

Land-Atmosphere Interactions

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Class time and Place: Wednesday 2:30-5:15 LINDLEY HALL 210
Office Hours: Tuesdays and Thursday 4-5 PM or by appointment

Course Objective: The overall purpose of this course will be to introduce you to the biophysical processes operating within the soil-vegetation-atmosphere continuum. We will approach this subject by examining the interactions between the traditionally distinct disciplines of atmospheric science, ecology, hydrology, soil science etc. A particular focus will be the physically based modeling of the Earth system with the use of satellite remote sensing data as input fields. Special emphasis will be placed on the hydrologic and carbon cycles.

With the realization that this is a highly interdisciplinary subject matter, there are no formal pre-requisites. However, it would be nice if you have some fundamental understanding of at least one of the following subjects: surface remote sensing, microclimatology, ecosystem/landscape ecology, hydrology, fluid mechanics, and/or numerical methods.

Text Book: No one book covers all of this material sufficiently; therefore nothing is required. Journal articles will provide the bulk of the reading material. Each week will consist of a lecture and discussion of several peer-reviewed papers. As background knowledge, you may wish to consult the following:

Principles of Environmental Physics, J.L. Monteith, M. H. Unsworth (1990)
Plants and Microclimate : A Quantitative Approach to Plant Physiology, H. G. Jones (1992)
Introduction to Boundary Layer Meteorology, R. B. Stull (1988)
Physical Principles of Remote Sensing, W. G. Rees (2001)
Physics of Climate, J. P. Peixoto, and A. H. Oort (1992)

Grades: There will be no exams in this class. Grades will be determined by a written and oral final project (50%) and homework/discussion (50%).

Final Projects: The final project will allow you to pursue a topic relevant to the course in more detail. The project will consist of a written research paper and an oral presentation to the class. Graduate students will be required to conduct original research as a component of this project. Undergraduates, while encouraged to conduct a small research project, will be allowed to conduct a literature review. The oral presentations will be conducted the last week of class, and the written report will be due on stop day (December 7).

Tentative Schedule:

Week	Date	Topic
1	8/22	Introduction – Earth system modeling and feedbacks (what is this and why does it matter)
2	8/29	Measurements and models (why data people never trust the measurements and modelers always do)
3	9/5	Radiative transfer and surface remote sensing (it's quantum physics!)
4	9/12	Micrometeorology (do you need a weatherman to know which way the wind blows?)
5	9/19	Soils (it's more than just dirt)
6	9/26	Vegetation (it's alive!)
7	10/3	Synthesis: Hydrological cycle (putting it together, part 1)
8	10/10	Synthesis: Carbon cycle (putting it together, part 2)
9	10/17	Coupling between the biosphere and atmosphere from stomata to globe
10	10/24	Temporal scaling and dynamics (why time matters)
11	10/31	Spatial scaling and dynamics (don't forget space)
12	11/7	Data assimilation/predictability (huh?)
13	11/14	NEON, CUAHSI and other acronyms (where are we going?)
14	11/21	People, society and policy (why all of this really matters)
15	11/28	Special topics (drought, deforestation, ???)
16	12/5	Project reports

Cheating:

Cheating in any manner will not be tolerated. Note that cheating includes handing in for credit work that is not your own (including copying from other students or plagiarism). Any student discovered cheating will be given an F for the course and a letter explaining that the grade was given for academic misconduct will be sent to the student's school or college. **If you have any question about what constitutes academic misconduct, please ask me in advance to avoid any confusion.**

Students with Disabilities:

The staff of Services for Students with Disabilities (SSD), 135 Strong, 785-864-2620 (v/tty), coordinates accommodations and services for KU courses. If you have a disability for which you may request accommodation in KU classes and have not contacted them, please do so as soon as possible. Please also see me privately in regard to this course.

Statement on Intellectual Property Rights

Course materials prepared by the instructor, together with the content of all lectures and review sessions presented by the instructor are the property of the instructor. Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. On request, the instructor will usually grant permission for students to audio tape lectures, on the condition that these audio tapes are only used as a study aid by the individual making the recording. Unless explicit permission is obtained from the instructor, recordings of lectures and review sessions may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

Important Note

The use of cell phones, laptop computers, i-pods etc. during the lecture is strictly prohibited.