

***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)**

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

		Readiness Levels (ARLs) Overview
<b>9:45am</b>	Brief around-the-room introductions facilitated by Vanessa Escobar <ul style="list-style-type: none"> <li>• Introduction of all stakeholders in the room</li> <li>• Stakeholders state their need/desired outcome(s) for CMS engagement.</li> <li>• 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? <i>Goals &amp; Objectives for the Day (Vanessa Escobar)</i></li> </ul>	
<b>10:15am</b>	<b>Morning Break</b>	
	<b>Session for Stakeholder supporting CMS Products from ARL 1-3</b>	
	<b>Speaker</b>	<b>Topic</b>
<b>10:30am</b>	<b>Florin Vladu</b> , <i>UNFCCC Secretariat</i>  <i>*REMOTE PRESENTATION FROM COP22-POSTPONED</i>	Systematic observation and the Paris Agreement  <b>ARL 3</b> – In conversations with Graven-01. (PIs: <b>Graven-01</b> , All CMS Projects)
<b>10:50am</b>	<b>Ben de Jong</b> , Terrestrial Ecosystems Coordinator, <i>Mexican Carbon Program</i> and Principal Investigator, <i>El Colegio de la Frontera Sur (ECOSUR)</i>	MRV efforts to support implementation of REDD+ across forests in Mexico  <b>ARL 1</b> – Using Vargas-01 CMS products for research and reference purposes and for report/document support. (PIs: <b>Vargas-01</b> , Baccini-01, Olofsson-01, Walker-W-01, Dubey-01, Kellndorfer-01, Stehman-01, Healey-01, Houghton-02)
<b>11:10am</b>	<b>Israr Albar</b> , Senior Officer and Researcher from Directorate of Forest Fire Management, DG of Climate Change, <i>Indonesia Ministry of Environment and Forestry</i>	Improving effectiveness of fire management and fire safety in Indonesia  <b>ARL 1-2</b> – Using Cochrane-01 CMS products for national carbon accounting as well as improving fire management and fire safety. (PIs: <b>Cochrane-01/02</b> , Miller-J-03, Olofsson-01, Hagen-01, Dubey-01, Stehman-01, Healey-01, Houghton-02)
<b>11:30am</b>	<b>Bambang Saharjo</b> , Expert, <i>Indonesia National Peatland Restoration Agency</i> , and Head of Forest Fire Laboratory, Faculty of Forestry, <i>Bogor Agricultural University (IPB)</i>	Use of CMS products for solving the national problem on peat fire  <b>ARL 1-2</b> – Using Cochrane-01 CMS products for improving fire management and fire safety. (PIs: <b>Cochrane-01/02</b> , Miller-J-03, Olofsson-01, Hagen-01, Dubey-01, Stehman-01, Healey-01, Houghton-02)
<b>11:50am</b>	<b>Discussion Panel for applications and uses for products with ARL 1-3 Feedback and recommendations moving forward</b>	
<b>12:10pm</b>	<b>Break for Lunch (On your own)</b>	

**Session for Stakeholder supporting CMS Products from ARL 4-6**

	<b>Speaker</b>	<b>Topic</b>
<b>1:30pm</b>	<b>James Whetstone</b> , Special Assistant to the Director for Greenhouse Gas and Climate Science Measurements, <i>National Institute of Standards and Technology (NIST)</i>	NIST Urban Testbed System & NASA CMS Interactions  <b>ARL 4</b> – Using Nehr Korn-01 CMS products for developing a long-term database of GHG concentrations. (PIs: <b>Nehr Korn-01</b> , 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)
<b>1:50pm</b>	<b>Mark Corrao</b> , Wildland Hydrologist, <i>Northwest Management, Inc.</i>	Lidar for estimation of forest metrics in support of local resource management in the Western U.S.  <b>ARL 4</b> – Using Hudak-01 CMS products for decision support, modeling and analysis, and implementing Hudak-01 Lidar processing and modeling approach. (PIs: <b>Hudak-01</b> , 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)
<b>2:10pm</b>	<b>Carl Trettin</b> , Team Leader, <i>U.S. Forest Service Southern Research Station</i>	Carbon cycle science in forested wetlands  <b>ARL 5-6</b> – Using Fatoyinbo-01 CMS products to derive mangrove forest biomass estimates. (PIs: <b>Fatoyinbo-01</b> , Bowman-02/01, Lohrenz-05/04, Windham-Myers-01)
<b>2:30pm</b>	<b>Hans Erik Andersen</b> , Research Forester, Resource Monitoring and Assessment/Forest Inventory and Analysis, <i>U.S. Forest Service Pacific Northwest Research Station</i>	A joint USFS-NASA partnership to leverage advanced remote sensing for forest carbon assessment in interior Alaska  <b>ARL 6</b> – 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: <b>Morton-02</b> , <b>Cook-B-03</b> , 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)
<b>2:50pm</b>	<b>Discussion Panel for applications and uses for products with ARL 4-6</b> <b>Feedback and recommendations moving forward</b>	
<b>3:10pm</b>	<b>Afternoon Break</b>	

**Session for Stakeholder supporting CMS Products from ARL 7-9**

<p><b>3:25pm</b></p>	<p><b>Leah Bamberger</b>, Director of Sustainability, Office of Mayor Jorge O. Elorza, <i>Providence City Hall</i></p>	<p>Using Regional Carbon Monitoring for Municipal GHG Inventories and Reporting</p> <p><b>ARL 6/7</b> – Using Nehr Korn-01 CMS products to build city emissions inventory. (PIs: <b>Nehr Korn-01/02</b>, 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)</p>
<p><b>3:45pm</b></p>	<p><b>Melissa Weitz</b>, Environmental Protection Specialist, <i>U.S. EPA Climate Change Division</i></p>	<p>Monitoring methane emissions under the GHG inventory</p> <p><b>ARL 6/7</b> – Using Jacob-02 CMS product {Gridded inventory of North American methane emissions} for policy purposes. (PIs: <b>Jacob-01/02</b>, 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, Nehr Korn-01/02, French-04, Pawson-01, West-03)</p>
<p><b>4:05pm</b></p>	<p><b>Elliot Campbell</b>, Director of the Center for Economic and Social Science, <i>Maryland Department of Natural Resources</i></p> <p><i>*REMOTE PRESENTATION</i></p>	<p>Maryland NASA CMS with the Maryland Greenhouse Gas Emission Reduction Act</p> <p><b>ARL 8-9</b> - Using Dubayah-03 and Hurt-03 CMS products for policy purposes. (PIs: <b>Dubayah-04/03</b>, <b>Hurt-03</b>, 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)</p>
<p><b>4:25pm</b></p>	<p align="center"><b>Discussion Panel for applications and uses for products with ARL 7-9</b> <b>Feedback and recommendations moving forward</b></p>	
<p><b>4:45pm</b></p>	<p align="center"><b>Group Discussion</b></p> <p>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 <b>Data Management Working Group, Megan McGroddy</b> and then follow up by a discussion from <b>Vanessa Escobar on data merging and communication tools</b> design for CMS Applications.</p> <p>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.</p> <p><b>Goals:</b></p> <ul style="list-style-type: none"> <li>&gt; Discuss future data management and communication tools recommendations for CMS.</li> <li>&gt; Create a list of challenges, opportunities, data format and requirements, uncertainty considerations, and a plan for implementation (if appropriate).</li> </ul>	

	<ul style="list-style-type: none"> <li>➤ <b>Report at least two action items</b> (one designated for CMS, the other for the stakeholder) that identify the next step forward in connecting CMS to decision processes and stakeholder needs.</li> <li>➤ Feedback from the CMS partners to how and when they can/cannot respond to the needs identified.</li> </ul>	
<b>5:20pm</b>	Vanessa Escobar, <i>CMS Applications Team Lead</i>	<i>Summary of workshop and actions moving forward. Closing remarks.</i>
<b>5:40pm</b>	George Hurtt, <i>CMS ST Lead</i>	<i>Tangible outcomes and actions for CMS based on workshop feedback. Closing remarks</i>
<b>6:00pm</b>	<i>Meeting adjourn</i>  <i>CMS Applications Social and Dinner at Boulder Beer Company.</i> <i>Reservations for 6:30pm</i>	