

# ***Towards Earth System Modeling:***

- What is an 'Earth System' model?
  - Draw distinction between an AOGCM and ESM: (land relevant)
    - Carbon-water-nitrogen cycles vs. heat-water
    - Dynamic vegetation and evolving ecosystems
    - Human fingerprint: (*prognostic*)
      - Crop modeling
      - Water management (irrigation, hydropower, diversions, groundwater pumping)
      - Land-use land-cover change, urbanization
      - Dynamic emissions
    - Reactive biogeochemistry, biogenic aerosols
    - Fire cycles
    - Geomorphology

# ***Towards Earth System Modeling:***

- What is an 'Earth System' model?
  - Draw distinction between an AOGCM and ESM: (other components)
    - Oceans:
      - Marine ecosystems
      - Marine chemistry
      - Fisheries
      - Pollution
    - Atmosphere: ???
      - Reactive chemistry
      - Emissions
      - Prognostic alterations in radiative transfer

## ***Towards Earth System Modeling:***

- Recent activities:
  - NCAR has formed internal working groups (land, ocean, atmosphere, chemistry, societal applications) tasked with developing a vision for ESM
  - Each working group is to develop or work within their external working groups to develop more comprehensive strategies
  - Spring-summer of 2008: produce a 2-3 page white paper outlining a few topical *priorities* from each group to engage in, in a “1<sup>st</sup>” generation ESM

# ***Towards Earth System Modeling:***

- **CLMWG:**
  - We invite any interested CLMWG participants to become involved in this visioning process
  - Begin scoping plans for 0-order offline simulations of enhanced CLM for future ESM applications
  - Current priorities:
    - Integrated chemistry/biogeochemistry and isotopes (develop framework for more explicit chemistry and tracing in CLM)
    - Water systems integration: enhance connections with water resources management w/ emphasis on freshwater discharge and water quality
    - Human systems integration: enhance capabilities in dynamic land-use practices, cropping patterns and urbanization

## ***Towards Earth System Modeling:***

- Funding environment for ESM explicit activities is yet unclear at NCAR and beyond