



North American
Carbon Program

NACP Data Center for Modeling and Synthesis (B43B-0277)

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Introduction

The North American Carbon Program (NACP) is designed to quantify the magnitudes and distributions of carbon sources and sinks, explain the processes controlling them, and produce a consistent analysis of North America's carbon budget. To accomplish these ambitious goals, NACP requires an integrated data and information management system that will enable researchers to access, understand, use, and analyze large volumes of diverse data at multiple thematic, temporal, and spatial scales.

The Modeling and Synthesis Thematic Data Center (MAST-DC) is an integral component of the NACP data system and supports NACP by providing data products and data management services needed for modeling and synthesis activities. This poster represents planned activities and status in the first six months of the MAST-DC project.

NACP Approach: Data and Modeling Intensive

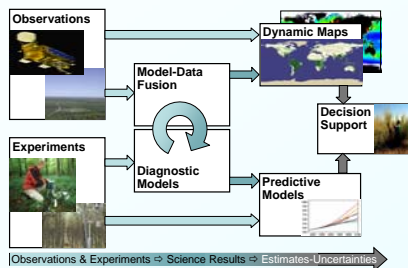
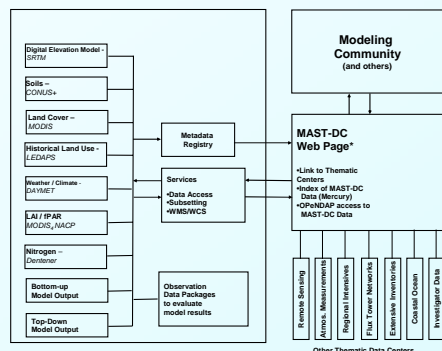


Figure Courtesy of William Emanuel, NASA

Objective

The overall objective of MAST-DC is to provide data management support to NACP investigators and agencies performing modeling and synthesis activities. Ultimately, we would like to free modelers and those doing the synthesis and integration from having to perform data management functions.

Framework for MAST-DC



Tasks

Based on NACP requirements established, MAST-DC will provide data products and services in a central location, in consistent and uniform grids, with common and co-registered spatial projection, in easily convertible formats.

The first activities will be to establish NACP projections, grid system, and land water mask, and also to establish NACP preferred file formats.

Task 1. Coordinate data management activities with NACP modelers and synthesis groups

Collaborate with NACP modeling groups and those performing synthesis and integration to identify the data specifications, data products, and tools and services required to accomplish the goals of NACP.

Task 2. Prepare and distribute model input data.

MAST-DC will acquire, process, and distribute a base set of input and driver data in consistent and uniform format. Assembly and distribution of consistent input files will allow all modeling groups to start from common boundary conditions and driving variables.

Task 3. Provide data management support for model outputs.

We will acquire, process (as needed), and distribute model output products for use by NACP synthesis and modeling groups.



Courtesy USDA Forest Service, Southern Global Change Program

Task 4. Provide tools for accessing, subsetting, and visualization.

In support of the user community, MAST-DC will provide tools, including an OpenDAP server, for accessing, subsetting, and displaying MAST-DC data products.

Task 5. Provide data packages to evaluate model output

We will acquire, process, and distribute field-based data products that can be used to evaluate the bottom-up and top-down models.

- USDA Forest Service's Forest Inventory Analysis (FIA) data
- Atmospheric CO₂ sampling sites to be used to evaluate forward models
- Hydrological components of forward models, based on national river discharge monitoring networks
- Flux tower data from the AmeriFlux and FLUXNET Canada networks

Task 6. Provide support to synthesis activities, including data support for workshops

MAST-DC will closely coordinate with the Synthesis Task Force to provide data management support for synthesis activities and to develop the data products required at NACP synthesis workshops.

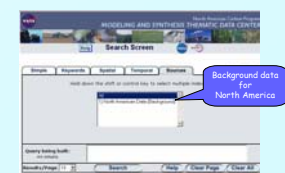
- Support Mid-Continent Intensive synthesis activities
- North American carbon budget:
 - Potential improvements
 - urban/suburban flux estimates
 - Crop and forest inventory maps
 - Anthropogenic emission maps
 - Historical and current sources and sinks maps
 - Comparison of forward and inverse modeling methods
 - Integration of short-term and long-term measurements (e.g. flux sites compared to biometrics)



Courtesy Scheel, et al., Science, 287 (5460), 2004. North American terrestrial carbon sink. Contributions of increasing CO2 and climate to carbon storage by ecosystems in the United States.

MAST-DC Services

- Web Site
<http://nacp.ornl.gov/mast-dc/>
- Clearinghouse for modeling and synthesis data and information
 - Metadata editor for entering new records
- North America WebGIS
 - Web Map Server and Web Coverage Server
 - Includes land cover, biophysical, elevation, geopolitical layers, and Open Geospatial Consortium (OGC) layers
- OpenDAP - to be implemented in calendar 2007



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