NASA CMS Applications Workshop: Linking CMS Products to Decision Makers and Stakeholders
UCAR Center Green, Boulder, CO
Monday, November 14, 2016

NASA Carbon Monitoring System (CMS) Applications Workshop

Goals of the CMS Applications Workshop:
- *Understanding of stakeholders needs for carbon monitoring and Measurement, Reporting and Verification (MRV).*
- *Identify the challenges/needs of communities that are interested in carbon measurement, reporting and verification (MRV), biomass, Lidar applications and related activities.*
- *Provide information on value of CMS products for MRV and related applications – including exploration of key "what?" and "how?" questions for carbon data.*
- *Link CMS community to active policy end users, decision makers and regulatory agencies to ensure maximum benefit of the projects to society.*
- *Identify CMS products that are relevant and ready for use by stakeholders and decision makers- update Application Readiness Levels (ARLs).*
- *Identify CMS data products that align with stakeholders. (Identify potential impact case studies).*

Expected Workshop Outcome:
- *Expose the Science Team members to decision makers and regulatory data users.*
- *Provide stakeholders an opportunity for communication and collaboration with CMS community.*
- *Discuss lessons learned from end users on the diverse applications and uses of CMS data products.*
- *Define a community of CMS scientists who are willing to serve as collaborators with future CMS impact studies.*
- *Identify potential stakeholders to demonstrate how CMS products may impact decision processes or what CMS products are needed in terms of carbon data at their facilities.*
- *Identify opportunities for supporting carbon MRV with CMS efforts.*

Monday, November 14, 2016 (CG1 - Auditorium)	
8:00am	CMS Applications Meeting Registration & Check-in (CG1 - Lobby)
8:30am	Meet and Greet / Background Slides: CMS on COP22, Lesley Ott, CMS PI
9:00am	**Kathy Hibbard**, and **Hank Margolis**, *NASA HQ*	Welcome, Introduction of carbon cycle and CMS congressional direction
9:15am	**George Hurtt**, *CMS Science Team Leader* & **Peter Griffith**, *Chief Scientist of NASA Carbon Cycle & Ecosystems Office*	CMS Science Team Meeting Welcome
9:30am	**Vanessa Escobar**, *CMS Applications Team Lead*	CMS Applications Activity Welcome: CMS Applications Program, Stakeholder Engagement Activities and CMS Application

		Readiness Levels (ARLs) Overview
9:45am	Brief around-the-room introductions facilitated by Vanessa Escobar ● Introduction of all stakeholders in the room ● Stakeholders state their need/desired outcome(s) for CMS engagement. ● Define the work you do and the decision you are trying to make. How/What type of carbon data from the CMS (potentially) provides decision support? *Goals & Objectives for the Day (Vanessa Escobar)*	
10:15am	**Morning Break**	
Session for Stakeholder supporting CMS Products from ARL 1-3		
	Speaker	**Topic**
10:30am	**Florin Vladu**, *UNFCCC Secretariat* *REMOTE PRESENTATION FROM COP22-POSTPONED*	Systematic observation and the Paris Agreement **ARL 3** – In conversations with Graven-01. (PIs: **Graven-01**, All CMS Projects)
10:50am	**Ben de Jong**, Terrestrial Ecosystems Coordinator, *Mexican Carbon Program* and Principal Investigator, *El Colegio de la Frontera Sur (ECOSUR)*	MRV efforts to support implementation of REDD+ across forests in Mexico **ARL 1** – Using Vargas-01 CMS products for research and reference purposes and for report/document support. (PIs: **Vargas-01**, Baccini-01, Olofsson-01, Walker-W-01, Dubey-01, Kellndorfer-01, Stehman-01, Healey-01, Houghton-02)
11:10am	**Israr Albar**, Senior Officer and Researcher from Directorate of Forest Fire Management, DG of Climate Change, *Indonesia Ministry of Environment and Forestry*	Improving effectiveness of fire management and fire safety in Indonesia **ARL 1-2** – Using Cochrane-01 CMS products for national carbon accounting as well as improving fire management and fire safety. (PIs: **Cochrane-01/02**, Miller-J-03, Olofsson-01, Hagen-01, Dubey-01, Stehman-01, Healey-01, Houghton-02)
11:30am	**Bambang Saharjo**, Expert, *Indonesia National Peatland Restoration Agency*, and Head of Forest Fire Laboratory, Faculty of Forestry, *Bogor Agricultural University (IPB)*	Use of CMS products for solving the national problem on peat fire **ARL 1-2** – Using Cochrane-01 CMS products for improving fire management and fire safety. (PIs: **Cochrane-01/02**, Miller-J-03, Olofsson-01, Hagen-01, Dubey-01, Stehman-01, Healey-01, Houghton-02)
11:50am	*Discussion Panel for applications and uses for products with ARL 1-3* *Feedback and recommendations moving forward*	
12:10pm	**Break for Lunch** **(On your own)**	

Session for Stakeholder supporting CMS Products from ARL 4-6		
	Speaker	**Topic**
1:30pm	**James Whetstone**, Special Assistant to the Director for Greenhouse Gas and Climate Science Measurements, *National Institute of Standards and Technology (NIST)*	NIST Urban Testbed System & NASA CMS Interactions __ARL 4__ – Using Nehrkorn-01 CMS products for developing a long-term database of GHG concentrations. (PIs: **Nehrkorn-01**, Andrews-03/02, Baker-01, Bowman-02/01, Jacob-02/01, Lohrenz-05/04, Ott-01, Windham-Myers-01, Asrar-West-04, Collatz-02, Duren-01/03, Graven-01, Lauvaux-01, Houghton-02, Huntzinger-01, Miller-J-01, Pawson-01, West-03)
1:50pm	**Mark Corrao**, Wildland Hydrologist, *Northwest Management, Inc.*	Lidar for estimation of forest metrics in support of local resource management in the Western U.S. __ARL 4__ – Using Hudak-01 CMS products for decision support, modeling and analysis, and implementing Hudak-01 Lidar processing and modeling approach. (PIs: **Hudak-01**, Fatoyinbo-02, Ganguly-01, Greenberg-01, Hurtt-03, Morton-01/02, Walker-01, Williams-C-01, Cohen-02, Dubayah-04/03, Duren-01, Cook-B-01/03, Kennedy-01, Saatchi-02/03)
2:10pm	**Carl Trettin**, Team Leader, *U.S. Forest Service Southern Research Station*	Carbon cycle science in forested wetlands __ARL 5-6__ – Using Fatoyinbo-01 CMS products to derive mangrove forest biomass estimates. (PIs: **Fatoyinbo-01**, Bowman-02/01, Lohrenz-05/04, Windham-Myers-01)
2:30pm	**Hans Erik Andersen**, Research Forester, Resource Monitoring and Assessment/Forest Inventory and Analysis, *U.S. Forest Service Pacific Northwest Research Station*	A joint USFS-NASA partnership to leverage advanced remote sensing for forest carbon assessment in interior Alaska __ARL 6__ – Using Morton-02 and Cook-03 CMS products to implement a new sampling design for the forest inventory of interior Alaska and to estimate carbon stocks over the vast boreal forests of interior Alaska. (PIs: **Morton-02**, **Cook-B-03**, Ganguly-01, Greenberg-01, Hudak-01, Hurtt-03, Williams-C-01, Cohen-02, Dubayah-04/03, Duren-01, French-04, Kennedy-01, Loboda-02, Saatchi-02/03)
2:50pm	*Discussion Panel for applications and uses for products with ARL 4-6* *Feedback and recommendations moving forward*	
3:10pm	**Afternoon Break**	

Session for Stakeholder supporting CMS Products from ARL 7-9		
3:25pm	**Leah Bamberger**, Director of Sustainability, Office of Mayor Jorge O. Elorza, *Providence City Hall*	Using Regional Carbon Monitoring for Municipal GHG Inventories and Reporting **ARL 6/7** – Using Nehrkorn-01 CMS products to build city emissions inventory. (PIs: **Nehrkorn-01/02**, Andrews-03/02, Baker-01, Bowman-02/01, Jacob-02/01, Lohrenz-05/04, Williams-C-01, Windham-Myers-01, Asrar-West-04, Cochrane-01/02, Duren-01/03, Graven-01, Miller-J-01, Pawson-01, West-03)
3:45pm	**Melissa Weitz**, Environmental Protection Specialist, *U.S. EPA Climate Change Division*	Monitoring methane emissions under the GHG inventory **ARL 6/7** – Using Jacob-02 CMS product {Gridded inventory of North American methane emissions} for policy purposes. (PIs: **Jacob-01/02**, Andrews-03/02, Baker-01, Bowman-02/01, Lohrenz-05/04, Williams-C-01, Windham-Myers-01, Asrar-West-04, Duren-01/03, Graven-01, Lauvaux-01, Nehrkorn-01/02, French-04, Pawson-01, West-03)
4:05pm	**Elliot Campbell**, Director of the Center for Economic and Social Science, *Maryland Department of Natural Resources* *REMOTE PRESENTATION*	Maryland NASA CMS with the Maryland Greenhouse Gas Emission Reduction Act **ARL 8-9** - Using Dubayah-03 and Hurt-03 CMS products for policy purposes. (PIs: **Dubayah-04/03**, **Hurtt-03**, Fatoyinbo-02, Ganguly-01, Greenberg-01, Hudak-01, Morton-01/02, Walker-01, Williams-C-01, Cohen-02, Duren-01, Cook-B-01/03, Kennedy-01, Saatchi-02/03)
4:25pm	*Discussion Panel for applications and uses for products with ARL 7-9* *Feedback and recommendations moving forward*	
4:45pm	**Group Discussion** Improving data access, making products easier to find and leveraging relationships with stakeholders is a goal for CMS Applications and the CMS Initiative. This group discussion will start off with the a 15 minute presentation from the ***Data Management Working Group, Megan Mcgroddy*** and then follow up by a discussion from *Vanessa Escobar* on ***data merging and communication tools*** design for CMS Applications. Following the talk, we will go into group discussion on individual CMS products and how they will/will not satisfy MRV, policy and GHG. Address what do stakeholders need/want? How can products (at all ARLs) be best applied to MRV. ***Goals:*** ➢ Discuss future data management and communication tools recommendations for CMS. ➢ Create a list of challenges, opportunities, data format and requirements, uncertainty considerations, and a plan for implementation (if appropriate).	

	➢ **Report at least two action items** (one designated for CMS, the other for the stakeholder) that identify the next step forward in connecting CMS to decision processes and stakeholder needs. ➢ Feedback from the CMS partners to how and when they can/cannot respond to the needs identified.	
5:20pm	Vanessa Escobar, *CMS Applications Team Lead*	*Summary of workshop and actions moving forward. Closing remarks.*
5:40pm	George Hurtt, *CMS ST Lead*	*Tangible outcomes and actions for CMS based on workshop feedback. Closing remarks*
6:00pm	*Meeting adjourn* *CMS Applications Social and Dinner at Boulder Beer Company.* *Reservations for 6:30pm*	