

Carbon Management (and Regional Climate Change) Breakout Session
January 10, 2008
Washington, DC

Participants: Steven Lloyd (NASA GSFC); Verne Kaupp (U Missouri/ICREST); Steve Smith (JGCRI/PNNL); Will Pozzi (CREW); Bill Teng (NASA GSFC); Paul Davis (U Maryland); Frank Lindsay (NASA HQ); Steve Young (EPA); Dave Clark (NOAA NGDC); Chuck Hutchinson (U Arizona); Dick Wertz (ESIP Federation); James Wilson (JMU); Robert Wolfe (NASA); Bruce Wilson (ORNL DAAC); Peter Grimm (NOAA); Lucien Cox (NASA); Annette Schloss (U New Hampshire); John Bates (NOAA NCDC); Jeff Arnfield (NOAA NCDC); Brian Wilson (JPL); Jianping Mao (GCMD); Greg Susanke (EPA/ORD); Marilyn Kaminski (U Colorado); Vince Ambrosia (CSUMB); Jeanne Behnke (NASA GSFC)

1. Viability of Forming a Carbon Cluster
2. Viability of Forming a Super Cluster on Climate

Why Carbon Management?

1. Increased atmospheric carbon
2. Concentration of carbon in atmosphere is increasing
3. Increase in carbon in the atmosphere due to anthropogenic sources
4. Impacts of global warming are evident in the rapid decline in extent of summer Arctic Sea ice; accelerated decrease in mountain glaciers; change in distribution of plants and animals
5. Regional impacts of climate change are difficult to model and predict
6. Human response to climate change will be mitigation and adaptation.
7. Both responses to climate change will reduce rate of increase of carbon
8. Carbon management includes analysis of sources and sinks of carbon through aquatic and terrestrial processes, and adaptation of policies to measure, monitor & validate the carbon flux, i.e. flux of carbon between the land, atmosphere and oceans.
9. Carbon flux is the net result of emissions and sequestration
 - a. Mitigation "wedges" to reduce emissions (ER) and increase (SEQ)
 - i. Renewable electricity & fuels (ER)
 - ii. Energy efficiency and conservation (ER)
 - iii. Fuel switch (ER)
 - iv. Nuclear fission (ER)
 - v. Forests and soils (SEQ)
 - vi. CO₂ capture and storage (SEQ)
 - b. Adaptation issues
 - i. Regional climate change prediction
 - ii. Land use, land cover change
 - iii. Resource management

ESIP Federation Issues:

1. Identify the policy makers and resource managers who are considering, or may consider, carbon management in their decision making
 - a. Need to accelerate engagement of decision makers (e.g. NASA project bringing data to wildfire decision makers)
2. Understand the existing decision making processes – what information is needed and how it is used

3. Connect decision makers with better information sources
4. Help connect the data sets currently used by decision makers to the carbon science community to broaden the scope of carbon cycle science and carbon management investigations.

Carbon Cycle Overview

Keeling Curve

Fossil Fuel Emissions and Relationship to Increase in Carbon in the Atmosphere

Impact of Climate Change:

Southern California wildfires

Greenland Changes as observed by ICESat

WSJ, Dec. 28, 2007, p. B1

Models – CQUEST (NASA ARC)

Agricultural Land Use Impacts on Soil Carbon Storage

Use of Night Light images to estimate energy use & carbon output

Can analyze land use/lighting policies

Issues (facing California):

Connecting with users

Who are the users?

The First State of the Carbon Cycle Report (SOCCR)

<http://www.climate-science.gov/Library/sap/sap2-2/final-report/default.htm>

Will Pozzi – we do want to form a Carbon Cluster

Create visualizations of carbon emissions

Create a carbon portlet on the Earth Information Exchange

Work with Carbon Tracker project in Boulder (NOAA tool)

Orbiting Carbon Observatory (OCO) – due to launch this year

John Bates – think about Carbon as a cycle

Hyperspectral sounders are being used to look at global warming gases

Dick Wertz – education of public should be a key objective of the cluster

What should the carbon cluster do?

Involve Department of Energy

Engage AmeriFlux community

How can Federation support mitigation wedge efforts (first, identify decision makers who would use the information & find out what the needs are)

Decision points of farmer doing soil sequestration; who makes the carbon exchange decisions; how to validate; how to measure; who does the measurement

Define what information would be useful; need to approach agencies or organizations at the technical staff (not policy) level since they're the ones working with the data

Strong need to do education and outreach

Connection to regional climate modeling

Identify research & data gaps, priorities from Earth science to support the carbon question

Need to identify users

Evaluate the “right” policies

Who are the decision makers?

USDA, EPA, DOE, state decision makers, local decision makers

Soil moisture (important for drought; agriculture) – how can we improve the observations and the modeling

Find out user needs – get requirements; develop use cases; amass a suite of tools and document data products and services produced by ESIP Federation partners

What would be the product of the carbon cluster?

TBD

Recommendations:

1. Form a Carbon Cluster
2. What the Carbon Cluster could/should do?
 - a. Increase visibility of ESIP Federation within DOE & more relevant to ORNL DAAC
 - b. Identify users/potential users of carbon data and information; get their requirements & develop use cases (some possible initial targets: USDA, EPA, DOE, state decision makers, local decision makers, carbon trading/exchanges)
 - c. Document data products and services related to carbon that are produced by Federation partners