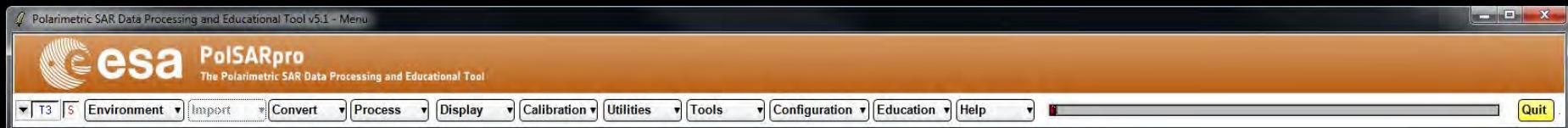


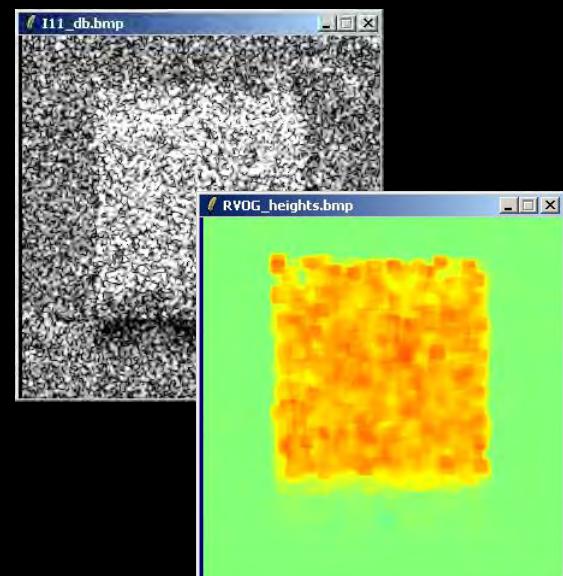
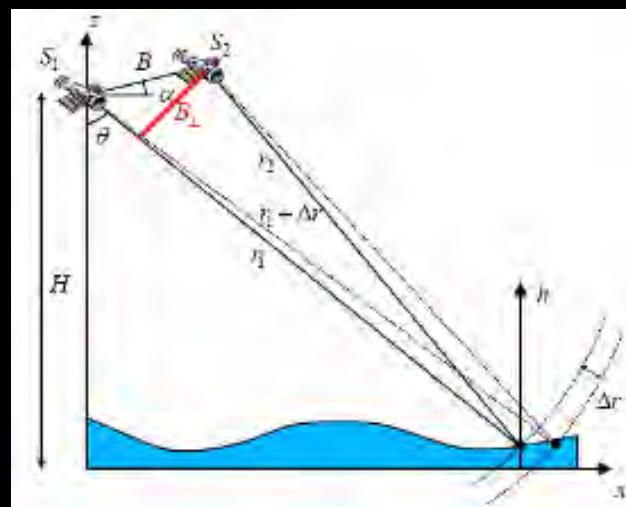
Forest Retrievals using SAR Polarimetry (Practical Session D3P2a)

Laurent FERRO-FAMIL - Eric POTTIER

University of Rennes 1



Pol-InSAR Practical Forest Application



Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

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Environment Convert Process Display Calibration Utilities Tools Configuration Education Help

Adobe Acrobat Standard - [1_Pol-InSAR_Training_Course.pdf]

Fichier Edition Affichage Document Commentaires Outils Options avancées Fenêtre

Sélectionner Création d'un fichier PDF

Sujets Signatures Pages Calques Pièces jointes Commentaires

POL-InSAR TRAINING COURSE

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e-mail : scloude@ieee.org, web : <http://homepage.mac.com/aelc/>

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Configuration Education Help

PolSARap Tutorial (C. Lopez - E. Pottier) ▶
PolSARap Showcases
Lectures Notes ▶

Recent Advances (W.M. Boerner)
Basic Concepts (W.M. Boerner)
Advanced Concepts (E. Pottier, J.S. Lee, L. Ferro-Famil)
Polarimetric SAR Interferometry (S.R. Cloude, K. Papathanassiou) ▶
Surface Parameter Retrieval (I. Hajnsek, K. Papathanassiou) ▶

Single vs multi polarization interferometry
Pol-InSAR (Training Course) ▶
Polarization Coherence Tomography (Training Course)

ESENSING

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PolSARpro - Calculator
PolSARpro - Display
PolSARpro - SIM
PolSARpro - Viewer
SATIM Map Algebra
SNAP - S1 TBX
SRTM
ASTER
GIMP
GOOGLE EARTH
Close All Widgets

Ground
Ground + small vegetation
Forest

PolSARpro Simulator (c) Dr Mark L. Williams

Output Master Directory: C:/DEV_PoSARpro_v3.0_track0

Output Slave Directory: C:/DEV_PoSARpro_v3.0_track1

Geometric Configuration:

- Platform Altitude (m): 3000
- Horizontal Baseline (m): 10.0
- Incidence Angle (deg): 45
- Vertical Baseline (m): 1.0

System Configuration:

- Centre Frequency (GHz): 1.30
- Azimuth Resolution (m): 1.5
- Slant Range Resolution (m): 1.06066

Ground Surface Configuration:

- Surface Properties: Smoothest = 0, Roughest = 10
- Ground Moisture Content: Driest = 0, Wettest = 10
- Azimuth Ground Slope (%): 2.0
- Range Ground Slope (%): 1.0

Forest Configuration:

- Tree Species: Hedge (0), Pine (1, 2, 3), Deciduous (4)
- Tree Height (m): 18.0
- Forest Stand Density (stems / Ha): 300
- Forest Stand Circular Area (Ha): 0.282745

Random Number Generator: 35961

Save Config

Final Image Number of Rows: 105

Final Image Number of Columns: 141

Configuration File: C:/DEV_PoSARpro_v3.0_track0/pspsim_config

Run ? Exit

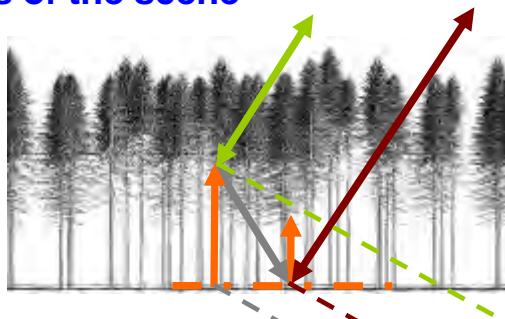
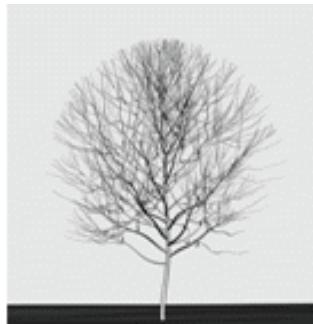
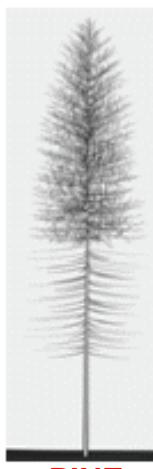
PolSARproSim is a rapid, coherent, fully polarimetric and interferometric SAR simulation of forest.

Mark Williams

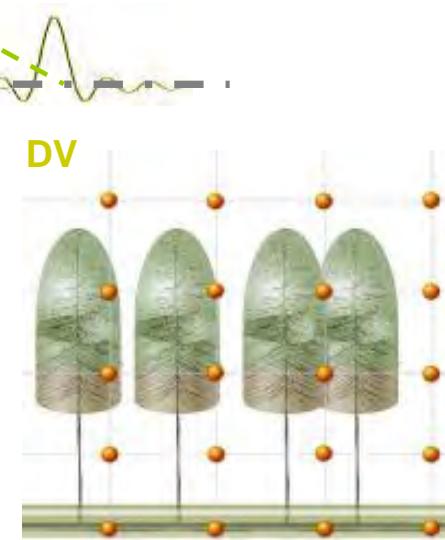
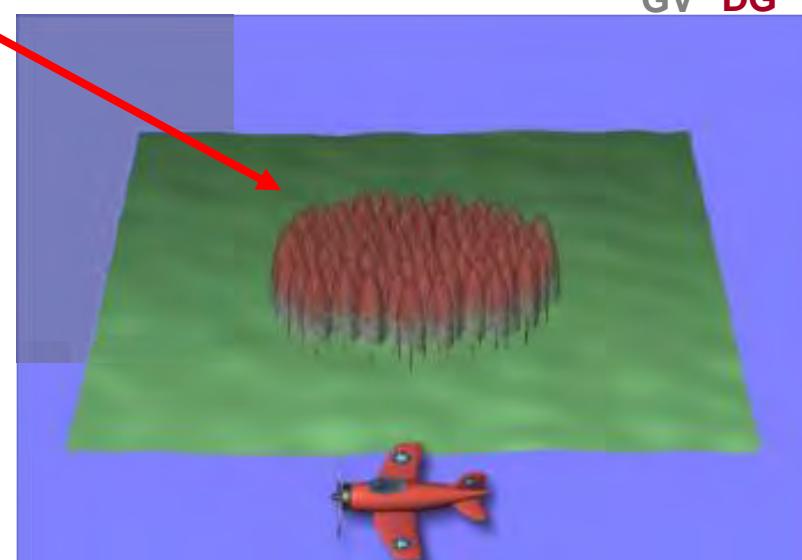
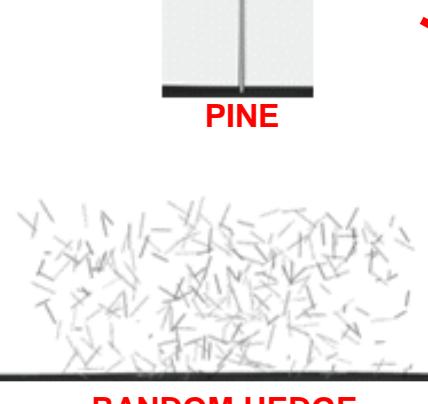
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The SAR image is evaluated as a coherent sum of scattering events from small elements of the scene

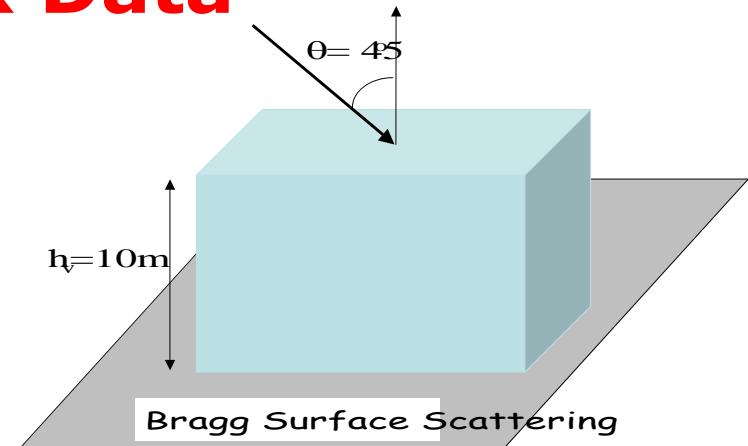
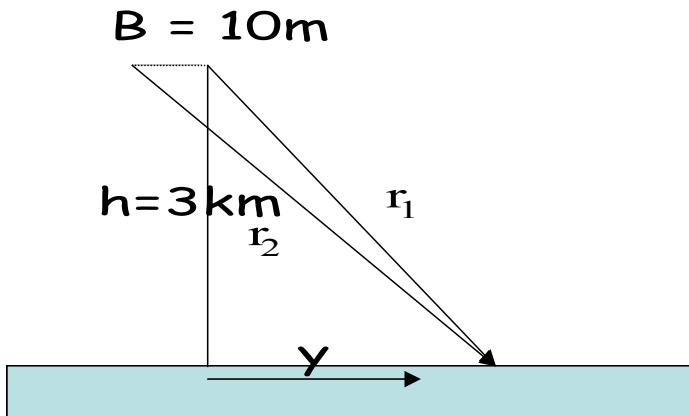


Direct-Ground, Direct-Volume and Ground-Volume contributions are included, with both trees and short vegetation comprising Volume terms.



Given the map of tree locations and dimensions a grid of points is used to sample the attenuation of the coherent wave in 3D

Pol-InSAR Data



Geometric configuration

Platform altitude :	3000m
Incidence angle:	45°
Horizontal Baseline :	10m
Vertical Baseline :	0m

System Configuration

Frequency :	1.5 GHz
Azimuth resolution :	1.3811 m
Range resolution :	0.6905 m

Ground Surface Configuration

Surface properties :	0 (smoothest)
Ground moisture Content :	0 (driest)
Azimuth / Range ground slope :	0 %

Forest configuration

Tree Species :	0 (hedge)
Tree Height:	10m
Forest stand density :	0.2
Forest Stand Circular Area :	1 Ha

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

PolSARpro
The Polarimetric SAR Data Processing and Educational Tool

Environment Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

PolSARpro Simulator (c) Dr Mark L. Williams

Output Master Directory: C:/DEV_PoSARpro_v3.0_track0

Output Slave Directory: C:/DEV_PoSARpro_v3.0_track1

Geometric Configuration:

- Platform Altitude (m): 3000
- Horizontal Baseline (m): 10.0
- Incidence Angle (deg): 45
- Vertical Baseline (m): 1.0

System Configuration:

- Centre Frequency (GHz): 1.30
- Azimuth Resolution (m): 1.5
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Save Config

Final Image Number of Rows: 105

Final Image Number of Columns: 141

Configuration File: C:/DEV_PoSARpro_v3.0_track0/pspsim_config

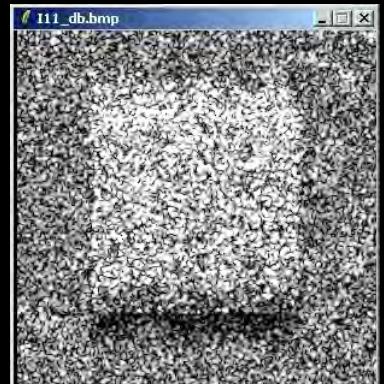
Run  Exit 

DATA_MASTERDIR

- config.txt
- s11.bin, s12.bin
s21.bin, s22.bin

DATA_SLAVE_DIR

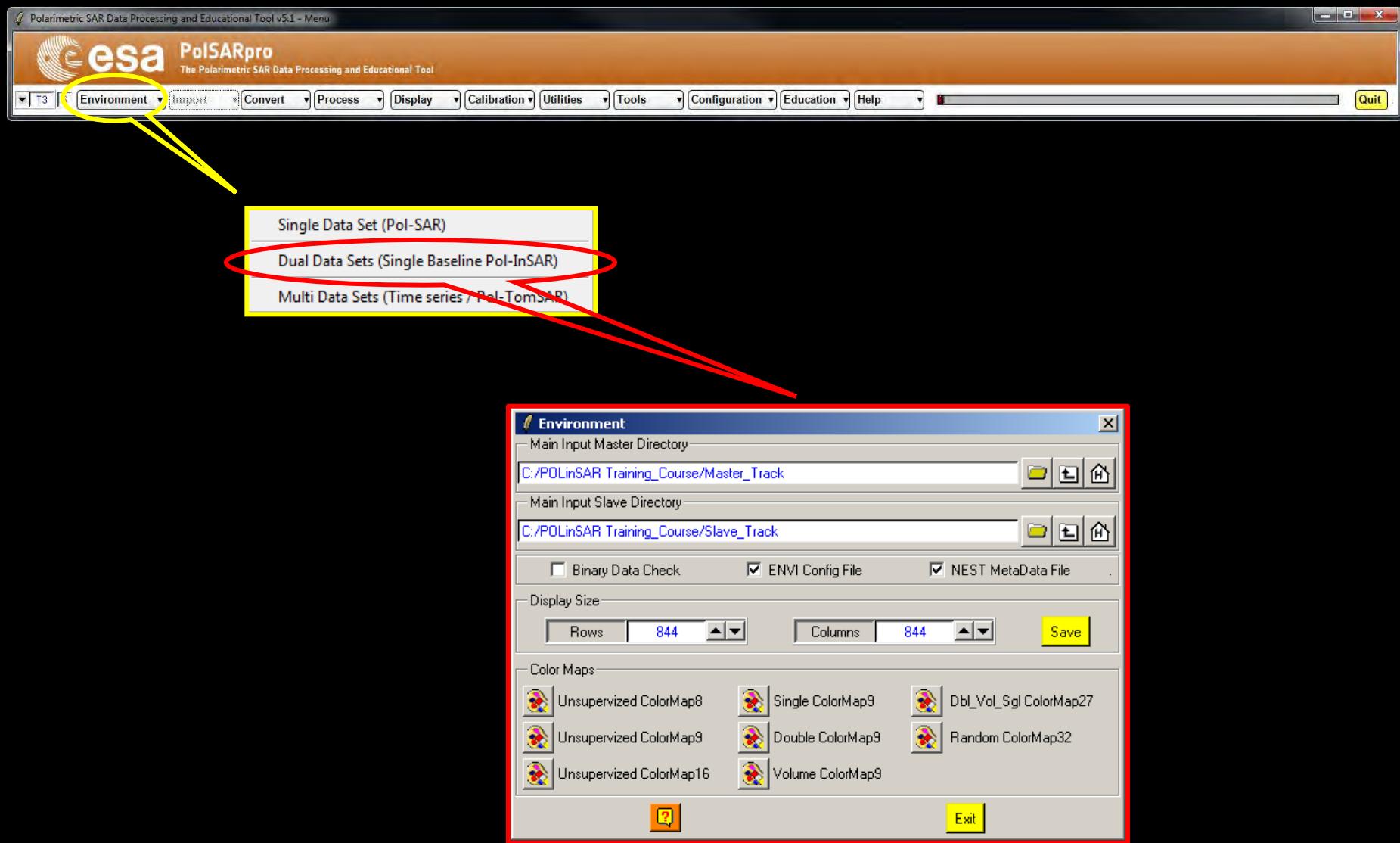
- config.txt
- s11.bin, s12.bin
s21.bin, s22.bin
- flat_earth.bin
- kz.bin



NOTE SENSING

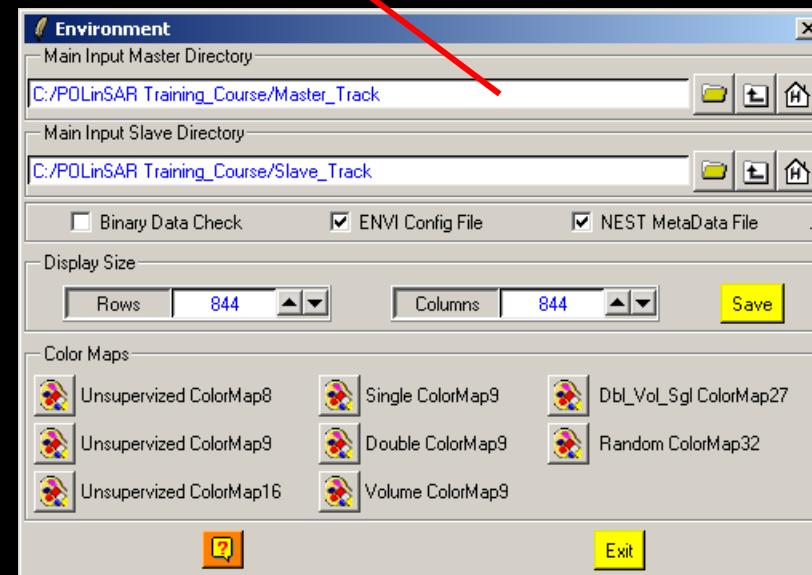
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MAIN MENU





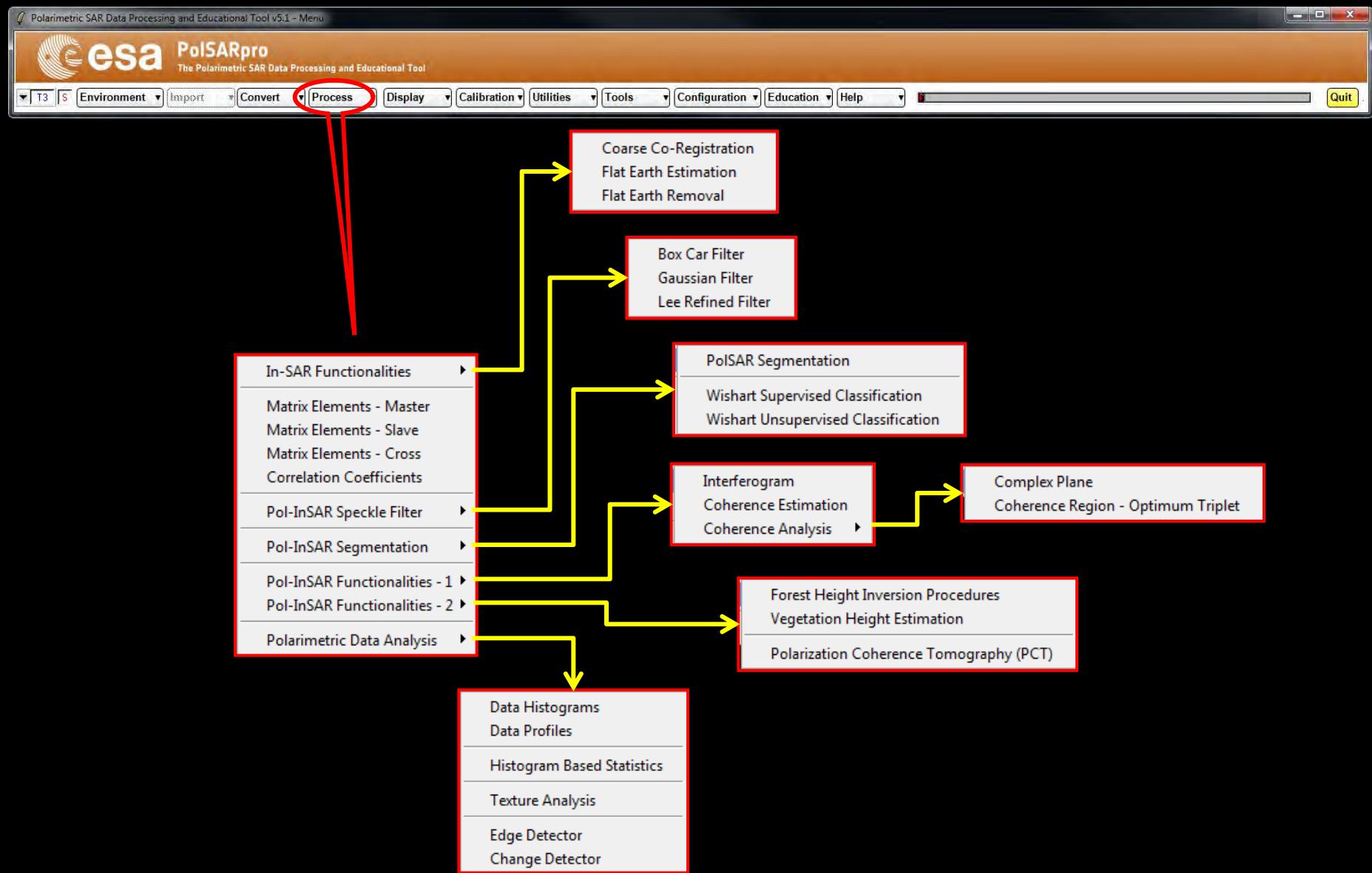
Configure Data Main Directories location

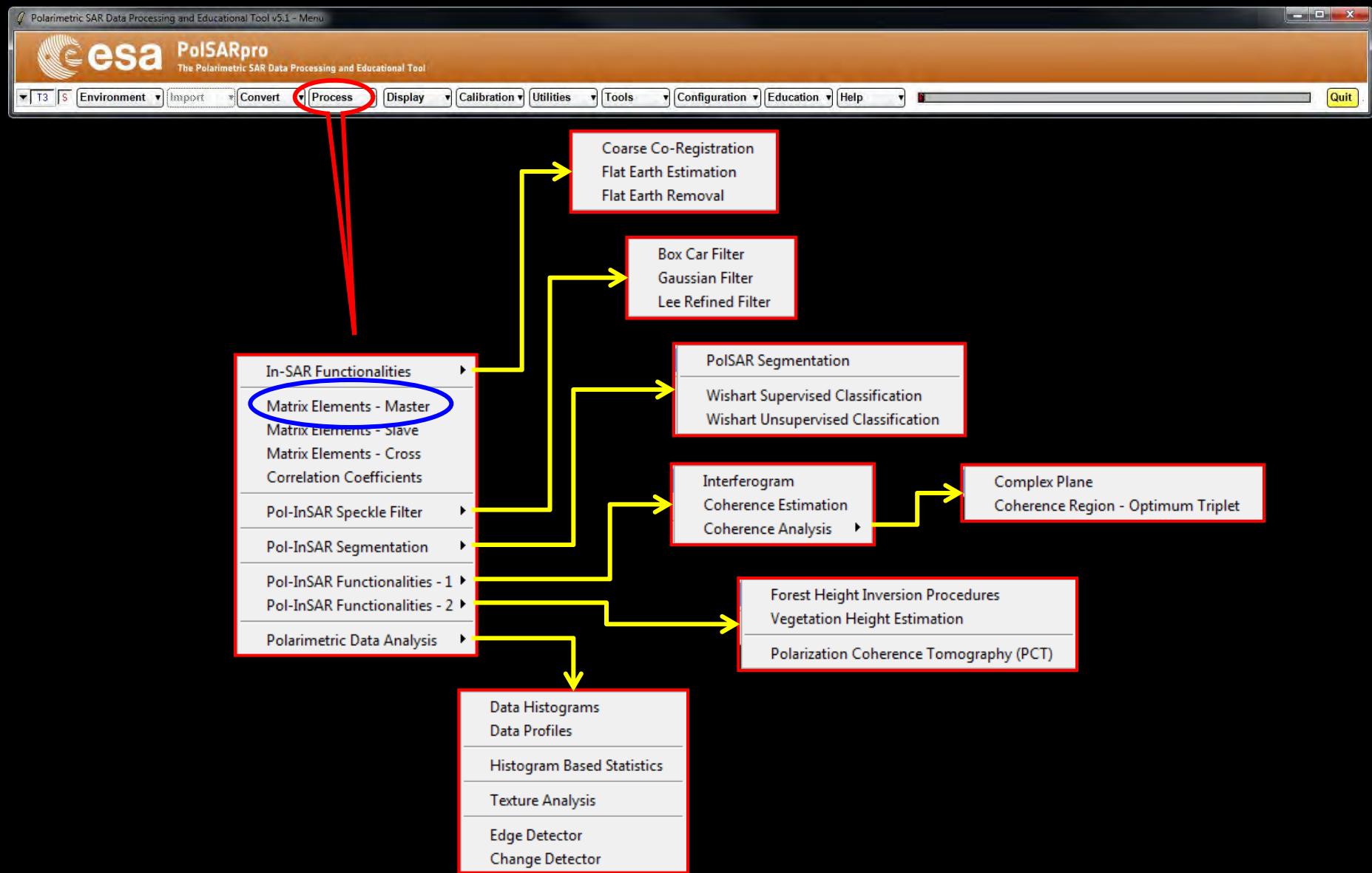


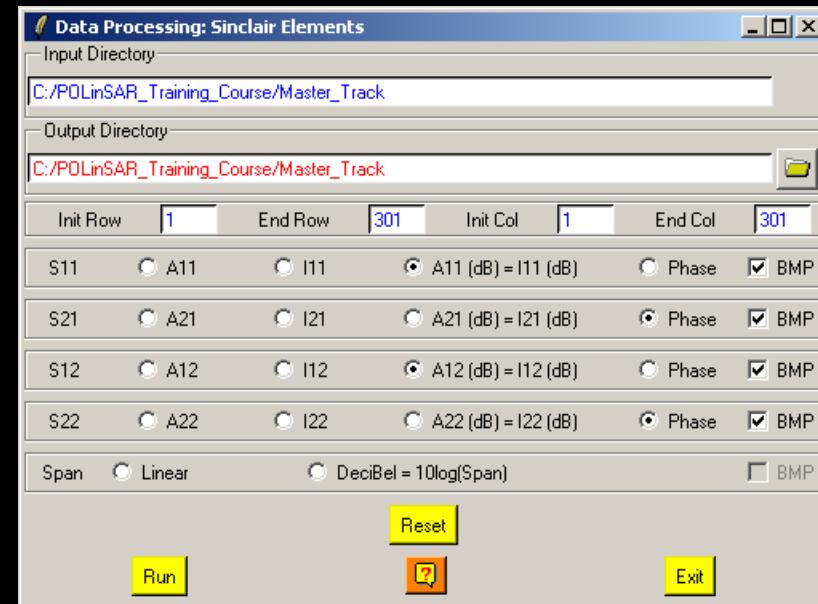
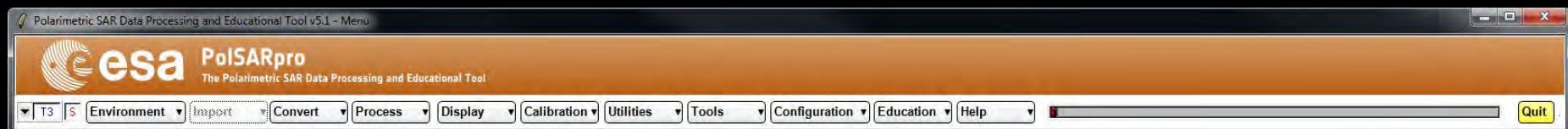
Input Master Directory: C:/Pol-InSAR_Training_Course/Master_Track

Input Slave Directory: C:/Pol-InSAR_Training_Course/Slave_Track

PROCESS DATA







Do it Yourself:

Select some elements, set the parameters and view the corresponding BMP files (select BMP).



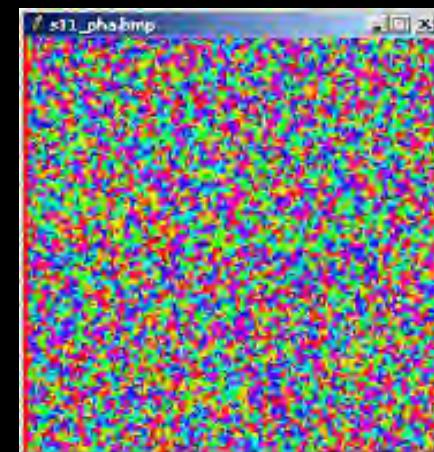
DATA_MASTERDIR

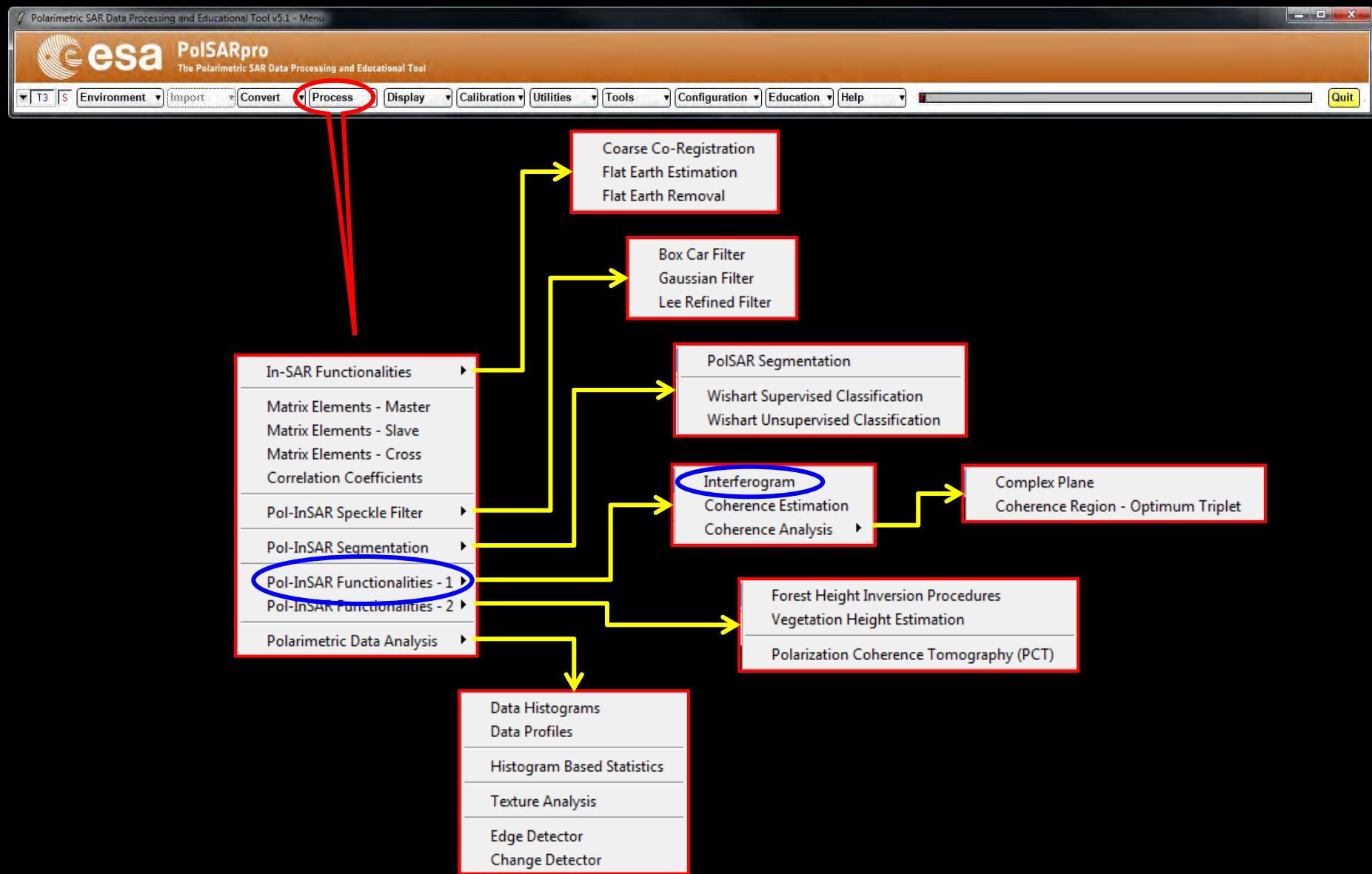
config.txt

s11.bin, s12.bin
s21.bin, s22.bin

Axy.bin, Ixy.bin
Ixy_db.bin
sxy_phा. bin

Axy.bmp, Ixy.bmp
Ixy_db.bmp
sxy_phा. bmp





RAW INTERFERrogram



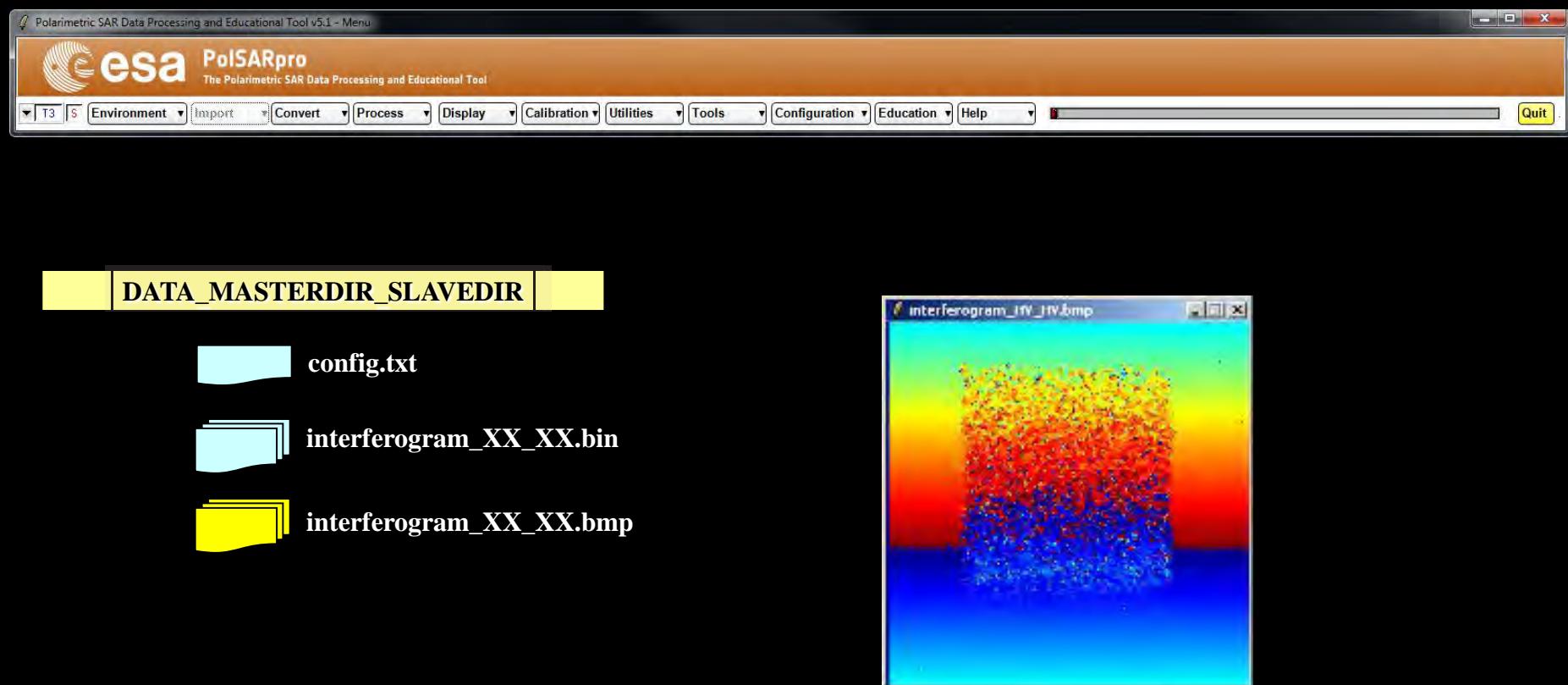
Do it Yourself:

Select polarization channels, set the parameters and view the corresponding BMP files.

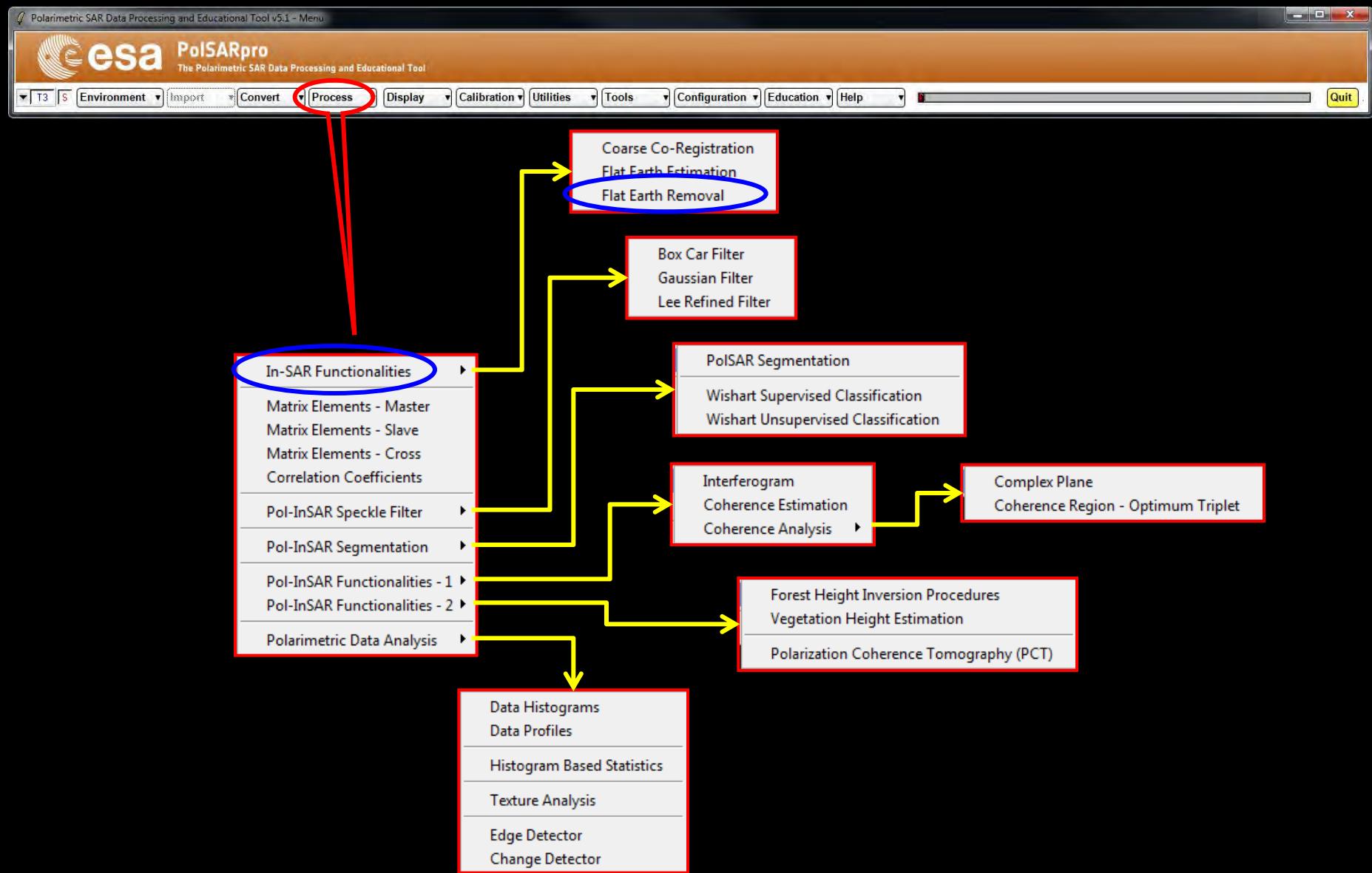
Note:

The Output Directory is automatically set to: **MasterDir_SlaveDir**

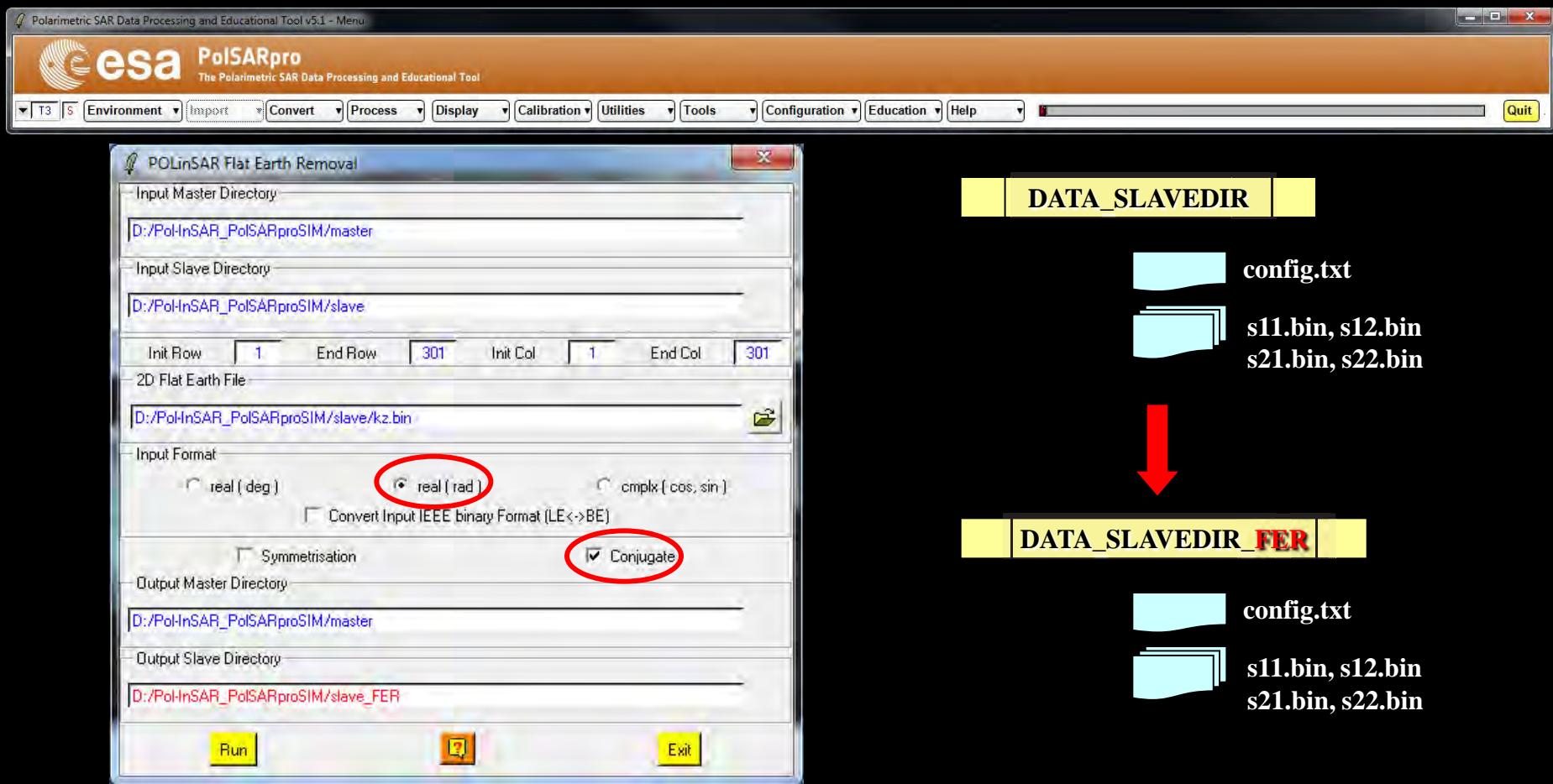
RAW INTERFEROGRAM



PROCESS DATA



FLAT EARTH REMOVAL



Do it Yourself:
Enter Flat Earth file name, set the parameters and run the function.

Note:
The Input Slave Directory is automatically set to: SlaveDir_FER

RAW INTERFERrogram



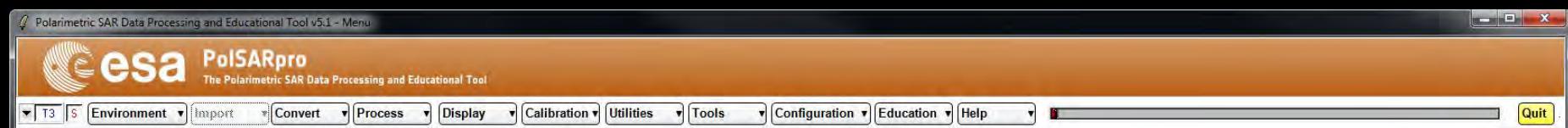
Do it Yourself:

Select polarization channels, set the parameters and view the corresponding BMP files.

Note:

The Output Directory is automatically set to: **MasterDir_SlaveDir_FER**

RAW INTERFEROGRAM



DATA_MASTERDIR_SLAVE_DIR_FER



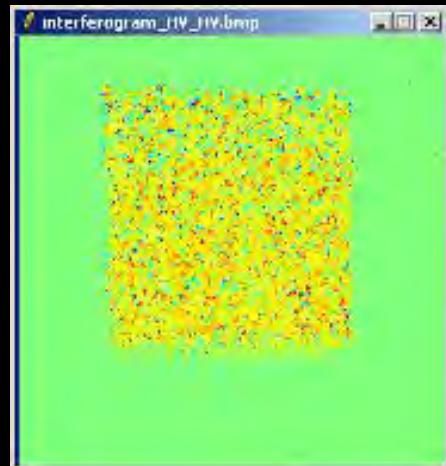
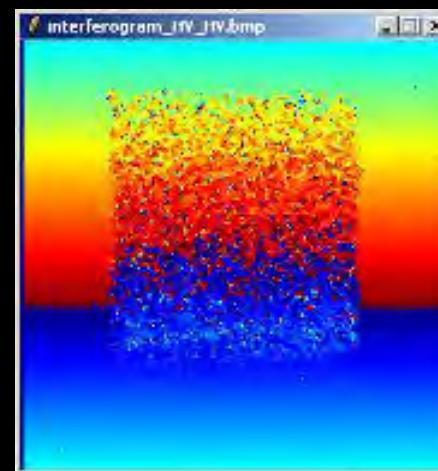
config.txt



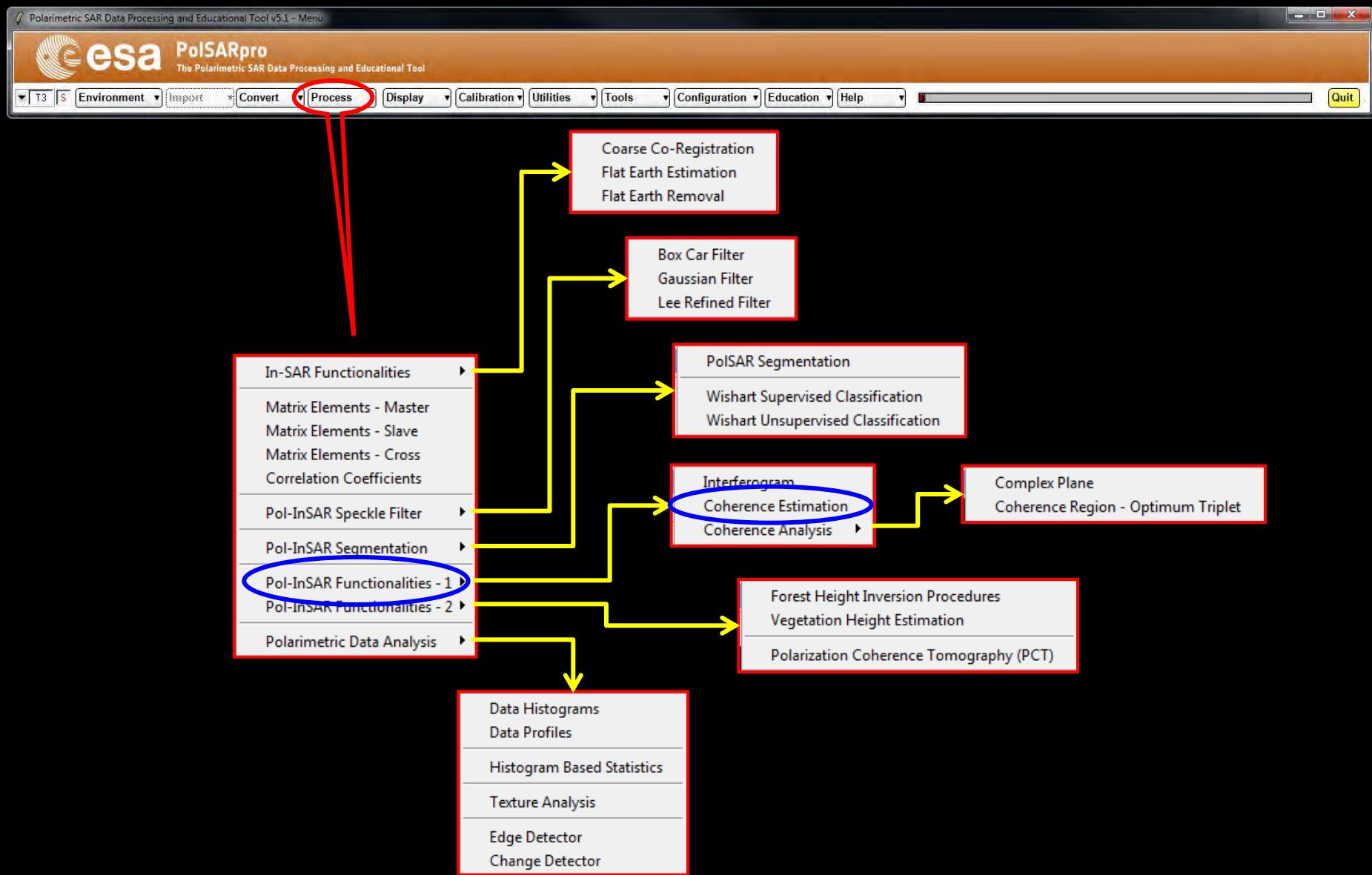
interferogram_XX_XX.bin

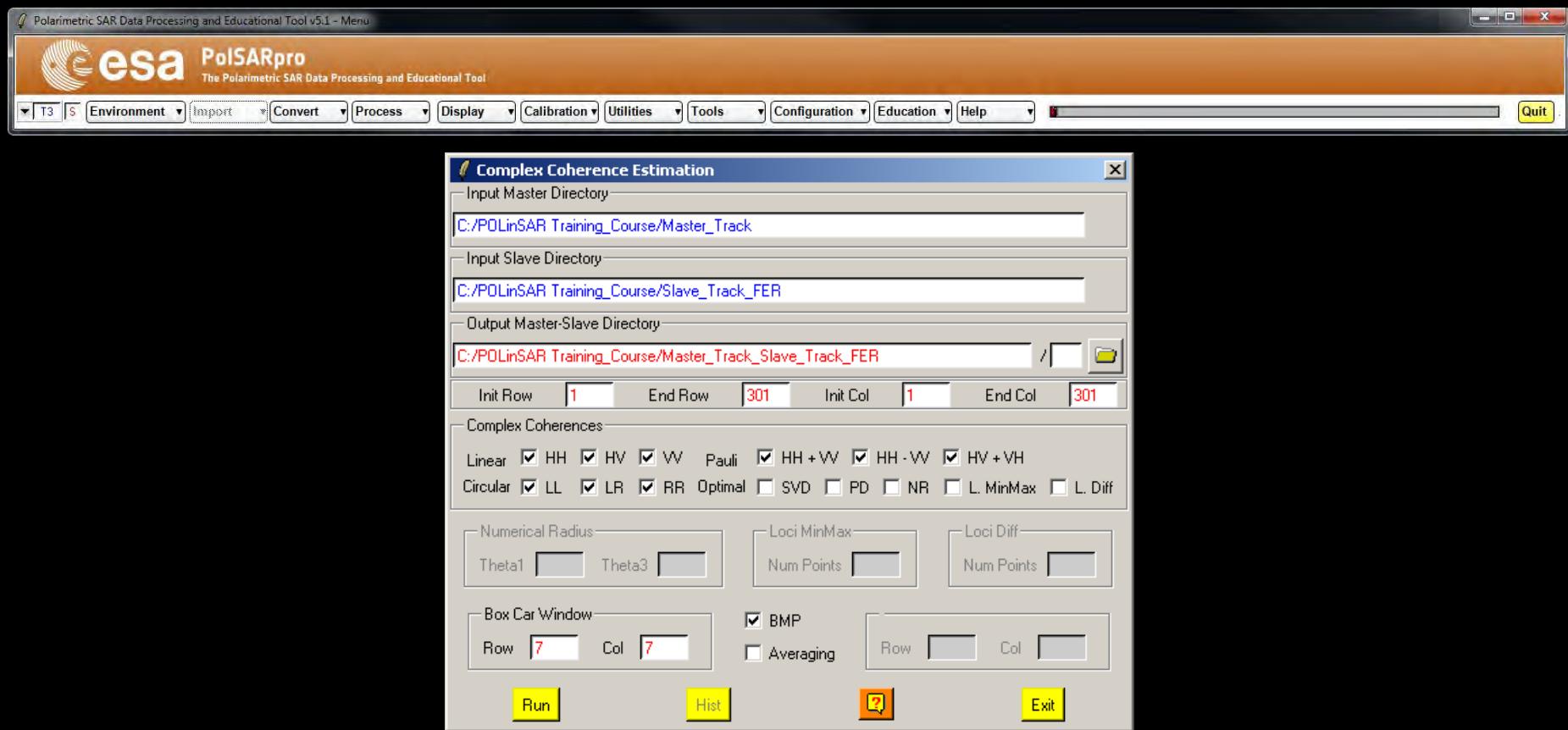


interferogram_XX_XX.bmp



PROCESS DATA





Do it Yourself:

Select polarization channels (linear, circular, pauli), set the parameters (Box Car = 11x11) and view the corresponding BMP files (select BMP).

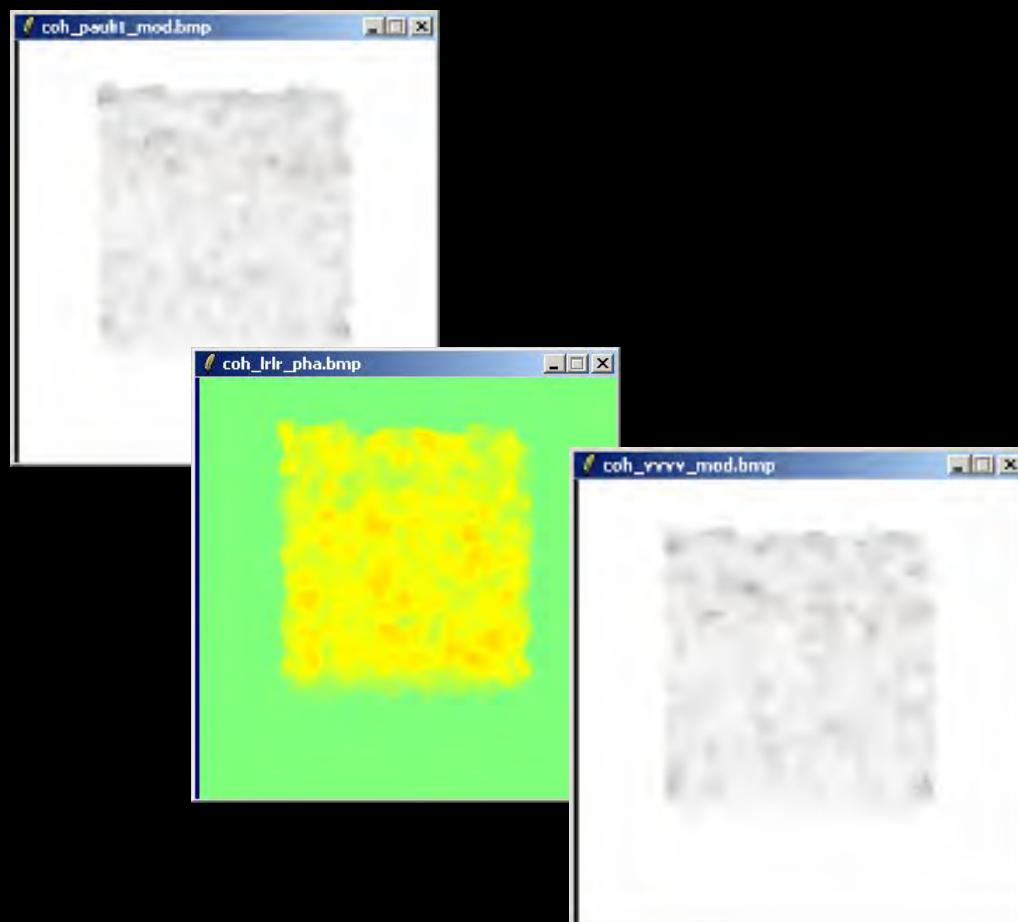
Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

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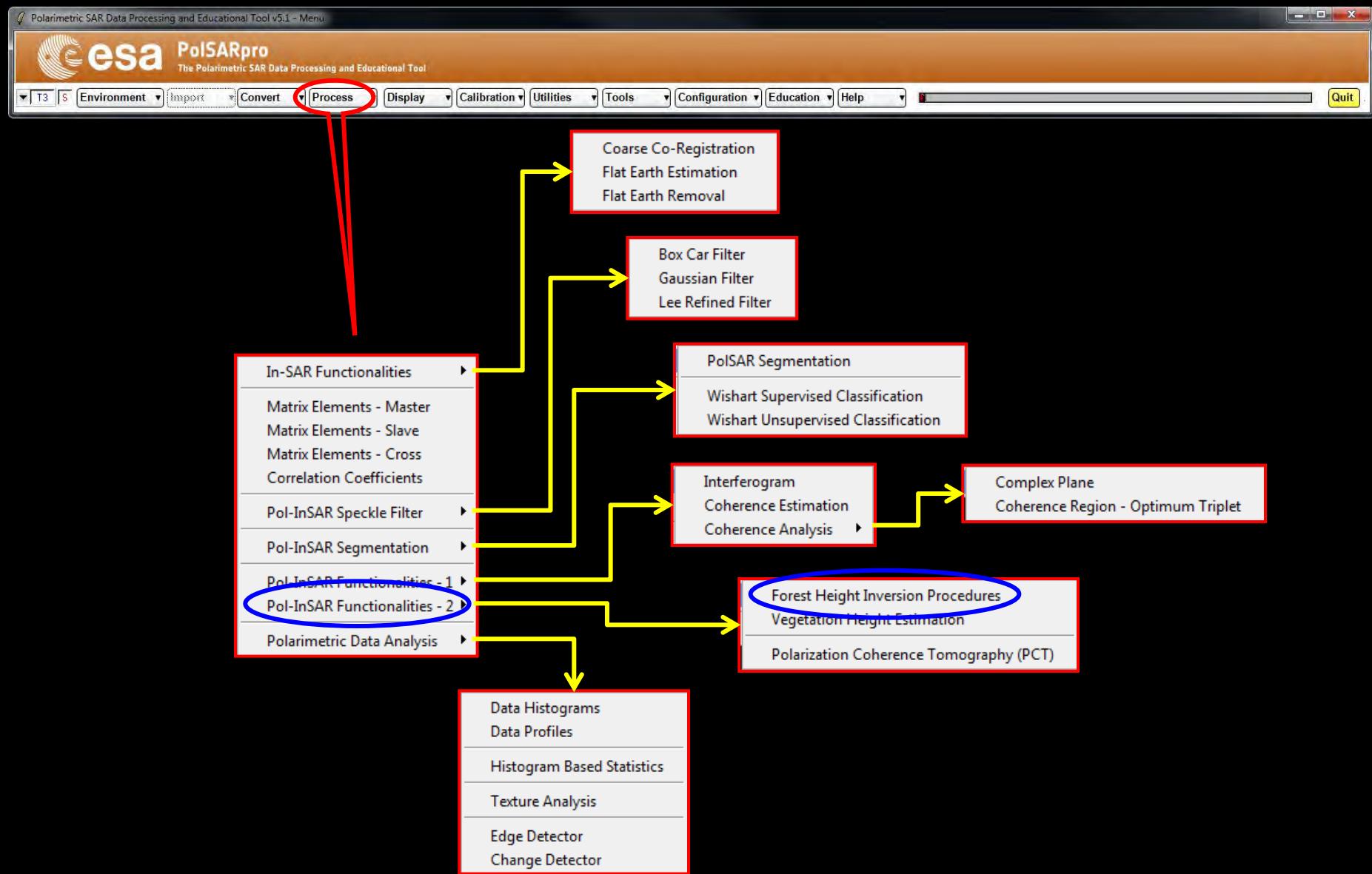
Environment Import Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

DATA_MASTERDIR_SLAVE_DIR_FER

- config.txt
- cmplx_coh_XX.bin
- cmplx_coh_XX_mod.bmp
cmplx_coh_XX_phा.bmp



PROCESS DATA



HEIGHT ESTIMATION

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

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The Polarimetric SAR Data Processing and Educational Tool

T3 S Environment Import Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

Height Estimation from Inversion Procedures

Input Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Output Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Init Row: 1 End Row: 301 Init Col: 1 End Col: 301

Update List

Polarimetric Phase Centre Height Estimation Polarimetric Channel: HH

DEM Differencing Algorithm

Coherence Amplitude Inversion Procedure

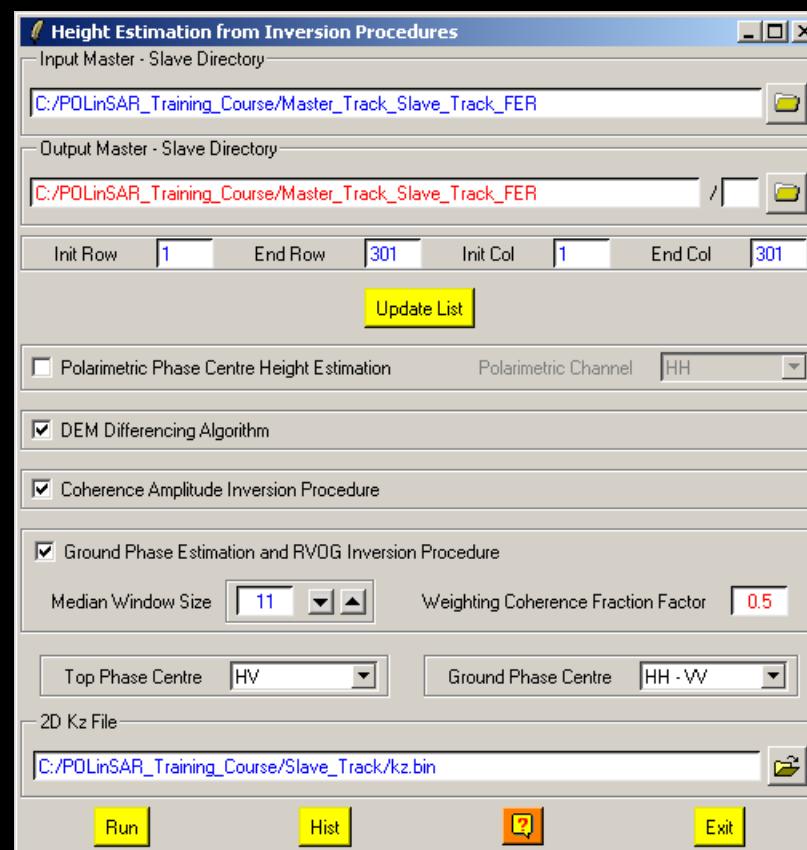
Ground Phase Estimation and RVOG Inversion Procedure

Median Window Size: 11 Weighting Coherence Fraction Factor: 0.5

Top Phase Centre: HV Ground Phase Centre: HH - WV

2D Kz File: C:/POLinSAR_Training_Course/Slave_Track/kz.bin

Run Hist ? Exit



Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

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T3 S Environment Import Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

Height Estimation from Inversion Procedures

Input Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Output Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Init Row: 1 End Row: 301 Init Col: 1 End Col: 301

Update List

Polarimetric Phase Centre Height Estimation Polarimetric Channel: HH

DEM Differencing Algorithm

Coherence Amplitude Inversion Procedure

Ground Phase Estimation and RVOG Inversion Procedure

Median Window Size: 11 Weighting Coherence Fraction Factor: 0.5

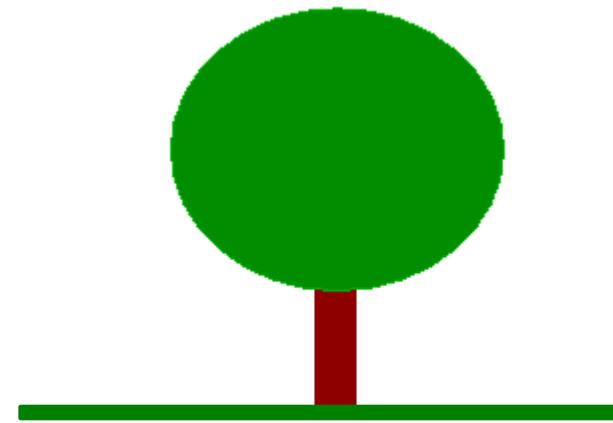
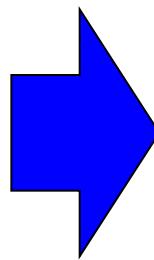
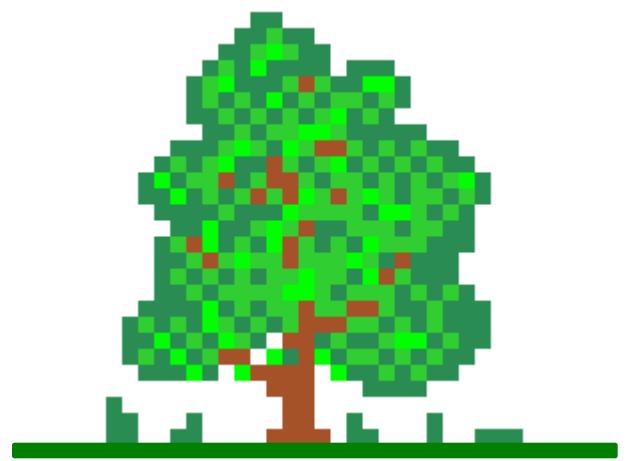
Top Phase Centre: HV Ground Phase Centre: HH - VV

2D Kz File: C:/POLinSAR_Training_Course/Slave_Track/kz.bin

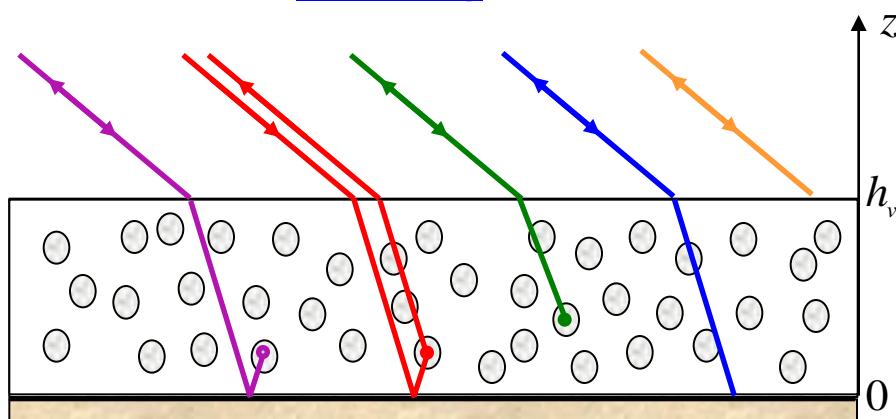
Run Hist ? Exit

INVERSION PROCEDURES

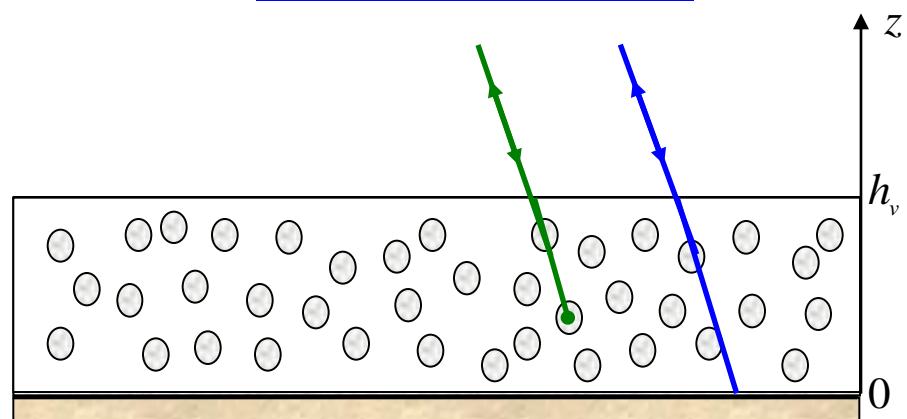
DEM Differencing Algorithm
Coherence Amplitude Inversion Procedure
Ground Phase Estimation
RVOG Inversion Procedure



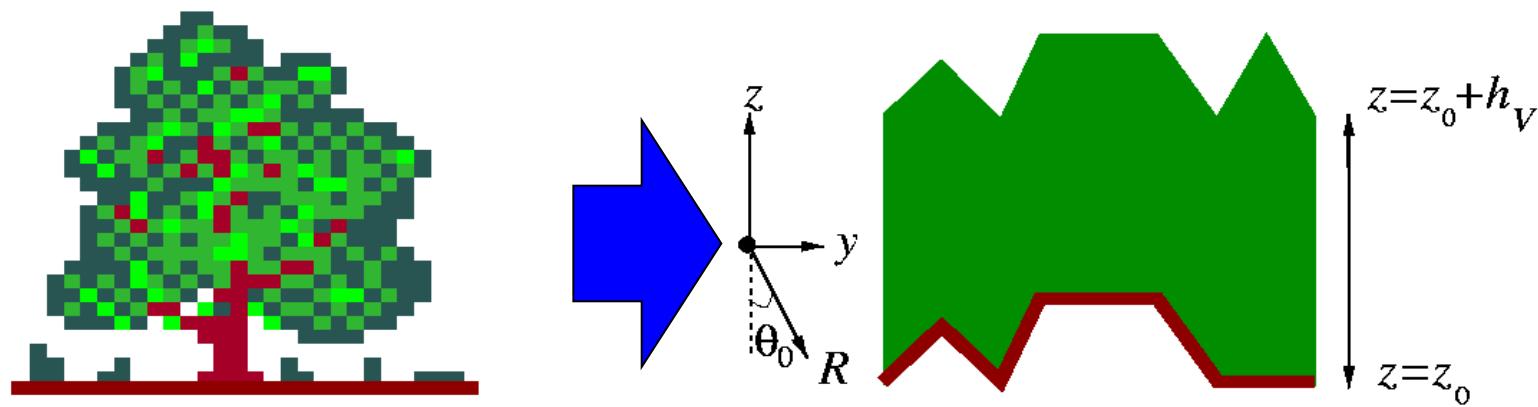
Modeling



Parameter Estimation



Simplifications : Only 2 significant mechanisms – Low density medium \Rightarrow No refraction



$$\frac{\int f(z) e^{j k z} dz}{\int_0^o f(z) dz}$$

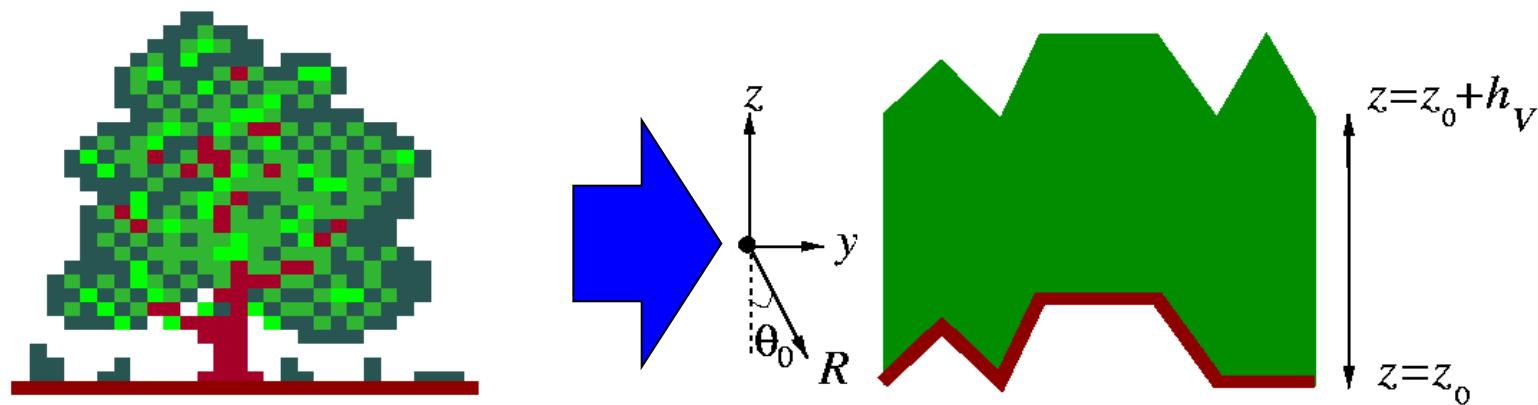
k_z *ϕ_0*

ϕ_0 Topographic Phase

$$k_z = \frac{4\pi\theta}{\lambda \sin \alpha}$$

Vertical Wavenumber

POLARIZATION INDEPENDENT



$$\gamma_{vol} = \frac{\int_0^h f(z) e^{j\phi} dz}{\int_0^h f(z) dz}$$

(k_z)

Vertical Structure function

$$f(z) = e^{-\sigma z^\alpha}$$

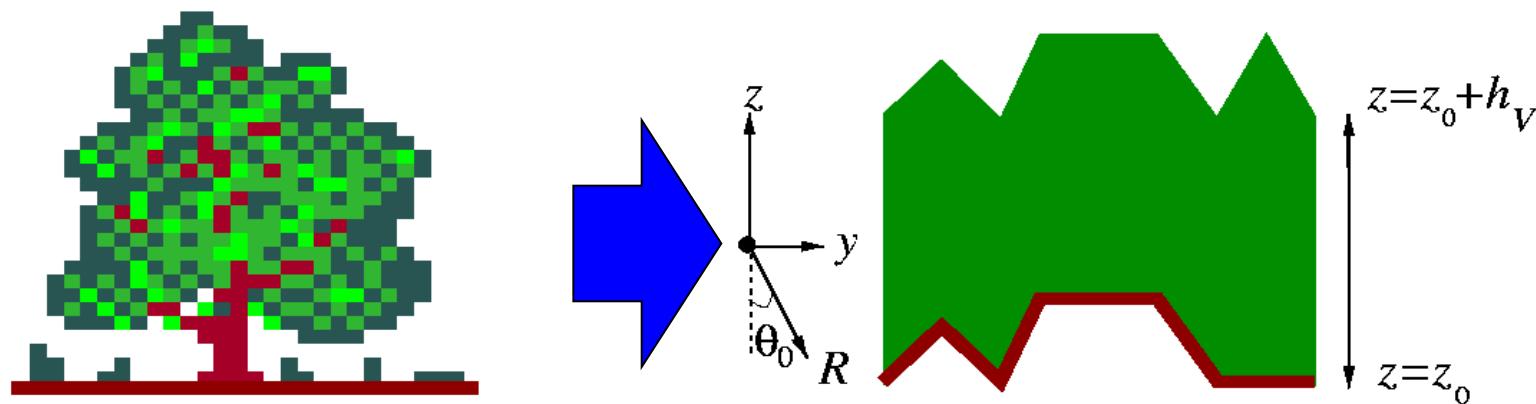
Case of Uniform Random Layer

θ_0 **Incidence Angle**

σ **Extinction Coefficient**

POLARIZATION INDEPENDENT

RVOG = Random Volume Over Ground



2 Layer Combined Surface and random Volume Scattering



Surface Scattering Contribution
Volume Scattering Contribution

G / V ratio

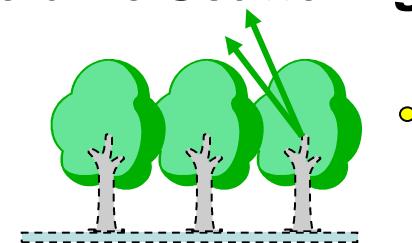
B. Treuhaft (2000), S.R. Cloude (2003)

POLARIZATION DEPENDENT

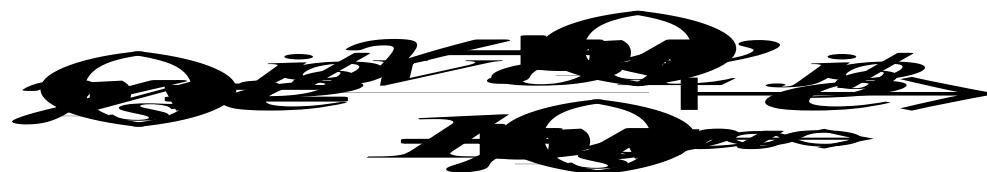
w_v Polarisation Channel corresponding to Volume Scattering



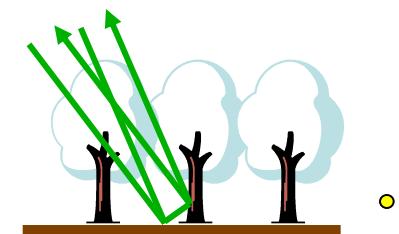
2HV

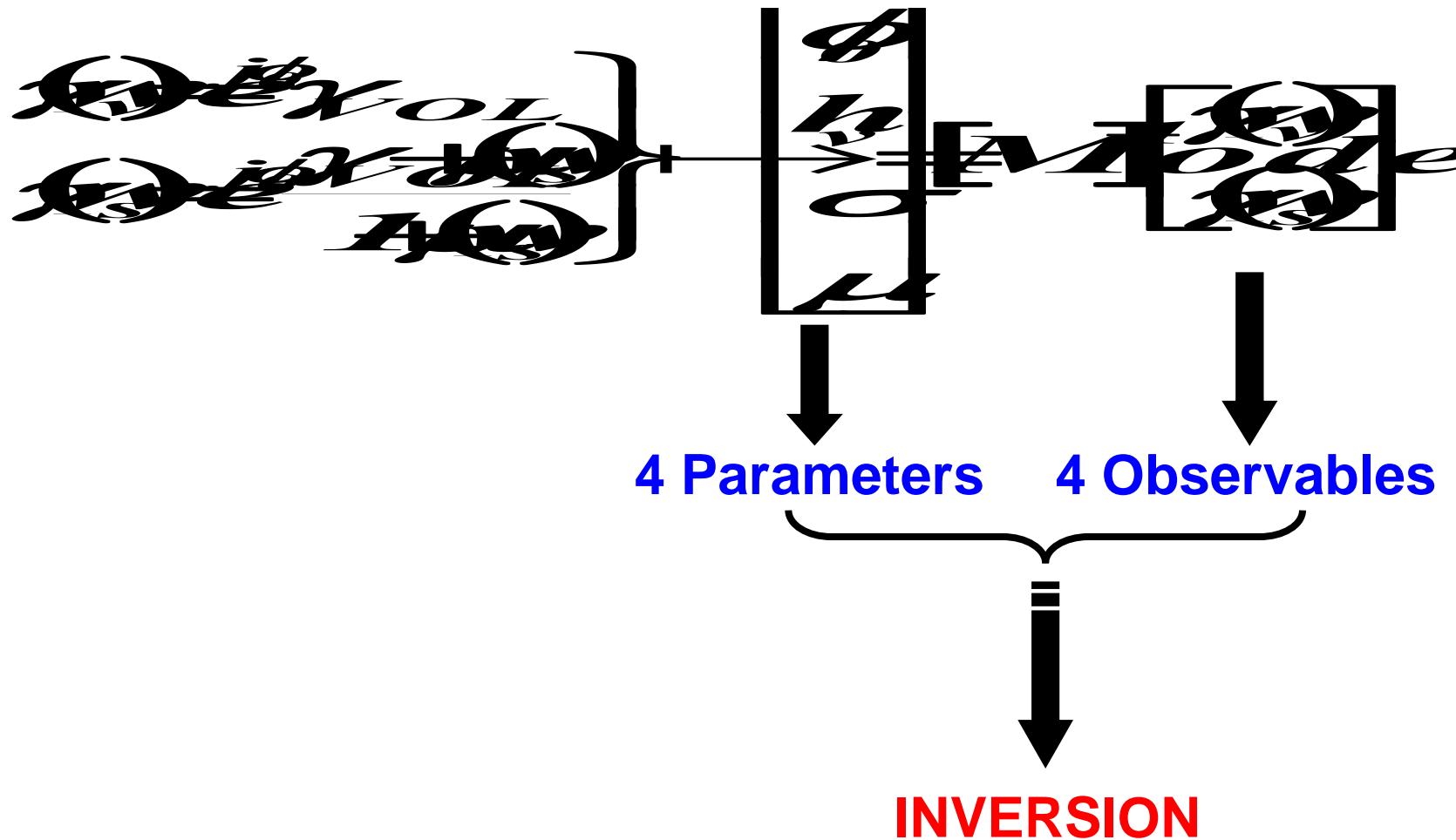


w_s Polarisation Channel corresponding to Surface Scattering



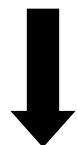
HH-VV





DEM Differencing Algorithm

$$\left. \begin{array}{l} \gamma(\underline{w}_v) = e^{j\phi_0} \gamma_{VOL} \\ \gamma(\underline{w}_s) \mapsto e^{j\phi_0} \end{array} \right\} \mapsto \gamma(\underline{w}_v) = \gamma(\underline{w}_s) \gamma_{VOL} \approx \gamma(\underline{w}_s) \alpha e^{jk_z h_v}$$



$$h_v \approx \frac{\arg[\gamma(\underline{w}_v)] - \arg[\gamma(\underline{w}_s)]}{k_z}$$

Coherence Amplitude Inversion Procedure

Assumption: Only Volume Scattering is present

$$\gamma(\underline{w}_v) = e^{j\phi_0} \gamma_{VOL} \quad \mapsto \quad |\gamma(\underline{w}_v)| = |\gamma_{VOL}|$$



$$\min_{h_v} \left\| |\gamma(\underline{w}_v)| - \left| \frac{p}{p_1} \frac{e^{p_1 h_v} - 1}{e^{p_1 h_v} - 1} \right| \right\|$$

1-D Search Procedure
Look Up Table (LUT)

Topographic Phase Estimation

$$\left. \begin{array}{l} \gamma(\underline{w}_v) = e^{j\phi_0} \gamma_{VOL} \\ \gamma(\underline{w}_s) = e^{j\phi_0} \frac{\gamma_{VOL} + \mu(\underline{w}_s)}{1 + \mu(\underline{w}_s)} \end{array} \right\} \mapsto e^{j\phi_0} = \frac{\gamma(\underline{w}_s) - \gamma(\underline{w}_v)(1 - L)}{L}$$

With: $L = \frac{\mu(\underline{w}_s)}{1 + \mu(\underline{w}_s)}$

$$\hat{\phi}_0 = \arg[\gamma(\underline{w}_s) - \gamma(\underline{w}_v)(1 - L)]$$

Estimation of L $\left| \frac{\gamma(\underline{w}_s) - \gamma(\underline{w}_v)(1 - L)}{L} \right|^2 = 1 \Rightarrow AL^2 + BL + C = 0$

$$A = |\gamma(\underline{w}_v)|^2 - 1 \quad B = 2\Re[(\gamma(\underline{w}_s) - \gamma(\underline{w}_v))\gamma^*(\underline{w}_s)] \quad C = |\gamma(\underline{w}_s) - \gamma(\underline{w}_v)|^2$$

$$L = \frac{-B - \sqrt{B^2 - 4AC}}{2A}$$

RVOG Inversion Procedure

$$\min_{h_v, \sigma} \left\| \gamma(\underline{w}_v) - e^{j\hat{\phi}_0} \frac{p}{p_1} \frac{e^{p_1 h_v} - 1}{e^{p h_v} - 1} \right\|$$

Expensive 2-D Search Procedure !



$$h_v \approx \underbrace{\frac{\arg[\gamma(\underline{w}_v)] - \hat{\phi}_0}{k_z}} + \varepsilon \underbrace{\frac{2 \sin c^{-1}(\gamma(\underline{w}_v))}{k_z}}$$

$0.3 \leq \varepsilon \leq 0.5$
Suitable
Compromise



DEM Differencing Coherence Amplitude
Inversion Inversion

HEIGHT ESTIMATION

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

PolSARpro
The Polarimetric SAR Data Processing and Educational Tool

T3 S Environment Import Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

Height Estimation from Inversion Procedures

Input Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Output Master - Slave Directory: C:/POLinSAR_Training_Course/Master_Track_Slave_Track_FER

Init Row: 1 End Row: 301 Init Col: 1 End Col: 301

Update List

Polarimetric Phase Centre Height Estimation Polarimetric Channel: HH

DEM Differencing Algorithm

Coherence Amplitude Inversion Procedure

Ground Phase Estimation and RVOG Inversion Procedure

Median Window Size: 11 Weighting Coherence Fraction Factor: 0.5

Top Phase Centre: HV Ground Phase Centre: HH - VV

2D Kz File: C:/POLinSAR_Training_Course/Slave_Track/kz.bin

Run Hist Q Exit

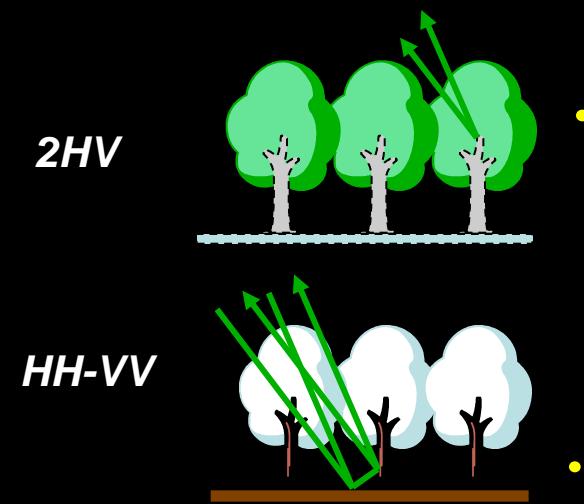
DATA_MASTERDIR_SLAVEDIR_FER

config.txt

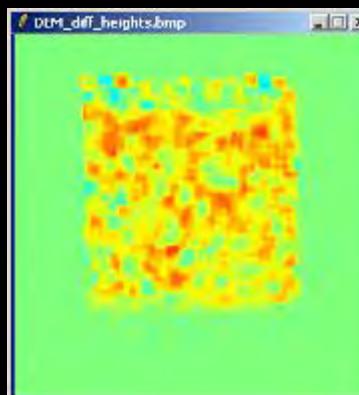
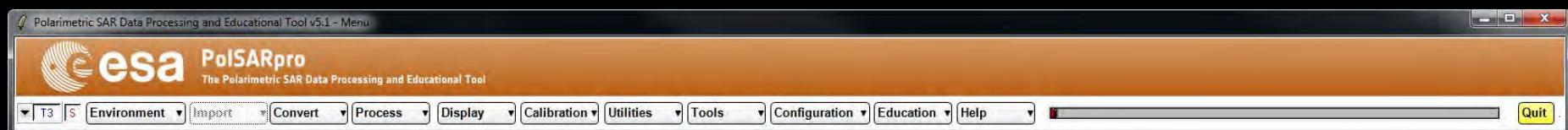
DEM_diff_heights.bin, Coh_heights.bin
Ground_phase.bin, Ground_phase_median.bin
RVOG_phase_heights.bin, RVOG_heights.bin

DEM_diff_heights.bmp, Coh_heights.bmp
Ground_phase.bmp, Ground_phase_median.bmp
RVOG_phase_heights.bmp, RVOG_heights.bmp

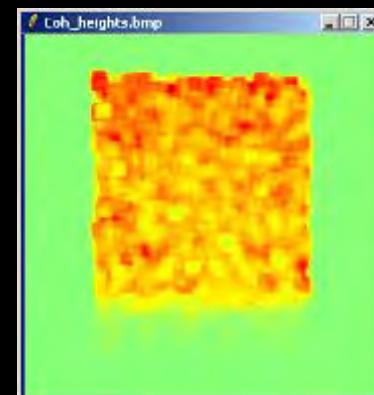
Do it Yourself:
**Set the parameters (Median Size = 21,
Factor = 0.4)**
and view the corresponding BMP files.



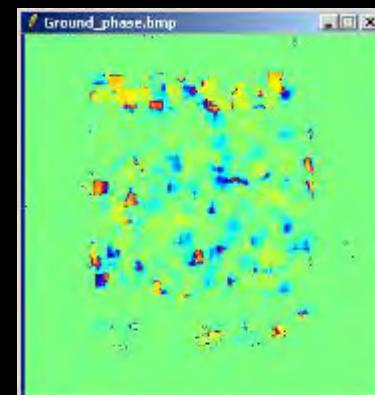
HEIGHT ESTIMATION



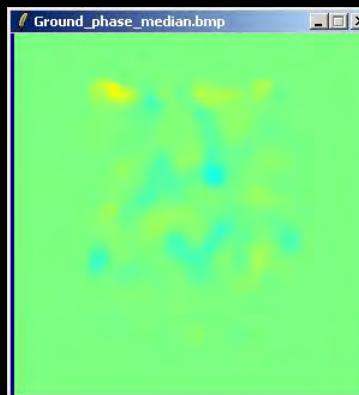
DEM_diff_heights



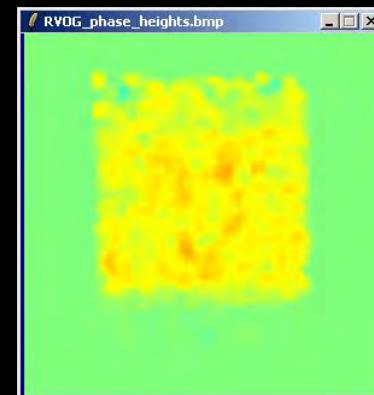
Coh_heights



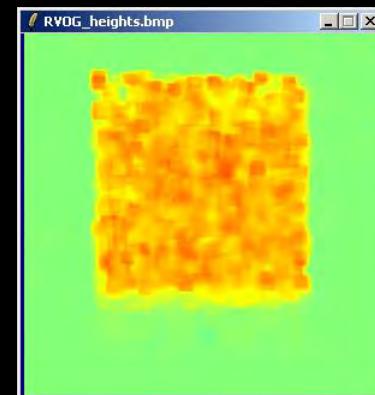
Ground_phase



Ground_phase_median

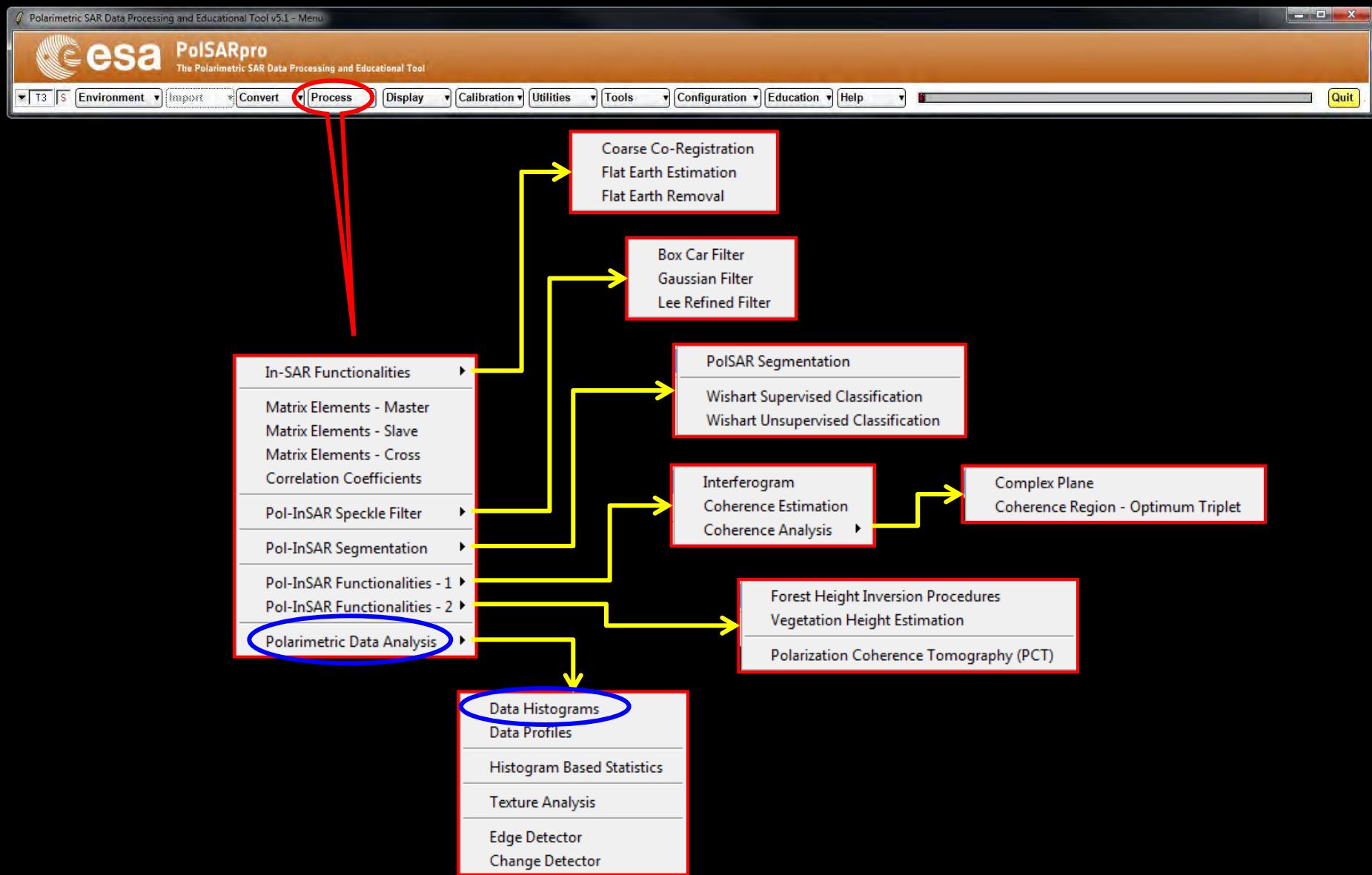


RVOG_phase_heights

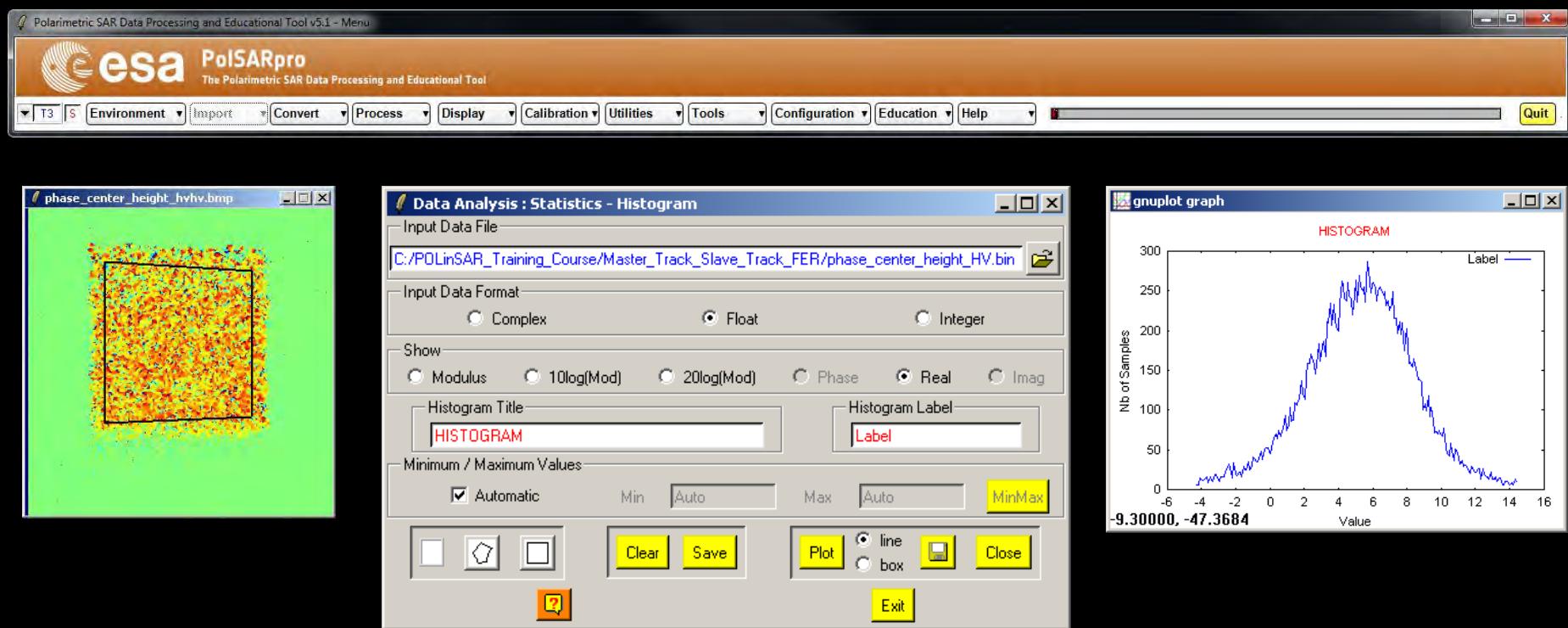


RVOG_heights

PROCESS DATA



HEIGHT ESTIMATION



Do it Yourself:

Select a BMP file

Select a BIN file

Select Input Data Format

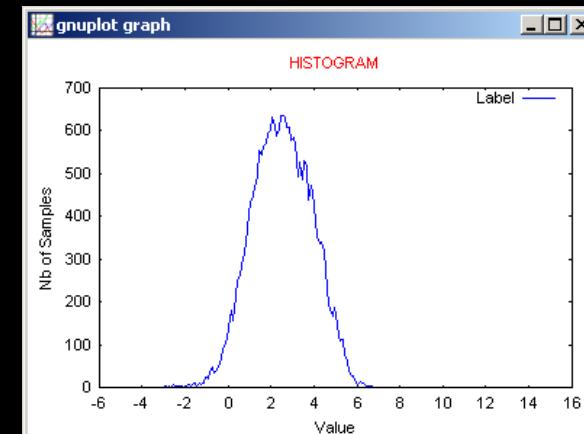
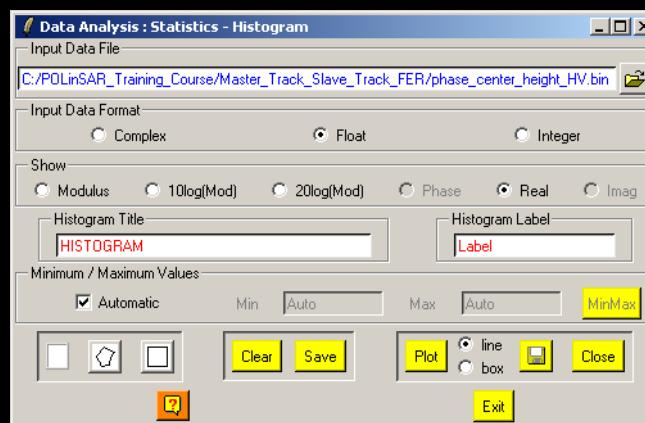
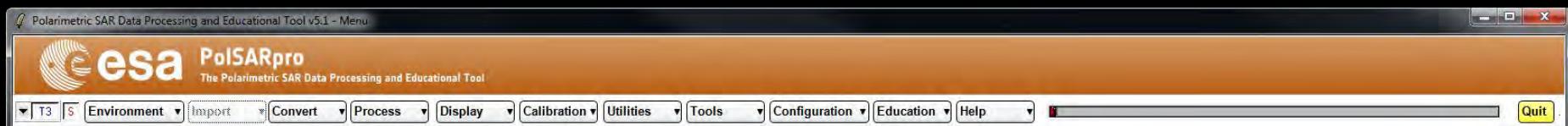
Select Show

Select Area (line or rect)

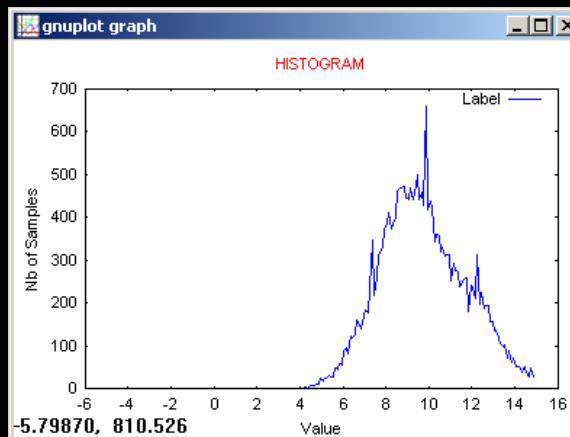
SAVE

PLOT

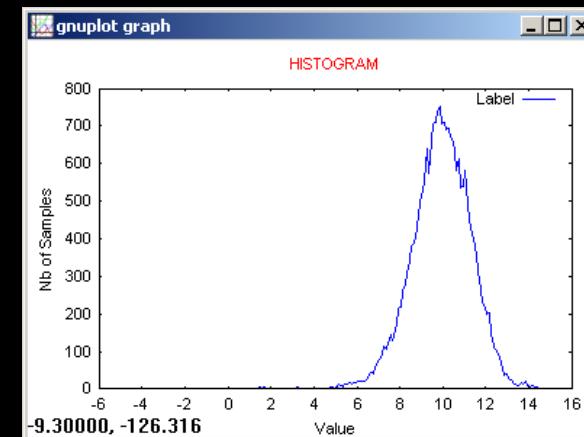
HEIGHT ESTIMATION



DEM_diff_heights

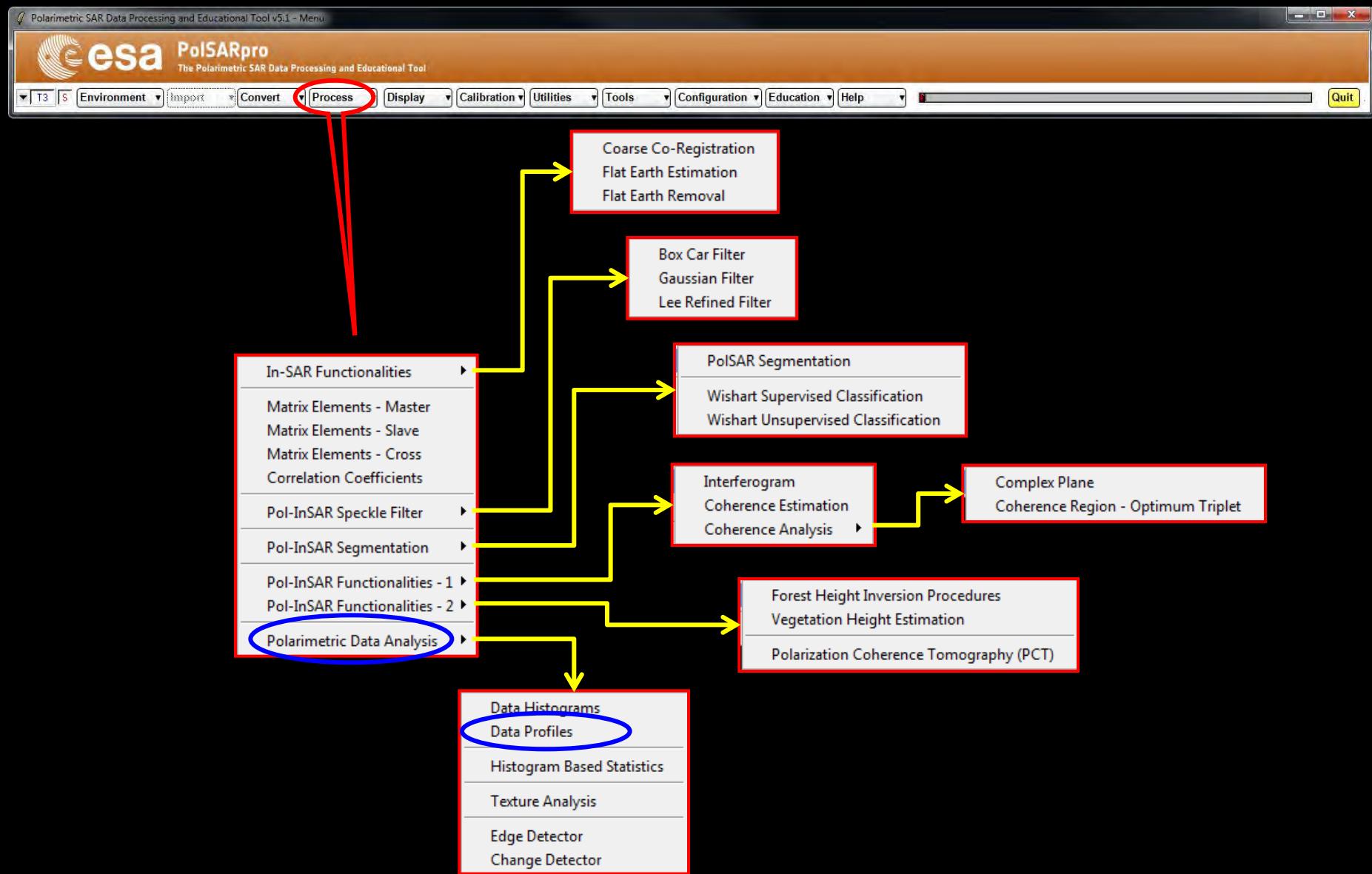


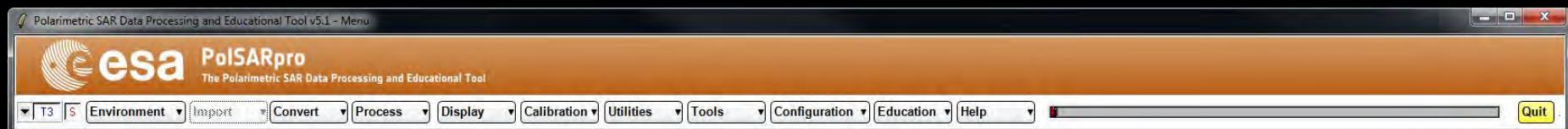
Coh_heights



RVOG_heights

PROCESS DATA





Do it Yourself:

Select a BMP file

Select a BIN file

Select Input Data Format

Select Pixel

Select Show

Select Representation

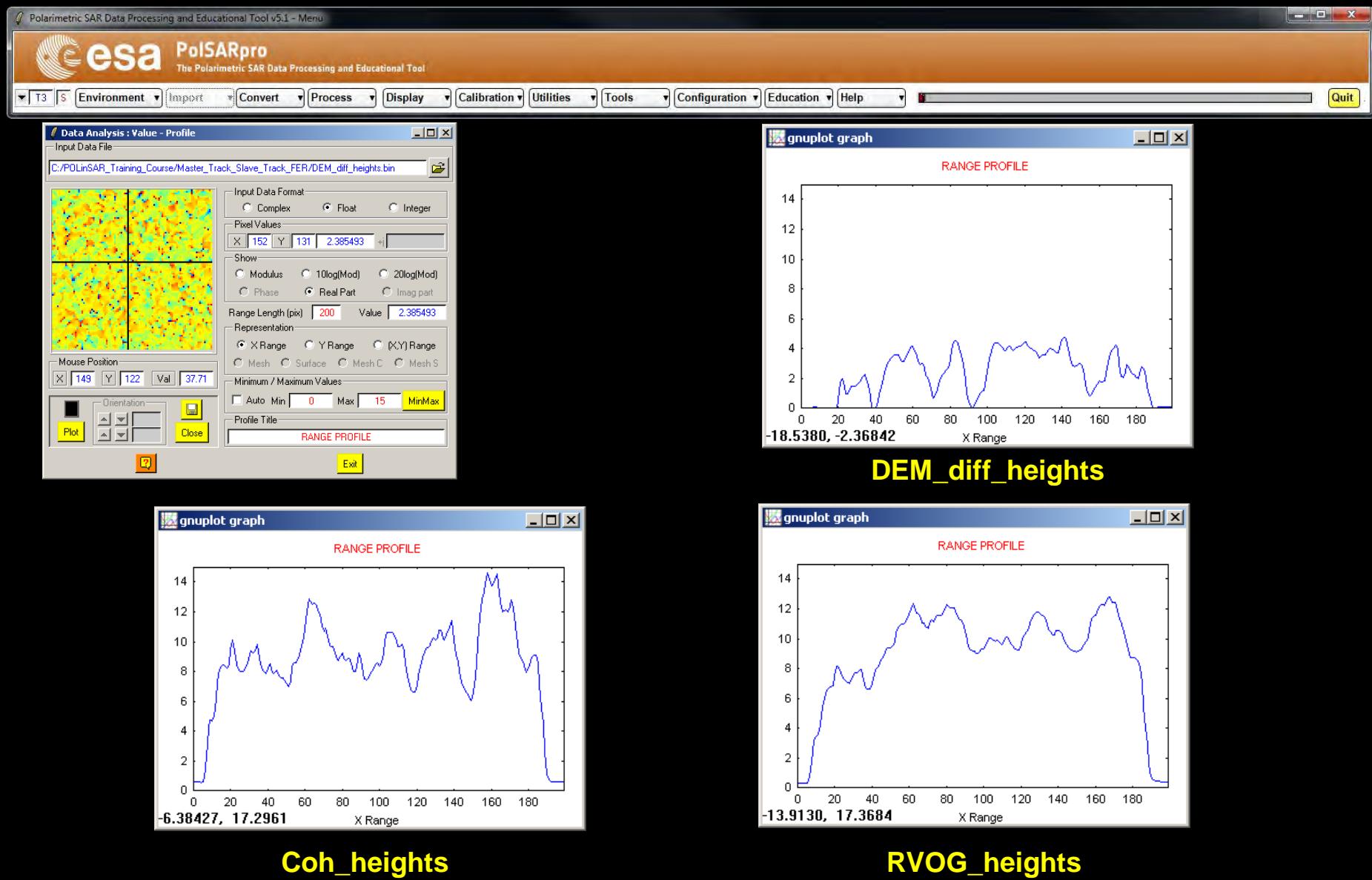
X Range / Y Range = 200pix

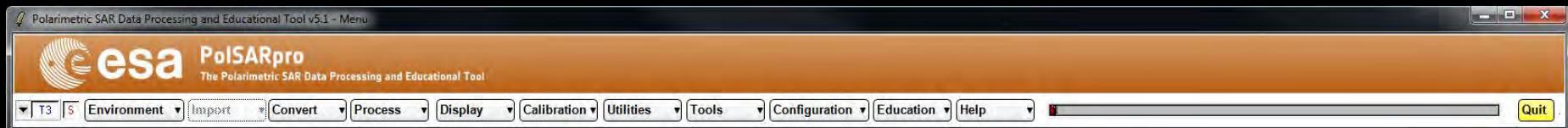
XY Range = 30 pix (3D)

Set Min / Max Values

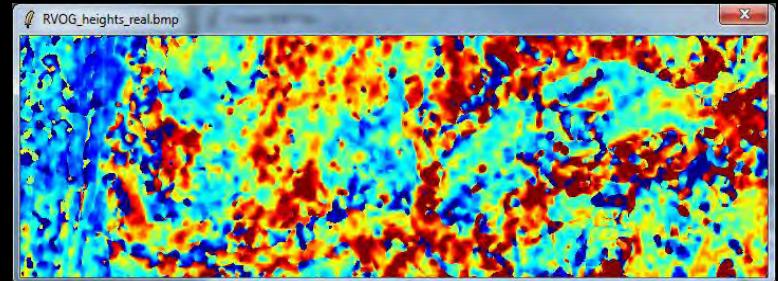
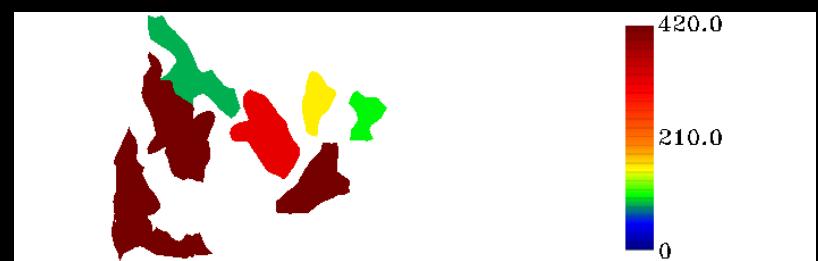
PLOT

HEIGHT ESTIMATION

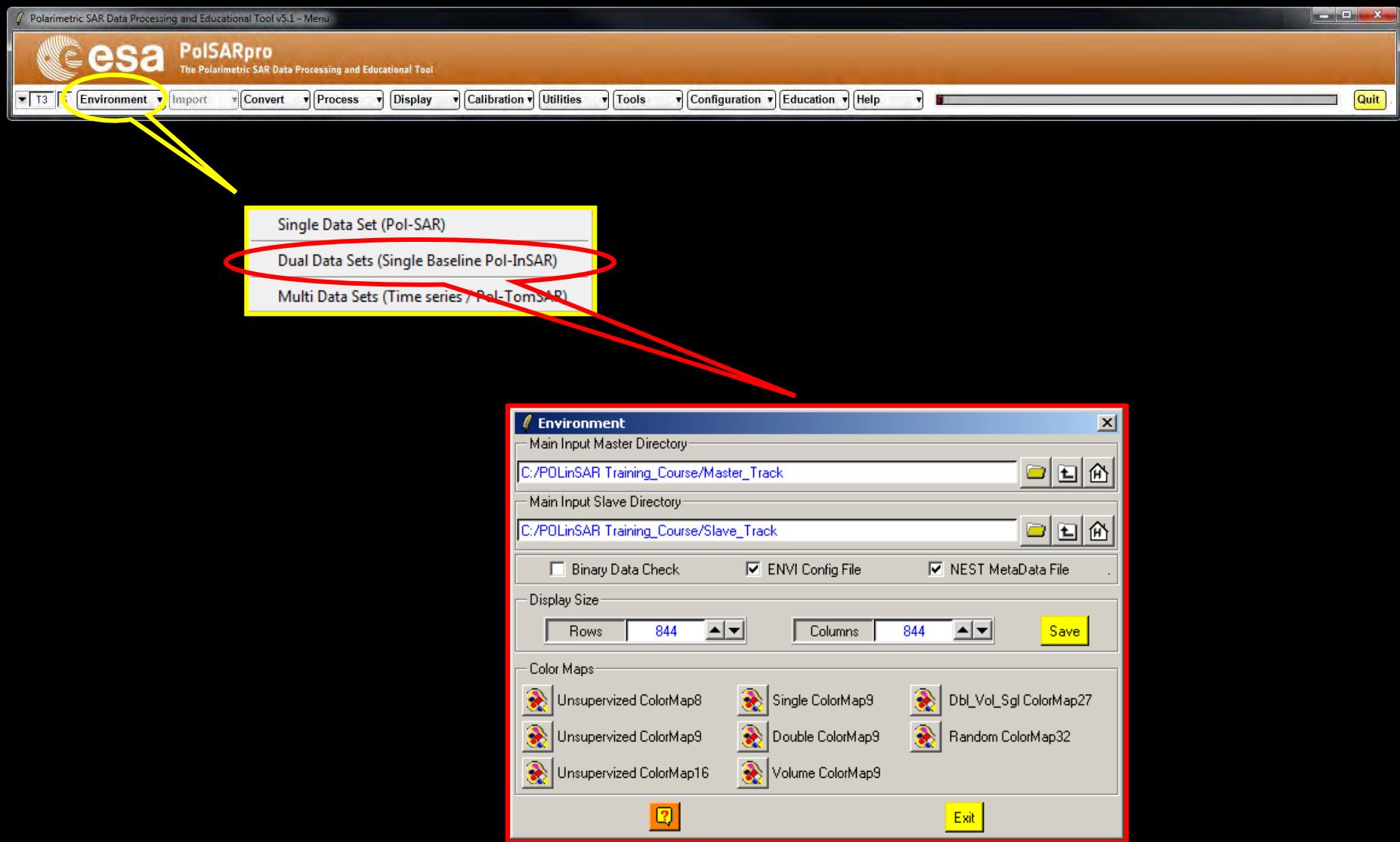




Pol-InSAR Practical Forest Application

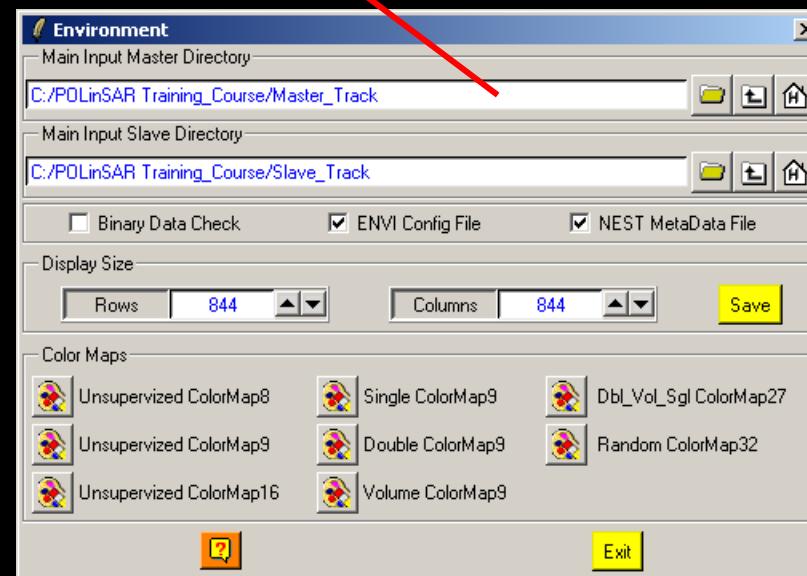


MAIN MENU



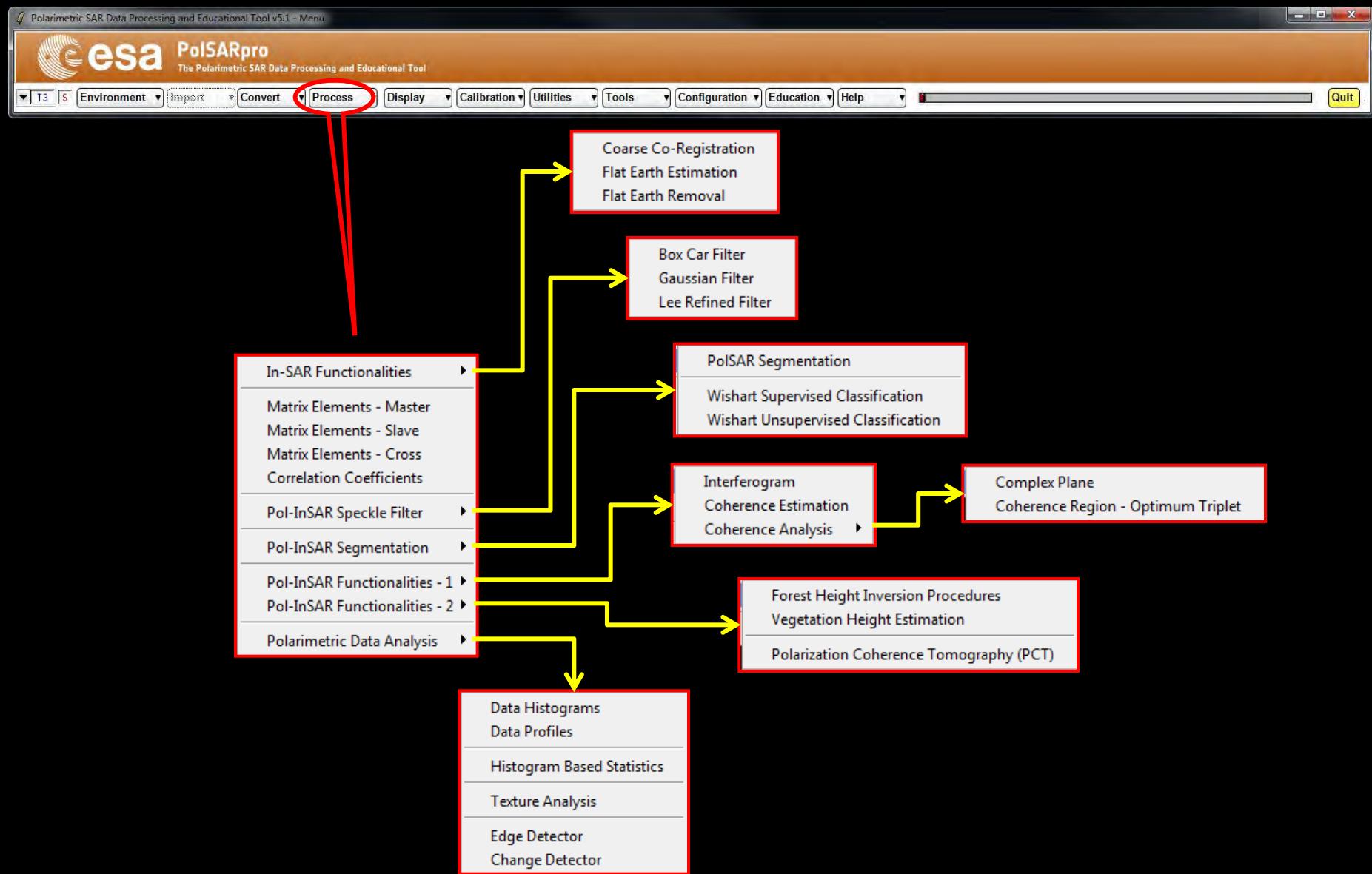


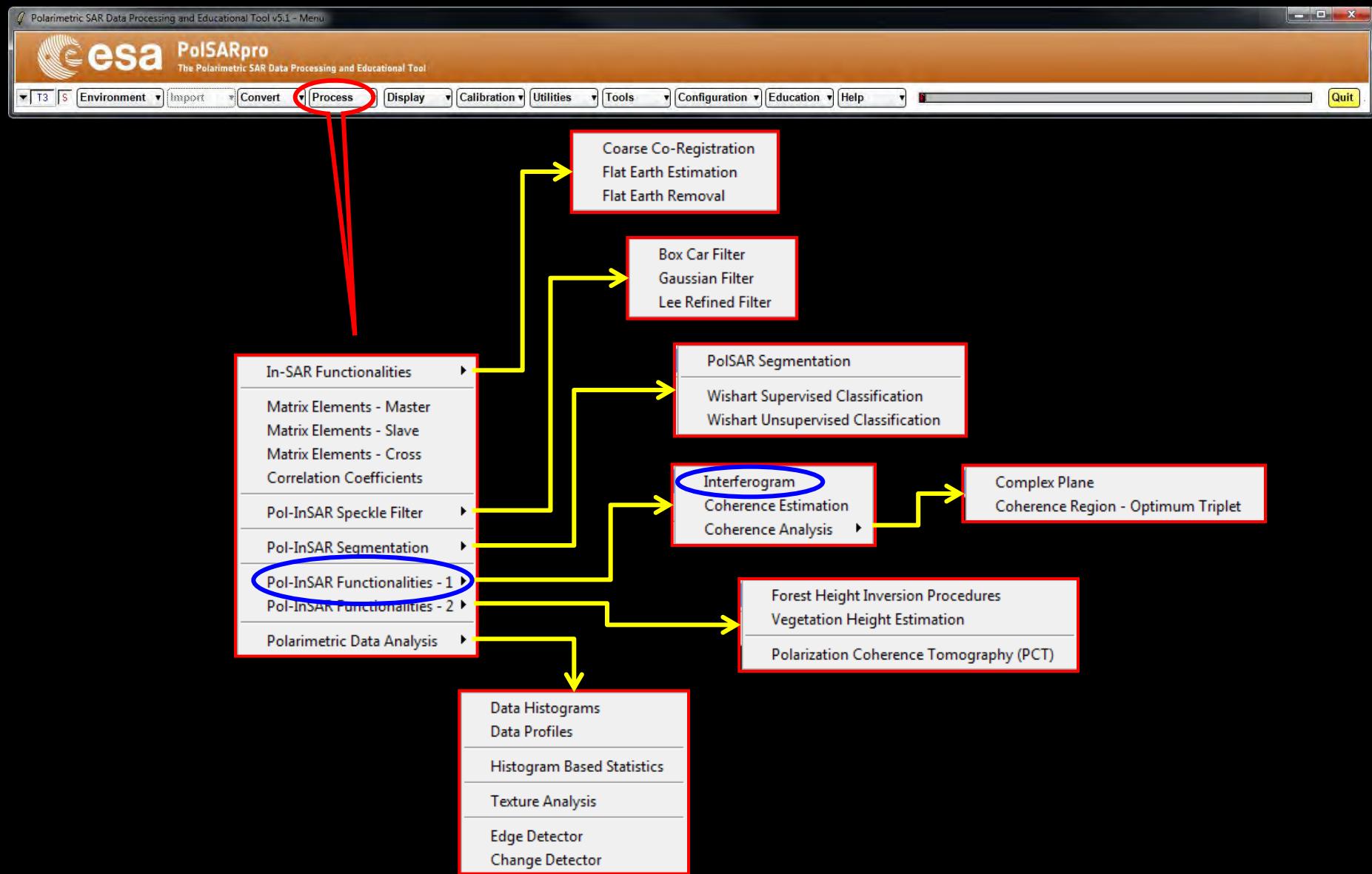
Configure Data Main Directories location



Input Master Directory: C:/Taunstein_ESAR/master_slc

Input Slave Directory: C:/Traunstein_ESAR/slave_slc





RAW INTERFEROGRAM



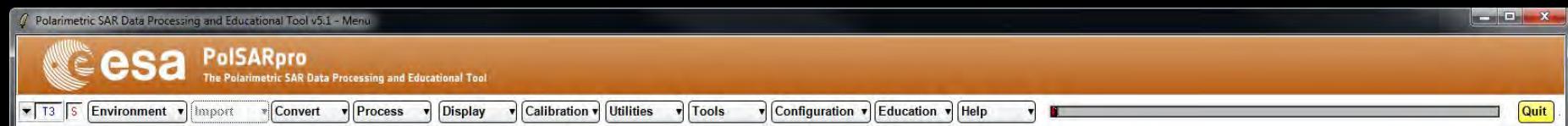
Do it Yourself:

Select polarization channels, set the parameters and view the corresponding BMP files.

Note:

The Output Directory is automatically set to: **MasterDir_SlaveDir**

RAW INTERFEROGRAM

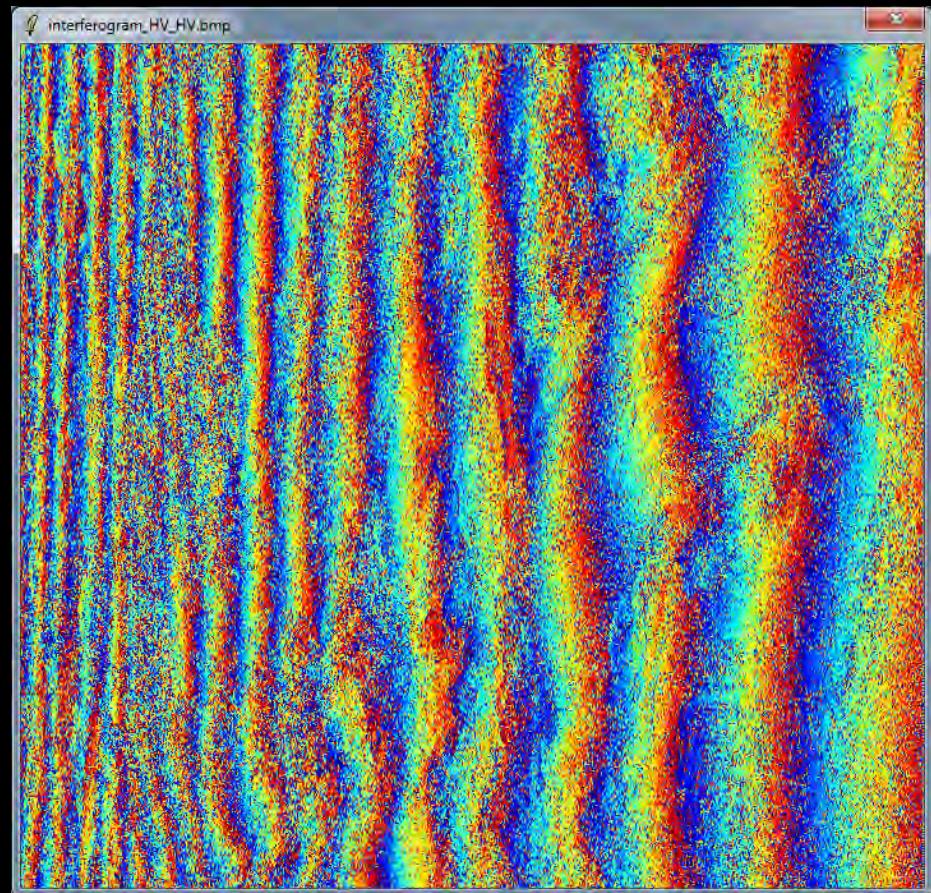


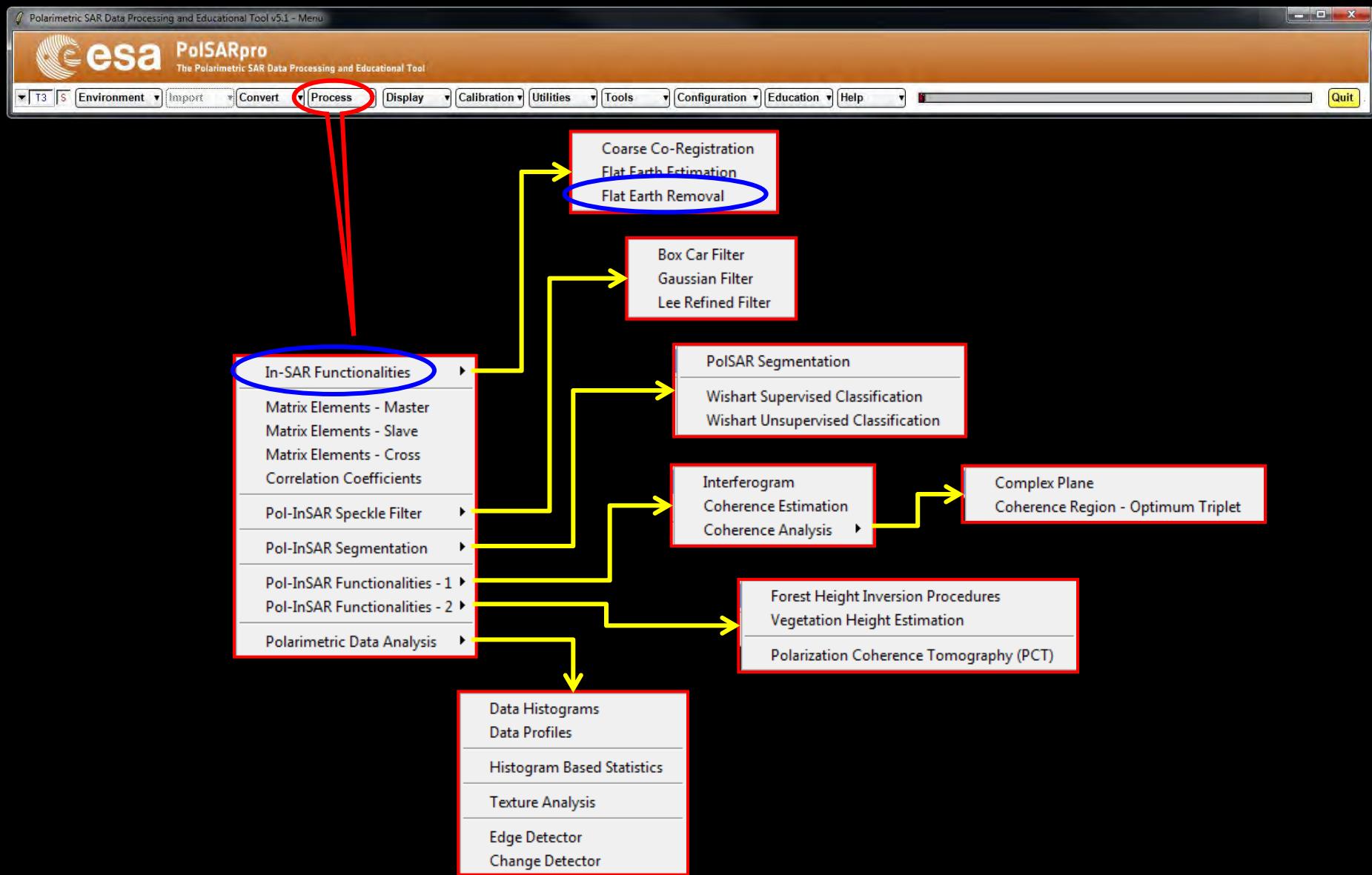
DATA_MASTERDIR_SLAVE DIR

 config.txt

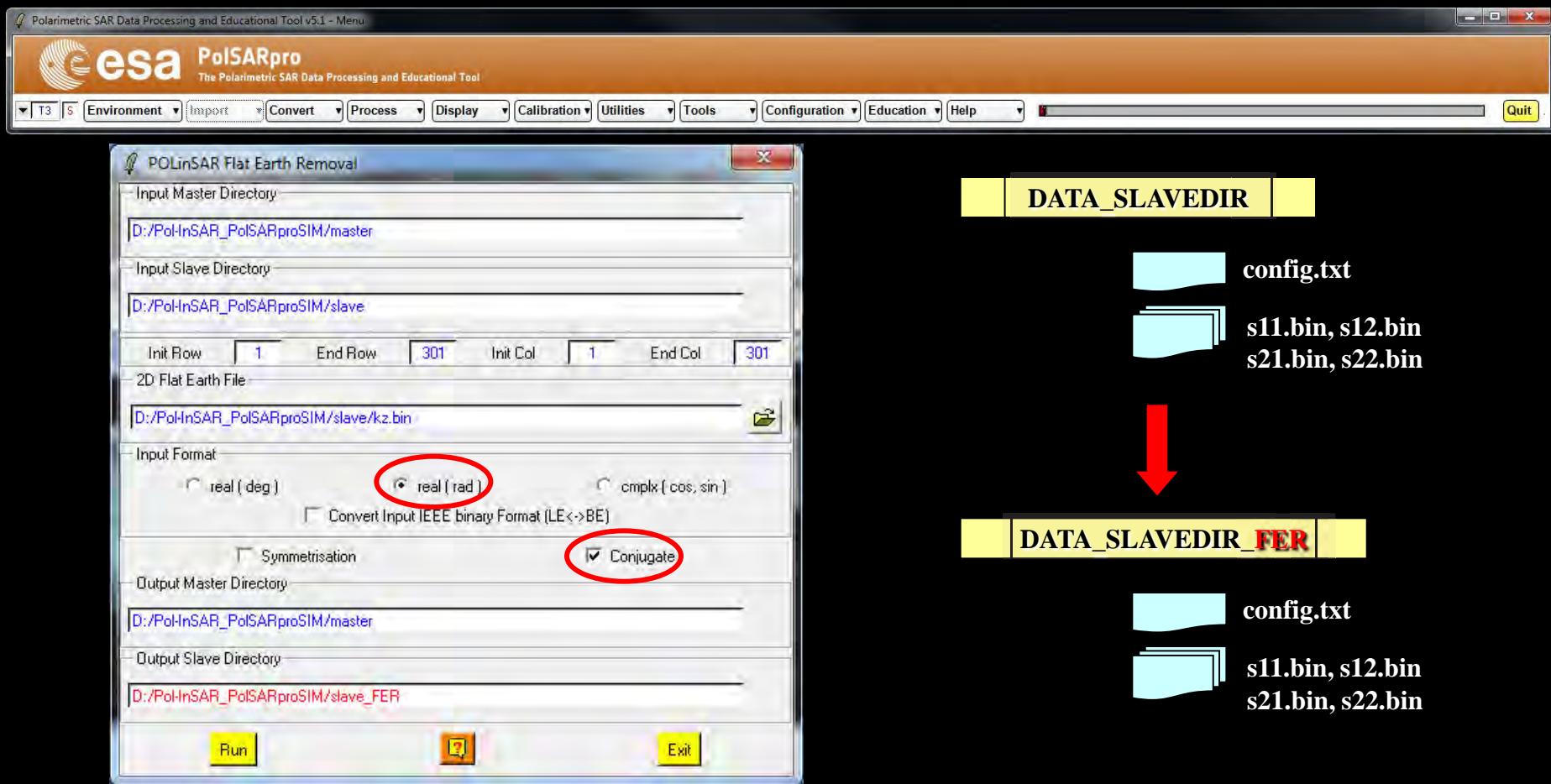
 interferogram_XX_XX.bin

 interferogram_XX_XX.bmp





FLAT EARTH REMOVAL



Do it Yourself:
Enter Flat Earth file name, set the parameters and run the function.

Note:
The Input Slave Directory is automatically set to: SlaveDir_FER

RAW INTERFERrogram



Do it Yourself:

Select polarization channels, set the parameters and view the corresponding BMP files.

Note:

The Output Directory is automatically set to: **MasterDir_SlaveDir_FER**

RAW INTERFEROGRAM

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

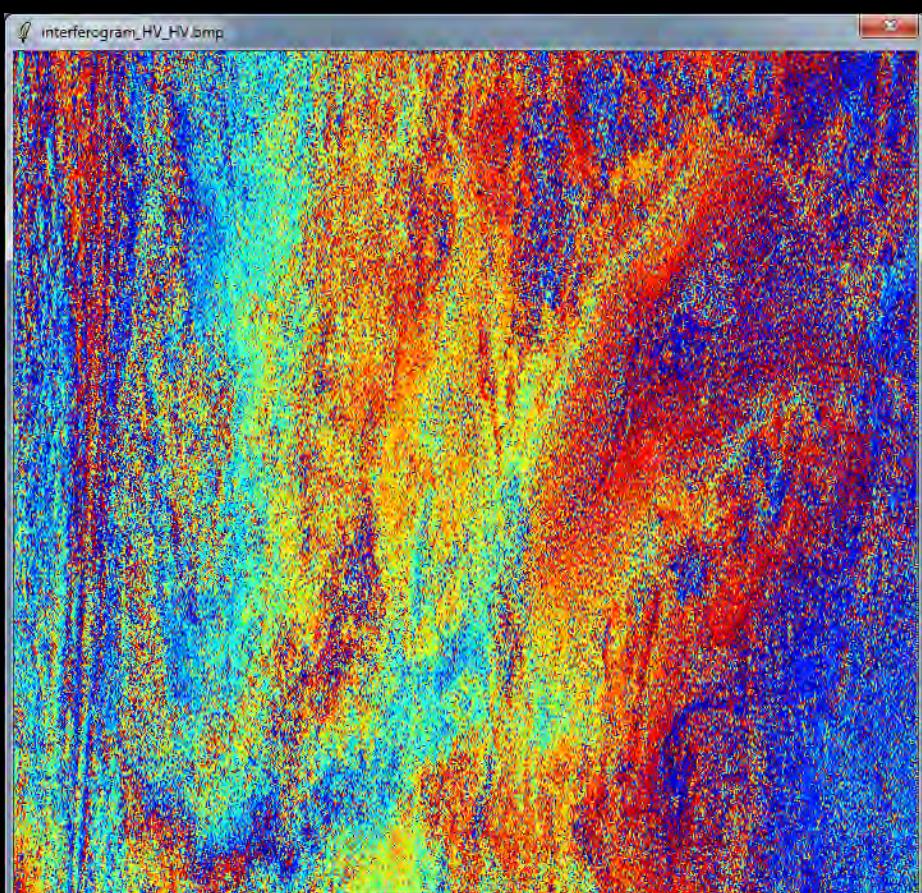
esa PolSARpro
The Polarimetric SAR Data Processing and Educational Tool

T3 S Environment Import Convert Process Display Calibration Utilities Tools Configuration Education Help Quit

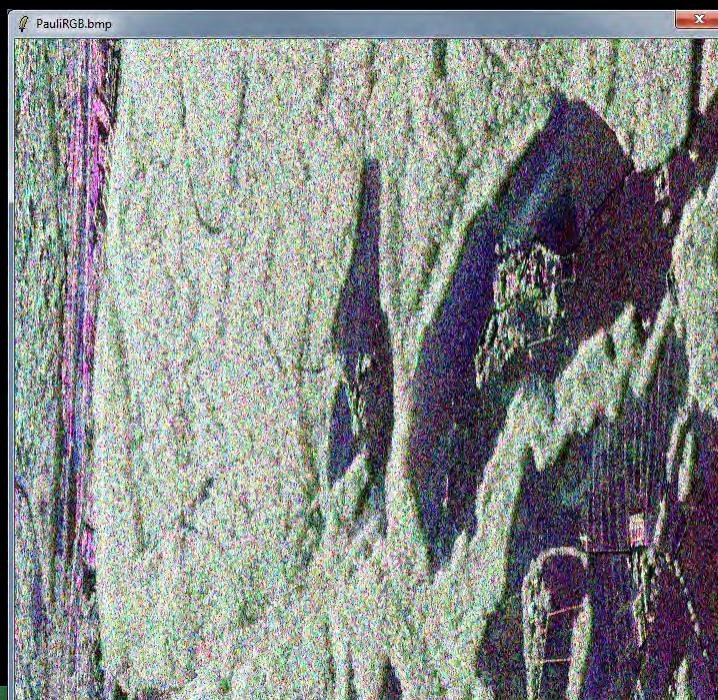
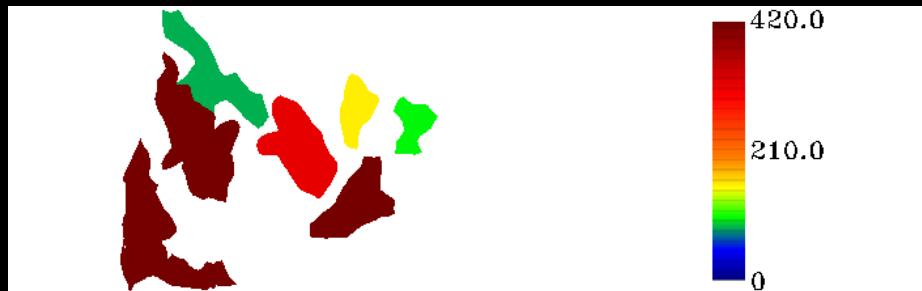
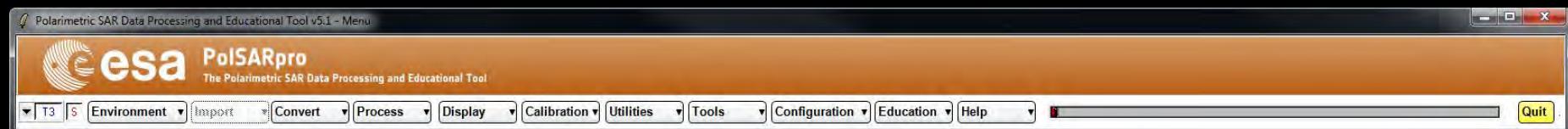
DATA_MASTERDIR_SLAVE_DIR_FER

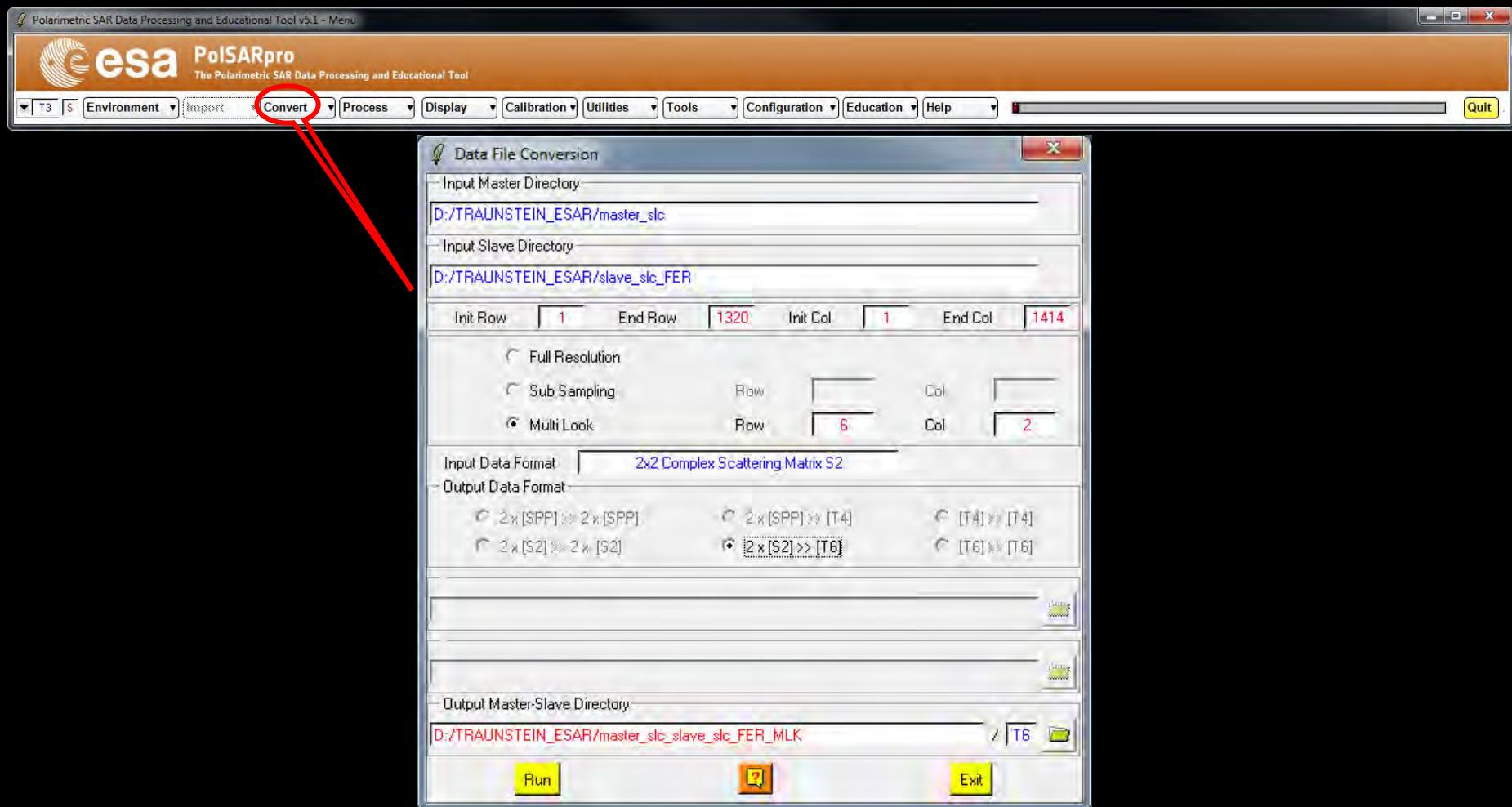
- config.txt
- interferogram_XX_XX.bin
- interferogram_XX_XX.bmp

interferogram_HV_HV.bmp



The image shows a raw interferogram visualization titled "interferogram_HV_HV.bmp". The visualization is a color-coded map where different colors represent different terrain features or elevation differences. The colors range from blue (lower values) to red (higher values). The map displays a complex landscape with numerous vertical and horizontal patterns, likely representing different radar reflections from various surfaces like water bodies, vegetation, and geological structures.



**Do it Yourself:**

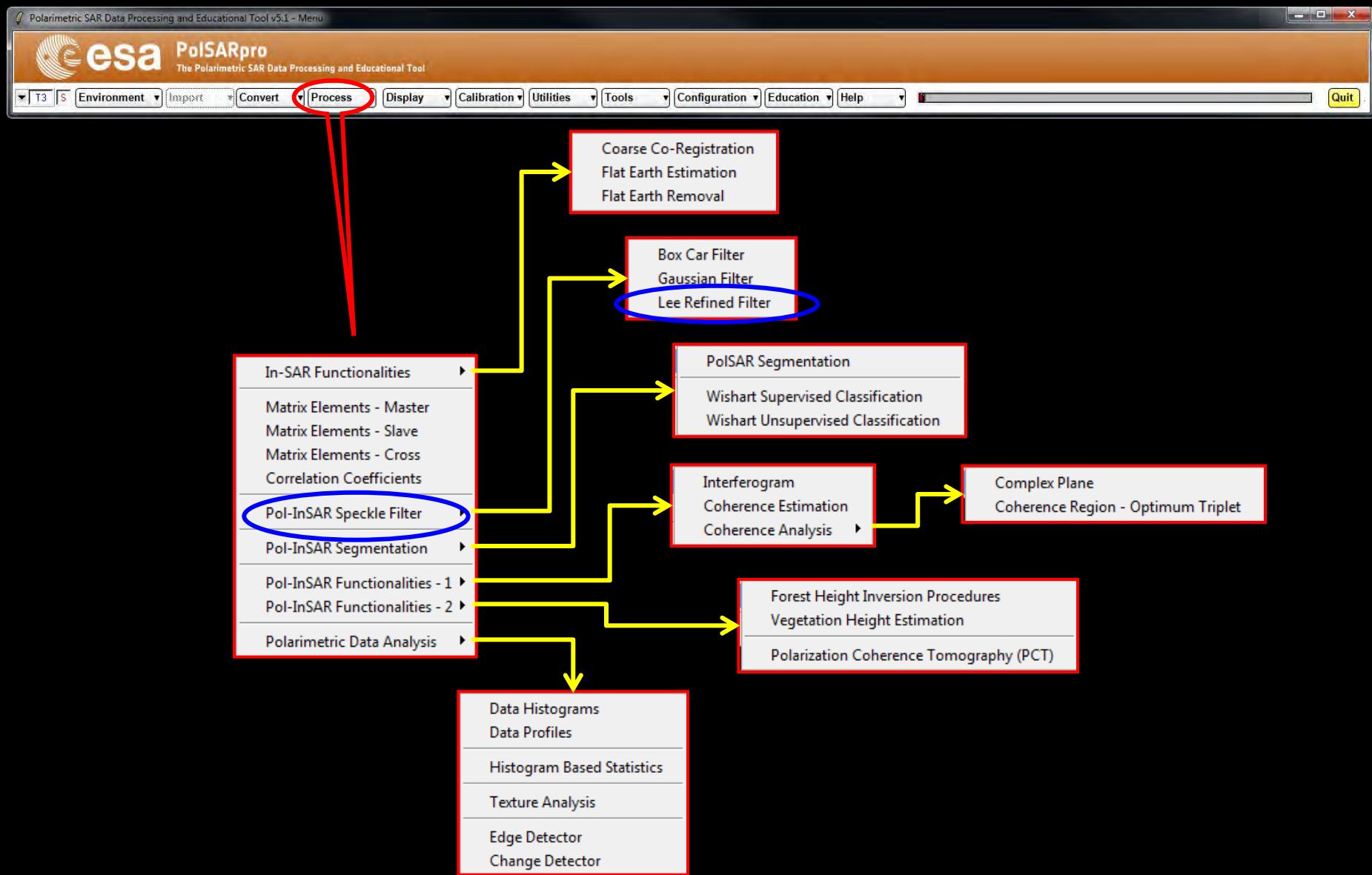
Select Multi Look : Row = 6 and Col = 2

Select Output Data Format : 2 x [S2] >> [T6]

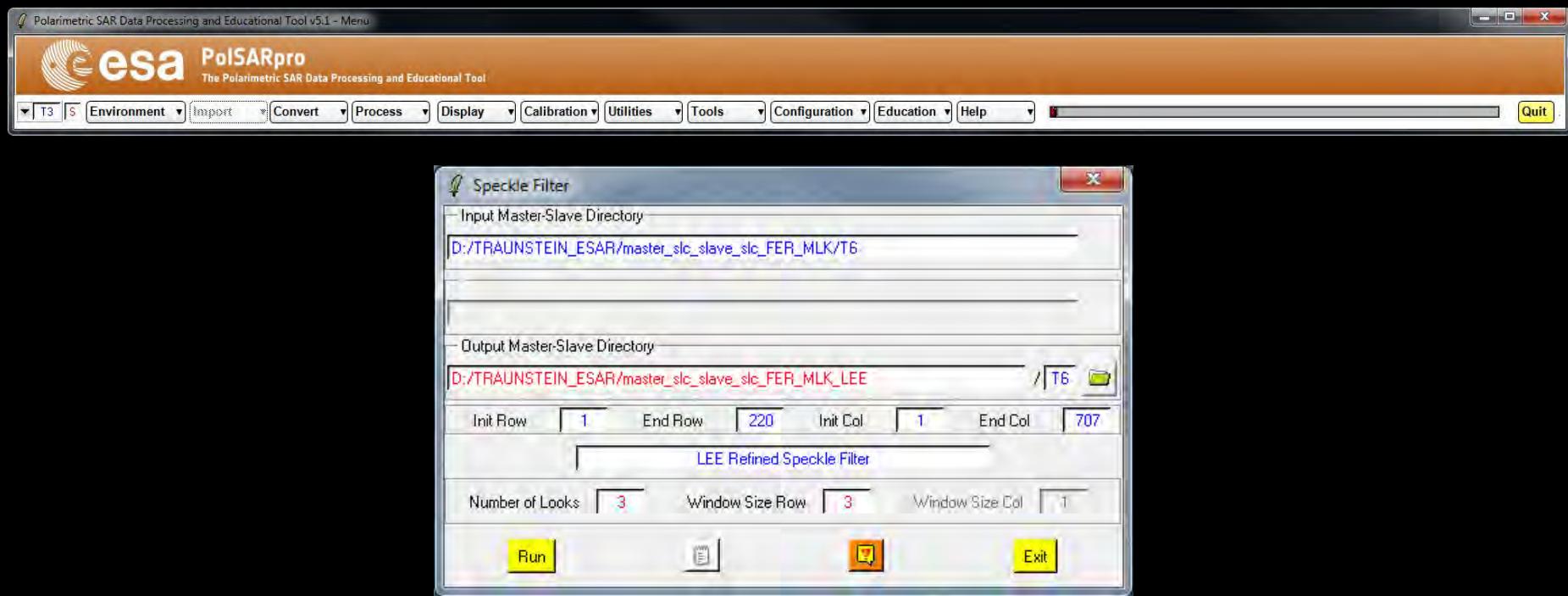
Note:

The Output Directory is automatically set to: MasterDir_SlaveDir_FER_MLK

PROCESS DATA



PROCESS DATA



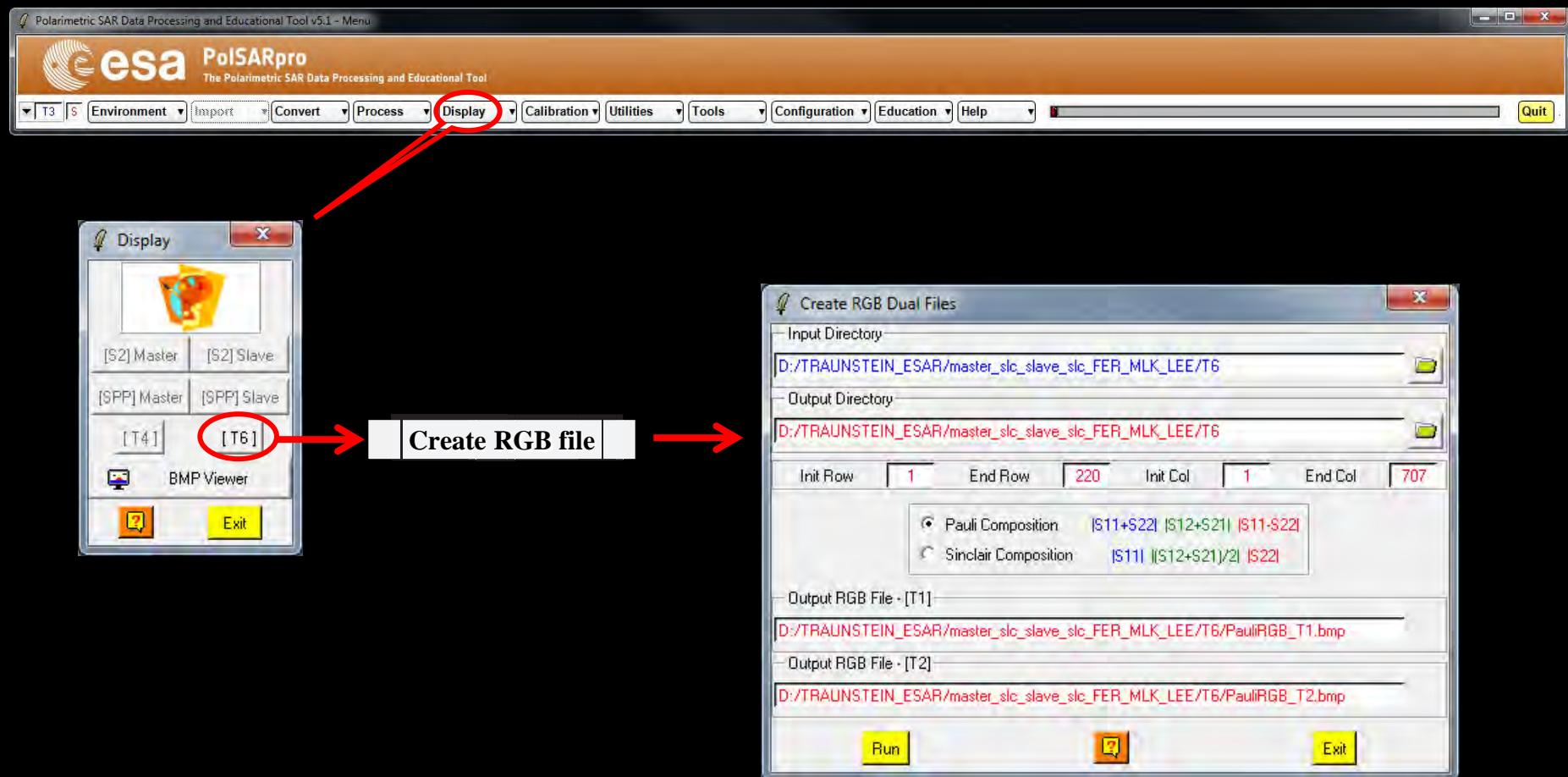
Do it Yourself:

Set the parameters : Num Looks = 3 ; Window Size = 3.

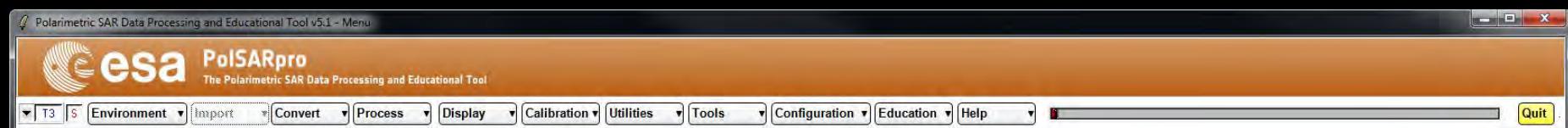
Note:

The Output Directory is automatically set to: MasterDir_SlaveDir_FER_MLK_LEE

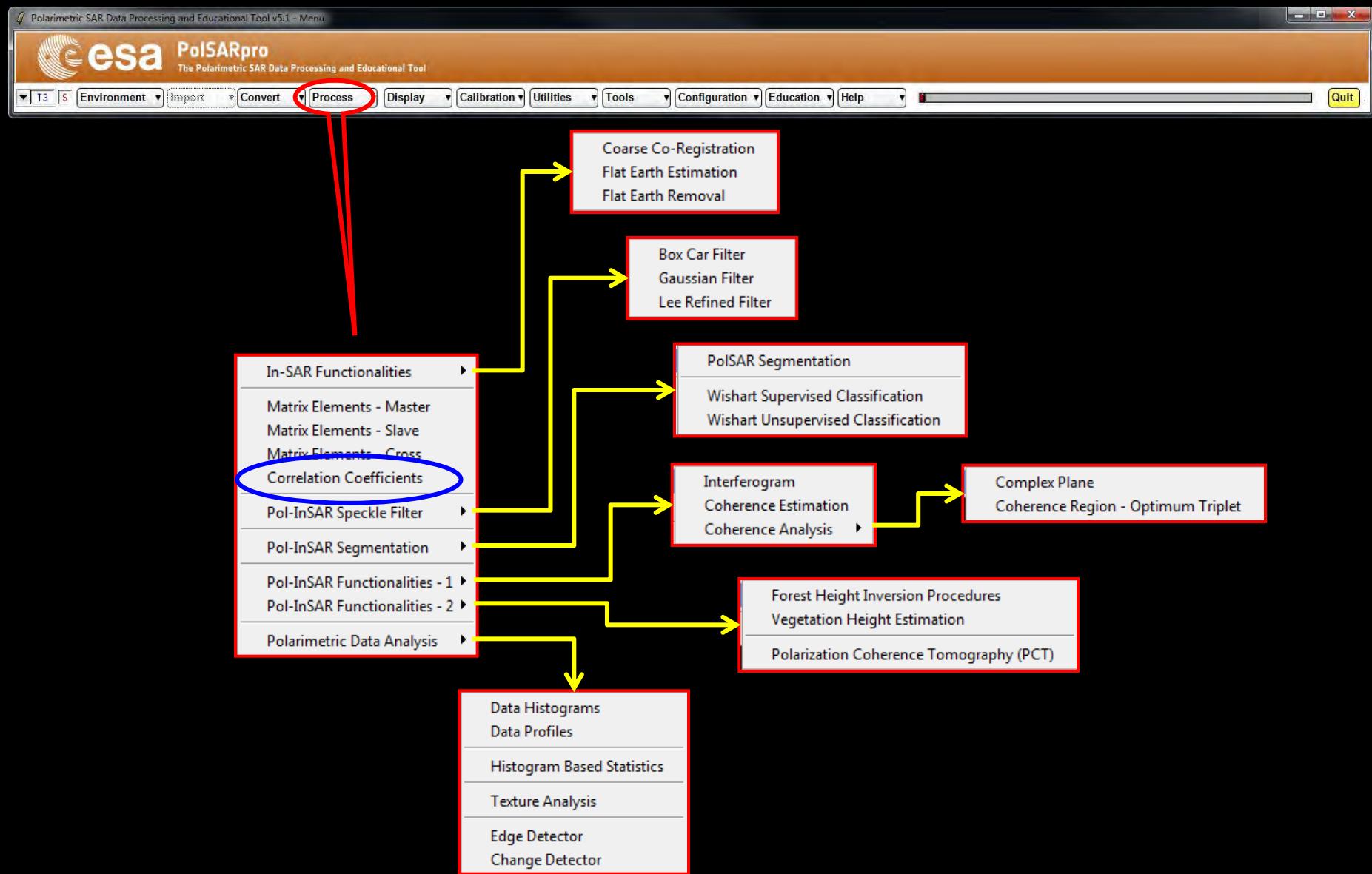
PROCESS DATA

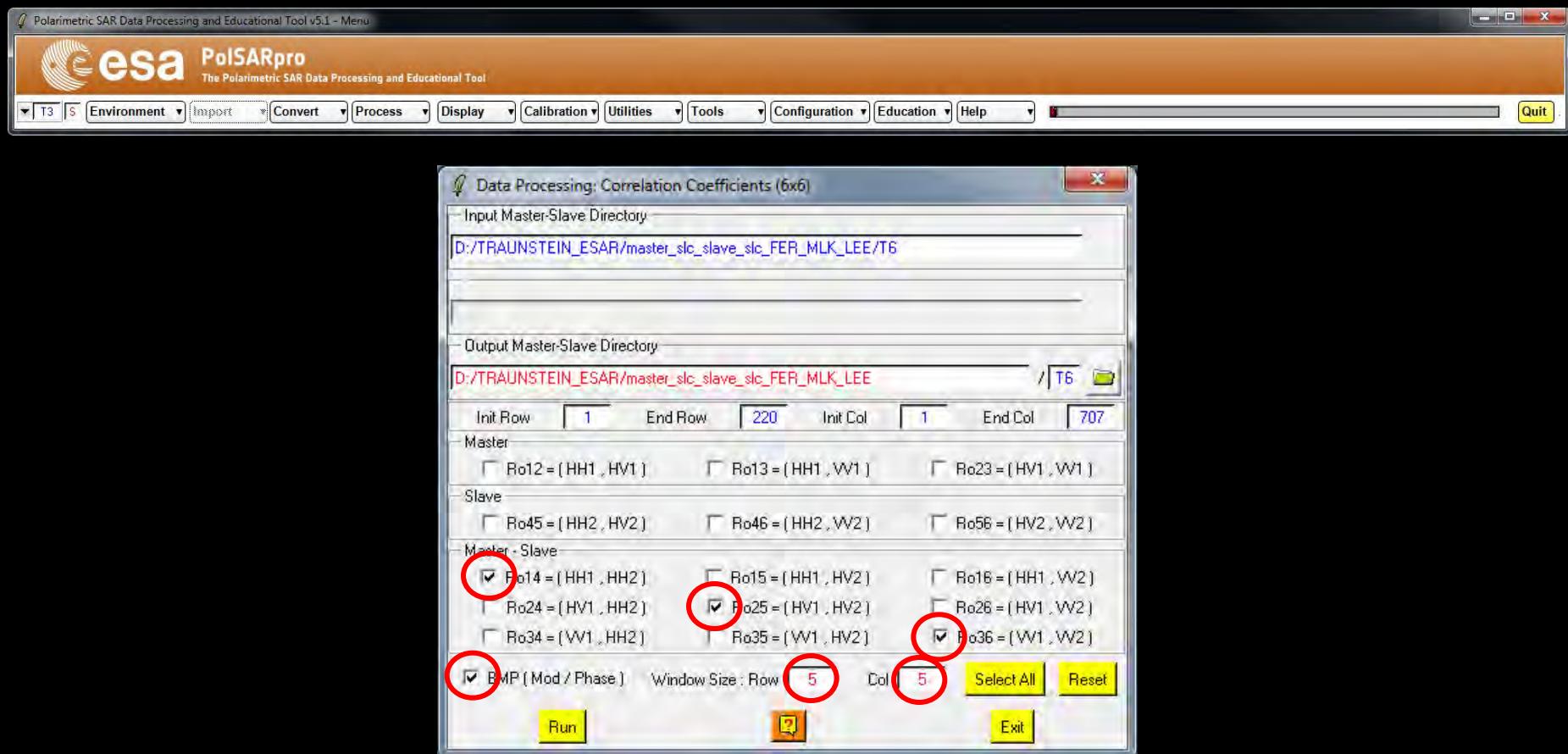


PROCESS DATA



PROCESS DATA

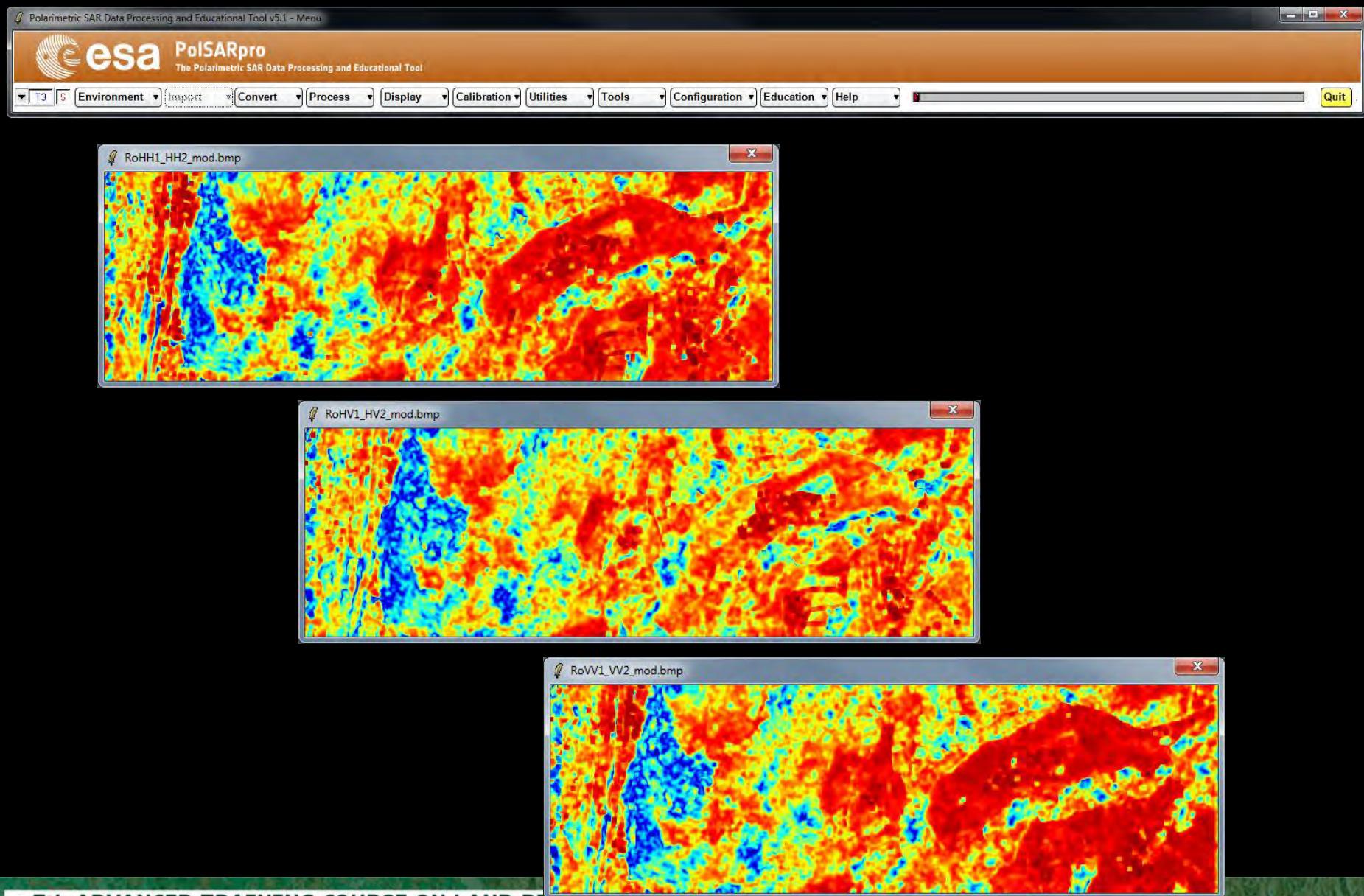




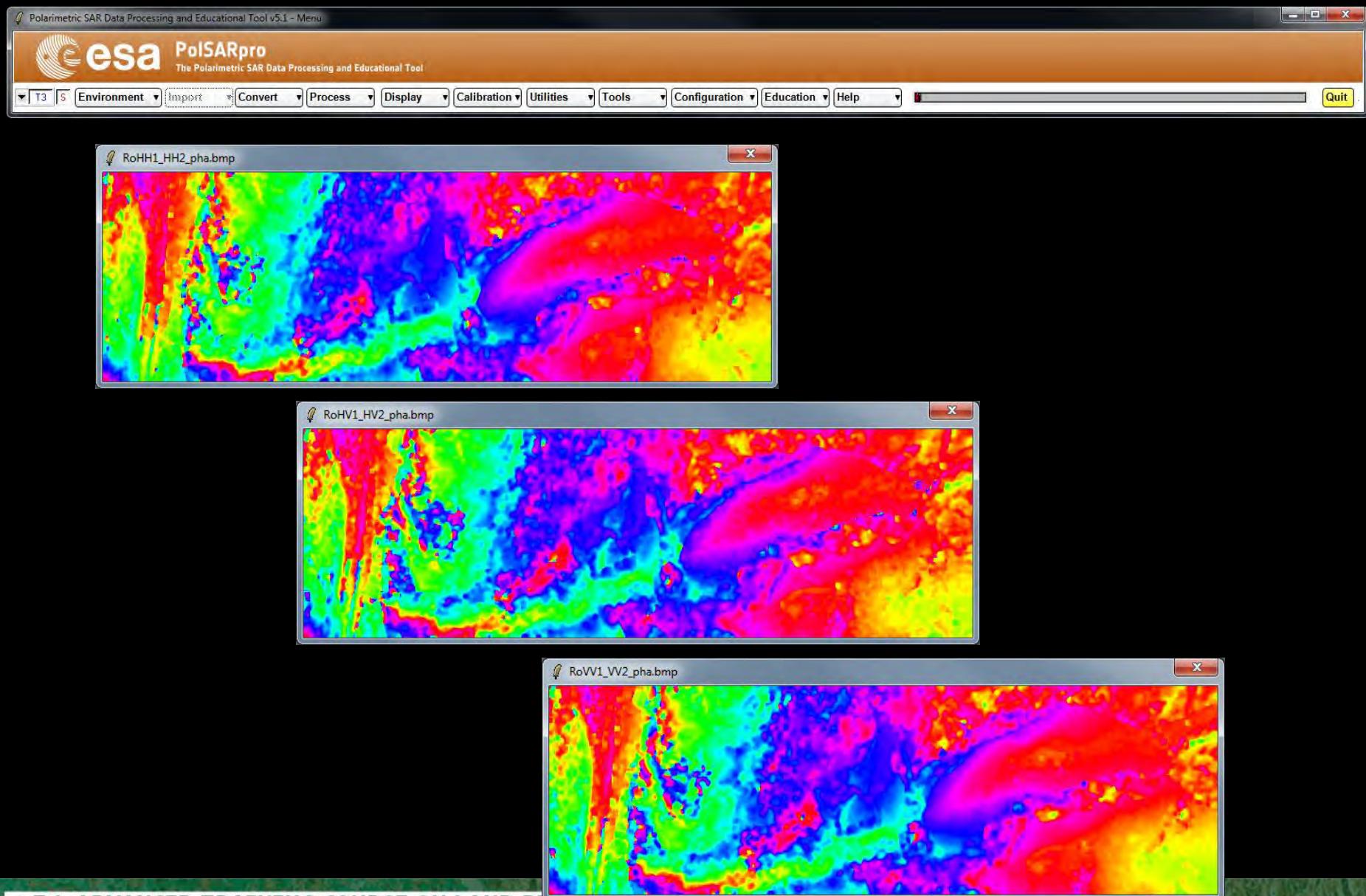
Do it Yourself:

Select the correlation coefficients, set the parameters (Box Car= 5x5) and view the corresponding BMP files.

PROCESS DATA



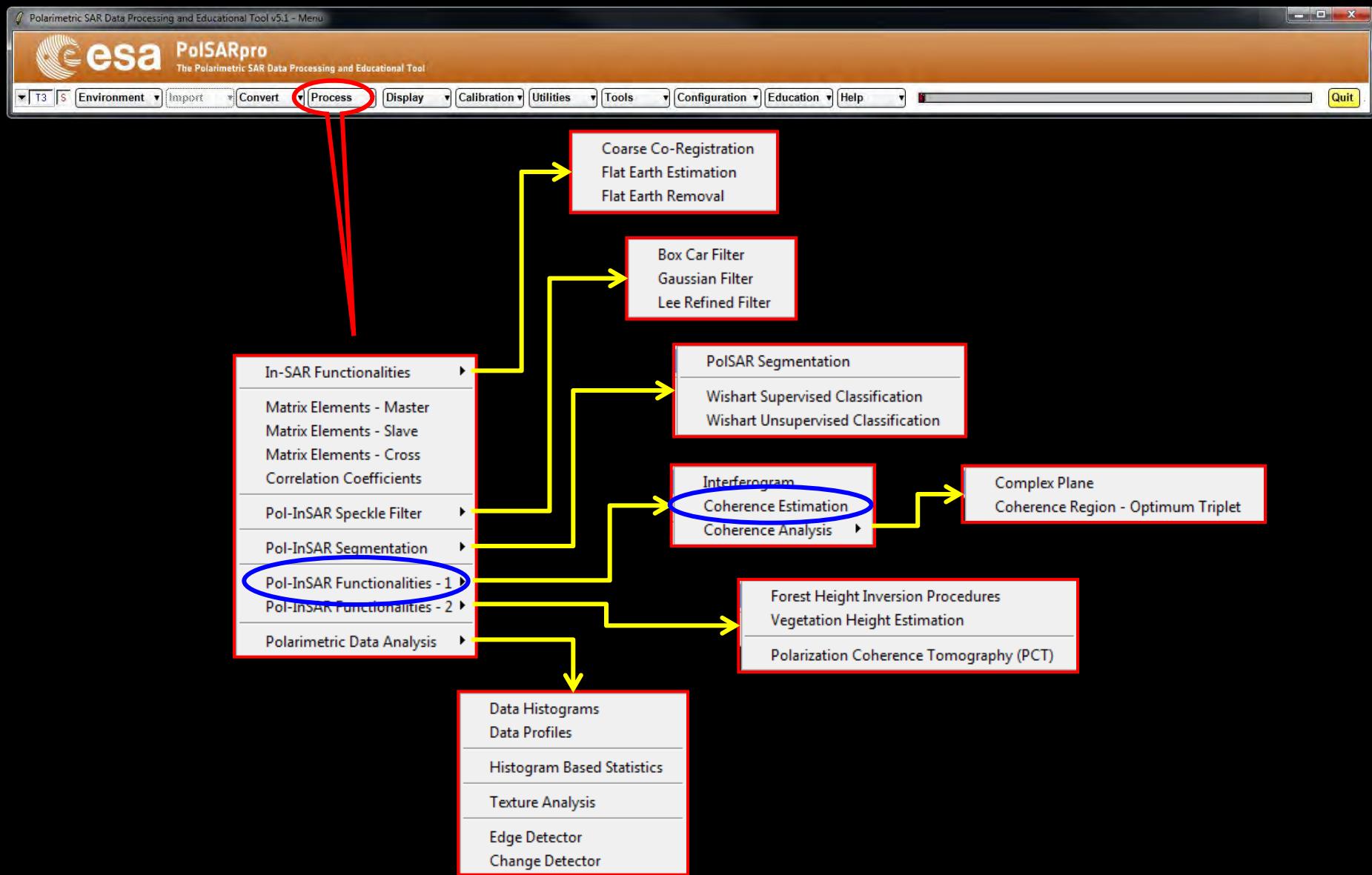
PROCESS DATA

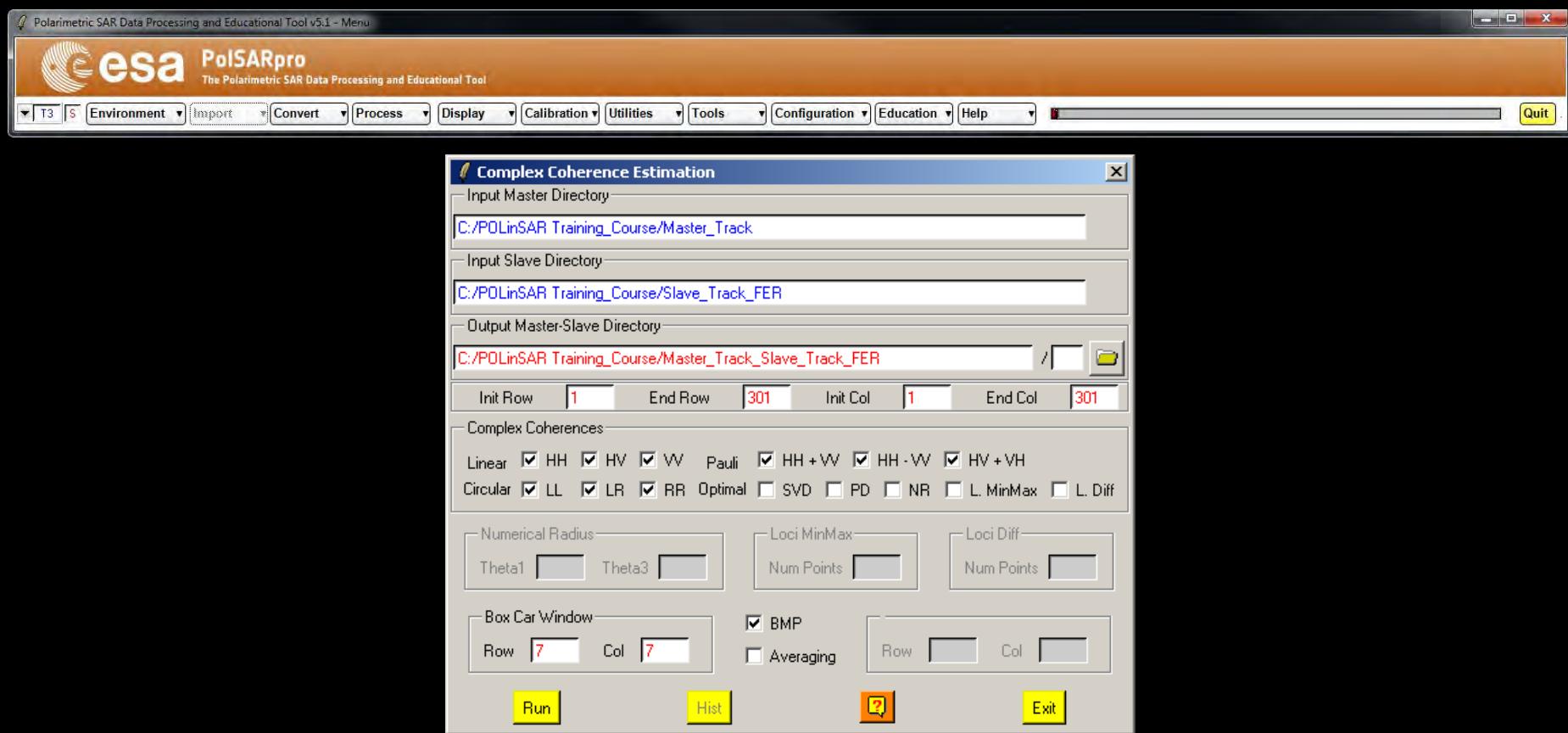


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4–9 September 2017 | Szent István University | Gödöllő, Hungary

PROCESS DATA

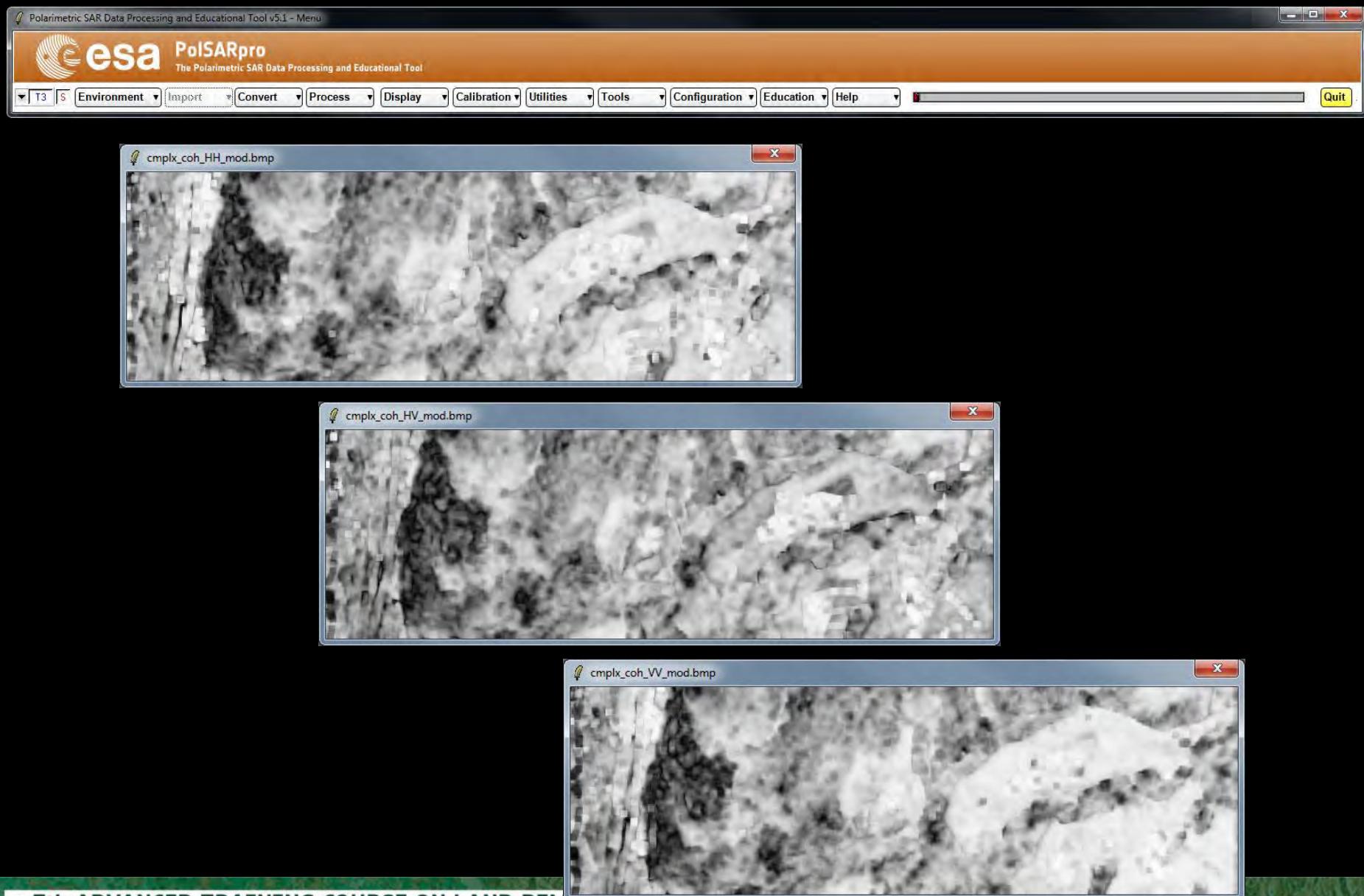




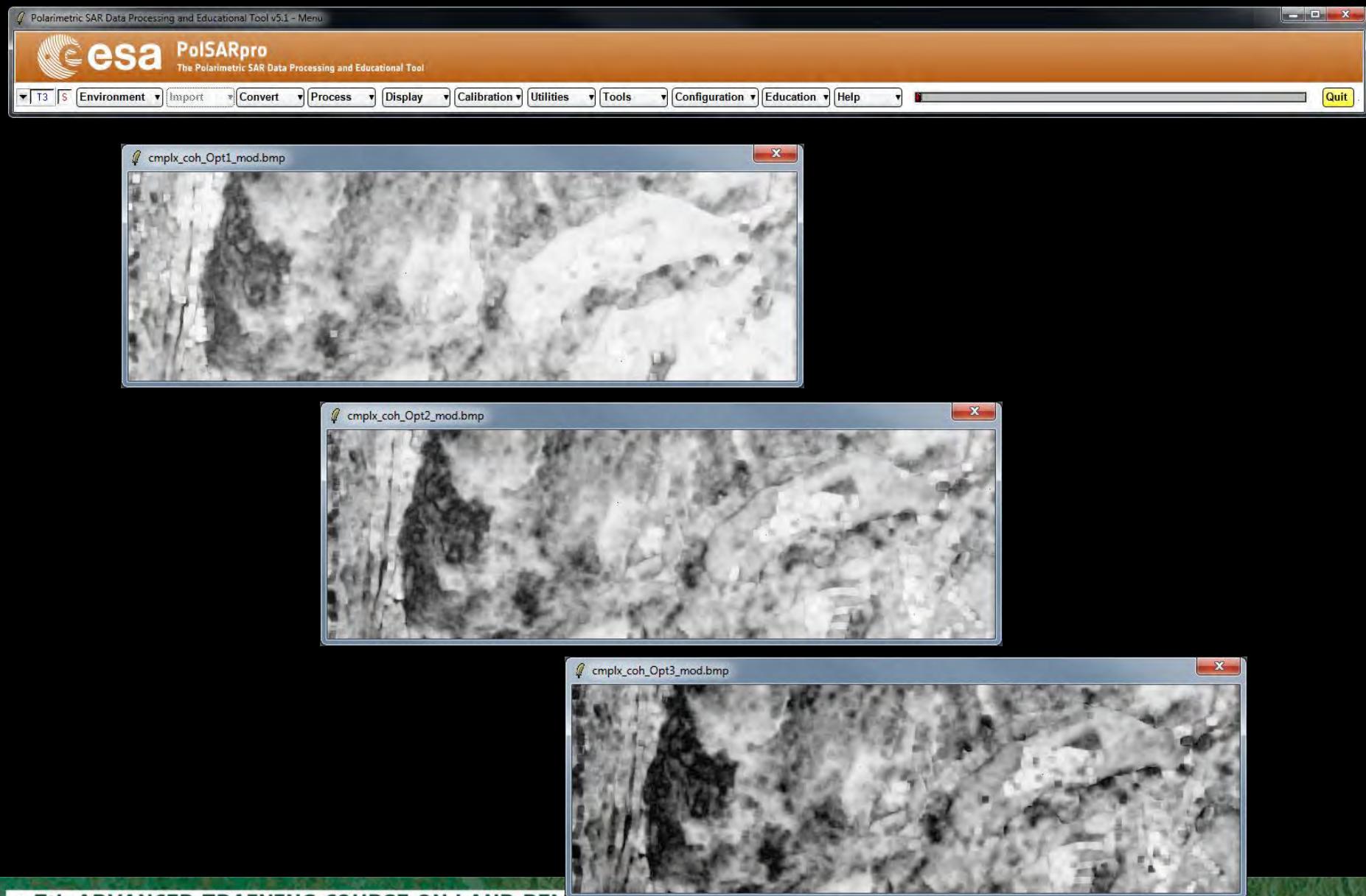
Do it Yourself:

Select polarization channels (linear, circular, pauli), set the parameters (Box Car = 7x7) and view the corresponding BMP files (select BMP).

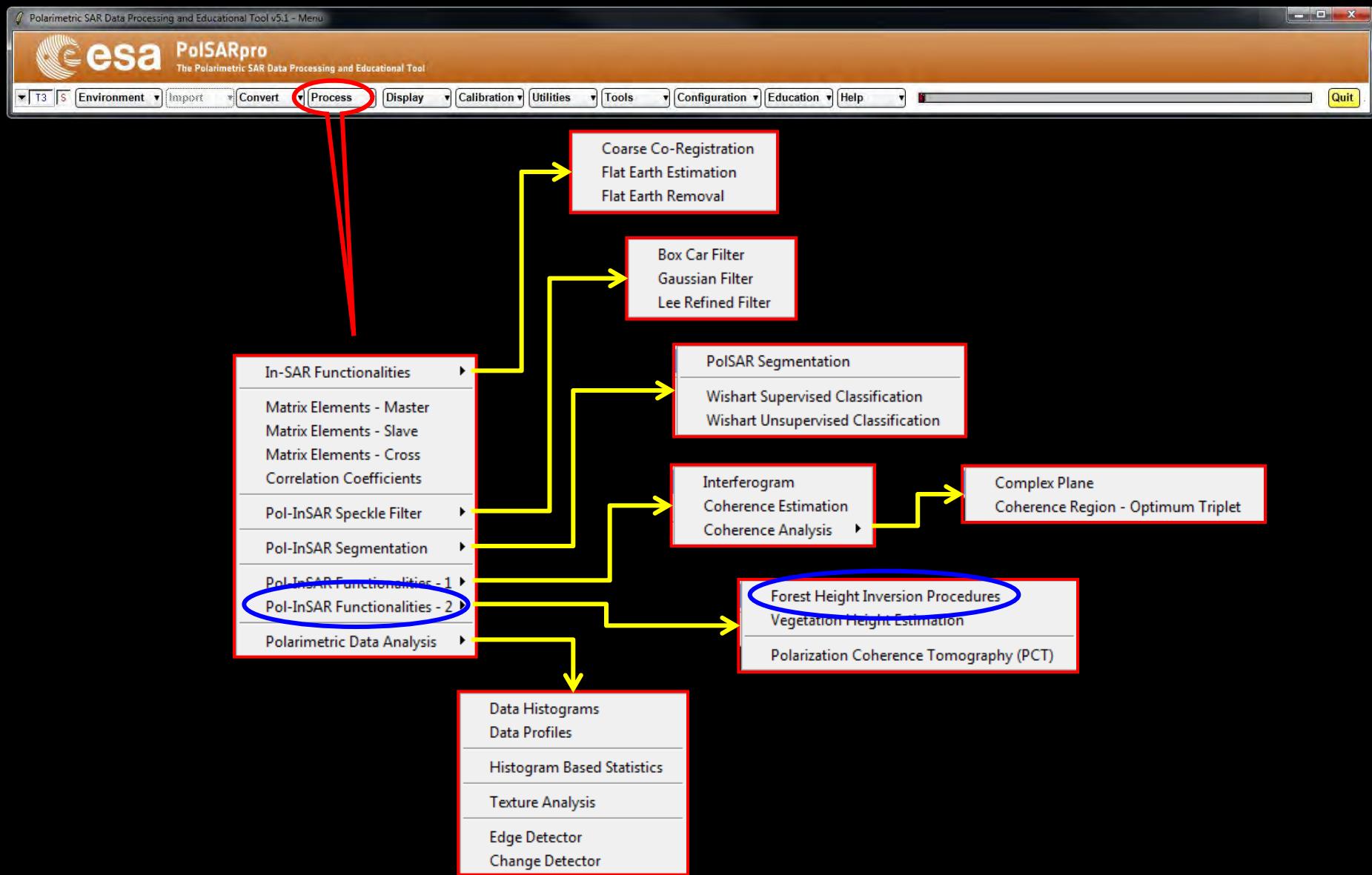
COHERENCE ESTIMATION



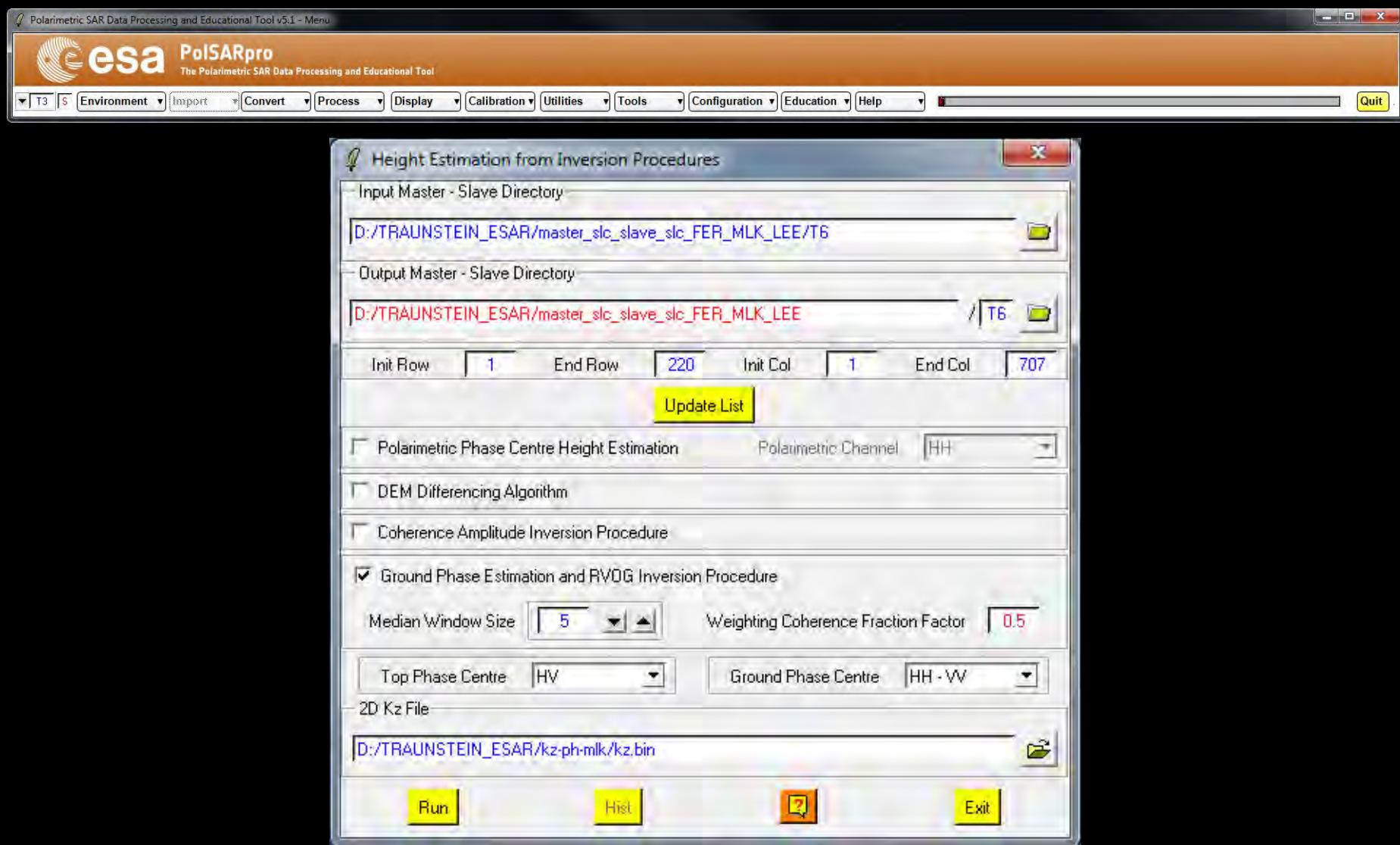
COHERENCE ESTIMATION



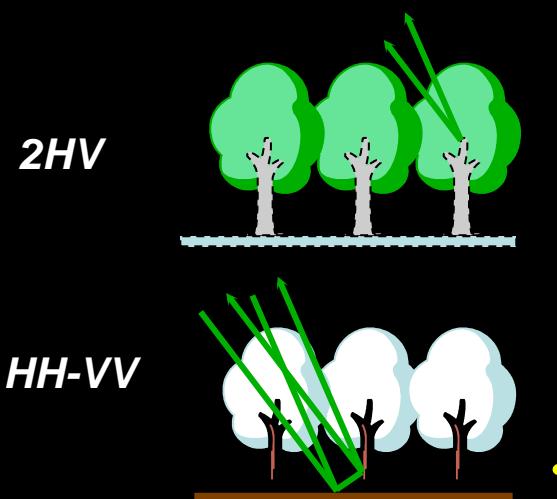
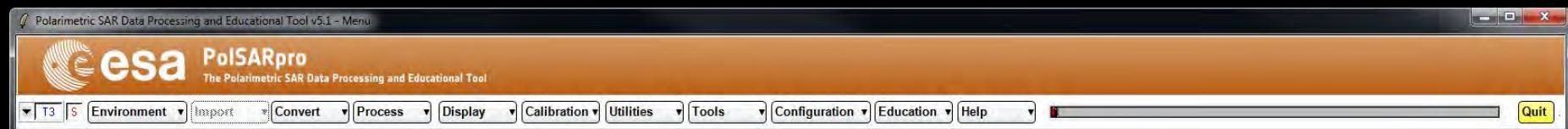
PROCESS DATA



HEIGHT ESTIMATION



HEIGHT ESTIMATION

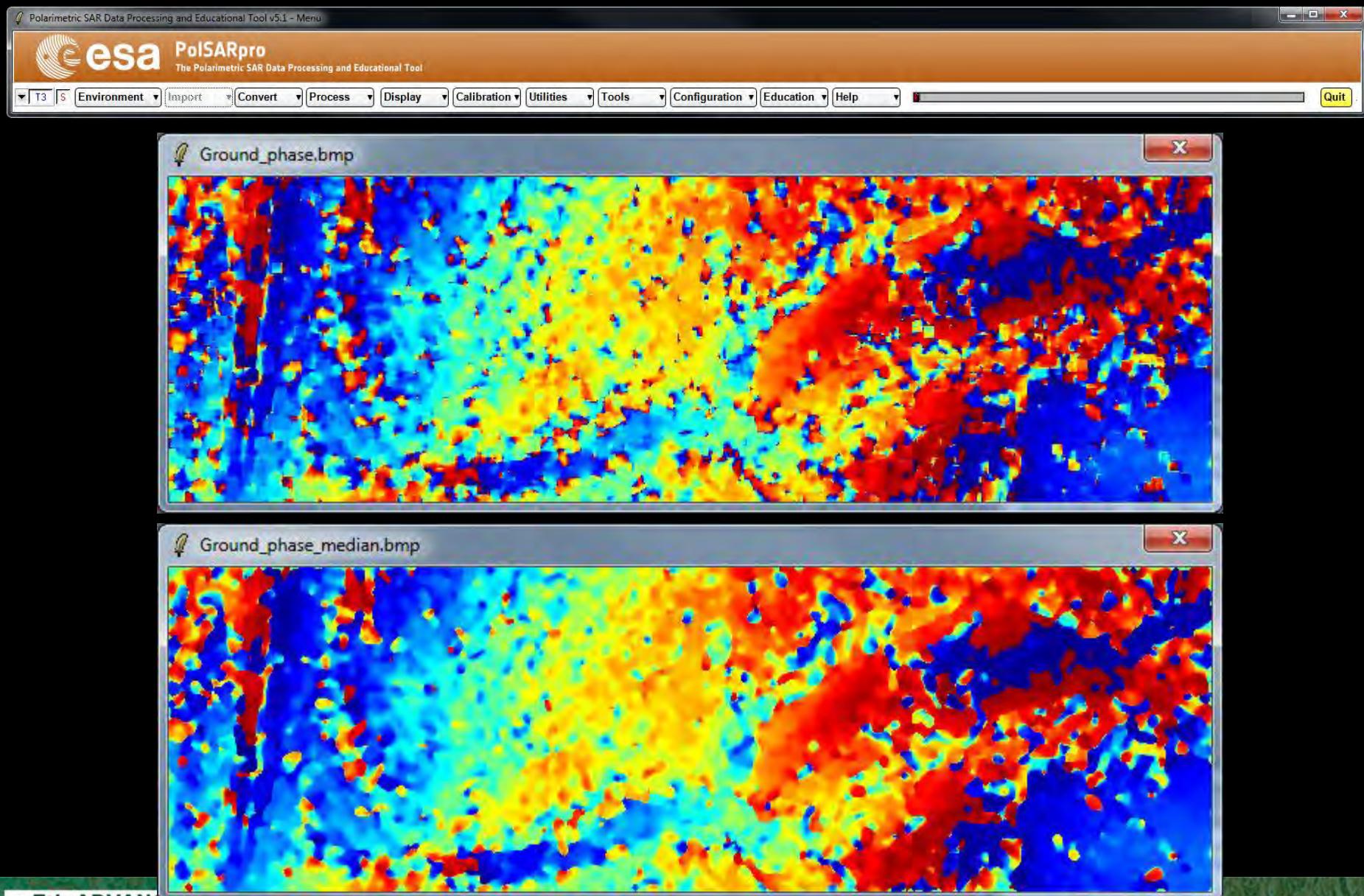


Do it Yourself:

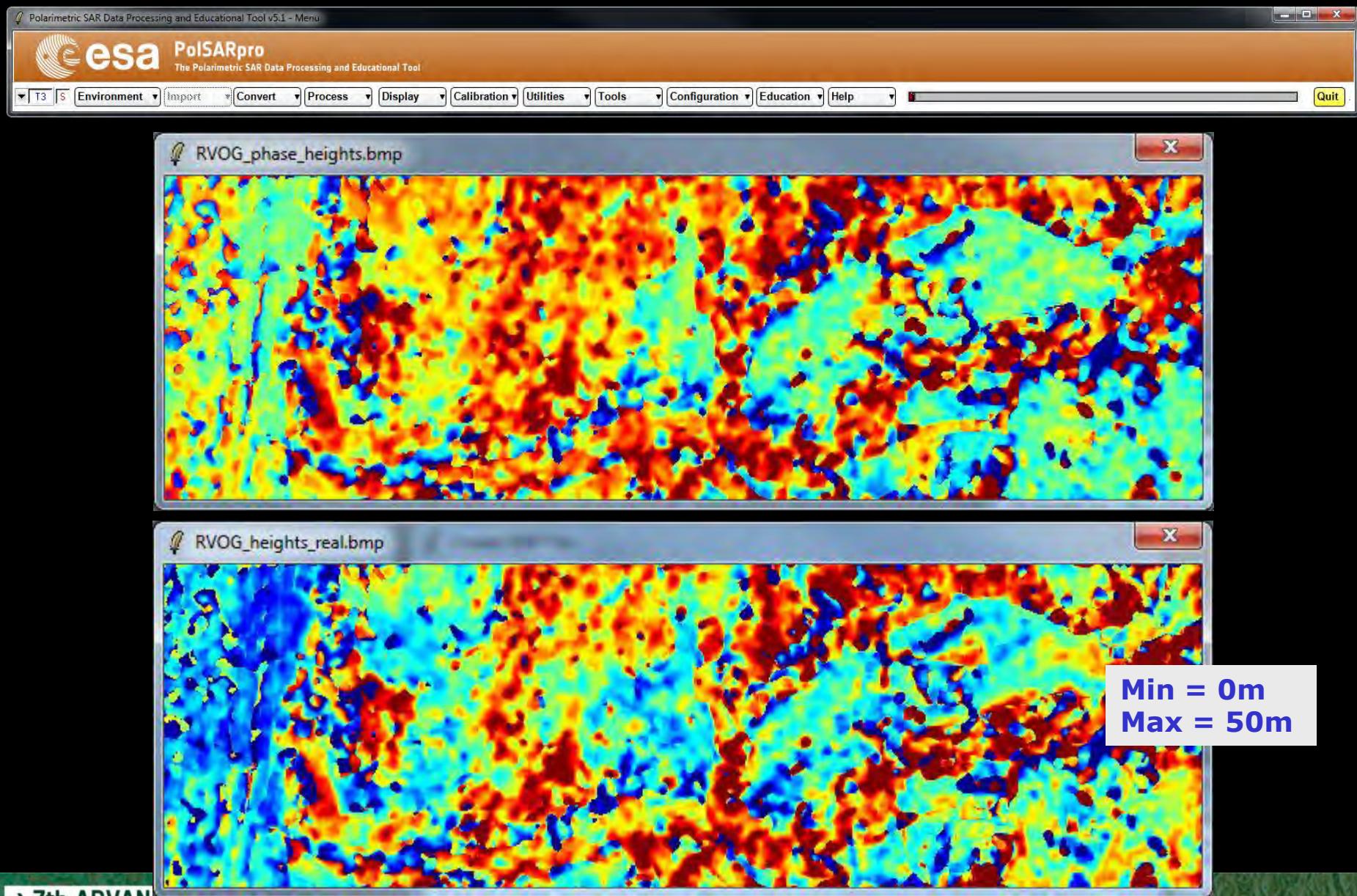
Set the parameters (Median Size = 21, Factor = 0.4) and view the corresponding BMP files.

2D Kz File : DataDirectory / kz-ph-mlk / kz.bin

HEIGHT ESTIMATION



HEIGHT ESTIMATION



HEIGHT ESTIMATION

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

esa PolSARpro
The Polarimetric SAR Data Processing and Educational Tool

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Height Estimation from Inversion Procedures

Input Master - Slave Directory: D:/TRAUNSTEIN_ESAR/master_slc_slave_slc_FER_MLK_LEE/T6

Output Master - Slave Directory: D:/TRAUNSTEIN_ESAR/master_slc_slave_slc_FER_MLK_LEE / T6

Init Row: 1 End Row: 220 Init Col: 1 End Col: 707

Update List

Polarimetric Phase Centre Height Estimation Polarimetric Channel: HH

DEM Differencing Algorithm

Coherence Amplitude Inversion Procedure

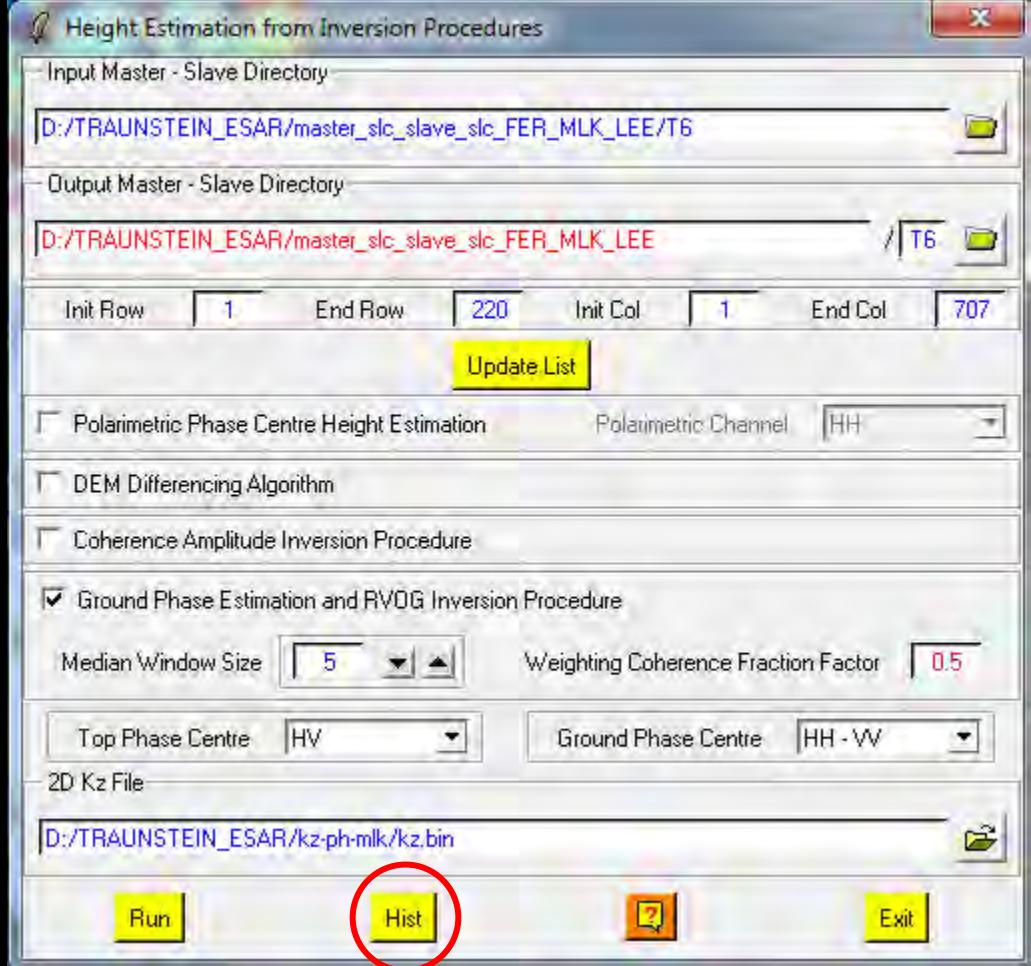
Ground Phase Estimation and RVOG Inversion Procedure

Median Window Size: 5 Weighting Coherence Fraction Factor: 0.5

Top Phase Centre: HV Ground Phase Centre: HH - WV

2D Kz File: D:/TRAUNSTEIN_ESAR/kz-ph-mlk/kz.bin

Run Hist ? Exit



HEIGHT ESTIMATION

Polarimetric SAR Data Processing and Educational Tool v5.1 - Menu

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PauliRGB_T1.bmp

Do it Yourself:
Select a BMP file
Select a BIN file
Select Input Data Format
Select Show
Select Area
SAVE
PLOT

Data Analysis : Statistics - Histogram

Input Data File: D:\TRAUNSTEIN_ESAR\master_slc_slave_slc_FER_MLK_LEE/T6/RVOG_heights.bin

Input Data Format: Float Integer Complex

Show: Modulus 10log(Mod) 20log(Mod) Phase Real Imag

Histogram Title: HISTOGRAM Histogram Label: Label

Minimum / Maximum Values [x-axis]: Automatic Min Auto Max Auto MinMax

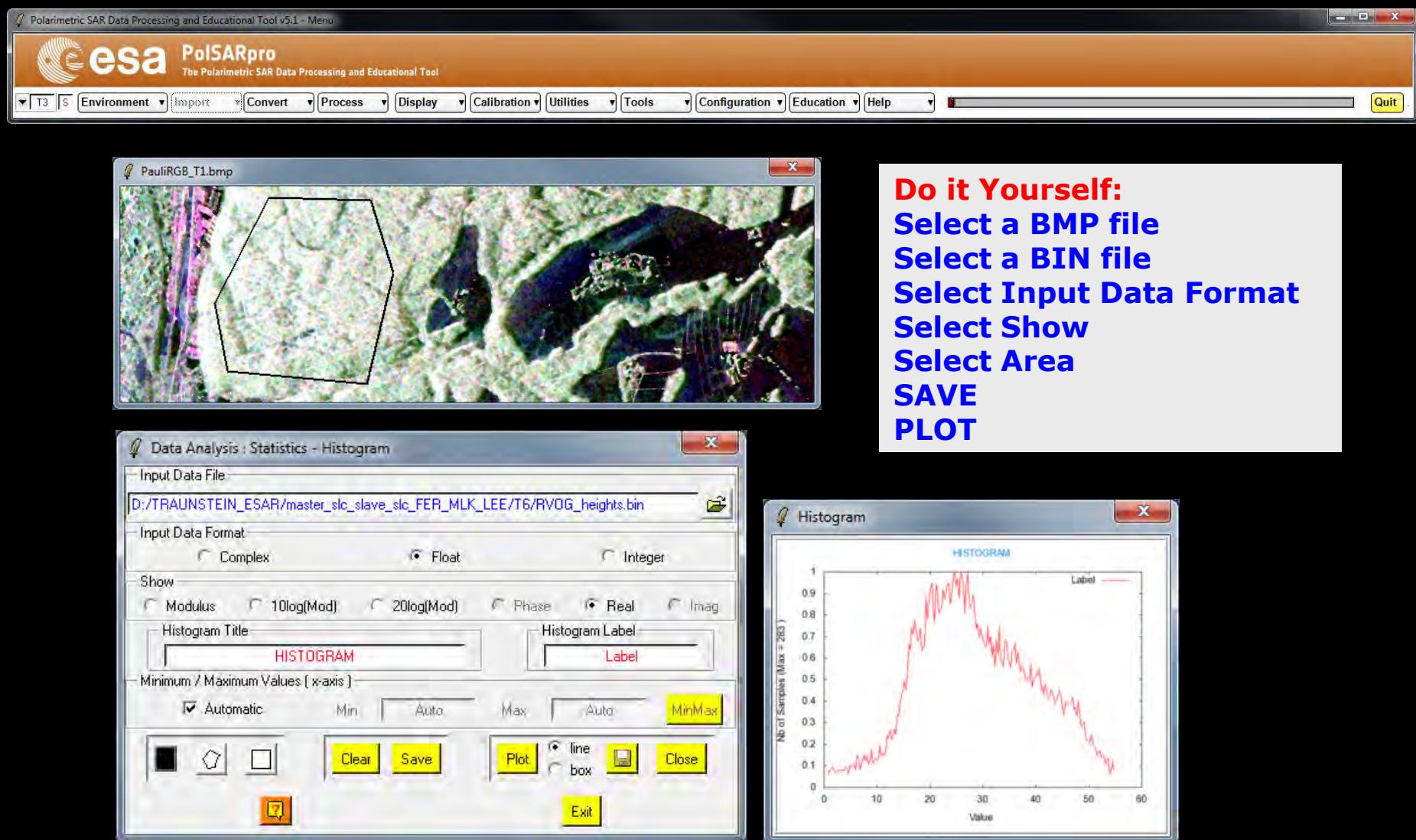
Plot Close Exit

Nb of Samples (Max = 283)

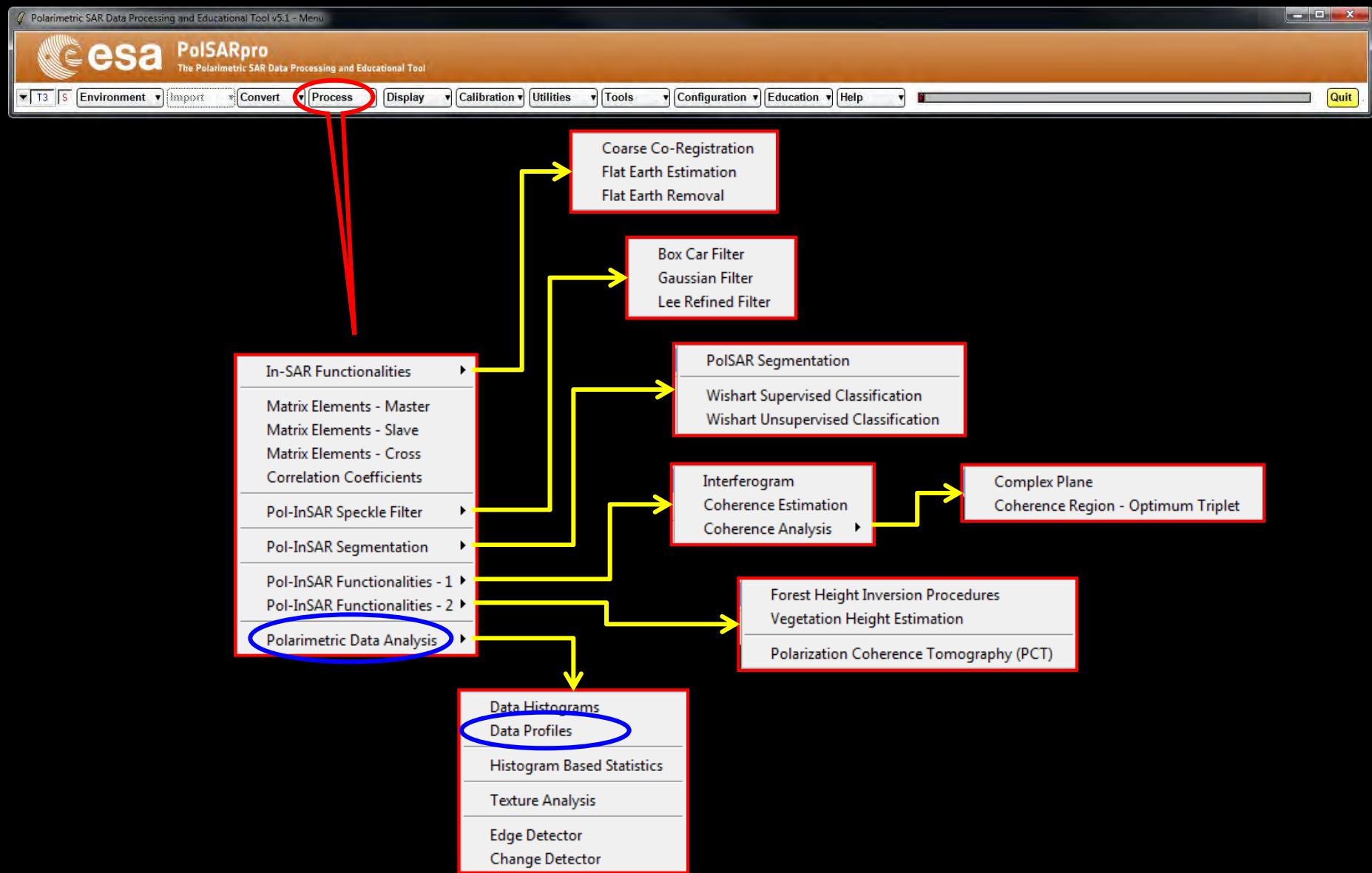
HISTOGRAM

Label

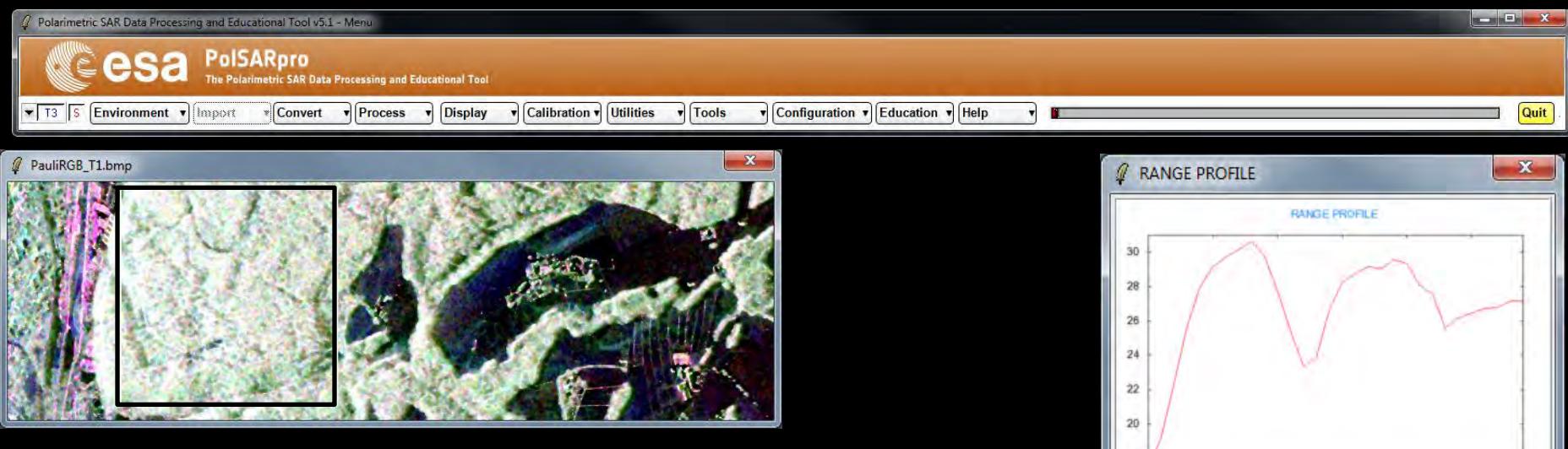
Value



PROCESS DATA



HEIGHT ESTIMATION



Do it Yourself:

Select a BMP file

Select a BIN file

Select Input Data Format

Select Pixel

Select Show

Select Representation

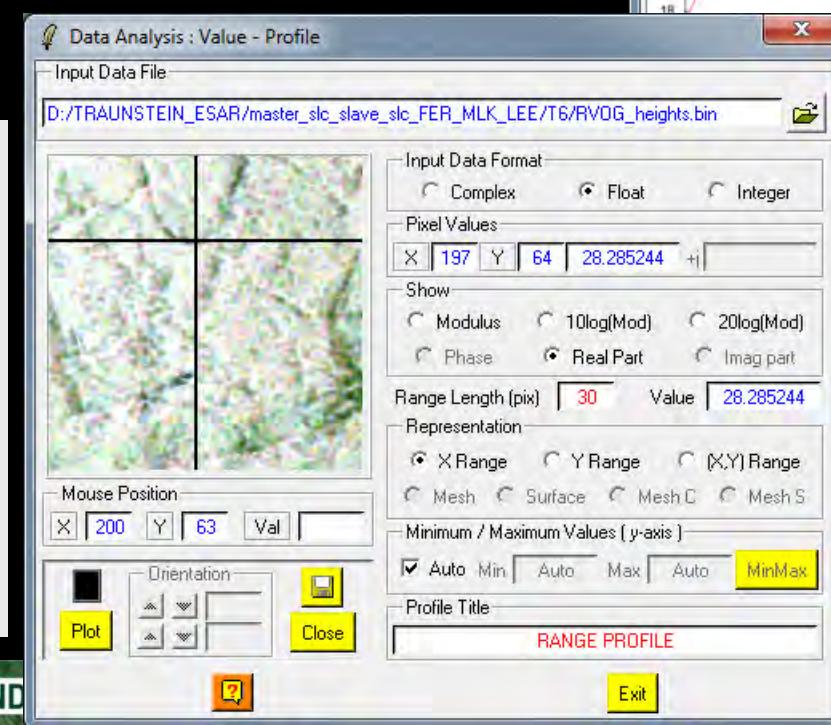
X Range / Y Range = 30pix

XY Range = 30 pix (3D)

Set Min / Max Values

PLOT

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Questions ?

