JECAM (Joint Experiment for Crop Assessment and Monitoring)
Science Meeting
Meeting Summary and Action Items[1]
Kyiv, Ukraine
11 – 12 October 2015

Tuesday, 11 October 2016

Welcome Address
Ian Jarvis opened the meeting and Nataliia Kussul welcomed the participants. The participants introduced themselves around the table.

Meeting Objectives
Pierre Defourny welcomed the participants. Pierre reviewed the JECAM goals, documented at www.jecam.org. The meeting objectives are:
- Report from each site on results and EO data acquired
- Highlight benefits and opportunities of the JECAM network including the cross-site experiments
- Initiate a process to update GEOGLAM EO and in situ data needs
- Capitalize on JECAM achievements to identify the way forward.

JECAM is providing R&D support to GEOGLAM. We have a few guidelines about minimum data sets and in situ field data collection. We also share an open source licence for data sharing. The landscape of EO is changing in ways such as:
- Sentinel fleet is now operational
- Cloud computing facilities
- Drones (UAV) are changing the way we work
- Mobile devices.

With Sen2Agri and SIGMA ending next year, we need to identify the way forward.

JECAM Network Update and Report from GEOGLAM Advisory Committee Meeting
Ian Jarvis said that he would not give a report from the GEOGLAM Advisory Committee meeting, but he dealt with the strategic issues that were brought forward to the Advisory Committee meetings, and progress that has been made on these fronts. These strategic issues are:
- Enhancing Technology Transfer
- Inter-comparison projects and strategic partnerships
- Enhanced R&D networks for food insecure nations.

Ian said that we need to address small holder farms and food insecure areas. The European Horizon 2020 call focuses on agriculture and livestock monitoring in Africa. We want to link this network to that activity.

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[1]The presentations for this meeting can be found at http://www.jecam.org/. Follow links to the 2016 Science Meeting presentations. This meeting summary does not intend to duplicate the presentations.

We need the JECAM outcomes to really work for the GEOGLAM system of systems. We want to engage the commercial sector more. Ukraine is a star in terms of the research to operations continuum at various scales.

GEOGLAM: Status and Achievements
Michel Deshayes summarized GEOGLAM background and progress. In June 2016, GEOGLAM was re-endorsed by GEO. At the same meeting, GEOGLAM became a member of the AMIS secretariat in Rome. Michel reviewed progress in GEOGLAM components #1 (Global Agricultural Monitoring) and #3 (Countries at Risk). The Early Warning Crop Monitor (EWCM) reported the drought in southern Africa (the most severe in 50 years). Ultimately, 83 countries will be covered by the EWCM. GEOGLAM global crop monitoring covers about 94% of the world's agricultural area.

Inbal Becker-Reshef reviewed the GEOGLAM Crop Monitor progress. The Crop Monitor was launched in 2013, and is published in the AMIS Market Monitor. The EWCM was launched in 2016 and has informed decisions already in South Africa. Some countries are interested in a national Crop Monitor. Tanzania launched one in 2016, and discussions are underway with South Africa, Brazil and Ukraine. This work is facilitating the research to operations transition. There is a need to validate and scale up the JECAM results to national scales. Michel added that the crop monitoring contributes to information symmetry, and this in turn helps the markets to function better. Inbal said that the EU has asked GEOGLAM to report on yield and area. However, they cannot force a single national system on every nation. GEOGLAM spends a lot of time on the discrepancies and what data stands behind the reports. They ask what is the evidence base of the reports. Ian said that user pull is increasing, and this is directing the research work.

Chris Justice said that we need national scale reports next, and we should know the accuracy assessment. JECAM should move toward accuracy assessment and best practices. Chris also provided a presentation which summarizes the GEOGLAM Initiative.

Michel pointed out that in some developing countries, the quality of statistics has decreased. Small fields and many crops bring big challenges. Pierre said that even countries like South Africa with a good system in place are looking for high quality at lower cost.

2016 Highlights from JECAM Sites

Several site representatives introduced their sites prior to the poster session, where attendees could meet each site rep. The site reps were:

Burkina Faso – Raffaele Gaetano	Madagascar – Valentine Lebourgeois
Tunisia & Morocco– Gérard Dedieu	Senegal – Agnès Bégué (on behalf of Valérie Soti)
Mali – Pierre Sibiry Traoré	Brazil Tocantins – Beatriz Bellón
Brazil Sao Paolo – Margareth Simoes	Argentina – Diego de Abelleyra & Santiago Verón
Germany (proposed DEMMIN site) – Daniel Spengler (see GLAM.DE)	
Ukraine – Nataliia Kussul	Belgium – Xavier Blaes
France OSR – Eric Ceschia	Bangladesh – Urs Schultess
Canada (South Nation, CFIA & Red River) – Andrew Davidson	

Pierre Defourny made a number of observations of the JECAM site results:

- Over half of the sites are using SAR. Argentina is using SAR at 3 wavelengths (L, C & X band).
- Another observation is that some sites are using many variables (300) with high temporal resolution (dense time series).
- GEOGLAM is asking for yield information and several sites are addressing yield.
- More and more sites are measuring soil moisture.
- A few sites are involved in the STARS project (funded by GATES Foundation). Some are also involved in Sen2Agri as a pilot.

1st Session: Multi-site Experiments: Updates and Discussion

Nicolas Bellemans presented Sen2Agri Demonstration over Multiple Sites. During the Demonstration Phase, they have 3 national sites: Ukraine, South Africa and Mali, of which Ukraine is the most advanced, with an already complete suite of products at national scale and in real time production.

Xavier Blaes and Urs Schultess presented the STARS Smallholder Farming Experiment using VHR Time Series. The sites are in Mali and Bangladesh. Others are welcome. They showed a methodology for producing crop type maps for small fields with 75% overall accuracy using pixel-based classification. They have no plans to use SAR. Planet Labs has an Ambassador Program which might be interesting.

Valentine Lebourgeois presented an internal CIRAD project which compared several smallholder sites. Others are welcome to join. They used an object-based approach. Raffaele Gaetano said that CESBIO wants to integrate pixel-based and object-based approaches. Pierre said that we need to coordinate to ensure that we are using the same validation process. The JECAM Field Data Collection Guidelines include validation. We need to solve this as a community.

Sven Gilliams presented the SIGMA Cross-site Experiments. The tools they used are VEGA (developed by Russian partners) and AGRO-STAC. He showed the SIGMA Geoportal (http://sigma.geoportal.vgt.vito.be/). As SIGMA funding winds down, the Russian partners will maintain VEGA-GEOGLAM (a web-based system for analysis of agricultural monitoring) with Russian government funding. Hendrik Boogaard described the AGRO-STAC Initiative. The need arises because in-situ data is heterogeneous, and in order to facilitate retrieval, exchange and use of data, the data need to be checked, converted to common formats, units etc, then processed, stored and maintained in a consistent, transparent and unambiguous manner.

François Waldner presented the Effect of Sampling Schemes on Cropland Classification Accuracy. Collecting data from the roadside has a bias, and we want unbiased data. He described a case study in Russia based on a preliminary protocol. He compared the results of several sampling strategies (including along roads).

Diego de Abelleyra and Santiago Verón presented a proposal for a comparison of data sources for calibration of large scale cropland mapping with in-situ, crowd- and landcover-derived products. The goals of this experiment are to:

      1) assess the accuracy of crowd and landcover data in both direct and indirect ways over various JECAM sites;

      2) check the accuracy of cropland maps derived by locally adapted mapping methods adopted by site partners while using crowd-source and landcover-derived data and performing over larger areas.

The crowd-source generation could use VEGA or Geowiki tools. They are working with Dmitri Plotnikov and Miao Zhang. Other JECAM partners are invited to join the experiment.

Andrew Davidson presented the JECAM SAR Cross-site Experiment. The presentation focused on RADARSAT-2 acquisitions. The comment was made that Sentinel-1 needs to be more prominent in the experiment. Sentinel-1A & 1B now provide 24 day repeat globally since 1 October 2016. Benjamin Koetz said that beginning next year, the goal is 12 day repeat globally. This change is related to the completion of commissioning of Sentinel-1B and the ESA relay satellite starting soon.

Thuy Le Toan spoke about experiments in the region of Toulouse. A time series of SAR data achieved nearly 90% accuracy in crop classification. She said that NDVI from SAR may be good for several crops except sunflowers. We need to think of new ways to exploit the data.

2nd Session: Revisiting the EO Data Needs for a Global System of Systems

Alyssa Whitcraft gave a presentation entitled: GEOGLAM's Earth Observation Requirements, R&D Outcomes to Operational Requirements and Guidance. She traced the development of EO Data Requirements from the early days of JECAM + GEOGLAM, but said that it is time to update the requirements. (Prior to the meeting, she had asked the sites to fill in a data requirements spreadsheet, and she analysed several replies before the meeting. She welcomes input from any JECAM sites that have not yet filled in the spreadsheet.) The summary spreadsheet with the input that Alyssa has already received can be found on JECAM.org.

Alyssa asked some questions for discussion during her presentation. The first was about the variables in the Excel spreadsheet. It was noted that fapar is missing. The methods and guidance document will clarify this. We are working on R&D with the goal to transition to operations. Soil moisture is of strong interest (using both passive and active microwave). Benjamin mentioned evapotranspiration and land surface temperature. Pierre said that we need atmospherically corrected surface reflectance with cloud screen. Ian paraphrased this as analysis-ready data. Alyssa said that CEOS is working to define analysis-ready data for land, so that pre-processing will be done to a certain level for analysis-ready state.

Chris Justice mentioned the work taking place at CEOS on Land Product Validation (cal/val). The Atmospheric Correction Inter-comparison Exercise (ACIX) is taking place at CEOS. Some connection should be made with our community.

Ian suggested that accurate methods for harvest monitoring and tracking should be added to phenology. Crop nitrogen should be added. Agnès Bégué suggested adding cropping practices (e.g. how many crops/ year, rainfed or irrigated, etc). Other suggested additions were:

- Tillage, residue, tillage orientation and timing, water management, multiple cropping
- Carbon cycle considerations, and linking our network with the ICOS network in Europe and NEON in U.S.
- Flooding status and duration is important for the rice crop, and linking it to methane or nitrous oxide.
- Applying emission factors to estimate global GHG emissions from the agriculture sector.
- Pest and disease monitoring and forecasting.

Thuy said that food security needs to link to the carbon budget and the water budget. Ian suggested that we ask CEOS to link to other communities (e.g. forestry and others). Alyssa sits on the Land Surface Imaging Virtual Constellation group of CEOS.

Alyssa's second question related to research questions that need to be addressed in order to refine the requirements, specifically where the knowledge gaps are. Pierre said that the SAR time series availability is new and we need to learn how to use it. High resolution optical is also becoming available. How do we move to a future having high resolution and high frequency data, including infrastructure (data cube, processing tools, etc)?

The second page of questions asked whether replacing simple field size breakdown with 'cropping system' would be enough of an improvement to counter-balance the added complexity. It was felt that 'cropping system' is too complex for now. Michel thought that there is work to do in stratification in homogeneous landscapes (e.g plains). Regarding the different requirements from similar and dissimilar sites, Ian suggested that cross-site experiments help. However, there will always be outside-the-box research questions that fall outside the community norm, and are still important to do. The transition from research to operations is where we stabilize the requirements. Yves linked this to the capacity of sites to assimilate different types of data.

The third page of questions asked about 'Methods and Guidance' documentation. Yves pointed out that GFOI has developed a Methods and Guidance document. It helps with the transfer from research to operations. Ian said that we have already started to develop sampling strategies and this is important. Pierre asked if our current documents should go to a different level. FAO has a document on developing agriculture statistics. Shall we keep guidelines for common terminology, or should we be more prescriptive? Sen2Agri developed a prescriptive document. Inbal pointed out that the goal is to develop national scale statistics. At what point do the JECAM sites diverge their approaches because of different cropping systems? This is evolving country by country. What about countries without capacity? Chris thought that there are 3 steps in the process:

1. Going from the local JECAM site level to provincial/oblast level
2. R&D to operations
3. Going to national level.

Pierre said that we developed best practices which were applicable in Mali. The techniques can be applied in diverse sites. Scaling up to national scale is a different process. We need to capitalize on SIGMA and Sen2Agri to apply the techniques in different countries. Yves said that

a Methods & Guidance Document is important; any country should be able to follow the procedures in it. Ian said that we need a client demanding national level information; GEOGLAM can help with the transition.

Wednesday, 12 October 2016

3rd Session: CEOS Support and Joint Proposals for Agricultural Monitoring
Ian Jarvis spoke about EO Data and In-situ Data Licences. He recalled that Andy Davidson proposed two actions:
- Form the international working group
- Inventory available SAR, in-situ and ancillary data for 2015 and 2016.

We have been able to share RADARSAT-2 between collaborators for two years. Sentinel-1 data is open of course.

Worldview data is available for some sites free, but only 1 or 2 images /year/ site. Data is being acquired. The issue is that a multi-user agreement must be signed, but we need a collective agreement, not separate agreements. We have no entity that can sign on behalf of all the sites. This will be an issue for all commercial data providers. Alyssa Whitcraft is leading this activity.

Yves Crevier suggested that the space agencies should try to influence CNES to participate more actively in this group. We need a better strategy to attract commercial data providers. Their contribution should be seen not as a gift or charity but as an investment with a Return on Investment. What usually scares them is if there is no goals or end points. If there is a thorough Science Plan, it may attract them. A few years ago, he wrote a proposal to host a joint meeting of the agricultural and forest communities with the commercial data providers. Yves needs support to make this happen. Such a meeting was held in Ottawa early in Ottawa and it was successful. If we hold another such meeting, we should invite both traditional and emerging commercial data providers.

Action JECAM-3-1[2]: Ian Jarvis and Pierre Defourny will draft a letter to request support of CSA for a meeting with the two communities (agriculture and forestry) and the commercial data providers.

Chris Justice suggested that we should work to think of best practices at the operational level, and show that the need for data will be sustained. Ian said that the work plans would come from the break-out groups. Yves requested help to organize the meeting with the commercial data providers.

Chris pointed out that slides 15 and 16 of Alyssa's presentation describe a tool for requesting data, both public and private.

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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 third JECAM meeting, n=3 for this meeting.

Gérard Dedieu said that CNES proposes to acquire 20,000 km^2 of Pléiades data. They have a list of interested sites. The selection of which sites will get data will be done very soon. Either archive data or newly tasked data can be requested. Stephen Hosford sent a list of existing CNES images of JECAM sites to Alyssa.

Benjamin Koetz gave an update of the Sentinel- 1, 2 & 3 mission status. Sentinel-1A & 1B will provide global land coverage every 12 days, and Europe every 6 days. Full capacity will require the European Data Relay Satellite, EDRS-A and EDRS-C (launch of the latter in 2017). Sentinel-2 and Landsat-8 have been inter-calibrated since before launch. There is an atmospheric inter-comparison product. Level 2A products will be implemented in the ground stations. You can request Level 2A atmospheric correction and it will be done for you.

At this point, the side working groups met separately. The three side working groups were:
1. SAR inter-comparison
2. In situ sampling
3. Smallholder farming.

Notes from the SAR Inter-Comparison Working Group

Andrew Davidson opened the SAR Inter-comparison Working Group meeting. The interests of the group for cross-site experiments included crop mapping, biophysical parameters, phenology (particularly in timing of certain events), crop masking. The low hanging fruit could be a multi-year multi-site comparison using single frequency SAR, crops TBD.

Thuy Le Toan spoke about a multi-site experiment including France, Italy, Spain and a new site in Poland. They propose to include either Morocco and Tunisia or Vietnam and South Africa. They plan initially a time series with the goal to do crop mask and crop classification. They would start with C-band and would like to add L and X-band later. They plan to use interferometry but not polarimetry. Thuy also talked about Asia Rice, which has 10 sites in Asia. They used RADARSAT-2, Sentinel-1, a little TerraSAR-X, some CSK and PALSAR data. Some sites are moving to operations. There is national scale mapping in Thailand, Cambodia and Vietnam. She said the big problem is not data, but capacity. Training and capacity building is needed.

Diego said that in Argentina, they use multi-wavelength (L, C, X) for biomass and soil moisture. But they could not get an overlap of the 3 missions at the same time. They will have access to SAOCOM data when it is launched.

Guido Lemoine said that in Europe, they can get 1 − 2 day repeats with Sentinel-1, and this can be used to see phenology changes. This gives better results than LAI. They plan to do blind classification experiments; this may add to the thrust of SAR.

Pierre spoke about the Belgium site. They would like analysis-ready SAR data (ARD). Yves said that CEOS is addressing ARD. It is difficult to define ARD for SAR. (It is much easier for optical data.) ESA is opposed to it. Pierre suggested that this community could define ARD for crop mapping.

Action JECAM-3-2: Yves Crevier will circulate definitions of analysis-ready data.

There was discussion of how to get partners to take the same measurement approach. Diego suggested that an agreement is needed for partners to take the same measurements.

Last year, Agriculture and Agri-Food Canada proposed the following themes for the SAR cross-site experiments:
1. Crop mask and mapping
2. LAI and biomass (biophysical parameters).

There was discussion of the next steps.

Action JECAM-3-3: Andrew Davidson will summarize the SAR Cross-site Experiment WG discussion and hold a teleconference to agree on the next steps.

Thuy said that rice research has been done in Africa, Europe, US as well as Asia.

Action JECAM-3-4: Thuy Le Toan will do an inventory of techniques and data used for rice research.

Action JECAM-3-5: Raffaele Gaetano will do a survey of types of data and the pre-processing used for each, in order to arrive at the best method.

A concept paper with expected results and work plan could be the basis for a funding proposal.

Notes from the In-situ Data Working Group

Hendrik Boogaard reported on the In-situ Working Group. They discussed what kind of data should be collected – biomass, crop type, etc, and the definitions of each. Also how to measure Green Area Index. They want to share guidelines and definitions to improve standardization. There was discussion of flux towers, also the use of the BBCH Scale for phenology.

Regarding data policy, open licencing is good but there are some issues around publishing papers and sharing the data described in the paper.

Notes from the Small Field Experiments Working Group

Xavier Blaes presented the discussion of the Small Field Experiment Working Group. There are two experiments with different protocols, because they are answering different questions. One experiment is being led by CIRAD, involving Kenya, Madagascar, Burkina Faso and possibly Mali and Bangladesh. The other experiment is the one that Xavier reported on yesterday, with a very dense data set.

The definition of a small field is in question: in Africa, 1 ha is large. New questions to research include cropland classification, analysis of the fertilizer gap and the intensity of the cropping system.

Digital Globe data was discussed. The archive is open. Access to new data is limited because we need a single person to sign the licence on behalf of all sites.

Yves Crevier noted that it is important to maintain the momentum of all the working groups.

4th Session: The Way Forward

Pierre Defourny presented a summary of the discussions. It is very important for the working group leaders to maintain the momentum.

We could use a common data model. This would simplify the cross-site experiments. Alyssa provided a tool for data access, and sites should try it out.

All JECAM sites are asked to respond to Alyssa's spreadsheet about requirements. (Some have already done so, but many have not.) When you reply to Alyssa, please comment on the GEOGLAM data request tool; is it relevant to you or not?

We are nearing the end of the SIGMA, Sen2Agri and STARS projects. We need a compendium document to summarize what we learned from these projects. Are there any volunteers to put together this document? GEOGLAM felt that it would be useful. Our mandate is the migration of R&D to operations.

Olivier Leo offered to support this document. Should this document have case studies, or a cookbook, or practical examples? Part of the bottleneck is handling large volumes of data. GFOI could be a useful model.

Chris Justice said that the GOFC-GOLD Source Book contains wisdom and best practices. Perhaps we could build something similar. It could be a global strategy, a new processing approach. Maybe SIGMA could take this as a deliverable. We need an editor.

There was discussion of how to endorse recommendations for protocols and best practices. We wrote two previous documents, but there was no formal endorsement. When no further comments were received, they were considered endorsed. Yves Crevier said that the authors who contribute endorse the documents. We do not want the documents to be prescriptive; rather they should be guidance. Ian Jarvis said that the documents are living documents which will evolve with time. Pierre asked whether the SIGMA documents should be put on the JECAM web site. Yves suggested that each document should have a list of authors, and would be branded as a JECAM document. Pierre added that we might have a list of authors and also a list of users for each document. It was agreed that each document will contain the list of JECAM site managers. If you object, we will remove your name. We will include SIGMA documents (data model and FAO cropland) on the JECAM web site, with the SIGMA site leader names.

The question of how to improve the JECAM network was discussed. It was suggested that we could write an annual report of EO and in-situ data. Ian pointed out that this is already in the

current annual report, although it might be improved. Yves suggested that we better formalize the sub working groups, with goals, schedules and reporting. Ian did not see the need for more formalization than we have at present. Yves said that we want to move to best practices, and to coordinate key thematic elements. If there is no priority, nothing happens. Pierre said that we want things to happen, but with the least possible structure. We could formalize the leadership of the cross-site experiments, and the leaders could report on progress.

François Waldner offered to lead on sampling impact on in-situ data. Andrew Davidson will lead the SAR cross-site experiment, subject to SIGMA discussions. Diego de Abelleyra & Santiago Verón will co-lead the inter-comparison of data sources for cropland classification. Hendrik Boogaard will lead open source data sources. Xavier Blaes and Valentine Lebourgeois will co-lead the small field experiments. Thuy Le Toan will lead on SAR for the rice crop.

There was discussion of the relationship between JECAM and other agricultural networks, such as AgMIP, ALTAR and Agri-STAC.

Next year, Sen2Agri, STARS and SIGMA will be complete. It will be the first year with H2020 funds. There was discussion of how next year's meeting will be different. Possible venues are Toulouse, Montpelier (CIRAD), JRC, FAO and Canada.

Ian Jarvis gave closing remarks. He said it was another successful meeting. These 2 days have been the best days of JECAM meetings. We are getting more feedback from GEOGLAM on their needs and we are maturing. He gave a gift to the hosts as a token of our appreciation.

Everyone was thanked for their participation. The meeting was closed.

Action Item Summary

No.	Action
JECAM-3-1	Ian Jarvis and Pierre Defourny will draft a letter to request support of CSA for a meeting with the two communities (agriculture and forestry) and the commercial data providers.
JECAM-3-2	Yves Crevier will circulate definitions of analysis-ready data.
JECAM-3-3	Andrew Davidson will summarize the SAR Cross-site Experiment WG discussion and hold a teleconference to agree on the next steps.
JECAM-3-4	Thuy Le Toan will do an inventory of techniques and data used for rice research.
JECAM-3-5	Raffaele Gaetano will do a survey of types of data and the pre-processing used for each, in order to arrive at the best method.

Appendix A - Meeting Participants

Agnès Bégué	CIRAD (France)
Allard de Wit	WUR-Alterra (NL)
Andrew Davidson	Agriculture and Agri-Food Canada (Canada)
Andrii Selestov	Space Research Institute of the National Academy of Science, State Space Agency (Ukraine)
Beatriz Bellon	CIRAD (France)
Benjamin Koetz	ESA
Chris Justice	UMD (US)
Danny Lo Seen	CIRAD (France)
Daniel Spengler	GFZ Potsdam (Germany)
Diego de Abelleyra	INTA (Argentina)
Don Ball	DB Geoservices Inc (Canada)
Eric Ceschia	CESBIO (France)
Erwin Goor	Vito (Belgium)
Fernando Camacho	EOLAB (Spain)
François Waldner	UCLouvain – Geomatics (Belgium)
Gérard Dedieu	CESBIO/CNES (France)
Guido Lemoine	EC-JRC
Hendrik Boogaard	WUR-Alterra (NL)
Ian Jarvis	Agriculture and Agri-Food Canada (Canada)
Inbal Becker-Reshef	GEOGLAM Secretariat/UMD
Joop Kroes	Wageningen Environmental Research (NL)
Kristof van Tricht	Vito (Belgium)
Margareth Simoes	Embrapa (Brazil)
Michel Deshayes	GEOGLAM Secretariat
Nataliia Kussul	Space Research Institute of the National Academy of Science (Ukraine)
Nicolas Bellemans	UCLouvain – Geomatics (Belgium)
Olivier Leo	EC-JRC
Patrick Knoefel	University of Wuerzburg (Germany)
Pierre Sibiry Traoré	ICRISAT (Mali)
Pierre Defourny	UCLouvain – Geomatics (Belgium)
Raffaele Gaetano	CIRAD (France)
Roel van Hoolst	Vito (Belgium)
Sander Mucher	Wageningen Environmental Research (NL)
Santiago Verón	INTA (Argentina)
Sergii Skakun	UMD (US)
Silvia Valero	CESBIO (France)
Sven Gilliams	VITO (Belgium)
Thuy Le Toan	CESBIO (France)
Tiphaine Tallec	CESBIO (France)
Urs Schulthess	CIMMYT (Mexico)
Valentine Lebourgeois	CIRAD (France)

Xavier Blaes   UCLouvain – Geomatics (Belgium)
Yves Crevier   Canadian Space Agency (Canada)