→ POLINSAR 2013
The 6th International Workshop on Science and Applications of SAR Polarimetry and Polarimetric Interferometry

Applications of SAR Polarimetry on Land: Soil Moisture and Wetlands

Seed Questions

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European Space Agency

SAR Polarimetry and Wetland

a) Incoherent target scattering decomposition (ICTD) has become the Standard tool for wetland characterization and classification:

1. Are we exploiting all the polarimetric SAR information with the ICTD parameters?

Polarimetry =ICTD???!!!!

2. Is there still additional information that can be extracted with all the **abandoned** tools (developed between 1950 and 1994) in the Polarization optimization theory ??

Target Polarization Information Extraction: Example of Abandoned Tools

- Polarization optimization theory (Ko 56, Kennuaugh 56, Boerner 80, Van Zyl 89)
- Completely polarized wave extrema (Kostinski-Boerner 86)
- Polarization signature (Van Zyl 88)
- Completely polarized and unpolarized component (Evans 1988)
- Poelman multinock filter (Poleman 76)
- Contrast optimization of partially coherent targets (Ionnidis79, Swartz 88)
- Extrema of the degree of polarization & scattered wave intensity (Touzi 92)
- …. And Others..???

SAR Polarimetry for Soil Moisture and Wetlands

- We have seen some results for using polarimetric phase information in wetlands but as yet not with widespread confirmation by the community. What barriers are there to progress on this issue?

- Can quadpol decomposition be used for robust sub-canopy moisture estimation? If not, what problems remain...are existing vegetation models used in quadpol decomposition adequate for the task?

- Is compact mode the best dual-pol option for surface moisture/parameter estimation? What are calibration requirements on RCH-RCV (radiometry and Phase) for surface parameters? Are they primarily noise or polarimetric limited?

SAR Polarimetry for Soil Moisture and Wetlands

- PolinSAR 2011: The **operational** use of polarimetric SAR is not demonstrated yet it is just at study levels. We should take advantage of the easier access to polarimetric data with the new satellite SAR (Radarsat2, ALOS, and TerraSAR-X) to conduct experiments and investigation that will demonstrate and create the need for operational use of fully polarimetric data in various applications.

➢ How far are we Today?

➢ When are we going to see X, C, L, and P Missions with Digital antenna beaming for Larger Swath?

❖ Strong recommendation for the DLR L-band TerraSAR TDX mission with Digital antenna beaming => 500km swath quad-pol !!!!