

Course Description and Syllabus
Paleoceanography (GEOL 4/54074)
Kent State University Fall 2013

Instructor: Dr. Joseph D. Ortiz
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Lecture: Monday/Wednesday, 2:15-3:30 pm,
Location: McGilvrey Room 234 for lecture or Room 303 for activities
Office Hours: T/R 1-3:55pm, W 10-12am, or by appointment.

Course Rationale and Objectives

Approach: Earth's Ocean plays a critical role in climate and maintaining a planet suitable for life. In this class we will explore how the ocean fits into the Earth System and learn how the ocean and earth system have changed in response to internal and external forcing.

Expected outcome: Student will gain an appreciation for the systems perspective and will learn how paleoceanographers extract information about past ocean states using data and modeling approaches.

Prerequisites: Interested students should contact the instructor for permission.

Text: *Earth's Climate Past and Future 2nd edition*, by William Ruddiman, ISBN 0-7167-8490-4 and Chapter 2, *Earth's Climate Past and Future 1st edition*, available online from the publisher.

On reserve in the student reading room: Chapters 4 and 6 of *Ocean Circulation*, ISBN 0-08-036369-5.

Course web site: <http://www.personal.kent.edu/~jortiz/paleoceanography/>

Office Hours and Consultation with the Instructor: I want you to do well in the class! I welcome questions from all students either in person, by email, or by phone. Whether you are doing well in the course, are on academic probation, or think that you may find the course challenging, attending office hours can help make the course a more enriching experience. Please use your university email account when you contact me. This is university policy and will ensure your privacy when sending electronic messages. Include your first and last name and your flashline id on any electronic correspondence. Please cc a copy of any important messages that you send to the instructor back to yourself so that you have a record.

University Policies: The following policies apply to anyone enrolled in this course:

1. **University Calendar:** The official university calendar, which provides information on deadlines for university-related transactions can be found at:
http://www.kent.edu/registrar/calendars/stu_important_fall.cfm
2. **Enrollment Status:** The official registration deadline for this course is 9/08/2013. Courses can have different scheduling deadlines depending on their mode of instruction. University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by the published deadline should not be attending class and will not receive credit or a grade for that course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashFast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline. You can look up your course using the

Kent State University Self Service Scheduling tool. Enter the information needed to find the course for which you are searching. The add/drop/withdrawal dates can be found from the link in the final column.

3. **Academic Honor Code:** All students in the course are expected to abide by the academic honor code, as specified in the University's Policy Register. The use of other's intellectual property without giving them appropriate credit is a serious academic offense. This includes copying answers or misrepresenting the source, nature or other conditions of your academic work to get undeserved credit. At a minimum, students caught cheating during exams will receive an exam grade of zero, which will be averaged into their class GPA, and the incident will be reported to the university. It is the University's policy that cheating or plagiarism can result in receiving a failing grade for the course or other more serious disciplinary action depending on the nature of the offense. Repeat offenses can result in dismissal from the University. For complete information see the: [Kent State University Policy Register, Chap. 3, section 3-01-8.](#)
4. **Withdrawal:** The last date to withdraw from this class prior to a grade of "W" being assigned is 9/08/2013. The last day to withdraw from this class with a "W" assigned is 11/03/2013. No approval is required to withdraw from a course prior to the withdrawal deadlines. Students should be aware that withdrawing from a class may affect their financial aid status or academic eligibility for athletics. If a student is unable to complete a class or the semester because of extreme circumstances, which first occur after the deadline, he or she should consult their college or campus dean's office. Any course withdrawal processed after the withdrawal date will appear on the students' academic record with a grade of "W". Courses can have different scheduling deadlines depending on their mode of instruction. For information on add/withdrawal dates, you can look up your course using the Kent State University Self Service Scheduling tool. Enter the information needed to find the course for which you are searching. The add/withdrawal dates can be found from the link in the final column. For more information see: <http://www.registrars.kent.edu/home/FALL/withdrawal.htm>.
5. **Students with Documented Accommodation needs:** In accordance with University policy, if you have a documented disability and require accommodations to obtain equal access to this course, please contact the instructor at the beginning of the semester or when given an assignment for which an accommodation is required. Students with disabilities must verify their eligibility through the Office of Student Accessibility Services (SAS) on the Ground Floor of the DeWeese Center (330-672-3391 or <http://www.kent.edu/sas>). If you have any questions regarding a potential accommodation need, please contact the instructor as soon as possible.
6. **Final Exam Dates:** The Final exam for this class will take place on Friday, 12/13/2013 from 12:45-3:00 pm in McGilvrey Hall, Room 234. Please check the final exam schedule for all the classes in which you are enrolled. This can be found on the web at: <http://www.registrars.kent.edu/home/FALL/exams.htm> In the event that you have a conflict with another scheduled exam, the instructor will make suitable arrangements. Students who have conflicts or more than three examinations on the same day should consult with the Dean of his or her college at the earliest possible time for assistance in making alternative arrangements.
7. **Notice of my copyright and intellectual property rights:** Any intellectual property displayed or distributed to students during this course (including but not limited to power points, notes, quizzes, examinations) by Dr. Joseph D. Ortiz remains the intellectual property of the Dr. Joseph D. Ortiz. This means that the student may not distribute, publish or provide such intellectual property to any other person or entity for any reason, commercial or otherwise, without the express written permission of the Dr. Joseph D. Ortiz.

Grading Policy: Students are expected to attend class, do the reading, and consult the instructor throughout the term. These steps will help you to learn the material covered in class on the exams, and in your term project. Class participation is an important part of this class. If you do not attend class, arrive unprepared for class, or do not contribute to the class discussions, your grade will suffer. Class participation will allow you to gauge your progress. Late assignments will not be accepted. Grades will be

based on the assigned work as follows:

Three Essay Midterm exams (20% each)	60%
Class Participation and Oral Presentations	10%
Final Assessment	
Graduate Student Term Paper	30%
Student Poster Session	30%
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Total	100%

Grading may be on a curved scale at the discretion of the instructor, but each student has the potential to succeed in this course. Assignments will be passed back to help students prepare for the cumulative final.

Midterm Exams: Written, in-class exams will test your knowledge of the material. These will include short answer and conceptual essay questions. Remember to write out your answers in a clear methodical fashion and to show all your work.

Make-up Exams: Students are expected to manage their academic and personal activities responsibly during the term. Students who miss an exam must provide a legitimate written excuse in a timely manner in order to receive a make-up exam. Legitimate excuses for missing an exam include written documentation for the following: conflict with another Kent State University academic activity (such as an off campus field trip), your own illness, a death in the family, and military or intercollegiate athletic commitments. If you are involved in military or official university athletic activities, review the exam schedule at the beginning of the term and consult with the instructor prior to the exam if you have a conflict. If you have an illness, personal crisis, or family tragedy that results in missing an exam, you must contact the instructor by phone or email no later than 48 hours after the scheduled start time of the exam. It is very important that you provide your name and a telephone number where you can be reached in your phone or email message.

Class Participation and Oral Presentations: During Weeks 7-12 of the class we will study interesting case histories of past worlds reconstructed through the use of a variety of paleoceanographic data (e.g. physical properties of sediments, microfossils, and geochemical tracers). We will select six of the following topics and explore each for a one-week period using the class text and readings from the literature as a guide:

The Snowball Earth	Mountains and Climate
Polar Amplification of Climate	Of Monsoons and People
The Mid-Pleistocene Transition	Climate Gateways
Abrupt Climate Change	Ice Free Worlds

Students will have the opportunity to vote on which of these topics they would like to study. Each week will consist of a setup lecture by the instructor followed by group discussion of the class based on material from the text and from published papers. For each topic, the instructor will select student teams who will have the responsibility of finding publications on the topic and presenting these to the class for discussion. Readings will be: Selected from the class text, handouts provided by the instructor, and provided by student group leaders selected for each topic. For the participation part of their grade, students will be graded on the basis of the research they conduct for their presentation, their preparation for their oral presentation, the quality of their presentation and their participation in all class discussions during the term.

Final Projects: All classes at Kent State must have a substantive final assessment as part of the grading processes. The final term paper (graduate students) and poster session (all students) will serve this purpose in Paleoceanography. Students who do not complete this assignment will not receive a passing grade in the class. Graduates students will work in pairs and undergraduates will work in groups of three to complete the final project. All students must contribute equally to the project. Groups should specify

the contribution of each student to the project. If difficulties with group dynamics develop, it is the responsibility of the students to bring this to the attention of the instructor as soon as possible so that a solution can be found, including differential grading if necessary.

Student may select their oral presentation topic for the final term project or an additional topic after consultation with the instructor. The term project will usually constitute a literature study, but can with the permission of the instructor constitute a paleoclimate research project related to the student's area of interest. Students should begin working on this project by the third week of class and are expected to be prepared to discuss progress on their topic during class and to meet with the instructor during the term to seek guidance and provide progress reports.

Graduate students will be required to select and research a topic during the course of the term, and to write up their results in the form of a short manuscript (which synthesizes findings from the literature) and an accompanying submission cover page written in the format of a rapid response journal such as: *Nature*, *Science*, *Nature Geoscience*, or *GEOLOGY*. To assist you with this project, Dr. Ortiz and Edith Scarletto, the Geology Librarian have collaborated to develop an Earth Science writing webpage: <http://libguides.library.kent.edu/EarthScienceWriting> where you can find useful resources. It will also be helpful to read papers published in this journal to become familiar with the writing style. The final term paper will be graded on the quality of the components of the project: outline, draft and completed final paper.

All students are required to make a poster discussing the primary findings of their term project. The final class paper and poster will be due by 5 pm on the last day before the beginning of exam week. We will present a student poster session during the scheduled final exam period for the class (see below).

How grades are calculated: Grades are based on a weighted average of your class scores using the following equation:

$$\text{Class GPA} = 0.6 * (\text{Average Midterm GPA}) + 0.10 * (\text{Class Participation}) + 0.30 * (\text{Final Term Project})$$

- Your Class GPA is then converted to a letter grade using the table below.

Class GPA	4.000	3.700	3.300	3.000	2.700	2.300	2.000	1.700	1.300	1.000	0
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F

- Students who do not complete the class term paper and poster will not receive a passing grade in the class regardless of their grades on the other assigned material.
- Student who never attend, or stop attending class will receive grades of NF or SF in accordance with university policy. Note that receiving a grade of NF or SF may negatively affect your financial aid status.

Bridging the Conceptual Divide Between Theoretical and Applied Environmental Chemistry The Geology Department at Kent State University was recently awarded a significant grant from the National Science Foundation to study how and in what ways different classroom approaches influence student learning. This course section has been selected as one of the classes to be studied for the Fall 2013 semester. On 8/28/2013 Dr. David M. Dees from the Faculty Professional Development Center will be visiting our class to explain to you the research design of this project, how it may or may not influence your experiences in this class, and offer you a chance to participate in the study. If you have any questions on this study beforehand, please do not hesitate to contact Dr. David M. Dees at 330-337-4285 or ddees@kent.edu.

Paleoceanography Class Schedule and Reading Assignments

Week	Class Topics	Readings*
Part 1- the Ocean's Role in Climate		
1	The Earth Systems Approach (Aug 26 & 28)	Chapter 1
2-3	Radiative Forcing and the Atmosphere <i>(Sept 2 is Labor day – no class)</i> Sept 4 and 9	Chapter 2 from the 1 st edition of the text & lecture notes (www/whfreeman.com/ruddiman2e)
2-3	Climate Recorders (Sept 9 and 11)	Chapter 2, 2 nd edition
4	Wind-Driven Circulation (Sept 16 and 18)	Handouts, TBA
5-6	Density-Driven Circulation (Sept 23, 25 & 30)	Handouts, TBA
<i>Midterm 1 and Term paper topics and outline due – Oct 2 class period</i>		
Part 2- Paleoceanographic Data- A case studies approach		
7-12 (Oct 7, 9, 14, 16, 21, 23, 28, 30; Nov 4, 6) <i>Nov 11 is Veteran's day – no class)</i>		
<i>13 Midterm 2 and First Draft of Term Paper – Nov 13 class period</i>		
<p>In this section of the class we will study interesting case histories of past worlds reconstructed through the use of a variety of paleoceanographic data (e.g. physical properties of sediments, microfossils, and geochemical tracers). We will select five of the following topics and explore each for a one-week period using the <u>class text</u> and readings from the literature as a guide:</p>		
<i>The Snowball Earth</i> <i>Polar Amplification of Climate</i> <i>The Mid-Pleistocene Revolution</i> <i>Abrupt Climate Change</i>		<i>Mountains and Climate</i> <i>Of Monsoons and People</i> <i>Climate Gateways</i> <i>Ice Free Worlds</i>
<p>Readings: Selected from the <u>class text</u>, handouts provided by the instructor, and provided by student group leaders selected for each topic.</p>		
Part 3- Paleoceanographic Modeling – Simulating Lost Worlds Weeks 14-15		
14	Classes of models, Analytical and Box Models (Nov 25; <i>Nov 27 is start of Thanksgiving Break – no class)</i>	Chapter 3 & handouts
15	Energy Balance Models and GCMs – Past and Future worlds (Dec 2)	Chapter 3 & handouts
15	<i>Midterm 3- Dec 4 class period</i>	
<i>End of class sessions – Final version of Term Papers due Last day of Fall Term at 5 pm</i> <i>Poster presentations during Final Exam Period Friday, 12:45-3:00 pm, Dec 13th</i>		

*Readings from Ruddiman unless otherwise noted. Any changes to the readings will be announced in class or posted to the website.