UColorado

Senior
UCO Global biogeo-chemical

GEOLOGICAL SCIENCES 4500: GLOBAL BIOGEOCHEMICAL CYCLES
FALL 1998

Instructors: Alan Townsend, Asst. Prof., EPO Biology
Julia Cole, Asst. Prof., Geological Sciences

Teaching Assistant: Jon Carrasco, Graduate Research Asst., EPO Biology

Office: Alan: Ramaley or 116 RL-1 (1560 30th)
Julie: 246D Benson (735-5033) or 153 RL-1, 492-0595
Jon: 246D Benson (735-5033) or 153 RL-1, 492-0595

(note that both Alan and Julie have primary research offices in RL-1 on East Campus; this is located at 1560 30th, a short walk down the bike path from Benson if you need to track us down. However, we'll hold office hours in our campus offices in Ramaley and Benson, respectively.)

email: Alan.Townsend@colorado.edu
Julia.Cole@colorado.edu

(this is generally an effective way to get in touch!)

Office hours: Alan: Wednesday, 3-5PM, Ramaley
Julie: Wednesday 1-2PM, Benson 246D
Jon: Wednesday 1-2PM, Benson 246D

Rationale: The science behind the study of global change is intertwined with the natural chemical cycles of the atmosphere, ocean, fresh waters, biosphere and solid Earth. Understanding (and therefore wisely reacting to) complex environmental problems such as the greenhouse effect, acid rain, the ozone hole, ecosystem degradation, deforestation, and many others will require knowledge of the underlying chemical processes. We'll focus specifically on carbon and nutrients in the environment, as these species are deeply integrated into nearly all aspects of regional and global environmental change and provide an intimate link between ecosystems and the physical environment.

Approach: First, we'll ask you to learn some basic chemistry and climate science, if you haven't already – just enough so that we can all use the same vocabulary and so that you can assess some of the simpler reactions, processes, feedbacks, and limitations of the systems we are studying. Regular short writing assignments will be designed to allow you to follow up on class topics, and more-or-less weekly student presentations will give you practice in communicating scientific information and debating science issues. We will assign a final short (~5p) paper on the biogeochemical topic of your choice, in which you'll be asked to propose an investigation into one of the topics we have covered (or into one that you wish we did). Simple models of geochemical cycles and processes will be used for demonstration and experimental ("what-if") purposes, to illustrate the often non-intuitive nature of how changes in one part of a system can influence other aspects. And we will take advantage of CU's Mountain Research Station to collect data on carbon cycling in different high-altitude ecosystems, which we'll analyze in class.

Policies: The class will be graded as follows:

Weekly assignments: 30%
Presentations and discussions in class: 20%
Final paper: 15%
Midterm: 15%
Final exam: 20%

Assignments and class participation are important components of this class, and we will take the grading of these seriously. Assignments need to be turned in on time; you'll always have a week to complete them, and it makes grading tougher if they are trickling in all semester rather than coming in as expected. Unless you have a REALLY good reason, you can expect us to refuse to take them after the due date.

Most of the assignments will be writing exercises. We expect you to do these on a computer, and to spell check them. We will evaluate your writing (grammar, organization) as well as your brilliant analyses. For the final paper, you'll be expected to produce a topic with an outline (1 page or so) about a month before the end of class; this is an opportunity for serious feedback on your direction with the topic and on your paper's organization.

Part of your in class grade reflects leading and participating in class discussions. We expect the following from discussion leaders: a summary of why the topic is important; a coherent presentation of the paper or topic under consideration; a discussion of problems or outstanding issues in the study, and a mention of what is likely to be "next" for this particular issue. But the discussion leader should allow time for questions and discussion after their own presentation - at least 15-20 minutes. During this time, the leader should pose specific topics or questions for discussion to the class, and we'll expect (and evaluate you on) participation.

Participation in one of the two field trips is required; you can come on both if you like this kind of thing. We'll drive up to Niwot Ridge above Boulder to make some measurements of carbon flux and climate, on a weekend in late September and one in late October, and the whole process will take about 6 hours. In return, we'll give up a couple of days of in-class lecture (to be arranged).