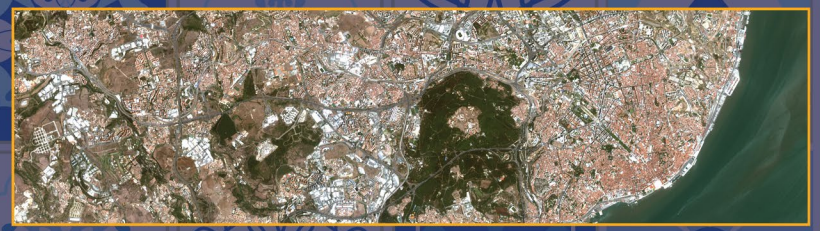
2024 DRAGON SYMPOSIUM

DRAGON 5 FINAL RESULTS REPORTING

24-26 JUNE 2024

ECOSYSTEMS



PROJECT ID. 192

3-D CHARACTERIZATION AND TEMPORAL ANALYSIS OF FORESTS AND VEGETATED AREAS USING TIME-SERIES OF POLARIMETRIC SAR DATA AND TOMOGRAPHIC PROCESSING

PRINCIPAL INVESTIGATORS: LAURENT FERRO-FAMLI, ERXUE CHEN

CO-AUTHORS: ZENGYUAN LI, ZHAO LEI
WEN HONG, QIANG YIN,
XINWU LI, XING PENG,
THUY LE TOAN

Project's objectives

Promote the use of existing spaceborne SAR sensors with polarimetric and interferometric diversities for the temporal monitoring of forested and vegetated areas and to pave the way for future spaceborne missions and concepts.

- Development of physical parameter retrieval methods for the quantitative 3-D characterization of forest areas using low frequency sensors;
- Development of innovative vector signal processing techniques for high-resolution 3-D imaging;
- Temporal monitoring of forested and vegetated areas using time-series of acquisitions;
- Updating PolSARpro Software.

Results

1. Assessment of High-resolution Airborne Multi-band PolSAR to Estimate Forest Stem Volume
2. Forest height and AGB estimation from X- and P-band InSAR data
3. A new approach of phase calibration for TomoSAR over forested area
4. TomoSAR—Forest underlying topography estimation
5. TomoSAR——Building height estimation
6. Preparation of ESA's BIOMASS mission
7. PolSAR image Classification Based on Polarimetric-Temporal Feature Selection
8. PolSAR image Classification Based on Time-Variant Features from T matrix operation in time dimension
9. Near-Real Time deforestation monitoring using S1

ID. 59313

PROJECT TITLE: GRASSLAND DEGRADATION DETECTION AND ASSESSMENT BY REMOTE SENSING

PRINCIPAL INVESTIGATORS: ZHIHAI GAO & ALAN GRAINGER

CO-AUTHORS: [ZHIHAI GAO, ALAN GRAINGER, XIAOSONG LI, BIN SUN]

PRESENTED BY: [PROF. XIAOSONG LI]

Project's objectives

1. Mapping and dynamic monitoring of grassland types
2. Quantitative estimation of grassland ecological indicators
3. Degraded Grassland detection and assessment

Results

1. Grassland type identification
2. Shrub encroachment monitoring with S1&S2
3. Estimation of grass yield
4. Global Degradation Trends of Grassland and their Driving Factors
5. Grassland Sandification monitoring and assessment with SDGSAT-1

ID. 59358

PROJECT TITLE: CHINA-ESA FOREST OBSERVATION

PRINCIPAL INVESTIGATORS: PANG YONG, JUAN SUÁREZ

CO-AUTHORS: [PANG YONG, JUAN SUÁREZ, JAMES HITCHCOCK, GERRARD ENGLISH, DU LIMING, JIA WEN, JACQUELINE ROSETTE, LI ZENGYUAN, LI SHIMING, MENG SHILI, NIU XIAODONG, YU TAO, LIANG XIAOJUN, YAN MING, LV QIAN]

Project's objectives

1. to develop methods and data products which will support the sustainable economic development of the key forestry sector in China
2. To apply and evaluate innovative remote sensing methods to improve sustainable forestry management for Chinese and UK forests he research focuses on priority areas of application of remote sensing
3. To develop methods based on fundamental tree physiology that can be extended for the future monitoring of hazards affecting Chinese and UK forests using remote sensing.
4. To integrate remote sensing data for model and algorithm development to advance data visualisation and simulation techniques;
5. to detect change using time series observations to inform policy, monitor vegetation condition, and provide growth model inputs to assess yield and to estimate carbon sequestration.

Results

- System integration, LiDAR data acquisition and application
- Field experiment in Pu'er in China and Forest of Dean and Kielder Forest in England
- The joint application of Chinese and European satellites
- Forest disturbance and flux monitoring
- Ground calibration of stressors
- New spatial representation of forest inventories (Digital Twins)
- Forest gap identification and aboveground biomass estimation based on multi-source LiDAR

Seed questions: Science & Application
Ecosystems

1. What are the remaining issues concerning the exploitation of current mission data?

- Harmonisation of datasets produced in China and ESA

2. What are the new science findings in the domain?

- Data and methods are available for paradigm change in the management of our natural environment
- Better monitoring capabilities for monitoring the health of our environment.

3. What is the general performance and what are the limitations of geophysical parameters retrieval?

- Datasets need to increase spatial and temporal resolution and extension

4. EO data synergy: is there scope for data synergy and if so which EO missions/sensors are required?

- Harmonisation of datasets produced in China and ESA

5. Validation : Have the necessary validation data been collected and shared?

- Cal/Val datasets georeferenced and with metadata available for validation analysis

Seed questions: New EO Mission Exploitation
Ecosystems

1. What are the new domains where further research is needed?

- LiDAR from space…
- Hyperspectral satellites to explore fundamental vegetation physiological processes

2. What are the synergy between Europe and China new missions to be exploited?

- Biomass (LiDAR, multiangle optical and SAR)

3. What complementarity in the operational use of the current / future missions (planning, observations, etc.) could be improved to allow better data exploitation?

- Sentinel and Gaofen programmes should be more closely integrated
- BIOMASS, FLEX and TECIS should exploit synergies and complementarity…