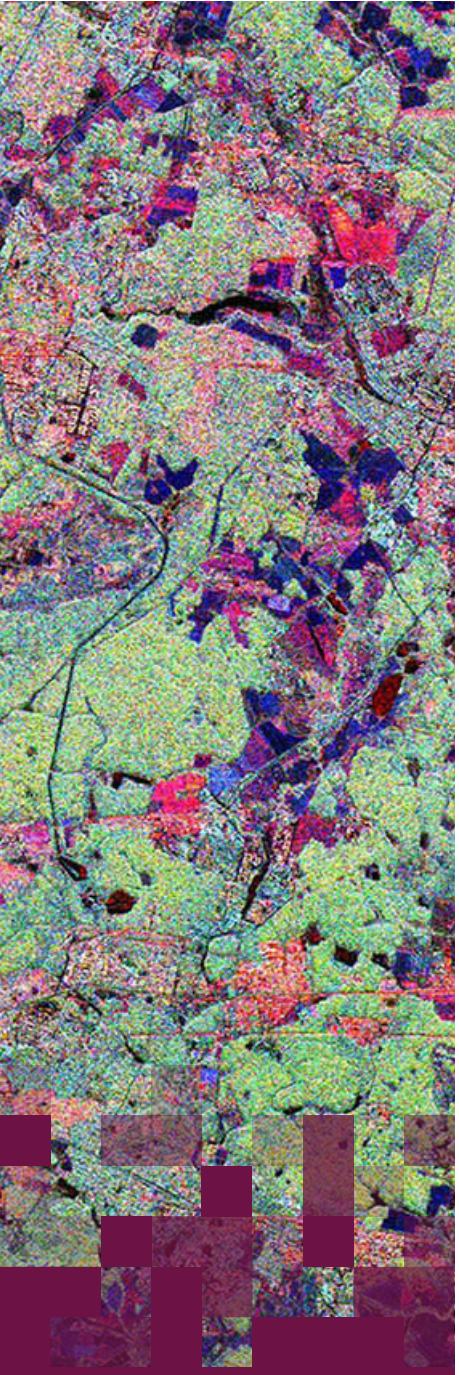

National Aeronautics and Space Administration

Mapping Crops and their Biophysical Characteristics with Polarimetric SAR and Optical Remote Sensing

Tuesdays, April 12, 19, 26 & May 3 2022

English Sesison: 10:00-12:30 EDT (UTC-4)

Spanish Session: 13:00-15:30 EDT (UTC-4)

This series will focus on the use of dual polarization C-band SAR from Sentinel-1, fully polarimetric C-band SAR from the RADARSAT Constellation Mission (RCM), fully polarimetric L-band SAR from SAOCOM (SAtélite Argentino de Observación COn Microondas), and optical imagery from Sentinel-2 to map and monitor crop types and assess their biophysical characteristics. This series will also cover the theory of SAR Polarimetry and include a practical exercise using the Sentinel Application Platform (SNAP) and Python code written in JupyterNotebooks, a web-based interactive development environment for scientific computing and machine learning.

Part 1: SAR Polarimetry for Agriculture (Theory and Practice)

- SAR Polarimetry theory

Polarimetry Practical Part 1: Intensity Derived Parameters for Agriculture Monitoring

- Generate Intensity parameters such as Span, Radar Vegetation Index, co-pol and cross-pol ratios derived from Sentinel 1 using SNAP

Part 2: Polarimetry Practical Part 2: SAR Polarimetry with Sentinel-1, RCM, & SAOCOM Imagery for Agriculture

- Generate pseudo-polarimetric parameters derived from SLC dual polarimetric Sentinel-1 using SNAP and PolSARpro (cont.)
- Analyze a time series of fully polarimetric RCM and SAOCOM images using Python Jupyter Notebooks to identify crop characteristics with different polarimetric observables

Part 3: Sen4Stat Open-Source Toolbox (Theory and Practical)

- Overview of Sen4Stat open source system to process Sentinel-1 and Sentinel-2 data at country level
- Explore how Sen4Stat combines Earth observation data with national statistical data sets and surveys for agricultural statistics
- Crop type classification combining SAR and optical time series

Part 4: Crop-Specific Time Series Analysis for Growth Monitoring

- Retrieval of crop specific LAI time series from Sentinel-2 using SNAP
- Quality control of the LAI time series using QGIS
- Time series analysis of crop types using Sentinel-2 derived LAI index
- Anomalies detection and intra-parcel heterogeneity assessment for different agricultural fields using optical data using Python Jupyter Notebooks

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