



Acknowledgement to the OPAQUE Team



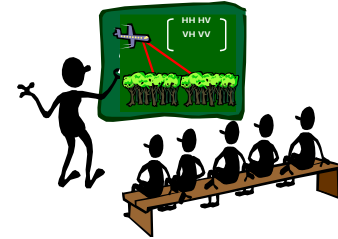

30/05/2007



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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

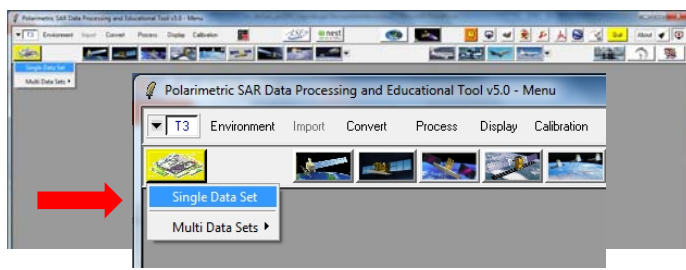

- **Testsite: Demmin**
 - Location: Northern Germany
 - Acquisition Date: May 2012
 - Frequency: L-band
 - Data size: az: 2.75km rg: 2.2 km
 - Polarisation: 4 SLC
 - Resolution: az: 60cm x rg: 3.8m
 - Rows and columns: 7981 x 1837

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First Steps in PoISARPro

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

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First Steps in PolSARPro

Define the environment of PolSARPro

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

Environment
Main Input Directory: D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2
Display Size: Rows 392, Columns 392
Color Maps: Supervized ColorMap16, Unsupervised ColorMap9, Unsupervised ColorMap27, Unsupervised ColorMap8, Unsupervised ColorMap16, Random ColorMap32

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Load the Airborne Data

Raw Binary Data
Airborne Sensors
Spaceborne Sensors
QuickLook
Extract
Edit Config File

Airsar
Convair
Emisar
E-Sar
F-Sar
Pisar
Sethi
Uavsar

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Fill the Widget with Row and Column

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

ESAR Input Data File

Input Directory: D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2

Input Data File (s11): D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2\slc_12\soimes0502_Lvh_03_sub_px

Input Data File (s12): D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2\slc_12\soimes0503_Lvh_03_sub_px

Input Data File (s21): D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2\slc_12\soimes0503_Lvh_03_sub_px

Input Data File (s22): D:\lecture\advanced_polinsar_esa_jan13\exercise\demint2\slc_12\soimes0503_Lvh_03_sub_px

ESAR Data Format: SLC Slant Range (RGI)

Initial Number of Rows: 7981, Initial Number of Cols: 1837

Note: Please add header!

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Display the Image

Raw Binary Data
Airborne Sensors
Spaceborne Sensors
QuickLook
Extract
Edit Config File

Generate a low resolution display

Slide 118

Extract the Test Data

Raw Binary Data

Airborne Sensors

Spaceborne Sensors

QuickLook

Extract

Full Resolution

Sub Area

Edit Config File

DLR

Extract S2 Data

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

POLARPRO Extract Data

Input Directory: D:/lecture/advanced_polinsar_eaa_jan13/exercise/damin12

Output Directory: D:/lecture/advanced_polinsar_eaa_jan13/exercise/damin12

Init Row: 1 End Row: 7981 Init Col: 1 End Col: 1837

Full Resolution

Sub Sampling

Multi Look

Symmetrisation (S12 = S21)

Input Data Format: 2x2 Complex Scattering Matrix S2

Output Data Format

Sinclair Elements: [S2] [Sxx, Sxy] [Sxx, Syy]

Coherency Elements: [T3] [T4]

Covariance Elements: [C2] [C3] [C4]

Run

DLR

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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 moisture content?

Pauli RGB

dihedral

volume

surface

DLR

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Filtering of the Scattering Matrix

Lee refined filter

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

DLR

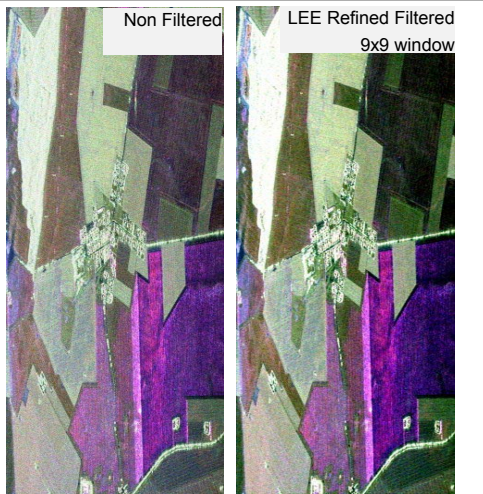
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Filtering of the Scattering Matrix

Generate a RGB Image of the Filtered Data

Display the Data

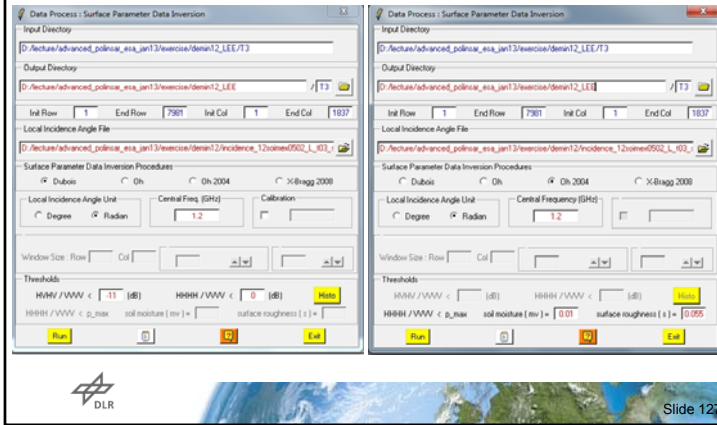
Use GIMP for image display



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

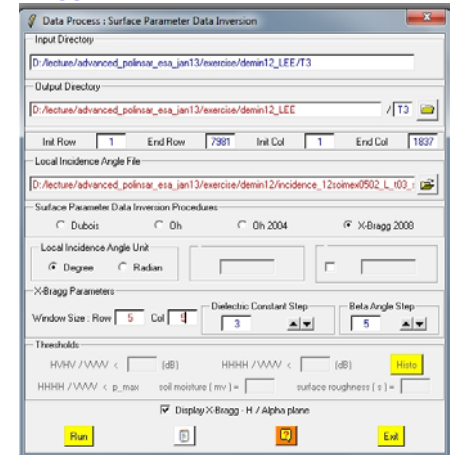
Empirical Models: Dubois @ Oh2004

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

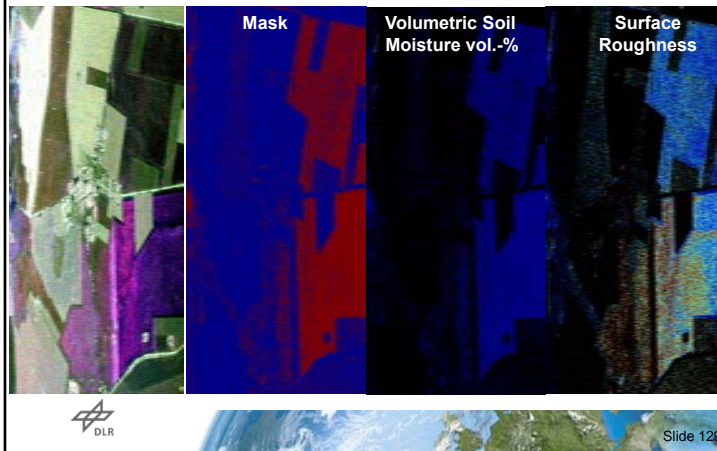


Model Based Models: X-Bragg

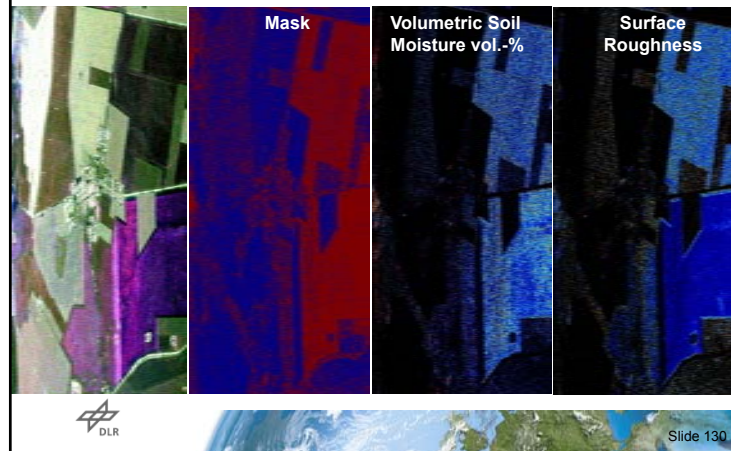
- Please run the X-Bragg inversion for soil moisture
- Load the incidence angle file (radian)



Empirical Models: Dubois – INVERSION RESULTS



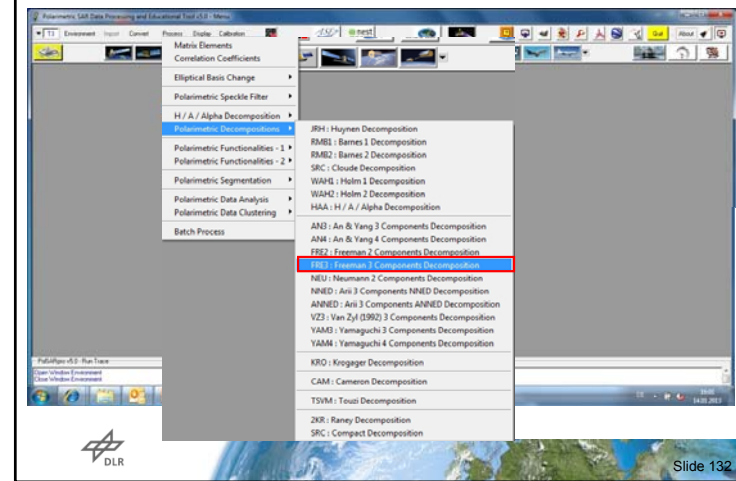
Empirical Models: OH2004 – INVERSION RESULTS



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

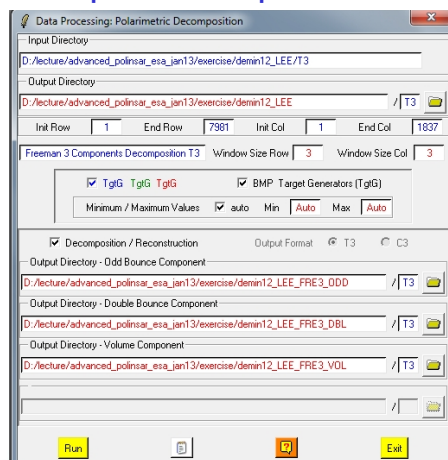


Perform Free3 – Freeman 3 Component Decomposition



Free3 – Freeman 3 Component Decomposition

Note: Perform the process on the filtered data



Free3 – Freeman 3 Component Decomposition

