

Ecosystem Simulation Modeling - Spring 2023

Agronomy 875 or Zoology 800

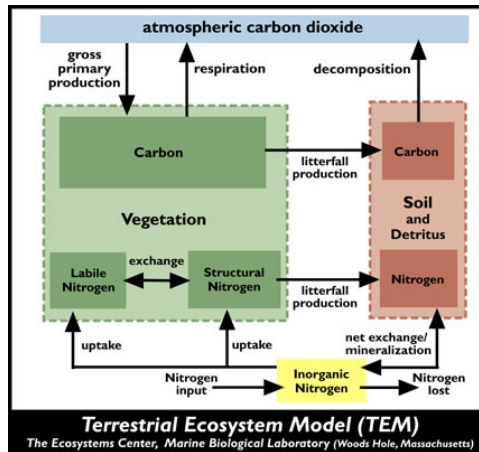


Image source: <http://web.mit.edu/globalchange/www/tem.html>

Instructors: Christopher J. Kucharik, Department of Agronomy (kucharik@wisc.edu)
Monica G. Turner, Department of Integrative Biology (turnermg@wisc.edu)

Credit hours: 2 credits
Time & place: Thursdays, 9:50 – 11:45 am, 158 Birge Hall
Class size: Capped at 20 students

Requisites:

- Graduate student status
- Background courses and/or training in ecology
- Strong quantitative skills
- Strong desire to learn about ecosystem simulation modeling!
- Consent of instructor

Course description: All ecological models are simplifications of nature. This course will introduce graduate students in ecology to process-based mathematical models of ecosystems that are simulated on the computer. Ecosystem simulation models describe the major pools and fluxes in an ecosystem and the factors that regulate those fluxes. Mathematical equations are used to represent the processes that control how major pools (*state variables*) of an ecosystem change over time. Mechanistically rich, process-based ecosystem models are increasingly seen as critical for anticipating ecosystem change in a no-analog world.

Students in this class will understand why and how ecosystem simulation models are used in ecology through: (1) class lectures; (2) readings from a textbook and the primary literature; (3) individual- and group-based computer exercises designed to introduce the building blocks of computer simulation modeling; and (4) development by each student of a simple ecosystem simulation model related to their research or field of study.

This class is recommended for graduate students who will develop and/or use ecosystem simulation models in their research. Topics will include specifying the system, mathematical formulation, parameter estimating and calibration, model evaluation, sensitivity and uncertainty analysis, and modeling pitfalls. Programming experience is useful but not required; simulation exercises and model development will use the academic version of the simulation software, VenSim.