Syllabus for Paleoclimatology
GEO 391

Instructor: Dr. Timothy Shanahan, tshanahan@jsg.utexas.edu 232-7051
Office: EPS 3.126
Office hours: by appointment
Class: M 1-4 pm EPS 1.126
Textbook: Paleoclimatology, Raymond S. Bradley (1999)

Course overview: The class is designed to introduce graduate students to the field of paleoclimatology, the study of Earth's present and past climate. The class will examine a broad spectrum of geologic archives of climate change including those from the oceans, the land and the cryosphere.

Prerequisites: *Previous exposure to university-level physics, math, geoscience and chemistry will greatly facilitate learning and comprehension in this class (and hence earning a good grade).*

Course materials: The instructor will provide the lecture material in the form of pdf files, which will be posted on Blackboard (http://courses.utexas.edu). Students should download these materials and bring them to class. Students are responsible for reading the assigned materials prior to the lecture on each topic (Bradley's Paleoclimatology book and additional class handouts and downloads (as distributed). The class will be conducted in an active-learning environment, which will include open discussions as a routine part of class.

Course requirements: Regular attendance is required in order to do well and participation is expected. There will also be several homework assignments designed to build upon the concepts in class. Homework will be due at the beginning of the first class meeting after the homework was assigned. In addition, there will be weekly paper discussions centered around topics related to the lecture material. Students are responsible for reading this material and will be graded based on participation. There will also be a term paper to be submitted on the last day of class on a topic of your choice, but approved by the instructor.

Grading policy: 30% Attendance and participation
30% Homeworks
40% Research project (proposal paper)

TEXTBOOKS
Paleoclimatology: Reconstructing Climates of the Quaternary by Raymond S. Bradley. Academic Press, San Diego, 1999.

OTHER GOOD BOOKS
Earth's Climate: Past and Future (ECPAF), 2nd Edition by William F. Ruddiman. W.H. Freeman and Company, New York, 2008.

After the Ice Age: The Return of Life to Glaciated North America by E. C. Pielou, University of Chicago Press, Chicago, 1991.

Ice Ages: Solving the Mystery by John Imbrie and Katherine P. Imbrie. MacMillan,London, 1979.

The glacial world according to Wally, by Wallace S. Broecker, Eldigio Press 1995

The Two-Mile Time Machine: Ice Cores, Abrupt Climate Change and Our Future by Richard B. Alley. Princeton University Press, Princeton, 2000.

Guidelines for Geoclimatology Research Project

Potential Research Project Topics: Greenhouse Earth: Paleocene-Eocene Thermal Maximum; Ice House Earth: Evolution of the Antarctic Ice Sheet; Evolution of the Northern Hemisphere Ice Sheets; Milankovic Forcing; Pliocene Warm Interval; Last Glacial Maximum; Abrupt Climate Change Events; Holocene Climates; Atmospheric Teleconnections; ENSO Variability; Monsoon Variability.

Research Project Proposal

Due date: TBD

Description: A short, one- or two-paragraph summary of the selected term paper topic, and a list of potential citations (need not be final).

Format: 1' margins all around, 11-point Arial font, double-spaced.

Submission: paper AND electronic version. (pdf or doc is fine. NOT docx.)

Term Paper

Due date: TBD

Description:

Undergraduates: Project Summary (approximately 1 page), Presentation of Research (not to exceed 10 pages), Figures with figure captions, Citations.

Graduate students: Project Summary (approximately 1 page), Presentation of Research (not to exceed 15 pages), Figures with figure captions, Citations.

Format: 1' margins all around, 11-point Arial font, double-spaced.

Submission: paper (mailbox) AND electronic version (emailed to tshanahan@jsg.utexas.edu). (pdf or doc is fine. NOT docx.)

Objective: to summarize the pertinent literature on your chosen topic, identify were there is scientific consensus and where questions remain.

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-6441 TTY.

A student who misses classes or other required activities, including examinations, for the observance of a religious holy day should inform the instructor as far in advance of the absence as possible, so that arrangements can be made to complete an assignment.

Class	Date	
1	8/26/10	Introduction
2	8/31/10	Overview of Earth's climate system

3	9/2/10	Variability, forcing in the climate system
4	9/7/10	Dating methods I - radiogenic
5	9/9/10	Dating methods II - other
6	9/14/10	Dating methods III - other
7	9/16/10	Proxies: stable isotopes
8	9/21/10	Proxies: stable isotopes
9	9/23/10	No class NSF grad fellowship
10	9/28/10	Proxies: stable isotopes
11	9/30/10	No class - special Friday lunch semiar Kevin Achukaitis on Tree rings (Friday, Oct 1)
12	10/5/10	Proxies: Reconstructing sea surface temperatures (and salinity)
13	10/7/10	Proxies: Reconstructing sea surface temperatures (and salinity)
14	10/12/10	Proxies: ice core records
15	10/14/10	Proxies: Climate change on land (loess, lakes and other systems)
16	10/19/10	Proxies: Speleothems
17	10/21/10	Midterm examination
18	10/26/10	Greenhouse Earth: Cretaceous climate/ late Paleocene thermal maximum
19	10/28/10	Cenozoic cooling and glaciation
20	11/2/10	Milankovitch and glaciations
21	11/4/10	interglaciations and sea level
22	11/9/10	Last glacial maximum
23	11/11/10	Abrupt climate change during glacials
24	11/16/10	The last deglaciation

25	11/18/10	Holocene climate system change I
26	11/30/10	Last 2000 years - observations
27	12/2/10	Paleoperspectives on the future
		Final exam