ISSI WORKSHOP on

Space-Based Measurement of Forest Properties for Carbon Cycle Research

6-10 November 2017

MONDAY 6 NOVEMBER 2017

12:30-13:15	Registration	**All participants**
13:15-13:30	Welcome & Introduction to ISSI	**A. Cazenave (ISSI)**
13:30-13:45	Introduction & Objectives of the Workshop	**T. le Toan**
Session 1	**Science Questions and Societal Challenges - What forest information is needed, where do we need it and how can we use it?**	***Chair: M. Williams and G. Hurtt***
13:45-14:15	The role of forest biomass in the earth system, related societal challenges and how spaceborne missions will respond to them.	**S. Quegan**
14:15-14:45	Can we infer forest dynamics from space-based observing systems taking into account accuracy, mission lifetimes and revisit characteristics?	**A. Huth**
14:45-15:15	How does forest structure relate to other key biophysical data, such as SIF, fAPAR or NPP, and more generally how can it be assimilated or used in a forest information system?	**D. Schimel**
15:15- 15-45	How will observations of forest structure improve C cycle and C flux estimates?	**M. Reichstein**
15:45-16:15	*Coffee break*	
16:15-16:45	Can information about biodiversity be inferred from space based observations of forest structure and dynamics?	**S. Goetz**
16:45-17:15	What steps must be taken to embed forest monitoring missions in policy?	**M. Herold**
17:15-18:00	**Plenary Discussion,** Seed Questions: 1. What are the driving research questions and societal challenges in carbon cycle science? 2. How can the spaceborne missions respond to these questions and challenges taking into account time/space sampling and observation uncertainties 3. What do the missions need to consider, in order to match their data to applications? 4. What information is needed and what are the associated requirements on products? 5. What long term actions are needed to support data uptake and to prepare the relevant communities?	**All participants**
18:00	*Welcome reception*	

ISSI WORKSHOP on

Space-Based Measurement of Forest Properties for Carbon Cycle Research

6-10 November 2017

TUESDAY 7 NOVEMBER 2017

Session 2	**Overview of Future Mission Concepts, their science objectives and latest status**	***Chair: T. Le Toan***
09:00-09:15	The Biomass Mission: Science objectives and latest status	**K. Scipal**
09:15-09:30	The GEDI Mission: Science objectives and latest status	**R. Dubayah**
09:30-09:45	The NISAR Mission: Science objectives and latest status	**P. Siqueira**
09:45-10:00	The Tandem-L Mission: Science objectives and latest status	**I. Hajnsek**
10:00-10:15	JAXA's Future Mission Plans for Forest & Carbon (incl. MOLI and ALOS)	**A. Rosenqvist**
10:15-10:30	Combined Q/A on Missions	
10:30-11:00	*Coffee break*	
Session 3	**Challenges of retrieving forest structure parameters from space-borne missions data**	***Chair: L. Ulander, I. Hajnsek***
11:00-11:20	Science challenges of retrieving forest height and biomass from full waveform lidar	**J. Armston**
11:20-11:40	Science challenges of retrieving forest height from SAR	**K. Papathanassiou**
11:40-12:00	Science challenges of retrieving biomass from SAR	**S. Saatchi**
12:00-12:20	Lessons learned from a global retrieval of biomass from EO data	**M. Santoro**
12:20-13:50	*Lunch*	
Session 4	**What did we learn from campaign data about the mission challenges and what needs to be done to address them?**	***Chair: L. Fatoyinbo, S. Tebaldini***
13:50-14:00	What campaigns took place, which questions did they address and what is the particular relevance of AfriSAR?	**L. Fatoyinbo**
14:00-14:20	Full waveform Lidar potential synergy with SAR: the GEDI strategy to merge Lidar and SAR.	**R. Dubayah**
14:20-14:40	What can we learn about vertical forest structure from TomoSAR at L- and P-band and how does it compare to full waveform lidar profiles?	**M. Pardini**

14:40-15:00	Forest height from PolInSAR and TomoSAR at L-band: sensitivity to different biomes and environmental factors and potential synergies with Lidar data	**M. Lavalle**
15:00-15:30	*Coffee break*	
15:30-15:50	Biomass from SAR data at L- and P-band: sensitivity to different biomes and how spatial variability impacts model training.	**L. Villard**
15:50-16:10	TowerScat: what did we learn about environmental variability at P- and L-band ad what are the consequences for the radar missions?	**L. Ulander**
16:10-16:30	On the use of Biomass Tomography for enhanced forest parameter retrieval: current status and future developments.	**S. Tebaldin**
16:30-18:00	**Plenary Discussion** Seed questions TBD: 1. How can GEDI, Biomass, NISAR and Tandem-L missions work together to produce an optimal set of products? 2. How can Lidar be used to infer structural information relevant for SAR missions and vice versa. 3. How can SAR missions be used to extrapolate sparse lidar sampling. 4. How can we build on the AfriSAR experience (and other campaigns) to bring this about? 5. What are the priorities for future analysis? What types of analysis do we need to better understand synergies? 6. What are priorities for future campaigns?	**All participants**

WEDNESDAY 8 NOVEMBER 2017

Session 5	**Training and Validation - challenges, data requirements, innovative measurement concepts and actions towards a joint validation plan.**	***Chair: L. Duncanson, M. Disney***
09:00-09:15	The CEOS perspective – a communal approach for cal/val and the newly formed LPV biomass cal/val group	**L. Duncanson**
09:15-09:30	The GEDI cal/val plan.	**J. Armston**
09:30-09:45	The NISAR cal/val plan	**S. Saatchi**
09:45-10:00	The Tandem-L cal/val plan	**I. Hajnsek**

10:00-10:20	Biomass and forest height cal/val. What are the challenges in the tropics and what changes are needed to current research networks?	**J. Chave**
10:20-10:40	Global networks: what data are available and what are the future perspectives to provide data?	**O. Phillips**
10:40-11:10	*Coffee break*	
11:10-11:30	Upscaling forest biomass estimates from local to regional scales	**M. Réjou-Méchain**
11:30-11:50	What can we learn from TLS measurements and how can TLS data be exploited by the missions? Recent findings from the AfriSAR sites.	**M. Disney**
11:50-12:10	Drone lidar as an alternative to airborne lidar.	**J. Kellner**
12:10-12:30	Forest allometry – best practices for global missions	**G. Domke**
12:30-14:00	*Lunch*	
14:00-15:30	**Plenary Discussion Cal/Val** proposed seed questions: 1. How to validate the EO products so users will trust them? 2. What is the cost of cal/val plots and who pays? What is the future perspective to provide this urgently needed data. 3. How do we deal with small plots (< 1ha)? 4. How to validate 1 km estimates of biomass in complex ecosystems? 5. What steps are needed to guarantee long term access to data from cal/val sites? 6. Can we agree on a set of supersites (how many, where, what should be measured) used for cross-mission validation? 7. Do we need to create a Joint Science Definition Team for Cal/Val (or can we do it within CEOS LPV)?	**All participants**
Session 6	**Data access, sharing and interoperability platforms**	***Chair: K. Scipal***
15:30-15:50	The Biomass Test Bed – A joint exploitation tool for campaign data and the BRIX experiment.	**C. Albinet**
15:50-16:10	How to access forest plot data from FOS and future plans to make it a cross-mission cal/val tool.	**D. Schepaschenko**
16:10-16:40	*Coffee break*	
16:40-17:00	Status and future plans of a joint ESA-NASA Mission Exploitation Platform.	**C. Albinet**

17:00-18:00	**Plenary Discussion on Joint Exploitation Tools/Platforms** Proposed seed questions: 1. What steps are needed to make FOS a cross-mission cal/val tool? 2. Shall we start a retrieval inter-comparison experiment (BRIX-II) using SAR and Lidar data and how shall it look like. 3. What actions need to be taken to make tools available across missions? What are these tools.	**All participants**
19:00	*Apero & Diner at the Tramdepot Restaurant*	

ISSI WORKSHOP on

Space-Based Measurement of Forest Properties for Carbon Cycle Research

6-10 November 2017

THURSDAY 9 NOVEMBER 2017

Session 7	**Data Assimilation, Statistical Frameworks and Error Propagation**	***Chair: S. Quegan, A Huth***
9:00-9:30	Statistical framework using 2-phase / 3-phase sampling and propagation of errors and the GEDI example for error propagation	**E. Naesset**
9:30-09:50	Using global maps in a manner compliant with the IPCC good practice guidance	**R. McRoberts**
09:50-10:10	How in practice can we stitch the information provided by the different missions together to give the best products over the full mission lifetime and beyond? Is there a data assimilation concept that could absorb the different sorts of data?	**J. Exbrayat**
10:10-10:40	Wrap Up. How new space observations can transform our knowledge of the role of forests in the global C cycle	**P. Ciais**
10:40-11:00	*Coffee break*	
11:00-12:00	**Plenary Discussion** proposed seed questions: 1. What should we focus on, where is the benefit? What analysis is required to support the definition of fusion products? What are the critical questions on how all three missions can be exploited together to produce a best set of products?	**All participants**
12:00-13:30	*Lunch*	
Session 8	**General discussion**	

13:30-15:00	**Summary, Key Recommendations and Actions from Session Chairs**	**All participants**
15:00-16:30	**Surveys in Geophysics Special Issue - Drafting of overview papers**	**All participants**

FRIDAY 10 NOVEMBER 2017

09:00-13:00	**Surveys in Geophysics Special Issue - Drafting of overview papers**	**All participants**

END OF THE WORKSHOP