

GEO Joint Experiment for Crop Assessment and Monitoring (JECAM):

Summary of 2014 Progress Report

This report shows the progress that GEO JECAM (Joint Experiment for Crop Assessment and Monitoring) test sites have made since JECAM started in 2011, with the focus on 2013. The amount and types of Earth Observation (EO) data received are also reported, along with in situ data, analytical results, and future plans. JECAM is the Research & Development (R&D) portion of the GEOGLAM (GEO Global Agricultural Monitoring) initiative, and so the R&D results are important for the development and sharing of 'best practices' in agricultural monitoring.

A historical background of JECAM is provided, showing how the concept evolved, and how the providers of EO data were engaged to support the initiative.

We have instituted an annual report process to obtain information on JECAM research progress, EO data usage and collaboration activities. The progress of several JECAM sites to February 2014 is presented in this document. There are currently thirty-three JECAM test sites, of which four appear to be dormant, and a few have just started. Twenty-four sites submitted progress reports. This participation rate is very encouraging.

Our website (www.jecam.org) was launched in 2012. Content from the annual reports will be used to keep the site 'fresh', accurate and current.

The data acquisition planning with CEOS Space Agencies and commercial providers went fairly well and most JECAM sites are receiving data. The types of EO data used at each JECAM test site (that reported in 2014) are shown in Table 1.

Since last year's report, the JECAM sites told us about 19 peer reviewed papers, 12 other publications and 19 presentations.

The JECAM sites are looking at a common range of monitoring needs over a very diverse range of landscape conditions and cropping systems, including:

- Crop identification and acreage estimation
- Yield prediction
- Near Real Time Crop condition
- Land management
- Soil moisture.

All of the reporting sites included crop mapping as an objective. Fifteen of 24 include crop condition objectives. Seventeen also included crop yield forecasting research. Twelve of 24 included soil moisture monitoring research as an objective. Eight reported residue and tillage monitoring research as an objective. Other objectives included biophysical variables, phenological events, cropping practices, crop calendar, CO₂ and water budgets/flux, and soil erosion.

Table 1: Types of EO Data Used at Each JECAM Test Site

JECAM Site	COSMO SkyMed	RADARSAT-2	TerraSAR-X	AWIFS	DMCII	ASTER	HJ-1	Landsat	MODIS	Quickbird	Rapideye	SPOT-4/5/6	Worldview-2	Pléiades	Formosat-2	Deimos	Chris
Argentina	X	X	X	X	X						X	X					
Belgium		X						X			X	X					
Brazil – Sao Paulo								X	X				X				
Brazil – Tapajos								X			X			X		X	
Burkina Faso								X						X			
Canada CFIA – Ottawa								X				X					X
Canada/Red River		X						X			X						
Canada/South Nation			X					X			X						
China/Guangdong (Taishan)	X	X									X						
China/Heilongjiang	X	X	X				X		X		X	X					
China/Jiangsu ¹																	
China/Shandong	X	X	X		X		X		X		X	X					
France								X				X		X	X	X	
Italy Apulian Tavoliere									X								
Madagascar												X		X			
Morocco												X					
Russia								X	X								
Saudi Arabia						X		X		X							
South Africa								X	X		X	X					
Taiwan									X			X			X		
Tunisia	X		X			X		X				X					
Ukraine		X						X	X		X	X					
Uruguay								X									
U.S.A.				X													

There is already significant bi-lateral collaboration between JECAM sites planned and underway. Use of the site network to support research external to JECAM is now taking place, including:

- ESA Sentinel 2 Simulation over JECAM sites
- IMAGINES project
- NASA SMAP Validation Experiment (SMAPVEX)
- EU FP7 SIGMA Project.

¹ The China/Jiangsu site ordered imagery in 2012, but in 2013, they focused on analysis and did not order imagery.

JECAM will continue to be responsive to GEOGLAM “R&D towards monitoring enhancements”, and the GEOGLAM needs will define the JECAM community activities. To this end, JECAM intends to support enhanced collaboration between sites. The collaboration will support the development of standards and practices that inform the GEOGLAM “system of systems” for agricultural monitoring. JECAM sites will also participate in the validation of new sensors as opportunities arise. Support will include exploring the development of minimum datasets of in-situ and satellite data for a core number of sites and taking part in the NASA “cloud” prototype to enhance data sharing and multi party data licensing.

This is a rich set of scientific results, produced by expert teams around the world, in a wide variety of geographic settings and cropping systems, available for sharing and definition of ‘best practices’. It provides clear indication of the impact of CEOS support.

We wish to thank the JECAM site teams for their impressive contributions to this work.