JECAM (Joint Experiment for Crop Assessment and Monitoring)

Science Meeting

Meeting Summary and Action Items[1]

Brussels, Belgium

16 – 17 November 2015

<u>Monday, 16 November 2015</u>

<u>Welcome Address</u>
Jean-Christophe Schyns opened the meeting and welcomed participants. The palace where the meeting took place dates from the 16th century. Jean-Christophe expressed deep sympathy about the recent attacks in Paris. JECAM is an example of collaboration and communication, with the goal of improving food security and price stability.

<u>Meeting Objectives</u>
Pierre Defourny welcomed the participants. He spoke about the Sentinel-2 for Agriculture and SIGMA meetings that would take place later in the week, after the JECAM Science Meeting. Pierre reviewed the JECAM goals, documented at <u>www.jecam.org</u>. We plan to capitalize and learn from the first JECAM cross-site experiments. We will share the progress, achievements and concerns of the JECAM sites. The links to CEOS are important, and we will get updates of CEOS missions. We will discuss best practices. We will discuss the recommendations that the GEOGLAM Advisory Committee made at their meeting in Mexico last week.

<u>JECAM Network Update and Report from GEOGLAM Advisory Committee Meeting</u>
Ian Jarvis said that the report from the GEOGLAM Advisory Committee meeting is postponed until the next day. Ian reviewed the background and origins of JECAM. JECAM has no end horizon; it will continue as long as it is relevant. The annual reports are useful; however, we plan to slim them down, so they will take less of your time to produce. What's next? A cross-site SAR experiment is underway, with 7 participating sites. Data cubes and cloud processing is coming. NASA has provided this capability for Asia-Rice already, and it will expand to JECAM. Microsoft Canada will host this capability at no charge for a time. Sharing of RADARSAT-2 data and tools for SAR processing is coming soon. Strategic issues for the way forward include:
- Enhancing technology transfer
- Inter-comparison projects and strategic partnerships
- Enhanced R&D networks for countries at risk – a subgroup focused on the food insecure nations.

Working at a range of scales is very important.

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[1]The presentations for this meeting can be found at http://www.jecam.org/. Follow links to the 2015 Science Meeting presentations. This meeting summary does not intend to duplicate the presentations.

GEOGLAM: Status and Achievements
Michel Deshayes summarized GEOGLAM background and progress. The Crop Monitor for AMIS has been operational since September 2013. He summarized Asia-Rice and RAPP (Rangelands and Pasture Productivity). A national crop monitor is being started in Tanzania with support from the Gates Foundation. Collaboration with CEOS is providing coordinated response to requirements. He summarized the R&D of JECAM, SIGMA and Sen2-Agri.

1st Session: Cross JECAM Sites Experiment
Nataliia Kussul presented a comparison study of five JECAM/SIGMA sites with large fields (China, Ukraine, Brazil, Argentina and Russia) using MODIS data. The main conclusion was that the site effect (cropland fragmentation and specific agrosystem characteristics) was more important than the method effect. Overall accuracy (OA) ranges from 85 – 95%.

Sophie Bontemps presented a study of JECAM/ SEN2AGRI sites for cropland masking. The 12 sites covered a wide range of agricultural systems. The conclusions were that a supervised approach leads to higher overall accuracy than unsupervised, but the performance of unsupervised is not bad. The accuracy increased over time but was already about 80% after 6 months. The per-object approach is most efficient for a-posteriori filtering.

Gérard Dedieu presented cross-site benchmarking of crop type. Twelve SEN2AGRI sites were used for this work, of which 9 are JECAM sites. The resulting score combines the producer and user accuracy. Gérard pointed out that this work was to define the best algorithm with only 6 months of data. It is too early to assess the success. It was set up in a consistent way to compare the sites.

2nd Session: 2015 Highlights from the JECAM Sites
Diego de Abelleyra and Santiago Verón presented the Argentina site. The OA ranged between 88% - 96% in different years for a few reasons:
- Differing cloud and availability of satellite data
- Late maize has become more frequent over the last five years.
- Management practices have changed.

It was pointed out that we are striving for consistent OA across the years.

Nataliia Kussul and Andrii Shelestov presented the Ukraine site. They participated in the SPOT5 Take5 experiment, and used this data for crop classification and bioparameter estimation.

Terry Newby presented the South Africa site. They are testing crop modelling with the AGMIP approach to yield and yield forecasting. They have an operational system using satellite and airborne data. The PICES system is a national system, which is expensive but cheaper than an in situ approach.

At 12:00 noon, a minute of silence was observed for the victims of the recent attacks in Paris.

Miao Zhang presented the Shandong site in China. They found that NDVI is best at an early growing stage (with low biomass/leaf area). The vegetation indices using red-edge band perform

much better than other indices. Next year, they plan to do crop classification by integration of optical (SPOT5) and SAR (RADARSAT-2) data.

Cheng-Ru Chen presented the Taiwan site. The accuracy of yield estimates using multi-temporal RADARSAT-2 data is 85 – 90%. Another team at their centre provided a network of sensors that are very cheap, using Arduino.

Pierre Sibiry Traoré presented the Mali site. This is a STARS (Spurring a Transformation for Agriculture through Remote Sensing) site funded by the Gates Foundation. The lack of crop maps is a deterrent to sustainable development here. Therefore, they want to recognize crops. They fly UAVs (typically 6-10 overpasses per season). The signal from fertility trials is dwarfed by the inter-field variability, which is dwarfed by the variability across the landscape. They plan to connect to AGMIP simulations to contextualize crop performance against 30-year normals. They are interested in opening a JECAM site in Nigeria.

Agnès Bégué presented the site of Burkina Faso (Koumbia). They hope to map fallow through multi-year time series analysis. Plans for next year include multi-source data fusion, including optical and radar data.

Valentine Lebourgeois presented the Madagascar (Antsirabe) site. Field size is very small, 0.03 ha! Statc variables include field size, area irrigated, slope, etc.

Bernard Mougenot presented the Morocco (Tensift) site and the Tunisia (Merguellil) sites. At both of these sites, water management is very important. They have produced estimates of evapotranspiration using thermal data (MODIS, Landsat) with experimental data in-field and models, since the pixel size of the thermal bands is larger than the field size.

Gérard Dedieu presented the France OSR Midi Pyrénées site. Land cover in France will combine data from farmers with EO data. A web application has been developed where farmers will enter the location, date of irrigation, amount of water irrigated, if possible soil characteristics. The French government provides a land cover database which is used for training the classifier.

Aline Léonard and Cindy Delloye presented the Belgium site. One of their objectives was to investigate the synergy between optical and SAR data and they found very promising results for optical-SAR synergy. The BELCAM project is supported from 2015-19 by BELSPO. It will investigate questions to move from research to operations.

Fernando Camacho presented the Barrax site in Spain. The in situ data was sampled according to the FP7 ImagineS field protocol. To validate their LAI results, they made several inter-comparisons of data, and have published the results.

Agnès Bégué presented the São Paulo site in Brazil on behalf of Guerric Le Maire, who moved to Brazil one month ago. She also presented the Matopiba/Tocantins site in Brazil which replaced the Tapajos (Amazon) site.

Shin-ichi Sobue presented the activities and accomplishments of the Asia-Rice team via skype.

Bernd Fichtelmann presented the proposed DEMMIN site near the Neustrelitz ground station north of Berlin. They are using drones for vegetation/crop monitoring.

Fernando Camacho presented standards for in situ LAI and biophysical variable measurements. ImagineS has specified in situ standards based on EO product validation needs.

Discussion about JECAM Guidelines for In situ Biophysical Measurements

Pierre Defourny said that this fits well with the discussion we had in Ottawa in July 2014, when we were looking at standards proposals. Global products are usually sampled at 3 km x 3 km. JECAM sites are more concerned about in-field values. Nataliia said that in Ukraine, they sometimes couldn't find crop diversity, because the fields are very large. It is important to take into account the spatial resolution of the satellite sensor in designing the density of samples. Santiago said that they have done this for a few years, and they get better results with fractional cover than with LAI. Time of day is important because of the sun position. Crop colour changes with time of day, and shadows are of different sizes. They take pictures of fallow and see many weeds; how do you treat this, having a green area from weeds? It could introduce noise. Fernando suggested not to measure when the sun is low, because the shadows are too big. His group validates mostly Green Area Index (GAI).

There was discussion of LAI versus Fcover versus FAPAR.

Open Discussion on Existing JECAM Guidelines and Expected Evolution

Pierre spoke about the guidelines that we sent out last year and asked for comments. It seems that the JECAM sites are using the guidelines and talking in more common language than in past meetings. Pierre asked about the experience with these guidelines; should they be adjusted? He also asked if we need more guidelines. Yves Crevier spoke about how two other communities of practice (ocean colour and global forest cover) are writing best practices or Methods and Guidance Documents. The question was asked about guidelines for developing methods; are we working per pixel? How to handle errors? Are we handling texture or backscatter? The software used should be standardized too. The STARS project asked the field teams to collect a canopy reflectance database, with spectral and textural information and how this changes with time. It was suggested that JECAM adopt this approach to develop a database of training data.

Ian Jarvis said that it is central to the mission of JECAM to develop guidelines and best practices. We must have peer-reviewed publications which describe the details.

Tuesday, 17 November 2015

3rd Session: CEOS Support for Agricultural Monitoring
Benjamin Koetz presented the ESA Sentinel-1 and 2 mission status. These missions have a free and open data policy. These missions are operational and funded for the next 20 years. Between Sentinel-1, 2, 3 and SMOS, ESA is responding to almost all GEOGLAM EO requirements. The Food Security Technical Exploitation Platform (TEP) is being defined now. ESA is still working

to validate data products. The Living Planet Symposium will include sessions relevant to national capacity building and other subjects of importance to this community.

Alyssa Whitcraft presented a CEOS update: JECAM EO data access and NASA/JECAM cloud-based SDMS (Space Data Management System) on behalf of the CEOS Ad Hoc Working Group for GEOGLAM. Alyssa works part-time for the GEOGLAM Secretariat where she leads Component 4 of the GEOGLAM Work Plan (Data Acquisition and Dissemination Coordination). The RADARDSAT-2 shared data will shortly be hosted by Microsoft Canada at no charge for a time. In future, users will need funds to pay for data. There was discussion of how to engage the commercial data providers. CEOS does not have the role to engage the commercial sector.

Yves Crevier presented the Canadian Space Agency (CSA) and support of the JECAM Science objectives. Yves described that CSA is moving from a one-to-one licence for RADARSAT-2 data (SOAR program) to an open sharing process for approved users and approved data acquisitions. Data requests must comply with the Canadian Remote Sensing Space System Act and underlying Master Agreement principles between the government of Canada and MDA. Yves stressed that in the next few years, there will be a plethora of SAR missions with data available for terrestrial monitoring. The research should address the new challenges of multiple C-band SAR sensors with high revisit frequency. In addition, there will also be multiple SAR sensors at L and X-bands. Data at different wavelengths in such high volumes with frequent revisit creates new challenges. The RADARSAT Constellation Mission will have Compact Polarimetric mode, which is a proxy for polarimetric data. While it may be interesting to study the information content of a C-band polarimetric instrument, this type of advanced configuration will not be available on future missions. The emphasis should be put on simpler modes and higher frequency of acquisition. As a final comment, CSA continues to encourage research activities and more specifically those related to interoperability and complementarity; Also, CSA is happy about the definition of a SAR cross-site experiment.

Joost Vandenabeele and Jean-Christophe Schyns presented the PROBA-V mission status and achievements. This mission fills the gap in vegetation sensing between the end of SPOT VGT and the launch of Sentinel-3. It has been in nominal operation since December 2013, and the nominal mission lifetime has been extended until May 2018.

Gérard Dedieu presented the Pléiades, SPOT4/5 Take 5 & Venμs missions. Sharing of Pléiades data has been approved, although the framework to distribute data is not yet in place (expected to be approved in mid December). SPOT5 Take 5 acquired data of 150 sites from April – September 2015. The call for proposals for Venμs sites resulted in 464 suggested sites, much larger than the planned number of 100. A formal decision of the possible increase in the number of sites is expected in early 2016.

4th Session: Collaborative Initiatives across JECAM Sites
Ian Jarvis and Pierre Defourny presented Data sharing: JECAM EO data licences and JECAM in situ data licences. The RADARSAT-2 Multi-User Agreement is in place for sharing the 2015 data collection. A JECAM Open Database Licence for in situ data was proposed, with the rights (to share, create and adapt) and obligations (to attribute, share-alike and keep open) of people using the data. Credit is given to the original source, not to the modifier. The group was asked

whether this type of licence is appropriate for JECAM. Pierre reminded the group about last year's agreements on the minimum data set (MDS) approach, with 25 km x 25 km minimum size of the representative site, with nested 10 km x 10 km for more intensive high resolution data. Sharing this data is key to the MDS approach. Should we share outside the JECAM network? Yves asked if people agree to share the data, and agree to the context for protection. Terry Newby said that in South Africa, there is sensitivity to sharing in-season data, but after the season ends, there is no sensitivity. Yves said that the data should remain within the science domain. Diego said that students need to publish their research results, so they want a delay before the data is shared. It was suggested that there could be an embargo period of perhaps two years, before making the data available for collaboration outside the group. Pierre said that if the data is published too soon, no-one will go to the field, because the cost of field data is very high. But field data is extremely valuable.

Yves expanded the question to ask how to document the data sets? Are there standard protocols or formats to allow sharing? Also, should there be standard algorithms and methodologies? It was pointed out that ShareGeo is an existing initiative of University of Edinburgh that shares geospatial data for agriculture.

Ian said that the JECAM concept led to a compelling research network. There are four steps to this process:
1. Define minimum datasets and evolve standards (done)
2. Sharing within the JECAM community (done)
3. Protect the initiators in a multi-site environment (done)
4. Sites are free to share the data widely if they want, not all data just the minimum datasets. We are not all comfortable with this yet. This is an evolution toward open data and open science.

Pierre Sibiry Traoré said that this same discussion is taking place in the AGMIP community. We might look at the AGMIP protocols for ideas. He said that the remote sensing community usually attracts science donors, not development funders. The STARS project is funded by development funding (which has more dollars), and this allows them to access commercial imagery. We should reach out to development donors to access commercial and high resolution data and also open tools.

Terry said that we need to know how to reliably reference shared datasets in peer-reviewed publications.

Action JECAM-2-1[2]: Pierre Defourny will investigate how other networks are sharing data and what their licences are.
Action JECAM-2-2: Pierre Defourny will benchmark data sharing by publishing JECAM crop/no-crop data in a peer-reviewed journal.
Action JECAM-2-3: Pierre Defourny and Ian Jarvis will document quality controlled JECAM protocols.

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[2] Action items for JECAM meetings will be numbered as JECAM-n-m, where 'n' refers to the number of the meeting and 'm' refers to the mth action item for meeting 'n'. Since this is the second JECAM meeting, n=2 for this meeting.

There was discussion of a fourth action, to discuss development of metadata, perhaps using the Tunisia and Morocco sites, as a good example. It was agreed that this will be dealt with in next year's meeting.

Pierre Defourny presented the JECAM SAR cross sites multi-platform experiment on behalf of himself and Heather McNairn. RADARSAT-2 and Sentinel-1 data were acquired over 7 JECAM sites for crop type identification and LAI monitoring at parcel level. The seven sites were: Argentina, Belgium, Burkina Faso, China Taishan, China Yangzhou, China Yucheng and US. Four strategies were tested:

- Object based
- Pixel based
- Field boundary
- Segmentation.

Ian Jarvis said that a postdoc will be available in Ottawa, and scientists could come to Ottawa for training in SAR.

Diego said that Argentina will continue to participate. He suggests multi-annual experiments with acquisitions on the same dates or nearly the same. The Belgian site will participate with systematic acquisition of crop/no-crop and LAI for maize, winter wheat and potatoes. Agnès said that the Burkina Faso site would like to play, but they need training. Ian said that capacity building is important, so he encouraged new sites to be trained in SAR. Miao Zhang was not sure about the Yangzhou site, but said the Taishan and Yucheng sites want to play next year.

Action JECAM-2-4: Ian Jarvis will contact the USDA to see if they will participate in the SAR cross-site experiment in 2016.

Action JECAM-2-5: Pierre Defourny and Heather McNairn will organize a meeting to plan the 2016 multi-site SAR project.

Olivier Leo asked how consistent the RADARSAT-2 and Sentinel-1 data are for measuring crop type and LAI. Yves replied that we could do single SAR studies, or SAR-SAR comparison studies, or SAR-optical comparison studies. We should also use L, C and X band data in the experiments. Heather has shown that TerraSAR-X is very useful (97% accuracy!)

Pierre said that 10 JECAM sites expressed interest in joining the 2016 SAR experiment. We need to firm up the list of sites soon. Urs Schulthess (working for CIMMYT) is working in India and Bangladesh, and may be interested in joining. Valentine Lebourgeois said that the Madagascar site might be interested too; they have Sentinel-1 acquisitions.

Action JECAM-2-6: Terry Newby will tell the group whether the South African site will join the SAR multi-site experiment.

Ian Jarvis gave an update of the cloud services supporting the 2015 collection of RADARSAT-2 and Sentinel-1. NASA is supporting this work. As stated earlier, Microsoft Canada will host the shared RADARSAT-2 data. There are plans to add the RADARSAT-2 and Sentinel-1 toolboxes,

as well as optical tools (later). Espen Volden reminded the group about the thematic exploitation platforms that Benjamin mentioned. There are also regional exploitation platforms. They want to collaborate and are using an open data sharing approach. They store in situ data as well as EO data.

Action JECAM-2-7: Espen Volden will share information about the thematic exploitation platforms (TEPs).

5th Session: The Way Forward

Alyssa Whitcraft and Ian Jarvis presented the feedback from the GEOGLAM Advisory Committee on 10 November 2015. This committee is an external committee (i.e. not GEOGLAM people); they are high-ranking policy people. The committee said that GEOGLAM's #1 job is coordination of data (EO, meteorological, soils etc). GEOGLAM should claim successful contributions to AMIS, and should seek re-endorsement at the next G20 meeting in 2016 in China. GEOGLAM should expand its focus to food security and should support implementation of the Post-2015 Strategic Development Goals (SDGs). They said that Capacity Development (Component #6 in the Work Plan) is not compelling. There should be more cross-fertilization across GEOGLAM activities, and GEOGLAM needs strategic communication and increased engagement with other organizations. The committee felt that more resources are needed in the GEOGLAM secretariat.

Sven Gilliams presented SIGMA current achievements and plans. SIGMA is part of Component #5 – R&D. It started on 1 November 2013 and runs until 30 March 2017. SIGMA is supporting 11 JECAM sites. The STAC (Spatial Temporal Attribute Catalogue) provides an interface to visualize data. The focus next year is to further develop and populate the STAC database, validation, capacity building and workshops and to increase cross-site experiments.

Sophie Bontemps presented the SEN2AGRI 2016 demonstration phase. The focus in 2014 was algorithm development, in 2015 prototypes of EO products, and in 2016 the focus will be on demonstration and validation. There will be 3 national sites, 5 local sites and some voluntary test sites.

Xavier Blaes presented the GeoODK tool for collecting information about cropland and crop type. This is part of SIGMA. It is available free of charge. The data is available at http://maps.elie.ucl.ac.be/jecam/odk. There was discussion of other tools and techniques for capturing in situ data.

Action JECAM-2-8: Guido Lemoine will identify a portable application for field surveys: the name, what it does and how to get it.

Pierre talked about a review of existing tools that was done by SIGMA about one year ago. Weaknesses were identified. Alterra proposed a data structure for in situ data; it organizes the data for you. Sven reminded us that STAC is very open, and can store a vast amount of data.

There was discussion of a small field cross-site experiment.

Action JECAM-2-9: Tunisia, South Africa, Madagascar, Burkina Faso, Mali, Bangladesh sites will design a small field cross-site experiment.

Action JECAM-2-10: Raul Zurita-Milla will share the STARS protocols as soon as they are published.

There was discussion of the AGMIP-GEOGLAM meeting that took place recently. There is keen interest in linking AGMIP to JECAM. The Argentina, Mali, South Africa and Burkina Faso JECAM sites are working with AGMIP. Argentina is using the WOFOST model and intends to compare the results with remote sensing data. Burkina Faso is using the SARA H model.

Action JECAM-2-11: The Argentina, Mali, South Africa and Burkina Faso JECAM sites will report on AGMIP progress and opportunities to connect at next year's JECAM meeting.

Pierre said that the agrometeorological COP (community of practice) wants to link to the EO COP. The South Africa and Mali sites are using agrometeorological data inputs in their modelling.

There was discussion of synergy between Landsat-8 and Sentinel-2. Pierre suggested that we study the inter-operability of these 2 sensors, so that we can combine the imagery of both in classifications. Yves said that this is addressed by the R&D element of GFOI (Global Forest Observation Initiative).

Action JECAM-2-12: Yves Crevier will report on the GFOI research results of inter-operability studies between Landsat-8 and Sentinel-2.

There was discussion about using UAVs for in situ data, as DEMMIN has done. Raul said that some STARS teams use UAVs. Urs reported on the use of UAVs in Bangladesh. The Mali site also uses them. Some countries have severe restrictions on where UAVs can fly, for safety reasons.

Pierre spoke about the request for Pléiades data. It might be more efficient to have one point of contact, rather than individual JECAM sites requesting data. If anyone would like to act as a representative, please contact Pierre or Ian.

Fernando told about an open call from Copernicus for coordinated collection of LAI, fPAR, fcover from several sites. JECAM could join this consortium as individual sites or as a network.

Pierre Defourny presented a summary of the discussions, including:
- 3 cross site experiments involving 16 JECAM sites
- New agriculture products beyond crop mask and crop type
- JECAM guidelines for biophysical variable in situ data
- JECAM in situ data sharing strategy
- SAR cross-site experiment involving 10 sites (candidates to join in 2016 are Bangladesh, South Africa, India and Madagascar; Heather will lead the LAI work, while UCL will lead the crop type work.)

- Small fields experiment
- SIGMA may help with operational training, to go the 'final mile'.
- JECAM document on field data collection tools (with contributions from SIGMA, JRC, SRI, IACS, …)
- High level strategy document related to resource mobilization or funding procedures.

The next JECAM meeting could be organized around the SIGMA annual meeting.

Ian Jarvis gave closing remarks. He found the meeting incredibly productive. We are achieving the original vision of JECAM. There is incremental, gradual improvement. SEN2AGRI and SIGMA are key funding initiatives, and there will be others.

Everyone was thanked for their participation, especially the organizers. The meeting was closed.

Action Item Summary

No.	Action
JECAM-2-1	Pierre Defourny will investigate how other networks are sharing data and what their licences are.
JECAM-2-2	Pierre Defourny will benchmark data sharing by publishing JECAM crop/no-crop data in a peer-reviewed journal.
JECAM-2-3	Pierre Defourny and Ian Jarvis will document quality controlled JECAM protocols.
JECAM-2-4	Ian Jarvis will contact the USDA to see if they will participate in the SAR cross-site experiment in 2016.
JECAM-2-5	Pierre Defourny and Heather McNairn will organize a meeting to plan the 2016 multi-site SAR project.
JECAM-2-6	Terry Newby will tell the group whether the South African site will join the SAR multi-site experiment.
JECAM-2-7	Espen Volden will share information about the thematic exploitation platforms (TEPs).
JECAM-2-8	Guido Lemoine will identify a portable application for field surveys: the name, what it does and how to get it.
JECAM-2-9	Tunisia, South Africa, Madagascar, Burkina Faso, Mali, Bangladesh sites will design a small field cross-site experiment.
JECAM-2-10	Raul Zurita-Milla will share the STARS protocols as soon as they are published.
JECAM-2-11	The Argentina, Mali, South Africa and Burkina Faso JECAM sites will report on AGMIP progress and opportunities to connect at next year's JECAM meeting.
JECAM-2-12	Yves Crevier will report on the GFOI research results of inter-operability studies between Landsat-8 and Sentinel-2.

Appendix A - Meeting Participants

Agnès Bégué	CIRAD (France)
Aline Léonard	UCLouvain – Geomatics (Belgium)
Alyssa Whitcraft	UMD/ GEOGLAM (USA)
Andreja Svab Lenarcic	SPACE-SI (Slovenia)
Andrii Selestov	Space Research Institute of the National Academy of Science, State Space Agency (Ukraine)
Antonio de Gregorio	FAO
Benjamin Koetz	ESA
Bernard Mougenot	CESBIO (France)
Bernd Fichtelmann	DLR (Germany)
Cheng-Ru Chen	Center for Space and Remote Sensing Research, National Central University (Taiwan)
Cindy Delloye	UCLouvain – Geomatics (Belgium)
Damien Jacques	UCLouvain – Geomatics (Belgium)
David Morin	CESBIO (France)
Diego de Abelleyra	INTA (Argentina)
Don Ball	JECAM / DB Geoservices Inc (Canada)
Espen Volden	ESA
Fabrizio Ramoino	ESA
Fernando Camacho	EOLAB (Spain)
François Waldner	UCLouvain – Geomatics (Belgium)
Gérard Dedieu	CESBIO (France)
Gilles Ollier	European Commission
Guido Lemoine	EC-JRC
Guillaume Chomé	UCLouvain – Geomatics (Belgium)
Henrik Boogord	Alterre (NL)
Ian Jarvis	Agriculture and Agri-Food Canada (Canada)
Jacques Delincé	FAO
Jan Kolomaznik	Gisat (Czech Republic)
Jean-Christophe Schyns	BELSPO (Belgium)
Jinlong Fan	National Satellite Meteorological Center (China)
Jonathan van Meerbeck	European Commission
Joost Vandenabeele	BELSPO (Belgium)
Joost Wellens	ULg (Belgium)
Lorenzo de Simone	FAO
Marcela Arias	CESBIO (France)
Miao Zhang	Institute of Remote Sensing and Digital Earth, CAS (China)
Michel Deshayes	GEO – GEOGLAM
Michel Massart	European Commission
Mykola Lavreniuk	Space Research Institute of the National Academy of Science (Ukraine)
Nataliia Kussul	Space Research Institute of the National Academy of Science (Ukraine)

Nguyen-Thanh Son	Center for Space and Remote Sensing Research, National Central University (Taiwan)
Nicolas Bellemans	UCLouvain – Geomatics (Belgium)
Nora Khojali	Ministry of Agriculture and Forests (Sudan)
Olivier Leo	EC-JRC
Pierre C. Sibiry Traoré	ICRISAT (Mali)
Pierre Defourny	UCLouvain – Geomatics (Belgium)
Raul Zurita-Milla	Faculty ITC/University of Twente (Netherlands)
Rob Verhoeven	SarVision (Netherlands)
Santiago Verón	INTA (Argentina)
Serigne Faye	University Cheikh Anta Diop (Senegal)
Sophie Bontemps	UCLouvain – Geomatics (Belgium)
Sven Gilliams	VITO (Belgium)
Terence Newby	Agricultural Research Council (South Africa)
Urs Schulthess	CIMMYT (Mexico)
Valentine Lebourgeois	CIRAD (France)
Xavier Blaes	UCLouvain – Geomatics (Belgium)
Yannick Curnel	CRA-W (Belgium)
Yves Crevier	Canadian Space Agency (Canada)