

Paleoclimate (ENVI 360)

Macalester College – Spring 2019

Class meetings: MWF 10:50-11:50am, Olin-Rice 270

Labs: T 8:00 – 11:10am, OLRI 189/OLRI 187/Keck lab

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Office hours: M 1:30-2:45, W 8:45-9:30

Course description

Earth's climate has evolved with the planet itself, as changing boundary conditions in the ocean, atmosphere, cryosphere and lithosphere have caused global icehouses, greenhouses and mass extinctions. Information about these events is recorded in the geologic record in the form of fossils and rock sequences, but also in lake and ocean sediment cores, ice cores, cave deposits and tree rings. This course will provide an overview of changes in climate throughout Earth history while also examining the proxies and archives used to reconstruct those changes. We will also construct our own record of paleoclimate using cores from a local lake and a variety of laboratory techniques. Prerequisites: an introductory course on either climate or Earth history.

Course organization

Class periods will be a mixture of lecture, discussion and group exercises. The latter two will count towards the course participation grade (see below). Lab work will consist of some computer modeling exercises, and some weeks focused on constructing our own record of paleoclimate from ocean or lake sediments. Late work (on any assignment) will not be accepted.

Goals for students

By the end of this course, students should be able to demonstrate the ability to:

- Analyze data and draw reasonable inferences from it
- Read, comprehend and discuss scientific papers
- Communicate clearly and effectively through written and oral presentations of ideas

Course Textbook

Ruddiman, W.F. Earth's Climate: Past and Future, 3rd Ed. New York: W.H. Freeman, 2013.

Moodle

The class Moodle page will be updated regularly, and should be your first stop for information about readings, assignments, and what to expect in class on any given day. The page is color-coded: anything in green is a reading you should complete before class on the day of the entry, and anything in blue is an assignment due that day. This will require some looking/thinking ahead on your part.

Grading

Your final grade for this course will be determined by the number of points you accumulate throughout the semester:

Point distribution	
Participation	100
Homework (4 @ 25 points each)	100
Computer labs (5 @ 20 points each)	100
Science paper	100
Exams (2 @ 100 points each)	200
TOTAL	600

Attendance and participation

Attendance in class is at your discretion, although students who attend regularly are likely to receive higher grades than those who do not. The participation portion of your grade will be based on your contributions to classroom discussions/activities, as well as your presentation of papers for discussion.

Exams

There will be two exams in this course, one near the middle of the semester and one near the end (see Moodle for dates). These will occur during scheduled lab time. They will cover material from lectures, labs, discussions, and readings assigned at any point before the date of the exam. The format usually consists of a combination of short answer questions and essays. If calculators are allowed/required, I will let you know well in advance. **Attendance at exams is required- failure to attend will result in a grade of zero for that exam.** I realize that this seems obvious. There are only 3 instances in which you may reschedule an exam: 1) serious illness 2) a family emergency 3) a college sanctioned activity that requires you to be off-campus during the exam. In all cases I will need to see some documentation (ie. a doctor's note, note from the Dean, etc.), and I ask that you notify me as soon as you know you will miss the exam.

Homework

There will be 4 homework assignments to give you practice using the methods discussed in class. You will have approximately two weeks to complete each one from the time it is assigned. I encourage you to work in pairs/groups on these assignments. However, each student must turn in their own assignment, written in their own words. This means you may discuss the answers together, but must write them out yourselves. See me with any questions about what this means- copying will not be tolerated.

Computer labs

Throughout the course we will complete several labs related to the course material. Write-ups of these exercises are meant to help you synthesize and reflect on what you gained from the experience and how it informs your understanding of other course material. These are not formal lab reports (i.e. no 'hypothesis' and 'methods' sections), but deal with many of the same

themes. Labs will be completed in pairs or groups (depending on the activity)- you only need to turn in one report per group.

Science paper

We will use existing ocean and/or lake sediment cores as material for part of the lab portion of this course. We will spend two lab periods at Macalester getting an overview of equipment and methods, and running some analyses together. Students will then work to complete a set of downcore analyses on their own. You may work individually or in groups of no more than three. More information about this part of the course will be available as the semester progresses.

The results of this work will be presented to the class, and in a Science-style (~1500 word) paper at the end of the semester (one paper per group).

Academic integrity

I take all instances of cheating and plagiarism very seriously. **For this course, I consider the use of previous years' homework and exams to be cheating.** It is YOUR RESPONSIBILITY to become familiar with Macalester's other policies on what constitutes cheating and plagiarism and to behave accordingly. Instances of suspected academic dishonesty will be handled as outlined in college policies. <http://www.macalester.edu/academicprograms/integrity.html>

Accommodations

Your experience in this class is important to me, and I am committed to creating an inclusive and accessible learning environment. If you have already established accommodations with the Disability Services office, please communicate your approved accommodations to me as soon as possible so that we can discuss your needs in this course. If you have not yet established accommodations, but have a temporary health condition or permanent disability that requires accommodations (this includes but is not limited to: mental health, attention-related, learning, vision, hearing, physical or health impacts), please contact Disability Services to make an appointment: disabilityservices@macalester.edu or 651-696-6974. Disability Services offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s), and the Disability Services staff.

Diversity

It is my intent that students from diverse backgrounds and perspectives be well served by this course, that students' learning needs are addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. I am committed to presenting materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. I appreciate your feedback on this and every aspect of our course, and your suggestions for ways to improve the effectiveness of the course for you personally or for other students or student groups.

Health and wellbeing

I encourage you to be intentional about maintaining your physical and mental health during this and every semester at Macalester. Taking care of yourself in these ways will help you to be

healthier, happier, and better able to focus on your academic work. Be aware of people, situations and circumstances that help you to feel focused and engaged, as well as those that cause you stress; try to maximize the former, and eliminate the latter as much as possible. While every person is different, for most of us regular and adequate sleep, healthy meals, regular exercise, and connecting with others are all ways to foster wellness. If you find that you are having trouble maintaining your health and wellbeing, please don't hesitate to set up a time to talk with me, or with one of the many individuals or programs in the Hamre Center for Health and Wellness.

Miscellany

If you have concerns about any aspect of this course please come see me sooner rather than later. I am always interested to hear about how you think the class could be more interesting, and if there's a topic you're just dying to see covered we'll see if we can fit it in. I will be as accommodating as possible with respect to religious/cultural observances (with appropriate notice). I will respond to email during 'normal business hours'. While it is possible that I will check my email at 2am, I probably won't write you back until the next morning. So, don't wait until the last minute to email with that question about your assignment that's due tomorrow.