

Summary of the 2026 JECAM Annual Meeting

ISPRS Congress – Toronto Canada

Overview

The 2026 JECAM Annual Meeting was held in conjunction with the ISPRS Congress in Toronto, Canada, on June 23, 2026. The hybrid meeting brought together 30+ site leads and researchers from multiple international agricultural monitoring sites to share updates, review ongoing collaborative experiments, identify new research priorities, and discuss opportunities related to emerging Earth Observation (EO) missions and partnerships.

JECAM Mission and Network Update

- JECAM continues to expand as a global agricultural monitoring network, now comprising more than 30 sites worldwide. The network reported strong engagement across Africa, Asia, Europe, North America, and South America. Recent additions include new sites in the Netherlands and Nepal, while discussions are ongoing with scientists in the Philippines and Benin to expand participation. Outreach to revive dormant sites in India and re-engage with Asia Rice through GEOGLAM are planned
- At the 2026 meeting, representatives from 11 sites participated, including Nepal, Philippines, Italy, Argentina, Belgium, China, Canada, Poland, Brazil, Benin, and Taiwan.

Major Activities and Experiments

1. ENMAP Hyperspectral experiment and Agricultural Virtual Labs

- A major milestone discussed was the AVL-EnMAP JECAM Experiment (2024-2025), the network's first hyperspectral collaborative experiment. Key achievements included:
 - Participation of 11 JECAM sites as early adopters.
 - High-priority EnMAP data acquisitions over multiple sites.
 - Access to more than 400 EO datasets through the ESA Agricultural Virtual Laboratory (AVL).
 - Development of preprocessing workflows for hyperspectral data.
 - Establishment of common protocols across participating sites.
 - Delivery of cloud-computing and data-access training webinars. The experiment combines over 400 EO data collections from multiple hubs and uses a standardized Jupyter Notebook-based workflow, with cloud infrastructure training provided to participants through AVL platform.
- The experiment was highlighted as a pioneering effort because it was:

- JECAM's first hyperspectral experiment.
- The first formalized under a collaborative agreement.
- Conducted entirely online.
- Built around a shared cloud-based working environment.
- The project includes coordinated EnMAP image acquisition, shared data storage and processing, and the development of a formal collaborative framework for data exchange and licensing.
- The meeting also included a review of a manuscript summarizing findings from the cross-site hyperspectral study.

2. EO4 Cereal Stress Pilot Site Initiative

- A significant new initiative is the ESA-funded Crop Stress project led by the University of Southampton. The objectives are to:
 - Assess the value of JECAM supersite datasets for early crop stress detection.
 - Support calibration and validation of crop growth and yield models.
 - Examine impacts of heat stress on cereal crops.
 - Improve integration of EO observations into agricultural modelling.
- Participating Sites: Canada; Poland; Spain Philippines
- Planned Activities
 - Two international hybrid workshops.
 - Standardization of field protocols for crop stress monitoring.
 - Improved understanding of EO requirements for crop modelling.
 - Future peer-reviewed scientific publications

3. New Proposed Initiatives:

- Leverage interest from multiple sites in benchmarking crop yield models (led by Belgium)
- Land Management Monitoring: A new collaborative experiment was proposed by China to monitor farming practices such as:
 - Seeding
 - Harvesting
 - Tillage/ploughing
 - The objective is to create transferable methods for detecting agricultural management activities using Sentinel-1 and Sentinel-2 time series, supported by field records and site observations. Expected outputs include joint scientific publications and improved inputs for crop yield and land-use assessments (led by China)
- SAR Green Area Index (led by Belgium)

- Re-use data sets for the JECAM SAR intercomparison experiment to test new methods for GAI retrieval and new AI methods developed by Belgium. Five sites are participating.

Site Presentations

- Presentations of site priorities and activities from JECAM sites in Nepal, Philippines, Italy, Argentina, China, Poland, Canada (slides in attachment)
- Field data collection continues at sites with emphasis on crop type, crop yield, evapotranspiration and crop stress, horticulture and smallholder systems and tools for data collection, land management, leaf area index and cover/winter crop classification.
- Research interests are in scaling up methods for national mapping (crop type), improving precision of crop maps for complicated classes and distinguishing irrigated and non-irrigated agriculture, evaluation of deep learning models, delineation of field boundaries in commercial and small holder agriculture, crop stress and drought impacts, crop yield modelling, development of data collection tools and transfer learning methods to reduce time to collect crop type information for model training
- New applications of AI and use of foundation model embeddings discussed by multiple sites

Other Items Discussed

- The meeting concluded with a discussion on collaboration opportunities with Earth Daily Analytics, including potential access to new satellite observations and joint research activities.
- A hotspot map of expertise and data interests would be useful to enhance collaboration across the network
- Updating of field data collection protocols in collaboration with GEOGLAM in situ working group and EO4Cereal Stress project
- JECAM NISAR experiment is of strong interest by many partners – will explore opportunities to progress this work

Conclusion

- The 2026 JECAM meeting demonstrated a shift from individual site activities toward coordinated, multi-site experiments focused on hyperspectral remote sensing, crop stress assessment, yield forecasting, land management monitoring, and next-generation EO missions. The network remains a globally recognized platform for testing and comparing

agricultural monitoring approaches across diverse cropping systems while expanding collaboration, standardization, and scientific impact

Appendix

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Casselman, Ontario

Site Lead: Dr. Catherine Champagne
Team: Dr. Gwendolyn Wang, Dr. Kaito Misono

- **Current Projects (research site)**
- Crop Identification – ENMAP AVI for improved discrimination of cereals, forages (2025)
- Tillage – spring/fall surface roughness estimates from Sentinel-1 and Radarsat Constellation Mission (2024 – 2025); windtiled survey
- Crop Residue – testing model for discriminating fraction of soil/residue/green cover using harmonized Landsat-Sentinel-2; Residue photos collected in 2024 & 2025 (Maize, Soy, Wheat)

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Ottawa (CFIA), Ontario

Site Lead: Dr. Catherine Champagne, Dr. David Nelson

- **Current Research**
- Landscape Productivity: Use Sentinel-2 and Light Use Efficiency model to estimate NPP / GPP (soy covariance system measurements, continuous since 2020)
- Evaluation of soil moisture data from Earth Daily Analytics, Planet (15 to 100 m resolution)
- 48 Nutrient Management practices: 2 NCO systems installed with continuous measurements
- Regular collection of soil moisture, meteorology, biomass, leaf area over 4 fields

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MB, SK, ON RISMA Sites

Site Leads: Dr. Kaito Misono & Dr. Tamiya Inaki
Team: Dr. Gwendolyn Wang, Dr. Catherine Champagne

- **Current Projects**
- Soil Moisture: Real Time in Situ Soil Moisture Monitoring for Agriculture (RICMA) automated soil moisture network with meteorological data
- Vegetation Phenology & Biomass from Synthetic Aperture Radar
- AISD Signals – soil moisture, crop biomass, LAI, stomatal conductance, NDVI (SAR and multispectral remote sensing data (Canadian RCM and the ESA's Sentinel-1/2/3), drone multispectral data)
- ISA – CCN project on Cereal Stress
- Snow depth/Composition/cover/melt with JAXA/JU of Waterloo
- International Soil Moisture Network site(s)
- Soil Carbon/GHG with USDA and U of Maryland

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Apulian Tavoliere, JECAM Italian site

A. Balenzano (1), F. Mattia (1), G. Satalino (1), D. Palmisano (1), R. Roseto (1), S. Rossi (1), F. Lovergine (1), S. Ruggieri (2), M. Rinaldi (2)

(1) National Research Council of Italy (CNR), Institute for Electromagnetic Sensing of the Environment (IREA), Italy
(2) Council for Agricultural Research and Economics (CREA), Italy

anna.balenzano@cnr.it
July 7, 2026

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Apulian Tavoliere site: open air laboratory

Apulian Tavoliere (OTB)

- 4000 km² (i.e. the second largest plain in Italy)
- semi-arid Mediterranean climate (annual rainfall about 550 mm)
- almost flat topography
- crops: durum wheat, barley, oat, alfalfa, tomato, fava bean, chickpea, artichoke...

Important challenges for water management: highly anthropogenic environment & increasing evaporative demand → significant reduction in water availability & increased water demand (e.g. irrigation, energy, industry, etc.) → risk of future yield loss and social vulnerability

Apulian Tavoliere is a test site for:

- <https://sarwater.irea.cnr.it/>
- <https://netline.cnr.it/demo/>

Presence of CREA experimental farms managing more than 900 ha & CNR Institute & University & Research Center

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Systematic collection of satellites and soil moisture (SM) data and seasonal campaigns

Examples from Sentinel-1 (S-1) & Sentinel-2 (S-2) SACCOM & COSMO data collection

Sagestia & Foggia hydrologic networks

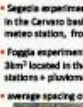
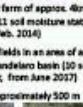
- Sagestia experimental farm of approx. 4000 ha located in the Carro basin (12 soil moisture stations + 1 meteorological station, from Feb. 2014)
- Foggia experimental fields in an area of approx. 3000 ha located in the Candellaro basin (10 soil moisture stations + pluviometer, from June 2017)
- average spacing of approximately 500 m

2022 crop inventory

Ground data systematically collected, such as land use, crop biomass, tillage change, soil moisture and irrigated fields

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ESA SarsimHT-NG Campaign: impact of rapid changes in soil and vegetation water content on SAR

F-SAR C- & L-band fully pol. acquisitions at high temporal resolution (i.e., ~10 min)

Incidence angle from 23° to 58°

study area of ~45 km², with documented land use

- Irrigation synchronised with FSAR overflights
- Sampling of ground data arranged in a grid and collected in conjunction with FSAR acquisitions

<https://earth.esa.int/en/gateways/news/new-radar-campaign-measures-snow-water-and-soil-moisture>

Apulian Tavoliere study site

April crop map (100 fields)

DLR FSAR flights

- Mission 1 & 2: 28-29 April & 15-16 June
- 4 flights per mission: morning & afternoon
- For each flight 11-12 passages every 10 minutes

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Retrieval of SM, vegetation water content (VWC), soil roughness & irrigation detection at 100m from S-1 and S-2

Examples of SM map and derived irrigated/non-irrigated fields

Examples of VWC map and normalized soil roughness spectrum

07/05/24

SM

0.05 - 0.5

06/05/22

VWC

0.05 - 0.5

Irrigated map

Non-irrigated

Irrigated

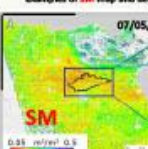
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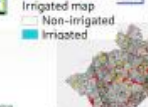
Mattia et al., TSD 2026

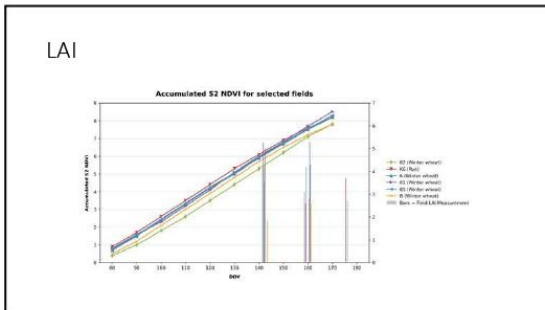
Cumulative tillage change map of March-April 2024

Satalino et al., 2018

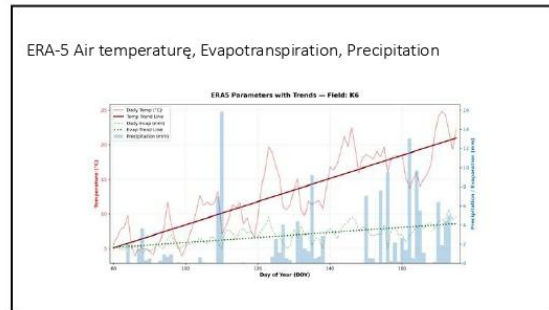
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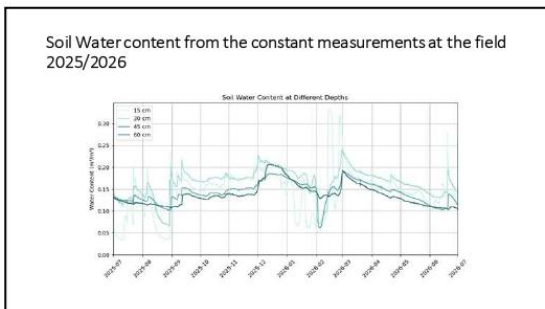


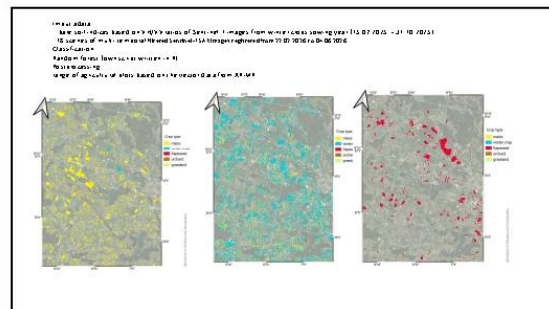
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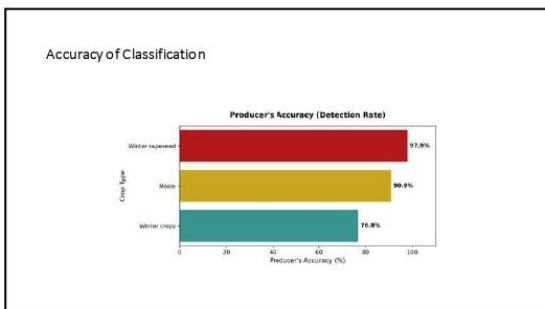
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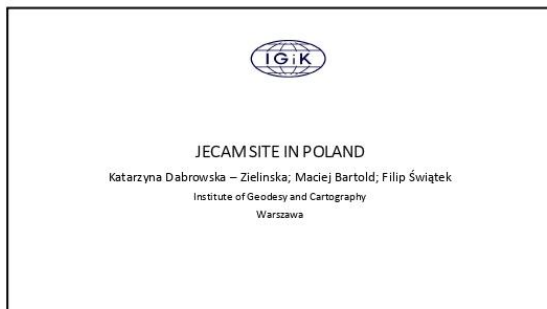
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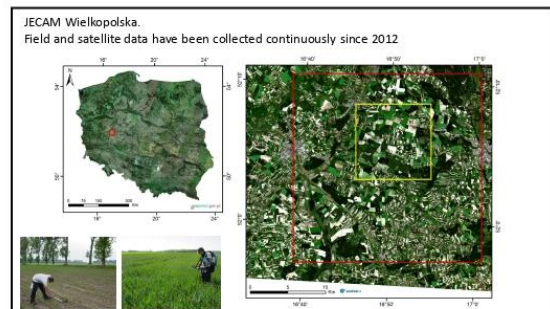
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• Thank you for your attention

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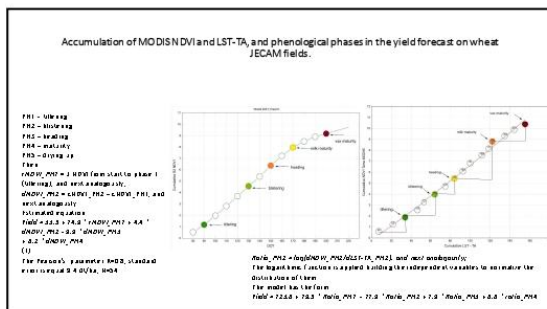
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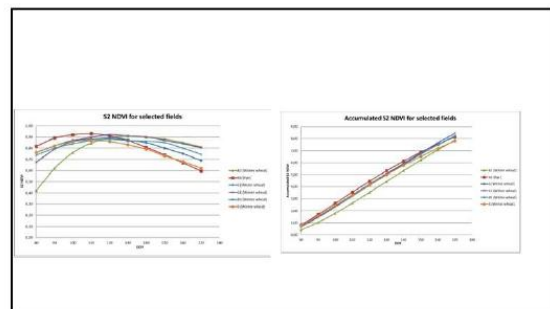
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Data Cleaning and Further Processing

- Location information obtained in CSV format
- Imported the data in a GIS environment
- Data were cleaned by digitizing the plots, plots' area computed

Further Processing:

- Phenological stage mapping for wheat
- Identifying the optimal stage for yield prediction



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Future Plans

- Two PhD research projects are currently ongoing, with plans to recruit one additional PhD candidate
- Yield mapping using crop cutting methods (subject to funding availability).
- Delineation of rainfed and irrigated paddy fields
- Parcel-level estimation of drought-induced yield losses
- Links with global research initiatives, test new sensor e.g. NISAR
- Data sharing and dissemination: dedicated Zenodo community page



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Thank you

Uma Shankar Panday
uspanday@iisu.edu.np
Arun Kumar Pratihast
arun.pratihast@wur.nl



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