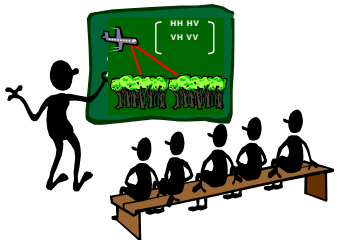
Acknowledgement to the OPAQUE Team

Slide 111

Part II: Exercises with L-band Airborne Data

- Read the airborne SAR data
- Speckle Filtering (refined Lee)
- Oh, Dubois and X-Bragg Inversion



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Test Date Used for the Exercise

- **Testsite: Demmin**
  - Location: Northern Germany
  - Acquisition Date: May 2012
  - Frequency: L-band
  - Data size: az: 2.75km rg: 2.2 km
  - Polarisation: 4 SLC
  - Resolution: az: 60cm x rg: 3.8m
  - Rows and colums: 7981 x 1837

Pauli RGB

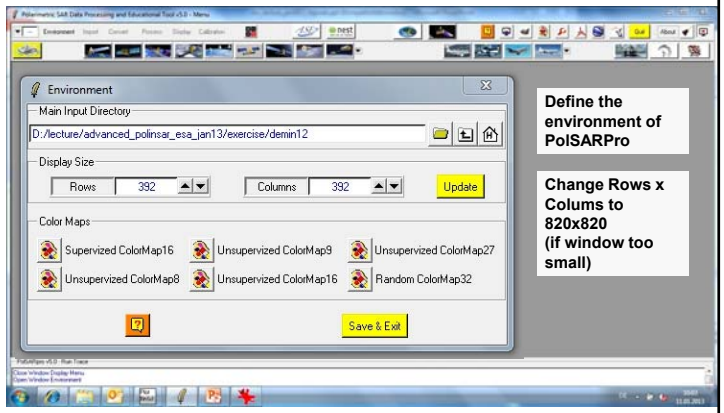
Slide 113

First Steps in PolSARPro

- Please open PolSARPro
- Define your environment
- Open the DLR's acquired test Radar data

Slide 114

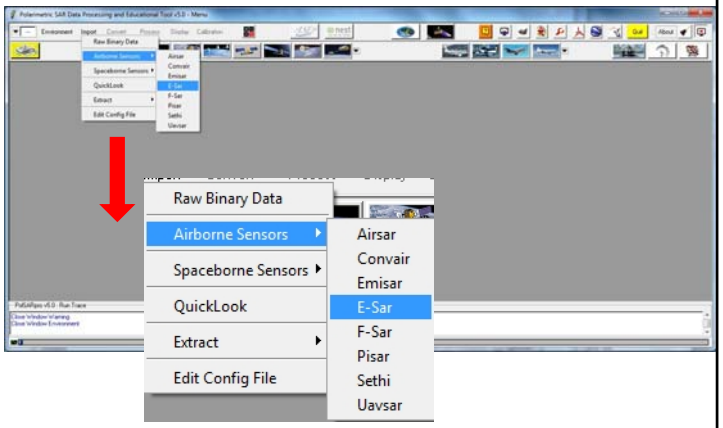
First Steps in PolSARPro



Define the environment of PolSARPro

Change Rows x Colums to 820x820 (if window too small)

Load the Airbrone Data

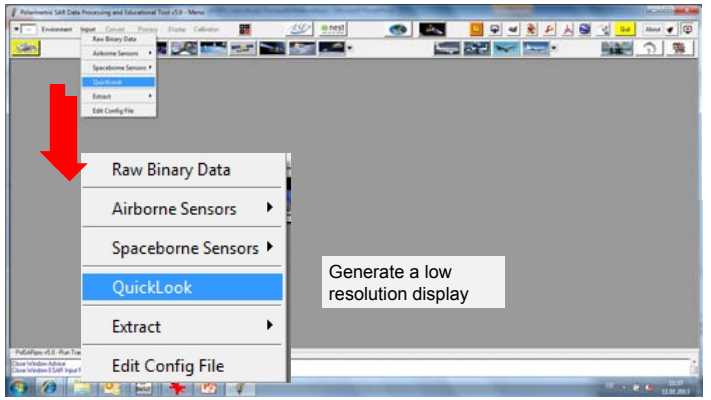


Fill the Widget with Row and Column

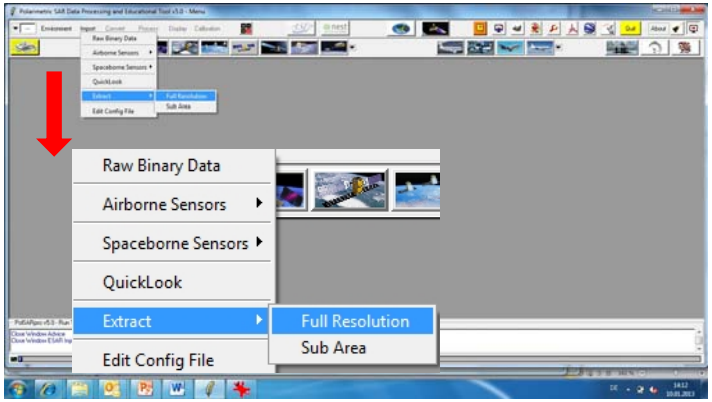
$$[S] := \begin{bmatrix} S_{11} & S_{12} \\ S_{21} & S_{22} \end{bmatrix} = \begin{bmatrix} S_{hh} & S_{hv} \\ S_{vh} & S_{vv} \end{bmatrix}$$

Note: Please add header!

Display the Image

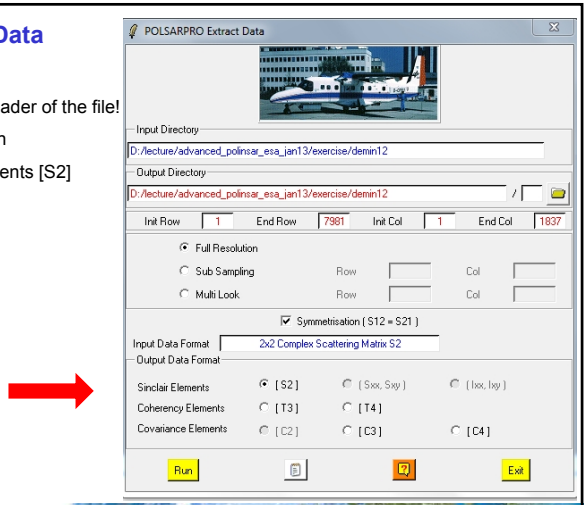


Extract the Test Data



Extract S2 Data

- Check the header of the file!
- Full resolution
- Sinclair Elements [S2]



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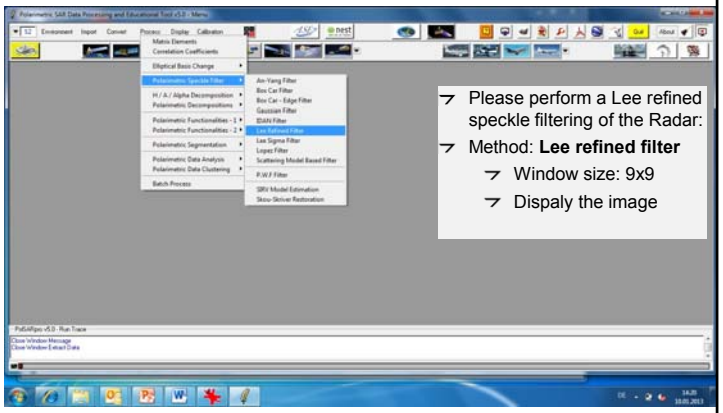
Display the Data

- Use **GIMP** for image display
  - What do you see on the image?
  - What does the colors in the image mean?
  - Which fields can be potentially inverted to soil moisutre content?

Pauli RGB

Slide 121

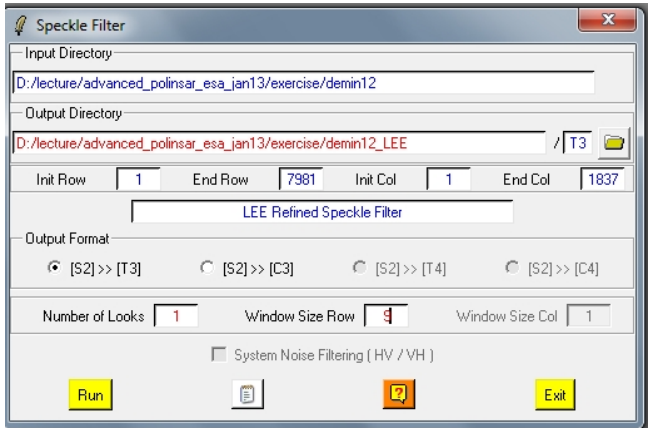
Filtering of the Scattering Matrix



- Please perform a Lee refined speckle filtering of the Radar:
- Method: **Lee refined filter**
  - Window size: 9x9
  - Dispaly the image

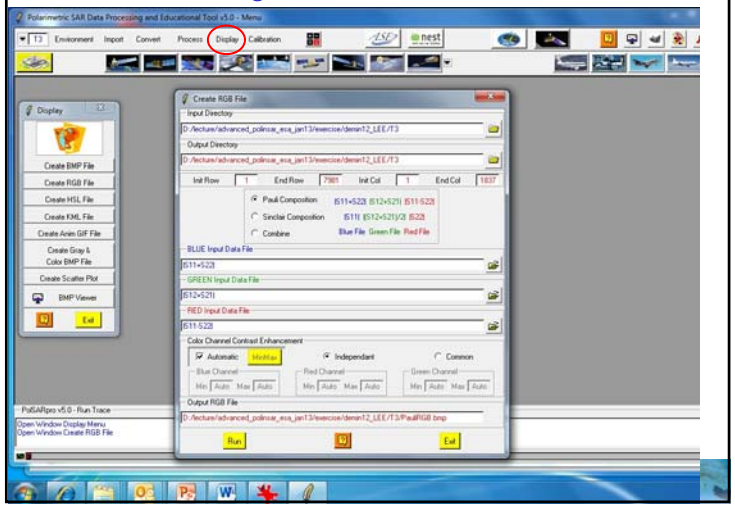
Slide 122

Filtering of the Scattering Matrix



Slide 123

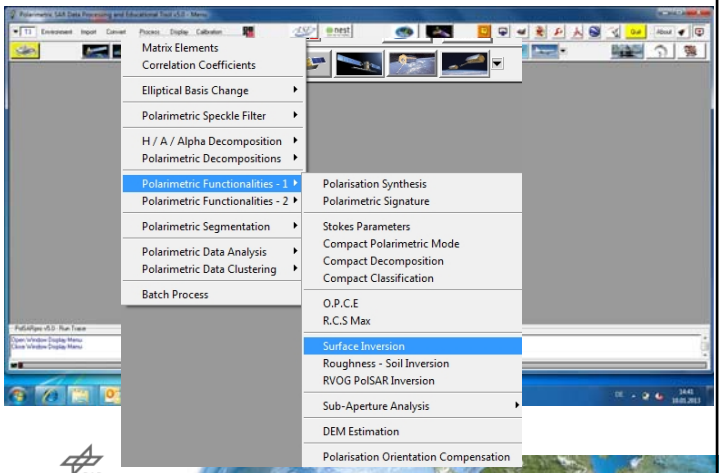
Generate a RGB Image of the Filtered Data



Display the Data

Use **GIMP** for image display

Surface Soil Moisture Estimation (Oh, Dubois & X-Bragg)



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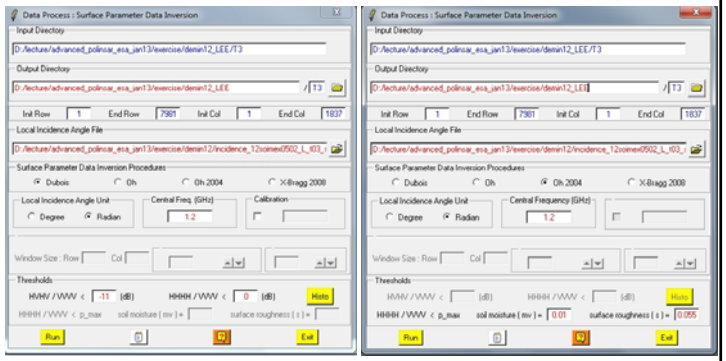
Empirical Models: Dubois @ Oh2004

- Please run the Dubois and Oh2004 inversion for soil moisture
  - Load the incidence angle file (radian)



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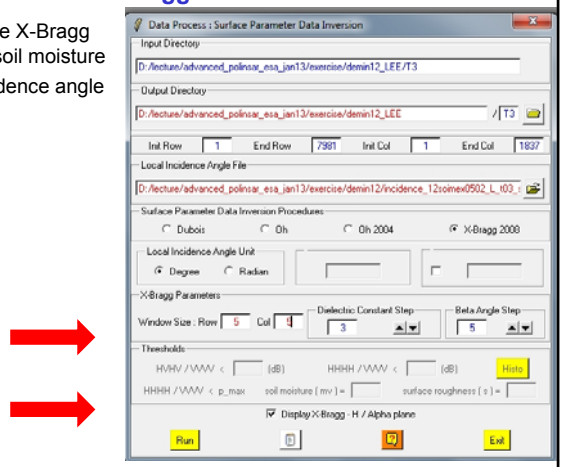
Model Based Models: X-Bragg

- Please run the X-Bragg inversion for soil moisture
- Load the incidence angle file (radian)



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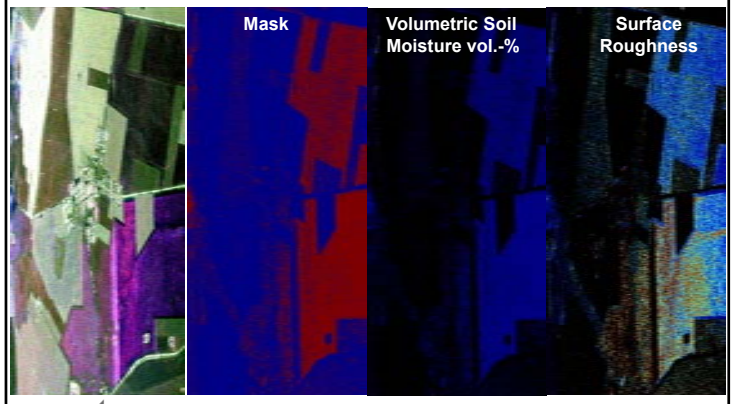
Empirical Models: Dubois – INVERSION RESULTS



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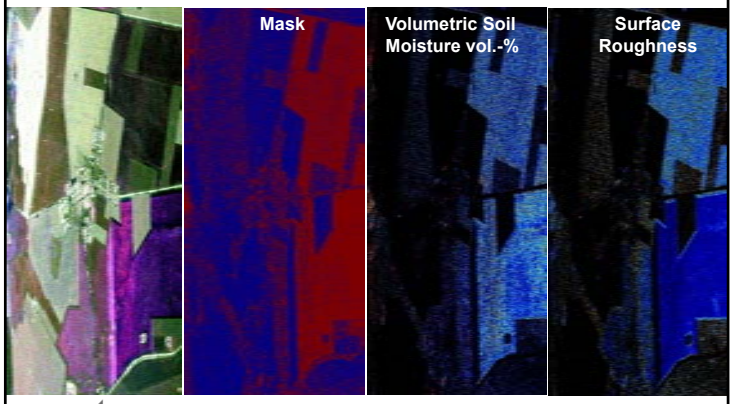
Empirical Models: OH2004 – INVERSION RESULTS



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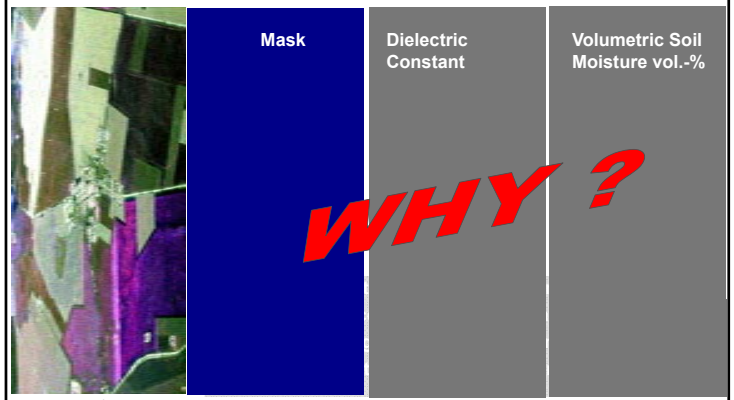
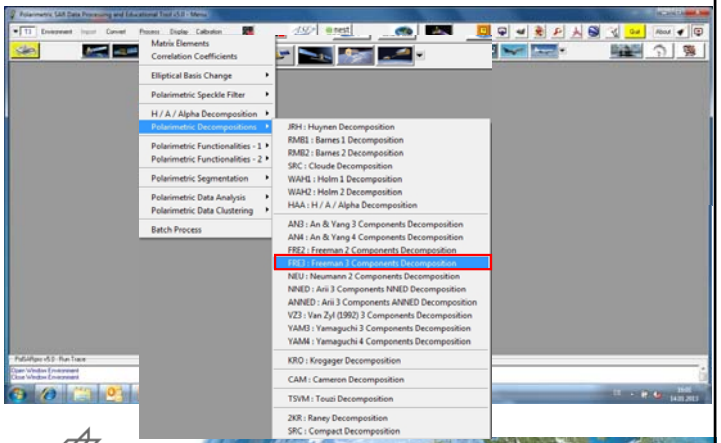
Model Based: X-Bragg – INVERSION RESULTS v4.2



Slide 131

Perform Free3 – Freeman 3 Component Decomposition



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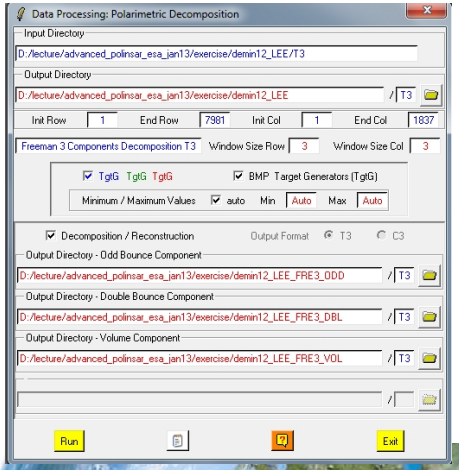
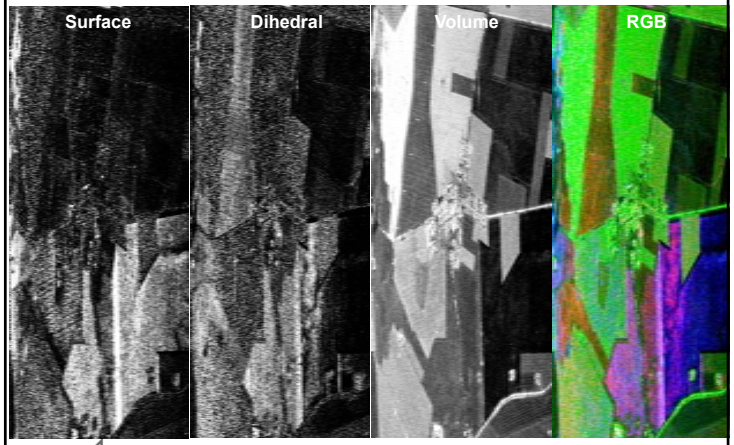
Free3 – Freeman 3 Component Decomposition

Note: Perform the process on the filtered data



Slide 133

Free3 – Freeman 3 Component Decomposition



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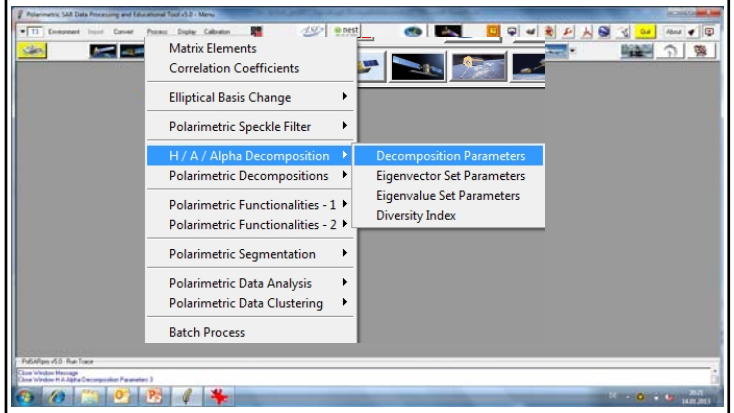
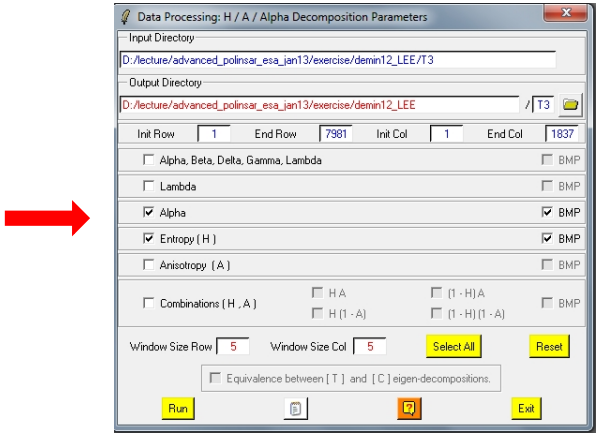
Eigen-decomposition Parameters



Eigen-decomposition Parameters



Eigen-decomposition Parameters