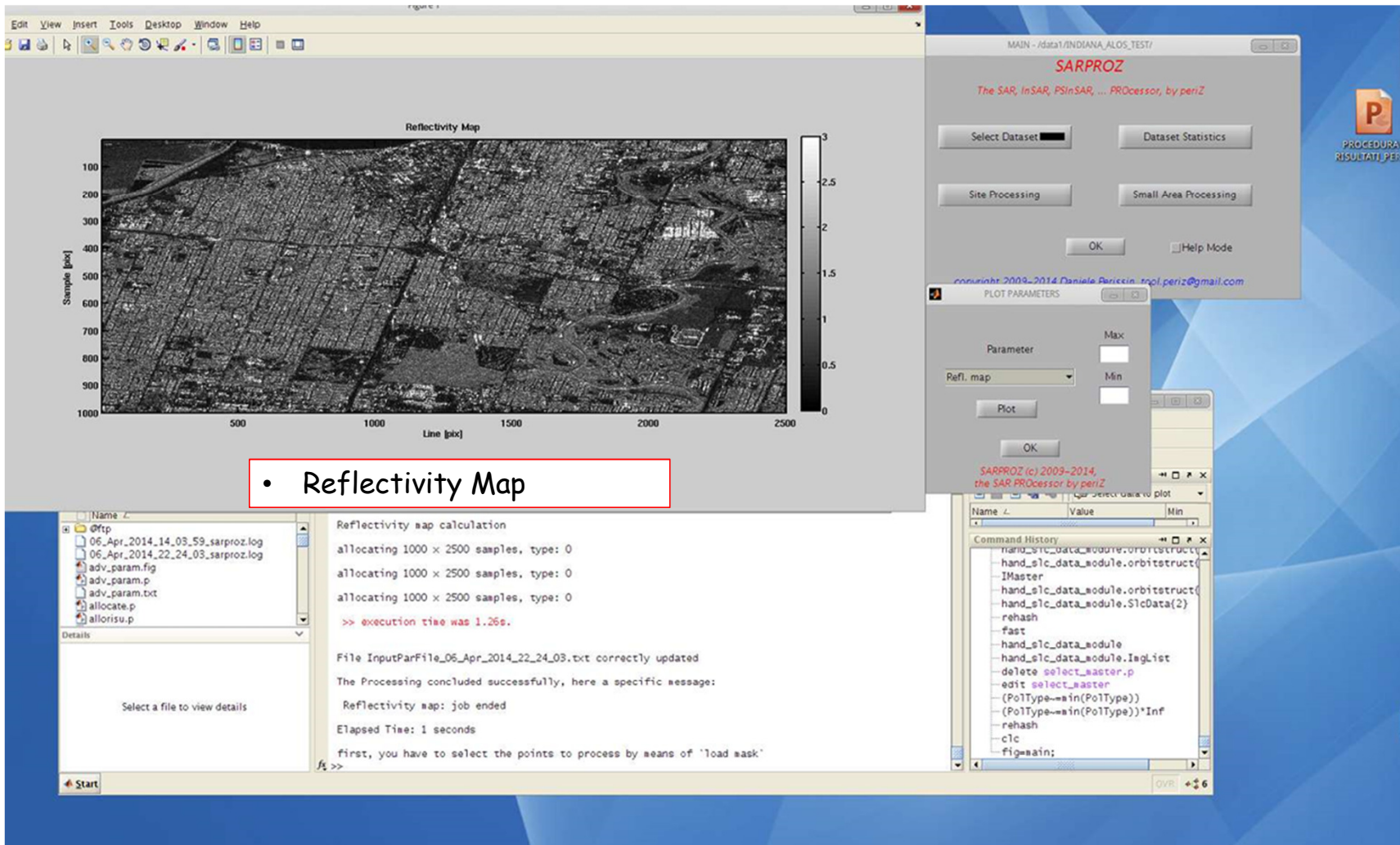
• Process the reflectivity map

The screenshot shows the SARPROZ software interface with several panels. The 'Preliminary analysis' panel has a red box around the 'Reflectivity map and amplitude stability index' button. The 'Post-analysis' panel has a red box around the 'View parameters' button. The 'SARPROZ' main window is also visible, showing 'Select Dataset' and 'Dataset Statistics' buttons.

• Plot the Reflectivity Map

The screenshot shows the command window with the following text:
Reflectivity map calculation
allocating 1000 x
allocating 1000 x
allocating 1000 x 2500 samples, type: 0
>> execution time was 1.26s.
File InputParFile_06_Apr_2014_22_24_03.txt correctly updated
The Processing concluded successfully, here a specific message:
Reflectivity map: job ended
Elapsed Time: 1 seconds
first, you have to select the points to process by means of 'load mask'
fs >>

The 'PLOT PARAMETERS' dialog is open, showing a list of parameters. The 'Refli. map' parameter is highlighted with a red box.



• Reflectivity Map

• Set the Mask

Mask Options

- All Points (no mask)
- Local Maxima
- Loc Max, no range I...
- Loc Max, no range/azimut...
- Regular Grid Rg: 10 Az: 10

Go OK

• Press Go and then Ok

MAIN - Idata1\INDIANA_ALOS_TEST\

SARPROZ

The SAR, InSAR, PSInSAR, ... Processor, by periz

Select Dataset Dataset Statistics

Site Processing Small Area Processing

OK Help Mode

2009-2014 Daniele Periccin - rpol.periz@gmail.com

Parameters

Parameter Refl. map Max Min Plot OK

SARPROZ (c) 2009-2014, the SAR PROcessor by periz

```
Reflectivity map calculation
allocating 1000 x 2500 samples, type: 0
allocating 1000 x 2500 samples, type: 0
allocating 1000 x 2500 samples, type: 0
>> execution time was 1.26s.

File InputParFile_06_Apr_2014_22_24_03.txt correctly updated
The Processing concluded successfully, here a specific message:
Reflectivity map: job ended
Elapsed Time: 1 seconds
first, you have to select the points to process by means of 'load mask'
fs >>
```

• Choose a DEM

The screenshot shows the SARPROZ software interface. A dialog box titled "DEM SOURCE SELECTION" is open in the center, with a red box around it. Inside the dialog, there is a "Choose file" button and a "Current: SRTM" label. The main interface has several panels: "Preliminary analysis" with buttons for "Reflectivity map and amplitude stability index" and "Mask for sparse points selection"; "Preliminary geocoding" with "External DEM selection" (Current: SRTM) and "DEM visualization"; "Auxiliary analysis" with "Change detection" and "Image classification"; "InSAR processing" with "InSAR Params", "Phase to height constants generation", "Phase to flat constants generation", "MST estimation", "Residual fringes estimation and removal", "Second order fringes removal", "Interferograms processing", "Coherence map generation", and "Synthetic coherence map generation"; "Sparse points selection" with "Load mask"; "Post-analysis" with "Geographic coordinates estimation", "Coordinates estimation", "Post-analysis", "Classification", "Multi-sensor analysis", "Cumulative placement", "Registration tools", "Interferograms", "Master Plots", "View parameters", and "View interferograms".

• By default, SRTM is used

```
crea_masch: selecting local max...
writing sparse file /data/INDIANA_ALOS_TEST/RESULTS/Maschera.mat
File InputParFile_06_Apr_2014_22_24_03.txt correctly updated
The Processing concluded successfully, here a specific message:
Mask processing: job ended
Elapsed Time: 0 seconds
>> execution time was 1.85s.
checking for SRTM files
missing SRTM files will be automatically downloaded, set to 0 if not found
Reading SRTM data
fs >>
```

• Plot the DEM

Preliminary analysis

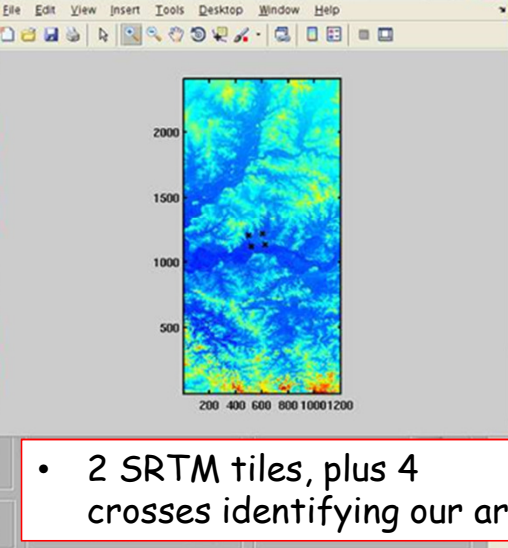
- Reflectivity map and amplitude stability index
- Mask for sparse points selection

Preliminary geocoding

- External DEM selection
Current: SRTM
- DEM visualization**
- CCP selection
- External DEM and synthetic amplitude in SAR coordinates

Auxiliary analysis

- Change detection
- Image classification



• 2 SRTM tiles, plus 4 crosses identifying our area

MAIN - /data1/INDIANA_ALOS_TEST/

SARPROZ

The SAR, InSAR, PSInSAR, ... PROCessor, by periz

Select Dataset

Site Processing

Help Mode

PLOT PARAMETERS

Parameter Max Min

Plot

SARPROZ (c) 2009-2014, the SAR PROCessor by periz

File Name

- 06_Apr_2014_14_03_59_sarproz.log
- 06_Apr_2014_22_24_03_sarproz.log
- adv_param.fig
- adv_param.p
- adv_param.txt
- allocate.p
- allorisu.p

Details

Select a file to view details

```
crea_masch: selecting local maxima
writing sparse file /data1/INDIANA_ALOS_TEST/RESULTS/Maschera.mat
File InputParFile_06_Apr_2014_22_24_03.txt correctly updated
The Processing concluded successfully, here a specific message:
Mask processing: job ended
Elapsed Time: 0 seconds
>> execution time was 1.85s.
checking for SRTM files
missing SRTM files will be automatically downloaded, set to 0 if not found
Reading SRTM data
fs >>
```

Command History

```
hand_slc_data_module.orbitstruct
hand_slc_data_module.orbitstruct
IMaster
hand_slc_data_module.orbitstruct(
hand_slc_data_module.SlcData(2)
rehash
fast
hand_slc_data_module
hand_slc_data_module.IngList
delete select_master.p
edit select_master.p
(PolType==min(PolType))
(PolType==min(PolType))*Inf
rehash
clc
fig=main;
```



• **GCP selection**

The screenshot displays the SARPROZ software interface with several windows open. The main window is titled 'ING - /data1/INDIANA_ALOS_TEST/' and contains various processing modules. A red box highlights the 'GCP selection' button in the 'Preliminary geocoding' section. Other visible windows include 'SARPROZ' (main control panel), 'PLOT PARAMETERS', and a 'Command History' window showing the execution of a script.

SARPROZ Main Window:

- Preliminary analysis:** Reflectivity map and amplitude stability index (Go), Mask for sparse points selection (Go).
- Preliminary geocoding:** External DEM selection (Current: SRTM) (Go), DEM visualization (Go), **GCP selection** (Go), External DEM and synthetic amplitude in SAR coordinates (Go).
- Auxiliary analysis:** Change detection (Go), Image classification (Go).
- InSAR processing:** InSAR Params (Go), Phase to height constants generation (Go), Phase to flat constants generation (Go), MST estimation (Go), Residual fringes estimation and removal (Go), Second order fringes removal (Go), Interferograms processing (Go), Coherence map generation (Go), Synthetic coherence map generation (Go), Single interferogram processing (Go), Sub-dataset extraction (Go).
- Sparse points selection:** Load mask (Go).
- Amplitude processing:** Images fine equalization (Go), Amplitude time series analysis (Go), Sub-pixel positions analysis (Go), Flat Cartesian coordinates estimation (Go).
- Multi Image InSAR processing:** APS estimation (Go), Sparse Points processing (Go).
- Results exporting:** Extended geocoding (googleearth kml) (Go), Sparse geocoding (kml-dbf) (Go).
- Post-analysis:** Geographic coordinates estimation (Go), UTM coordinates estimation (Go), DEM post-analysis (Go), PS classification (Go), Multi-sensor analysis (Go), Cumulative Displacement (Go).
- Visualization tools:** Histograms (Go), Scatter Plots (Go), View parameters (Go), View interferograms (Go).

PLOT PARAMETERS Window:

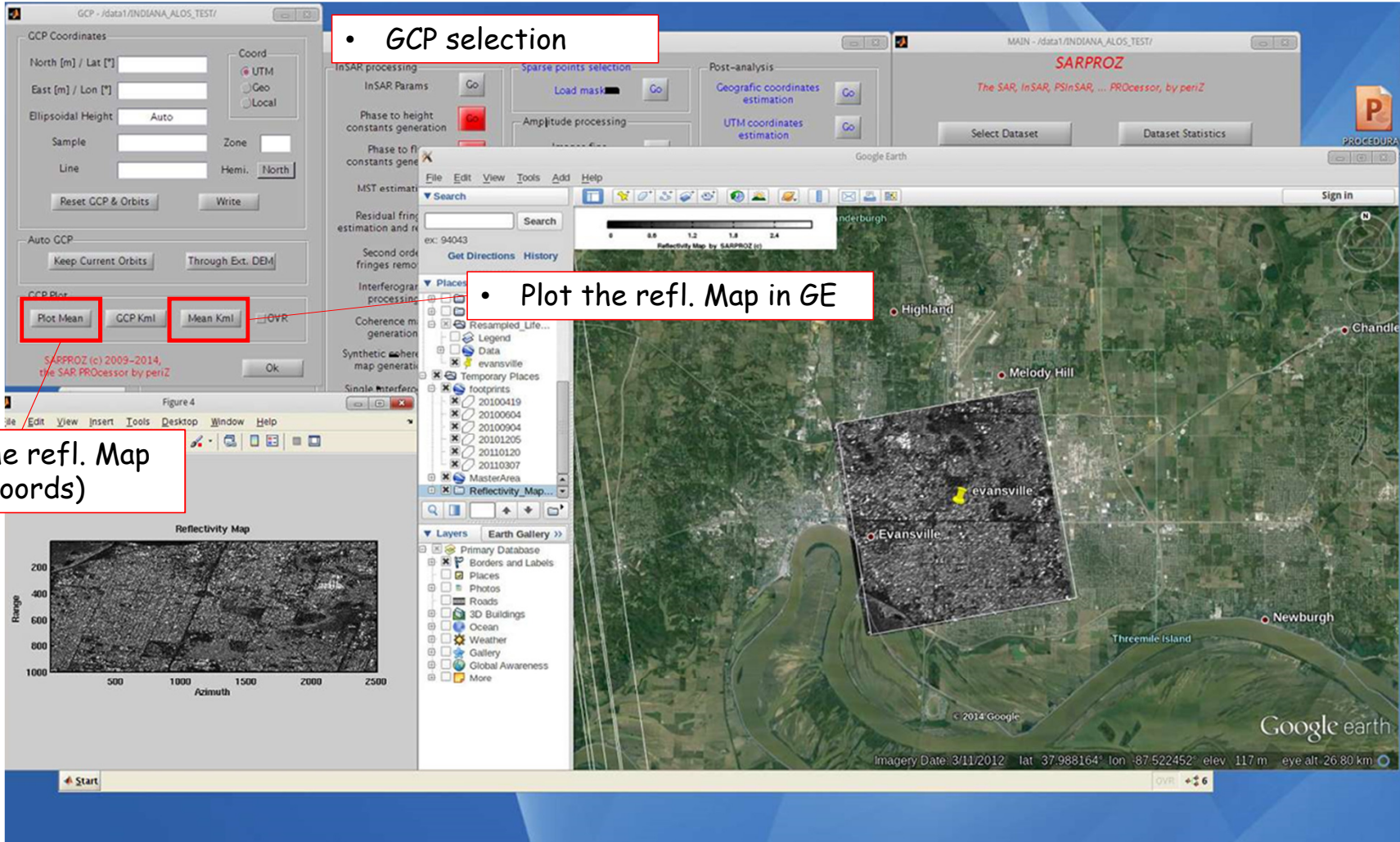
Parameter	Max	Min
Refl. map		

Command History Window:

```
hand_slc_data_module.orbitstruct(
--hand_slc_data_module.orbitstruct(
--IMaster
--hand_slc_data_module.orbitstruct(
--hand_slc_data_module.SlcData(2)
--rehash
--fast
--hand_slc_data_module
--hand_slc_data_module.IngList
--delete select_master.p
--edit select_master.p
--(PolType==min(PolType))
--(PolType==min(PolType))*Inf
--rehash
--c1c
fig=main;
```



PROCEDURA
RISULTATI PERI

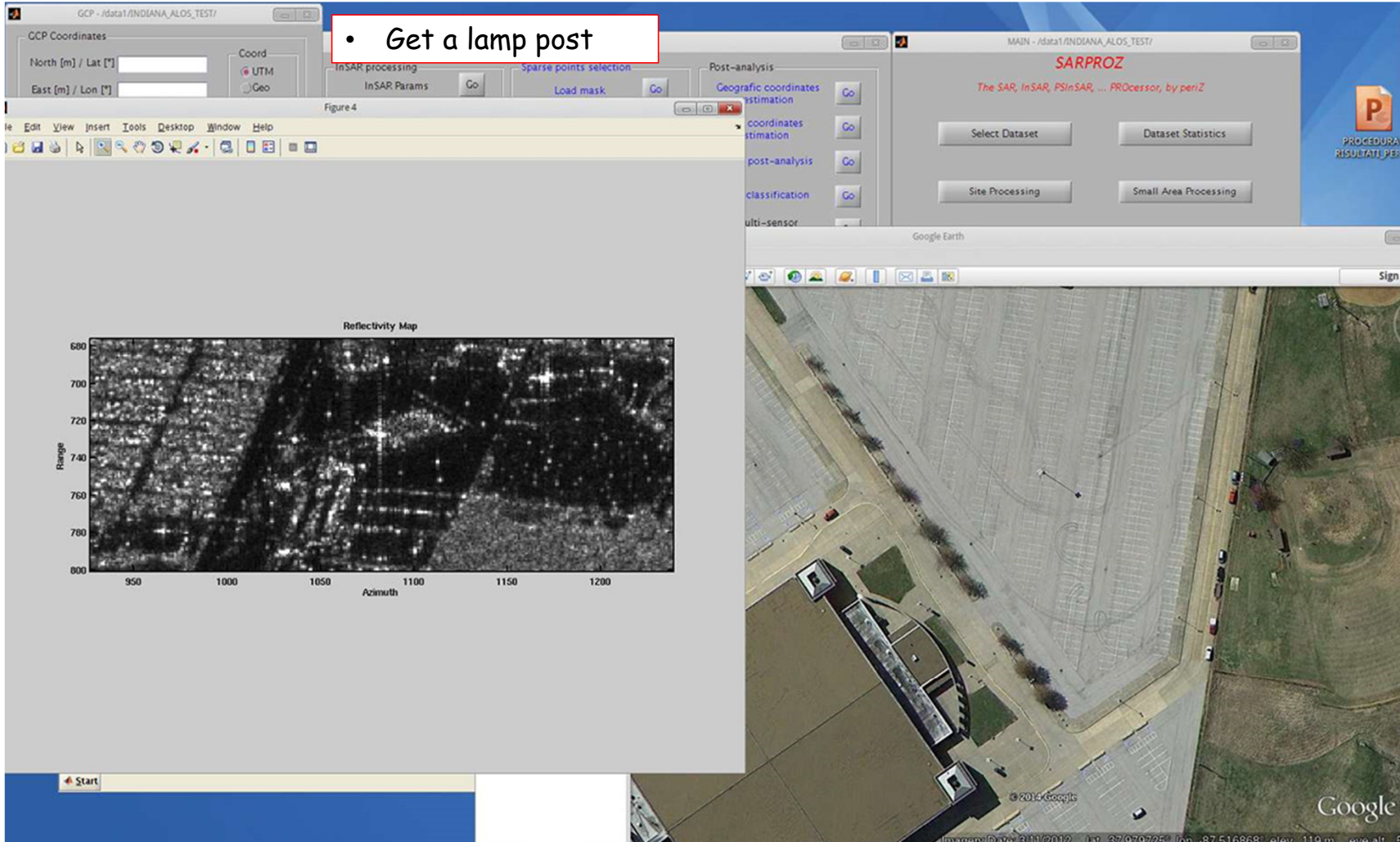


• GCP selection

• Plot the refl. Map in GE

• Plot the refl. Map (SAR coords)

• Get a lamp post



- Get its coordinates (Geo and SAR)

The image displays a computer desktop with several windows open. The primary window is SARPROZ, titled 'MAIN - /data1/INDIANA_ALOS_TEST/'. It features a 'Post-analysis' menu with options like 'Geographic coordinates estimation', 'coordinates estimation', 'post-analysis', 'classification', and 'multi-sensor'. Below the menu are buttons for 'Select Dataset', 'Dataset Statistics', 'Site Processing', and 'Small Area Processing'. A secondary window, titled 'GCP Coordinates', shows input fields for 'North [m] / Lat [°]' and 'East [m] / Lon [°]', with radio buttons for 'UTM' and 'Geo' coordinate systems. A third window, titled 'Figure 4', displays a 'Reflectivity Map' with a grid. The x-axis is labeled 'Azimuth' (ranging from 1120 to 1138) and the y-axis is labeled 'Range' (ranging from 707 to 714). A tooltip over a specific point provides the following data: 'x: 1128 y: 710', 'Index: 2.21', and 'RGB: 0.0317, 0.0317, 0.0317'. A fourth window, 'Google Earth', shows a satellite view of a field with a black line and a purple marker. The bottom of the screen shows a Windows taskbar with the 'Start' button and a system tray.

- Input the coordinates (both Geo and SAR)

The screenshot displays the SARPROZ software interface. A central dialog box titled "GCP - /data1/INDIANA_ALOS_TEST/" is open, showing the following fields and options:

- GCP Coordinates:**
 - North [m] / Lat [°]: 37.979672
 - East [m] / Lon [°]: -87.517275
 - Ellipsoidal Height: Auto
 - Sample: 710
 - Line: 1128
 - Zone: []
 - Hemi.: North
- Coord:** Radio buttons for UTM, Geo (selected), and Local.
- Buttons:** "Reset GCP & Orbits" and "Write".
- Auto CCP:** Radio buttons for "Keep Current Orbits" and "Through Ext. DEM".
- GCP Plot:** Radio buttons for "Plot Mean", "GCP Kml", "Mean Kml", and "OVR".
- Footer:** "SARPROZ (c) 2009-2014, the SAR PROcessor by periz" and "Ok".

In the background, the "Reflectivity Map" window shows a grid with Range (707-714) on the y-axis and Azimuth (1120-1138) on the x-axis. A tooltip for the point at x: 1128, y: 710 displays "Index: 2.21" and "RGB: 0.0317, 0.0317, 0.0317".

The "MAIN - /data1/INDIANA_ALOS_TEST/" window shows the SARPROZ logo and buttons for "Select Dataset", "Dataset Statistics", "Site Processing", and "Small Area Processing".

The Google Earth window shows a satellite view of a field with a black line and a cluster of points. The status bar at the bottom right indicates: "Imagery Date: 3/11/2012 lat 37.979700° lon -87.517243° elev 119m eye alt 262m".

• Write the GCP

The image shows a screenshot of a computer desktop with several windows open. The primary window is SARPROZ, titled "GCP - /data1/INDIANA_ALOS_TEST/". It features a "GCP Coordinates" dialog box with the following fields: North [m] / Lat [°] (37.979674), East [m] / Lon [°] (-87.517274), Ellipsoidal Height (117), Sample (710), Zone (16), Line (1128), and Hemi. (North). The "Write" button is highlighted with a red box. Below the dialog box are "Auto GCP" options (Keep Current Orbits, Through Ext. DEM) and "GCP Plot" options (Plot Mean, GCP Kml, Mean Kml, OVR). The SARPROZ main window is titled "MAIN - /data1/INDIANA_ALOS_TEST/" and contains buttons for "Select Dataset", "Dataset Statistics", "Site Processing", and "Small Area Processing".

Below the SARPROZ window is a MATLAB window. The Command Window displays the following text:

```
File /data1/INDIANA_ALOS_TEST/RESULTS/Lon.mat successfully deleted
processing lat-lon coordinates of 1 points

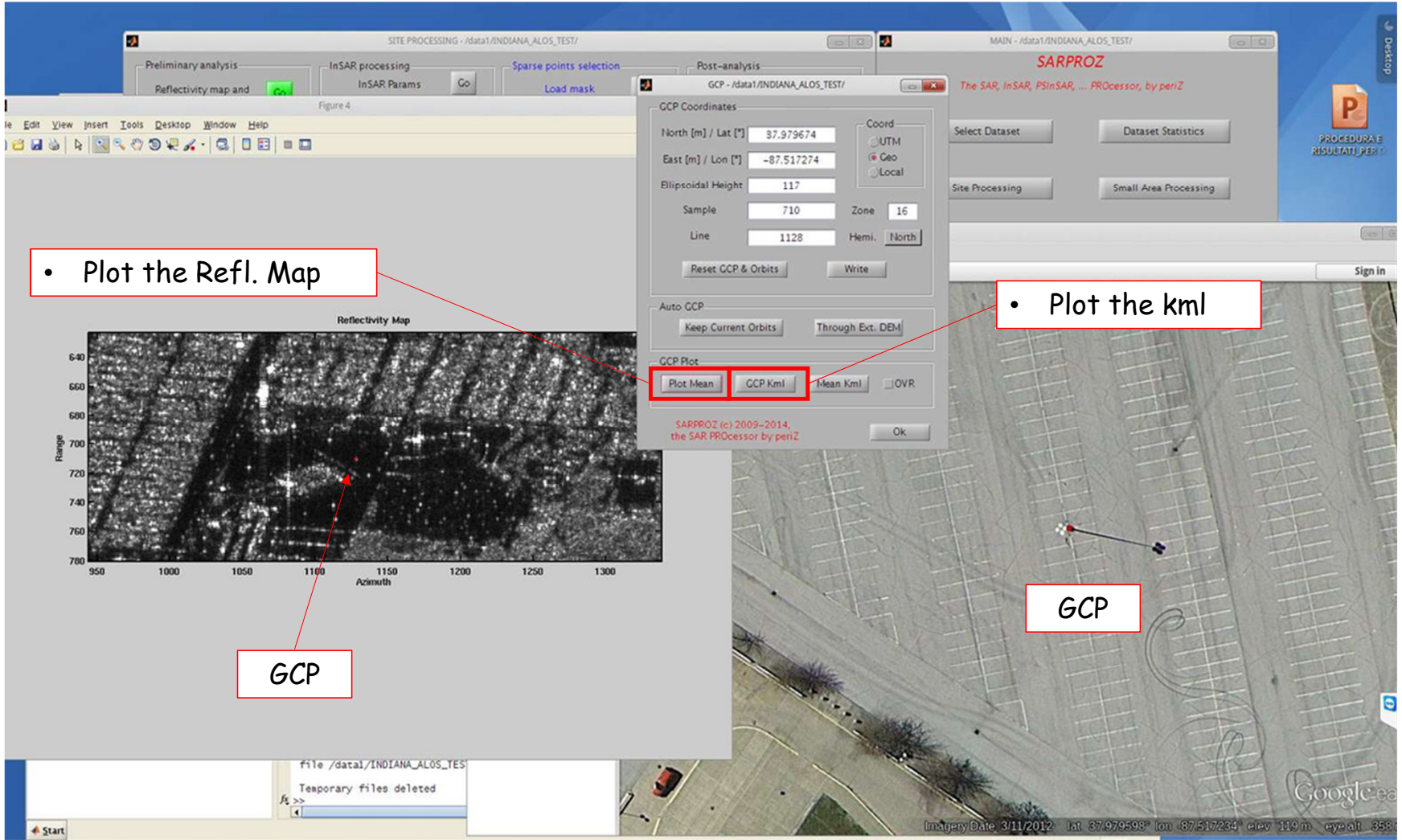
loading GCP:
north coordinate (UTM): 4203686.0
East coordinate (UTM): 454572.0
UTM Zone: 16
Hemisphere: North
ellipsoidal height (WGS84): 117
sample: 710
line: 1128

scrivi: file /data1/INDIANA_ALOS_TEST/RESULTS/Lat not found, writing sparse file /data1/INDIANA_ALOS_T
scrivi: file /data1/INDIANA_ALOS_TEST/RESULTS/Lon not found, writing sparse file /data1/INDIANA_ALOS_T
lat-lon coordinates written
GCP coordinates correctly written
fs >>
```

The MATLAB window also shows a file explorer on the left with a folder named "SAR" containing subfolders "matlab" and "pcodes". The Command History window shows the following commands:

```
hand_slc_data_module.orbitstruct
hand_slc_data_module.SlcData(2)
rehash
fast
hand_slc_data_module
hand_slc_data_module.IngList
delete select_master.p
edit select_master
(PolType==min(PolType))
(PolType==min(PolType))*Inf
rehash
c1c
fig=axis;
disp_err
clear
c1c
```

At the bottom right of the image, there is a Google Earth window showing a satellite view of a location with the following coordinates: Imagery Date: 3/11/2012, lat 37.979700°, lon -87.517248, elev 119 m, eye at 262 m.

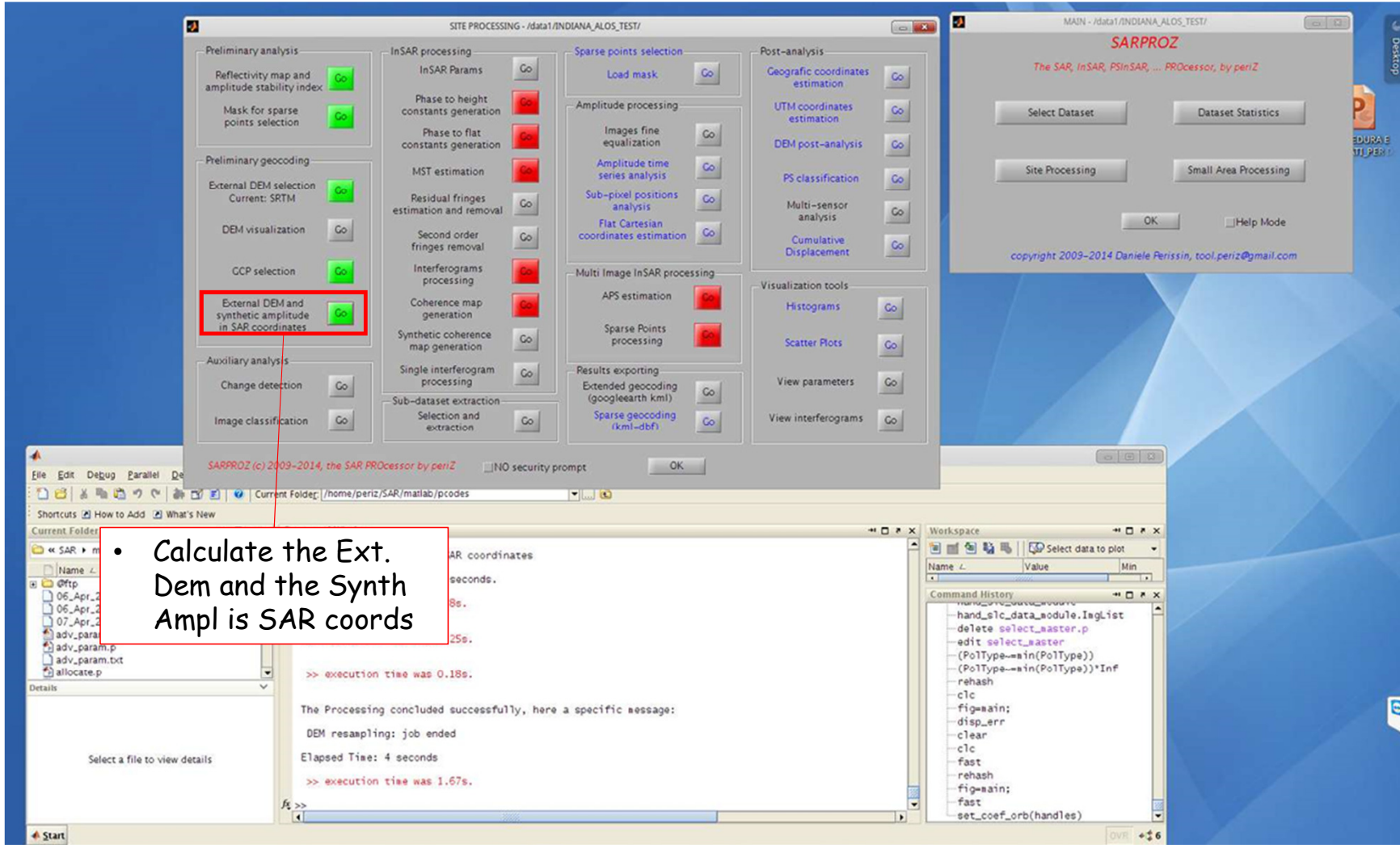


• Plot the Refl. Map

• Plot the kml

GCP

GCP

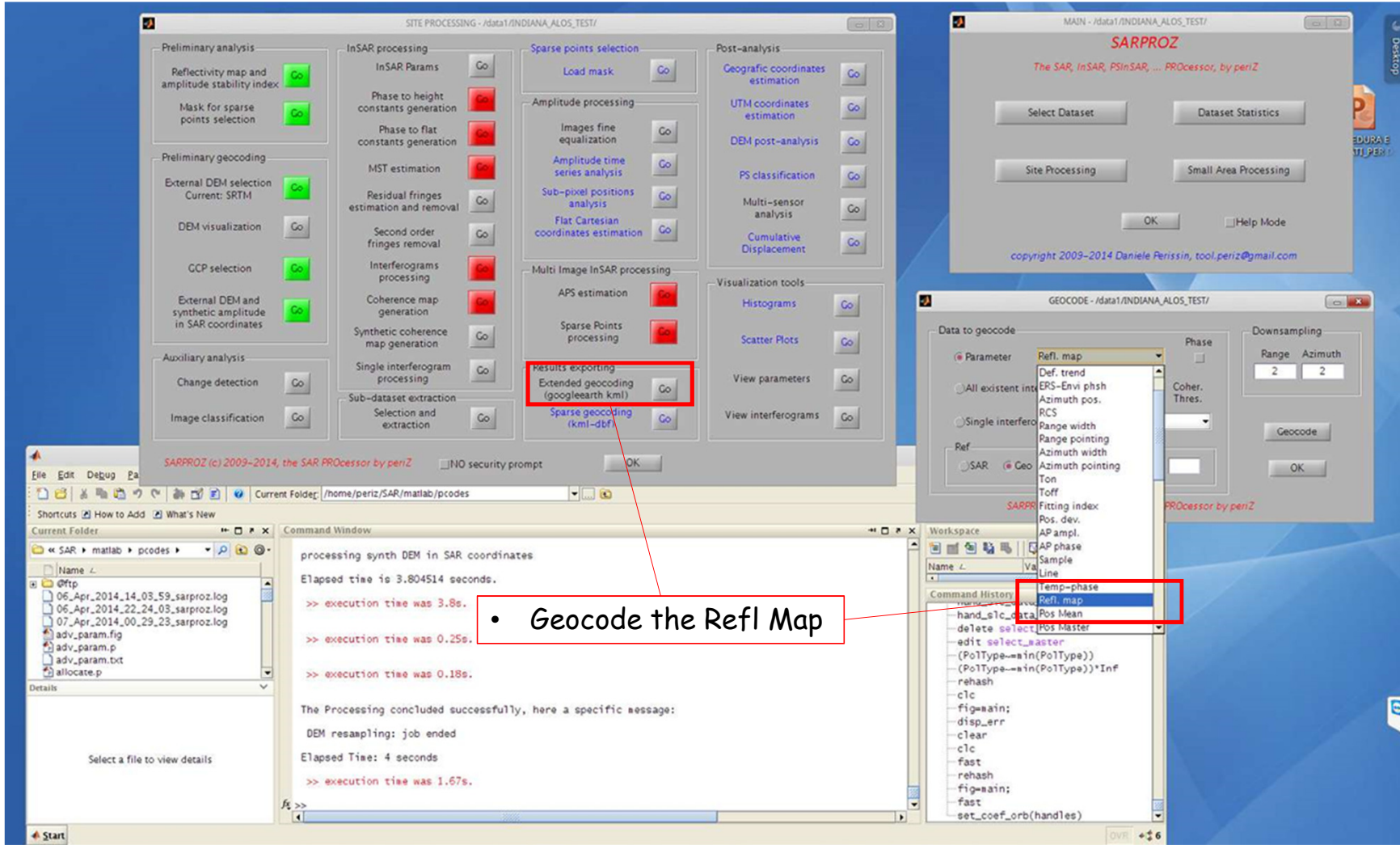


- Calculate the Ext. Dem and the Synth Ampl is SAR coords

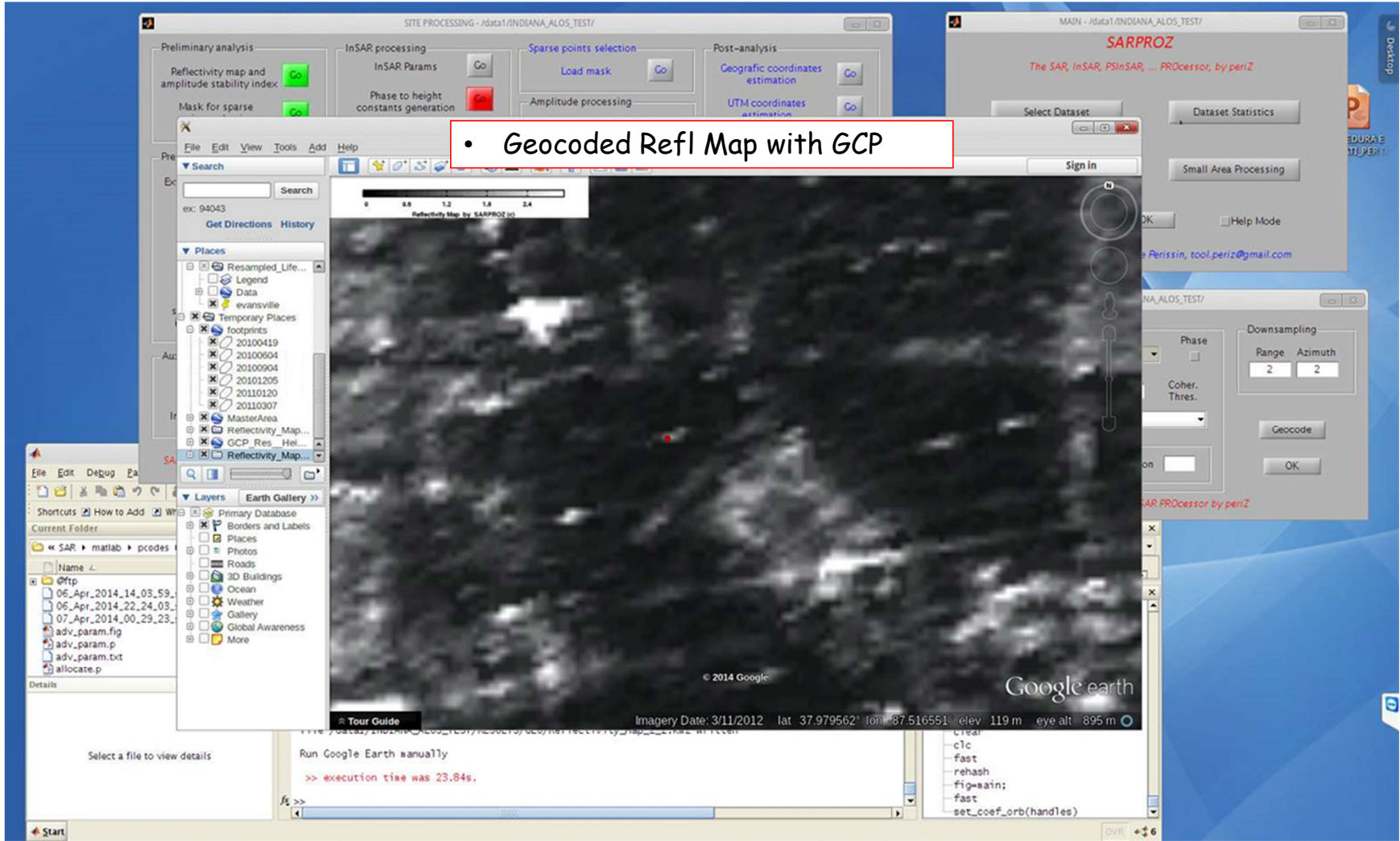
```
>>> execution time was 0.18s.

The Processing concluded successfully, here a specific message:
DEM resampling: job ended
Elapsed Time: 4 seconds
>>> execution time was 1.67s.
```

```
Workspace
Name Value Min
Command History
hand_e1c_data_module.Inglist
delete select_master.p
edit select_master
(PolType=main(PolType))
(PolType=main(PolType))*Inf
rehash
clc
fig=main;
disp_err
clear
clc
fast
rehash
fig=main;
fast
set_coef_orb(handles)
```



• Geocode the Refl Map



• Geocoded Refl Map with GCP

