
Mid Continent Intensive Science Plan:
Bottom-Up Inventories, Comparing Approaches and Deliverables
21 February 2006
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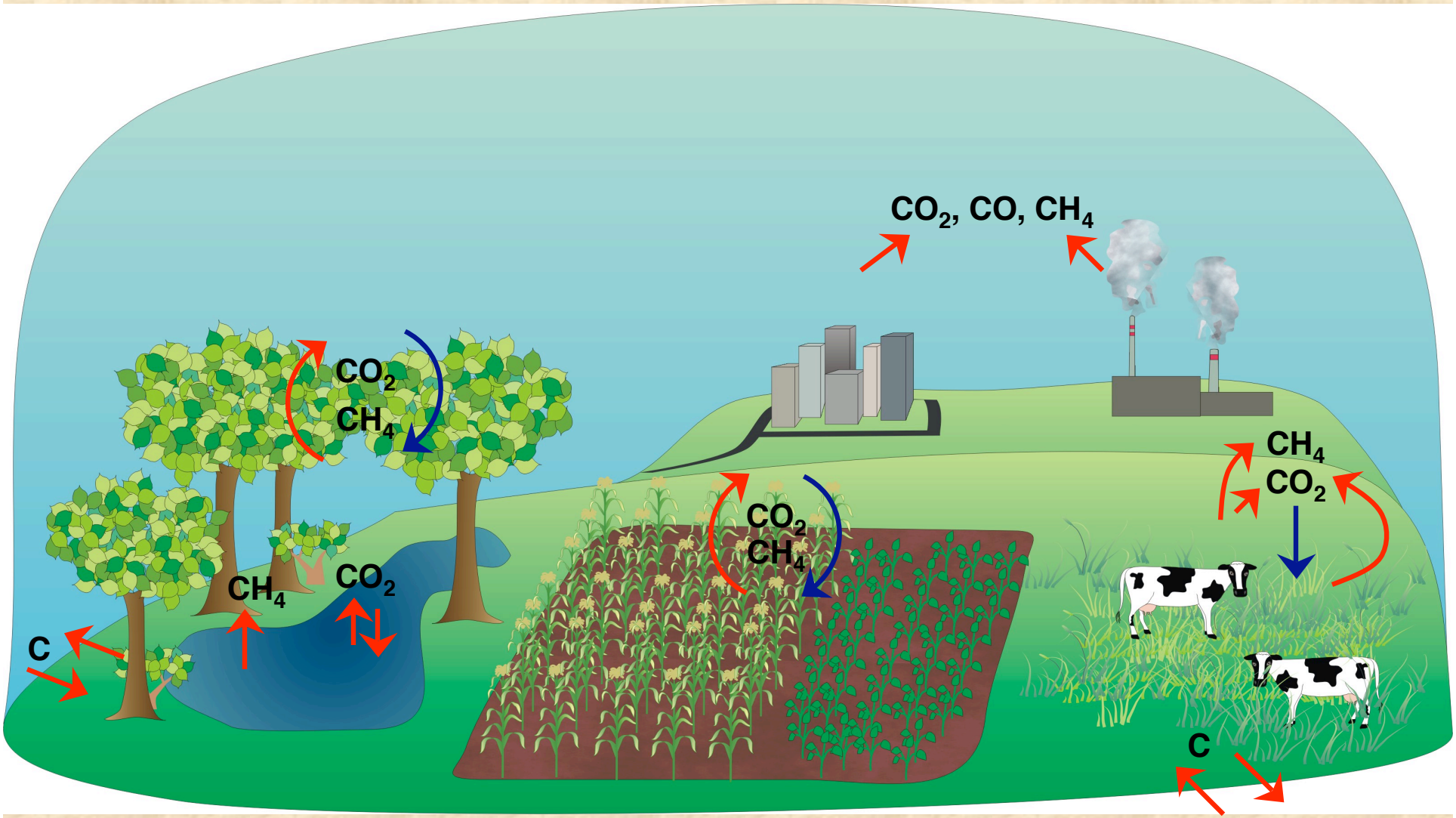
Examples of Sources and Sinks for Carbon in MCI Region

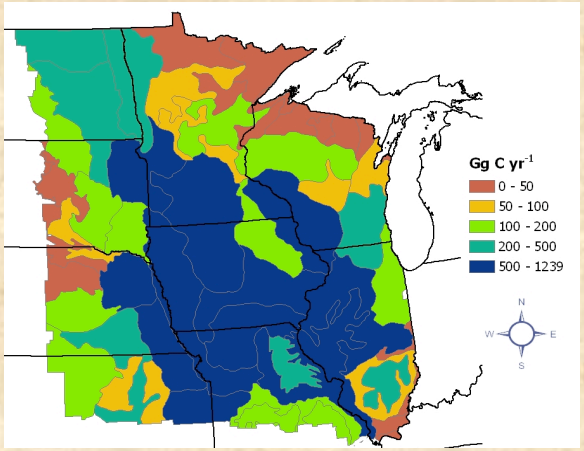


Developing "Bottom-Up" Estimates

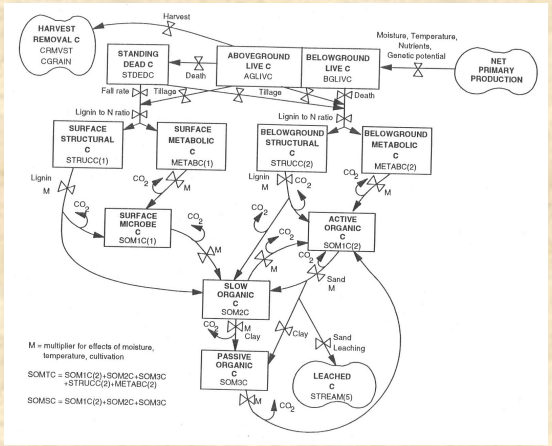
Ameriflux, Gracenet Long Term Ag Exp., Stand-level Studies, FIA Data

Experiments

Results



Ecophysiology, Ecosystem, Statistical at Various Scales



Model Development and Verification

MCI Land Product

Validation

Compiling "Bottom-Up" Inventory

- **Address Key Source/Sink Categories**
  - Plant/soil fluxes (crop/grassland/forest/wetlands, possibly urban/turfgrass)
  - Fossil emissions (power plants, urban areas, transportation corridors)
  - Livestock emissions (enteric and manure management)
  - Topic of Des Moines MCI Meeting in 2004
- **Synthesize Model Results**
  - Source/sink categories (including uncertainties)
  - Integration of Model Results for a Single Source/Sink Category
  - Estimate net flux on daily to annual time steps at an appropriate spatial scale
  - Compare to "top-down" estimates

Compare Validated "Top-Down" and "Bottom-up" Approaches

- Comparisons Across Scales
  - Sub-regional mini-intensives and Region-Wide comparisons
- Types of Comparisons
  - Dependent Comparisons
    - Data assimilation models
    - Use bottom-up estimates as prior information for the inversion
  - Independent Comparisons
    - Ecosystem models driven only by inputs without assimilation
    - Estimates independent of inversion modeling
- Compare results
  - Identify consistencies and inconsistencies
  - Testing of model assumptions and structure, both spatially and temporally
- Diagnose and make incremental improvements

Proposed Deliverables

1. MC Regional Flux and Stock Change Estimates and Uncertainties
2. Validated Methods
3. Data Products
4. Mechanistic Explanation of Patterns
5. Guidance for Future Intensives

Coordination/Management

1. **NACP Website**
   - **Information dissemination for intensive**
   - **Map server to provide information about ongoing experiments**
2. **Workshops**
   - **MCI investigators workshops**
   - **Whole-NACP workshop in the fall.**
     - **Compare results from summer 06 among MC PIs**
     - **Integrate MCI with NACP-wide activities**
   - **Methods workshop**
     - **Summer 2007**
     - **Invite representatives from regional studies across N. America and globe**
     - **Special focus on grad student and postdoc education**
3. **Session on regional carbon cycle studies at Fall AGU Meeting(s)**
   - Present science to a broad audience
   - Repeat 2005 session in 2006, 2007?
4. **Data management plan**
5. **Funding for future workshops, research collaboration**
   - NSF research collaboration network proposal?
6. **Coordinated special issues, synthesis papers**
7. **Calls for synthesis research, research to fill gaps in the MCI science team**.