

Past and Present Global Change

ERS321H5

(Fall Semester 2008)

The goals of this course are to discuss the geologic record of climate change and present an overview of the methods used to reconstruct the earth's climate history and the techniques used to determine the timing of environmental changes. Topics to be addressed will include paleoclimatic reconstruction, climate and climatic variation, dating methods, and climate proxies. In addition, periods of past climate change will be highlighted with particular emphasis on climate change during the recent past. Even though this course does not include specific lab or tutorial sessions, two relevant exercises will be included.

Instructor:

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Office hours: Tuesday + Wednesday 2-3 p.m. or by appointment

Class Schedule:

Lectures: 3-4 p.m. Tuesday, 3-5 p.m. Wednesday, Room 2062 South Building

Marking Scheme:

Term test 1	20%	October 14
Term test 2	20%	November 11
Term test 3	20%	December 3
Term paper	25%	Nov. 19th
Presentation of term paper	5%	Nov. 26 th , Dec. 2nd
Exercises	10%	due at end of each lab

Late penalty on term paper or exercise: 20% of full mark per day

Term paper:

The rationale for doing a paper is to demonstrate an increased amount of knowledge in your chosen subject. In addition, it will train you in scientific report writing. The paper should demonstrate a knowledge of scientific principles that pertain to your subject.

-Length 10 pages (12 point, 1.5 spaced) plus or minus 1 page, departure from this length restriction will result in 10% penalty for each page

-Maximum of 6 figures as part of the text (no individual figure may be larger than one third of a page).

- Paper will include an abstract (300 words plus/minus 10%), introduction (including statement of problem), main body (with subheadings, figures and tables if necessary), discussion, and summary and/or conclusions and list of references cited.

- Papers will be presented during last weeks of classes as 5 minute presentations (plus 2 minutes for questions).

Term paper topics:

Paper can be on any subject dealing with past or present global change.

By **October 14th** each student has to email me two acceptable topics for a term paper. I will choose one of them. If neither of the topics suggested appear to be appropriate, I will issue a topic. The earlier you decide on a topic the higher the chances are that it has not yet been taken somebody else. In addition, you can get a head start and don't have to work on the paper when you get busy with other assignments towards the end of the semester. If no topic has been received by Oct. 14th, I will take off 10% of the final term paper grade, and will e-mail a topic to the student.

All statements presented in this report that are not derived from your own research are to be properly referenced; this includes citations within the text itself. This paper is to be a synthesis **IN YOUR OWN WORDS** of your subject material; where direct quotes are made source must be properly referenced. You are encouraged to utilize a diverse series of source materials, including citable reports, journals and books.

A "References Cited" section that lists those materials that you actually used and cited is to be given at the end. Citation procedures and the "references cited" section are to follow exactly the format used by the Geological Society of America (bottom of page <http://www.geosociety.org/pubs/geoguid5.htm>)

Additional information on the report writing and literature search will be provided during a brief information session by a librarian.

Do not attempt to download 'ready-to-go' term papers from the internet- I also know how to use the internet!

Literature:

No textbook is required for this class even though it is highly recommended to consult the below books, which are on reserve at the library. A handout will be given for each lecture, containing an outline of topics discussed as well as the most relevant figures. It is your responsibility to follow the lectures and fill in relevant information on the handouts provided. Lecture notes will not be posted on Blackboard!

Ruddiman, W.F. (2001) Earth's climate: Past and Future, W.H. Freeman & Company, 465 p.
or

Ruddiman, W.F. (2008) Earth's climate: Past and Future, W.H. Freeman & Company, 380 p.

Bradley, R.S. (1999) Paleoclimatology, International Geophysics Series, Vol. 68, Harcourt Academic Press, 610 p.

In addition, the world wide web contains a plethora of resources. For general information and specific topics and definitions I recommend to look at wikipedia. For research on your term paper, I recommend using Google which will take you to citable scientific papers, which, if you are on the campus network, can usually be accessed and downloaded or printed.

Other useful internet resources:

www.iodp.org – The Integrated Ocean Drilling Program

<http://www.research.noaa.gov/climate/> - National Oceanographic and Atmospheric Administration Climate and Paleoclimate Research

<http://www.whoi.edu/page.do?pid=7016> –Woodshole Oceanographic Institution, Climate and Ocean Research

<http://www.ldeo.columbia.edu/> - Lamont-Doherty Earth Observatory, Climate and Ocean Research

Other courses on climate at UTM:

ENV 100Y, Environment, Barbara Murck

GGR377S, Global Climate Change, Scott Monroe

PHY 237F, Physics of the Climate, Kent Moore

Course outline:

1. Topic Overview, Sources of paleoclimate information,
2. Topic Components of the climate system
3. Topic Ocean circulation
4. Topic Dating of Paleoclimate data
5. Topic Stable Oxygen Isotopes and other geochemical and paleontologic methods
6. Topic Climate archives A: Marine Archives
7. Topic Climate archives B: Terrestrial Archives
8. Topic Orbital parameters
9. Topic The Cretaceous greenhouse climate
10. Topic Paleocene-Eocene Thermal Maximum
11. Topic Causes of cooling during the last 55 Ma
12. Topic Quaternary Climates
13. Topic Historical Climate
14. Topic Anthropogenic influence on climate
15. Topic Mitigation of global warming