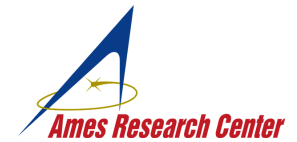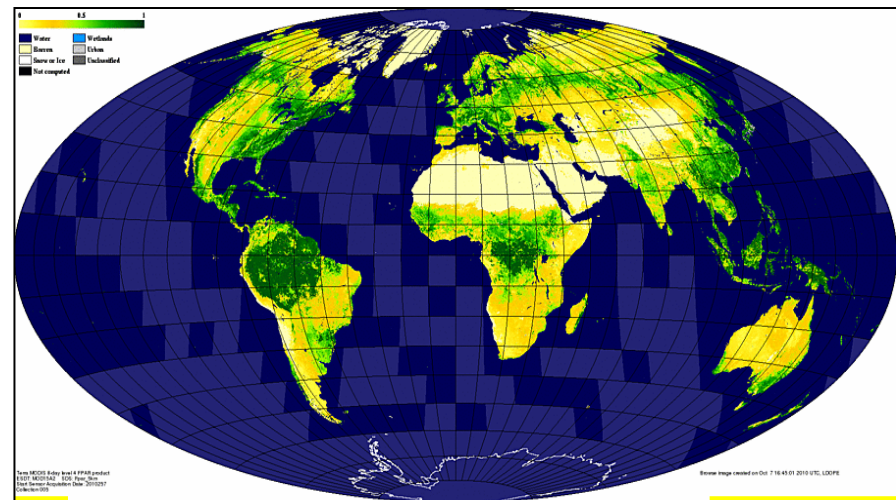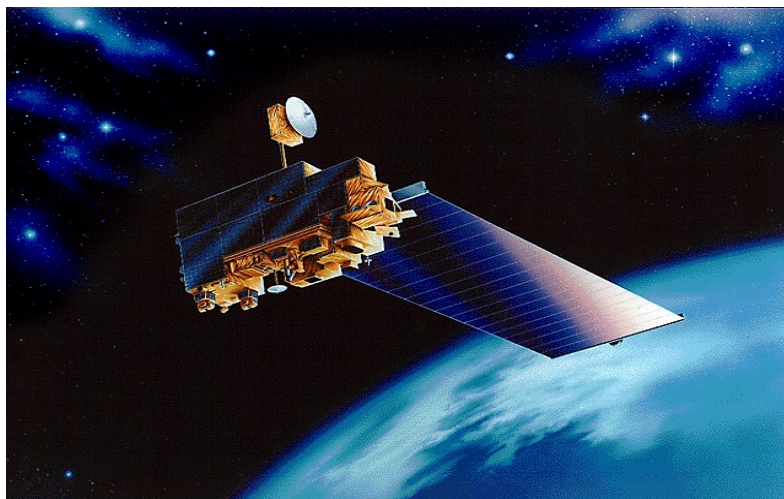# CASA-CQUEST Modeling for Carbon Cycle Assessments in Forested Ecosystems of the United States

Christopher Potter
Principal Investigator (PI)

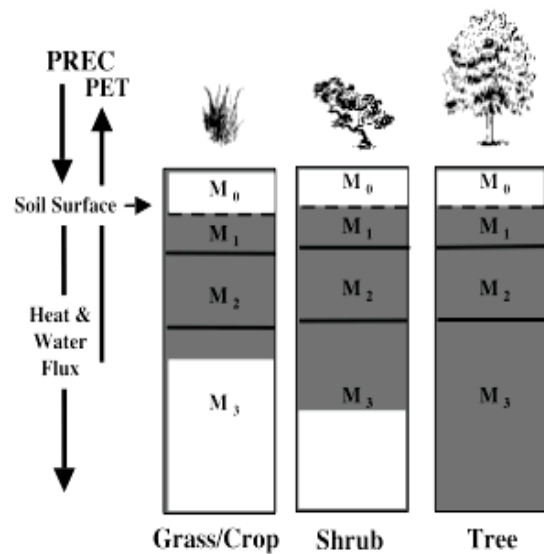Senior Research Scientist
NASA Ames Research Center

National Climate Assessment   NASA Products and Capabilities

Ames CASA Model Schematic
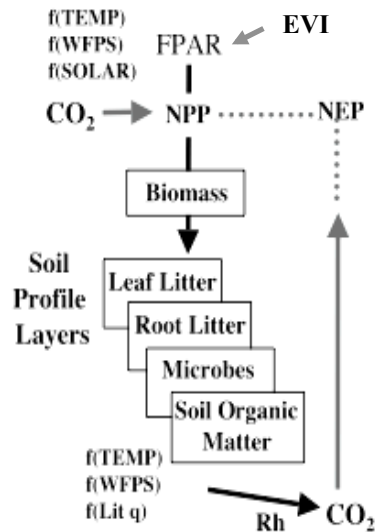
(a) Soil Moisture Balance and Plant Functional Types
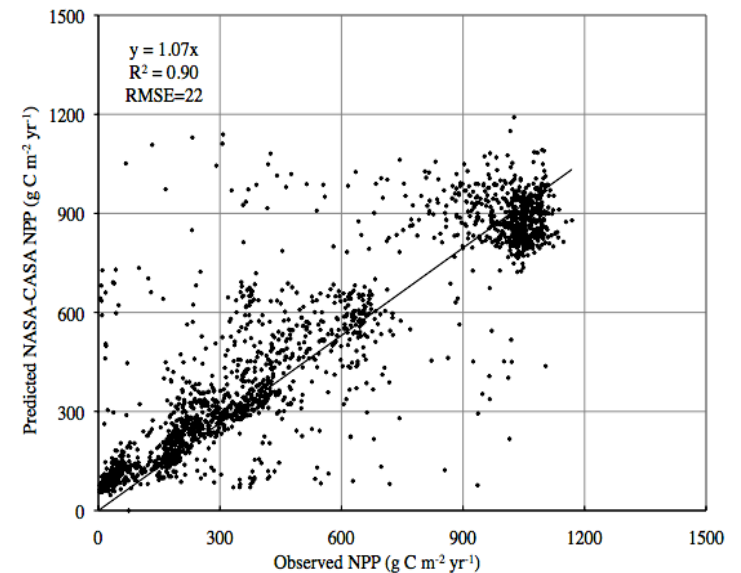
(b) Ecosystem Production Nutrient Mineralization

CASA global NPP validation versus observed NPP estimates (n = 1927 from IGBP-DIS; Olson et al., 1997)

$$NPP = Sr * EVI * e_{max} * T * W$$

CASA Model Prediction of Global NPP from 2000 to 2009

NPP Trend (g C m^{-2} yr^{-1})

-20   -10   0   +10   +20

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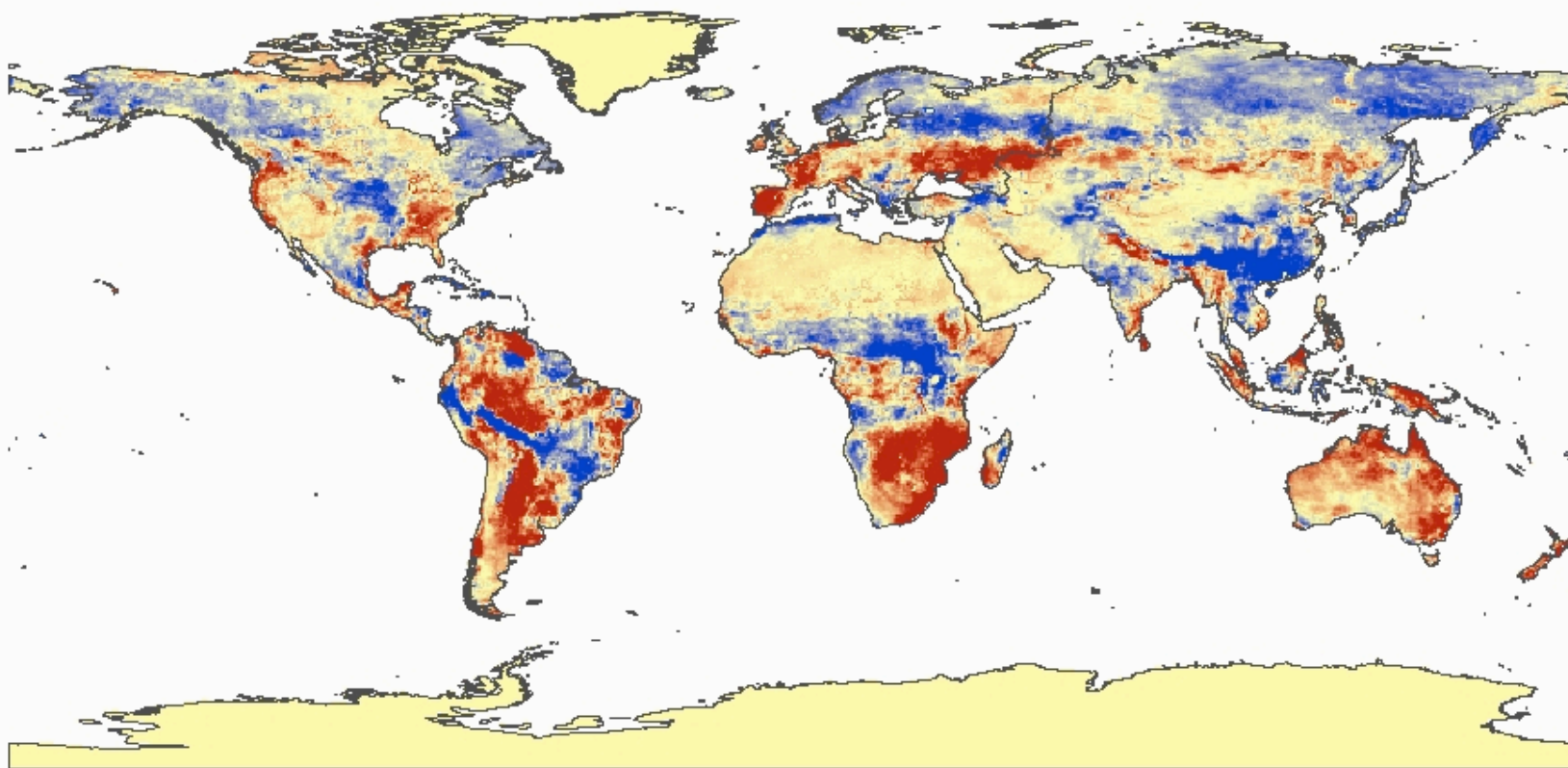
Storage of carbon in U.S. forests predicted from satellite data, ecosystem modeling, and inventory summaries

Biomass

Tonnes/Hectare

- > 450
- 400 - 450
- 350 - 400
- 300 - 350
- 250 - 300
- 200 - 250
- 150 - 200
- 100 - 150
- 50 - 100
- 0 - 50

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NCA Partnership

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE
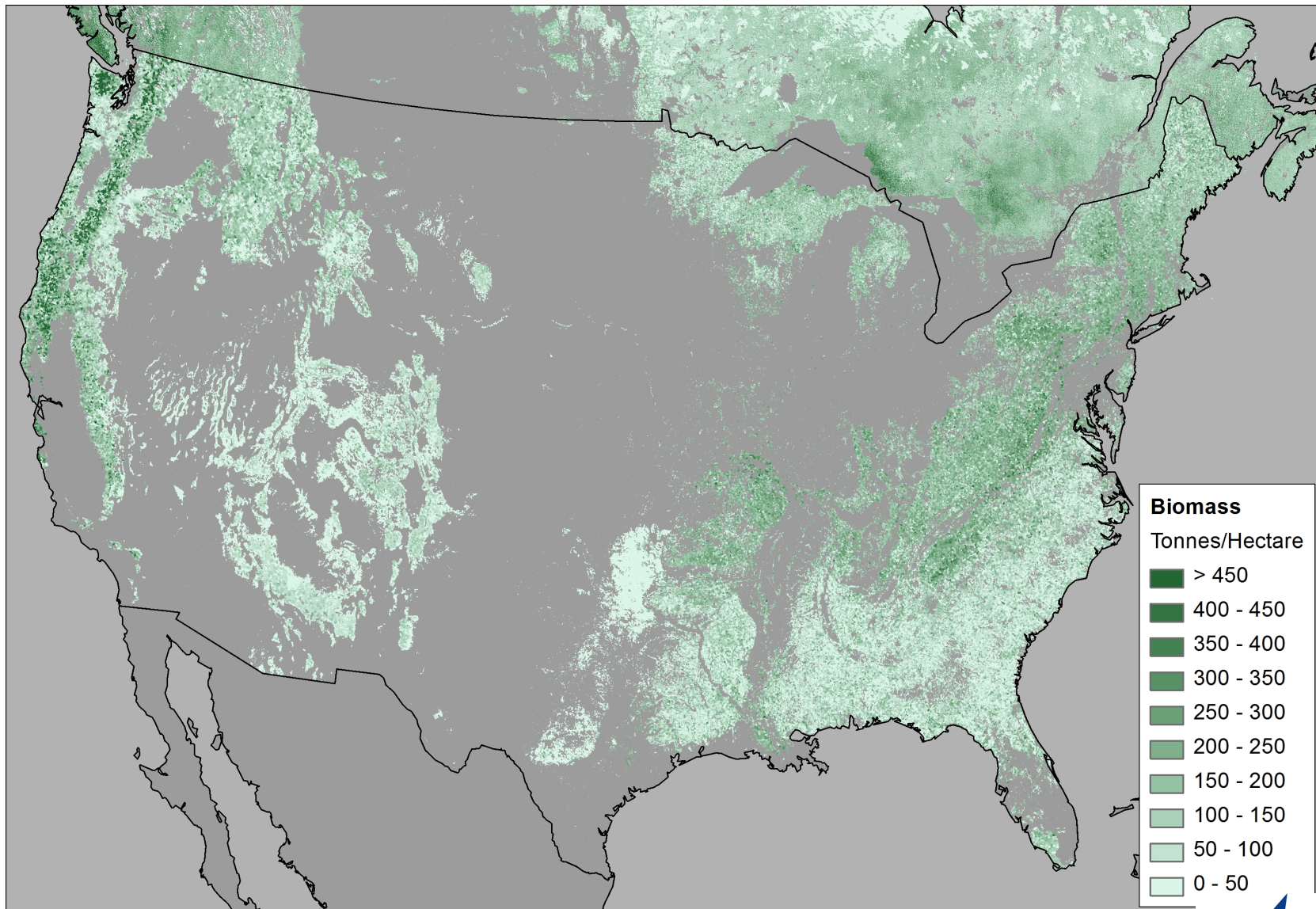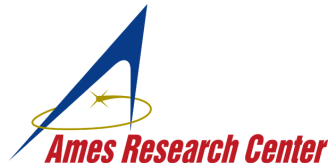
△ TACCIMO
Template for Assessing Climate Change
Impacts and Management Options

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About TACCIMO

The Template for Assessing Climate Change Impacts and Management Options (TACCIMO) is a web-based tool that connects forest planning to current climate change science. The formation of TACCIMO was rooted in the need for a standardized, credible, and concise science delivery tool relevant to forest planning and management.

What TACCIMO Delivers - Access to the most current climate change projections and science, including the likely range of projected future climate for any state, county, or National Forest and dynamically linked peer-reviewed scientific statements describing effects and management adaption options. For Forest Service users, TACCIMO additionally connects climate change science with relevant planning language.

Who Should Use TACCIMO - Federal, state, and private land managers with diverse information needs related to climate change. Certain content is developed specifically for USDA Forest Service planners to assist with climate change analysis for projects and forest plan revisions.

Who Is Developing TACCIMO - USDA Forest Service scientists from both the Eastern and Western Forest Environmental Threat Assessment Centers and forest planners from the Southern and Pacific Southwest Regions of the National Forest System.

1. Planning
Management conditions and capabilities to address climate change

2. Science
Physical and biological impacts of climate change and potential management options

3. TACCIMO Report
Customized and synthesized account of science and related planning

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Featured Tools

FCCS
Fuel Characteristic Classification System
developed by the Fire and Environment Research Applications Team

Fuel Characteristic Classification System (FCCS)

FCCS quantifies and classifies wildland fuels in the United States and predicts their fire hazard.
Read more...

Forest CarbonPlus Calculator

Water Supply Stress Index Model (WaSSI)
CCRC Home > Climate Change and Carbon Tools

Overview & Applicability

The WaSSI model is a tool that models local watershed stress by comparing water supply and demand in a particular area. The area is limited to a specific zipcode, which is linked to one of the 2100+ 8-digit **Hydrologic Unit Codes (HUCs)** in the lower 48 states, as defined by the US Geological Survey (USGS). WaSSI can be used to examine the historical water stress index for a given area, or can be used to predict future changes in water stress. The model incorporates natural and anthropogenic effects into its predictions of supply and demand. The modeling tool may be useful in facilitating integrated assessment of climate change adaptation and mitigation strategies across multiple watersheds and agencies, but would be substantially strengthened by the ability to forecast water stress across an integrated landscape larger than that defined by a zipcode (see Information on Tool Restrictions and Limitations, below).

Fast Facts

Website
http://www.taccimogis.sgcp.ncsu.edu/WaSSI

Topic
Hydrology

Purpose
The WaSSI model is an online modeling tool that allows a user to generate estimates of the historical, current, or future predicted water stress index for a particular zipcode. In reality, the water stress index outputs represent the predominent **Hydrologic Unit Code (HUC)** within a particular zipcode.

Output
The model output consists of a value which represents the "Water Supply and Stress Index" (WaSSI). This value is essentially a water balance (e.g. a ratio of water demand to water supply) for a particular zipcode, which is linked
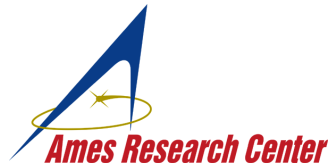
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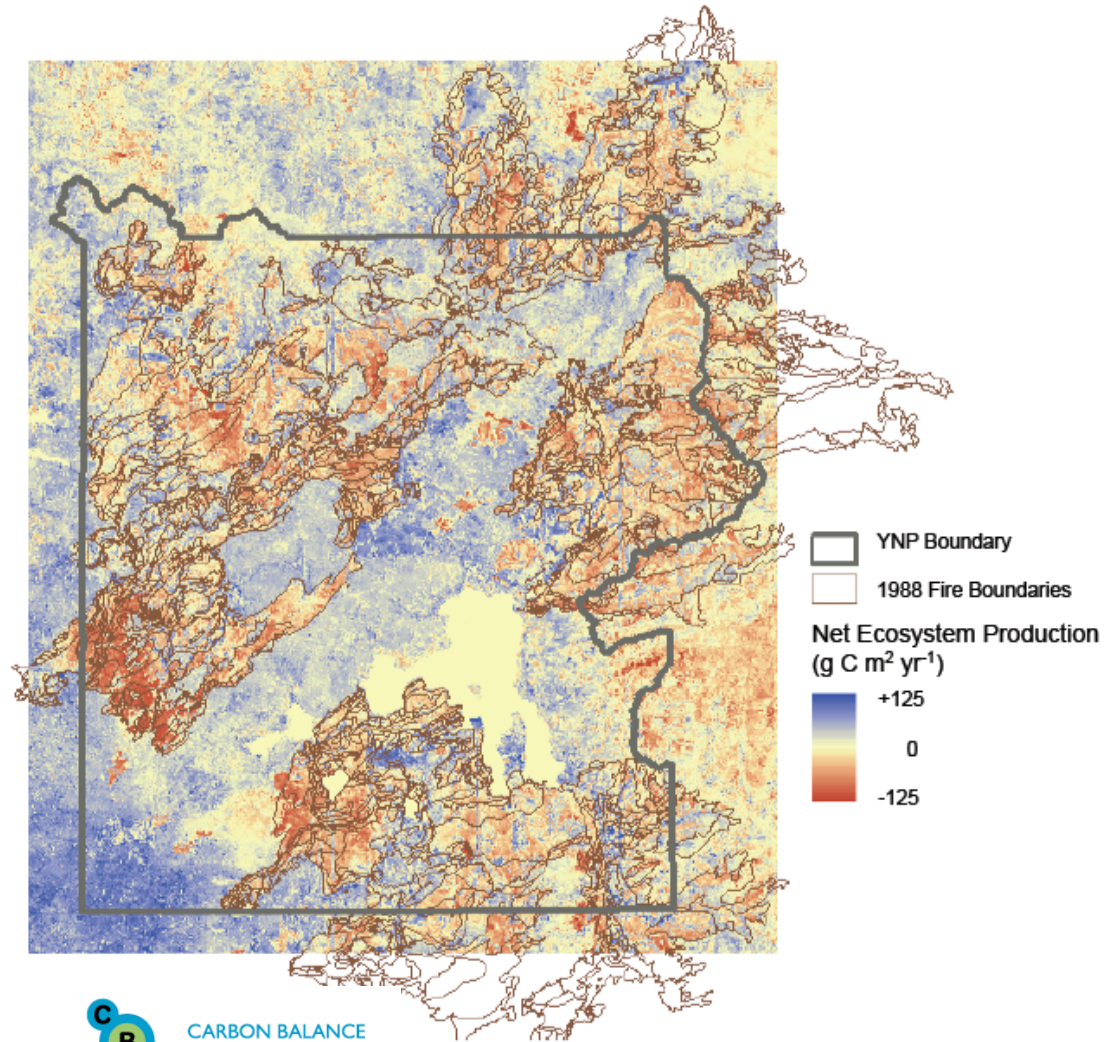
Carbon fluxes in ecosystems of Yellowstone National Park predicted from remote sensing data and simulation modeling