

EARS 37 Marine Geology Fall, 2013

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Meeting Times: Mon, Wed, Fri 11:15-12:20, X-period Tues 12:00-12:50

Office Hours: **Erich:** Mon 12:30-1:30; Fri 4:00-5:00, or by appointment: Fairchild 205
Matt: Tues 11:00-12:00; Thurs 4:00-5:00: Fairchild 217

Class Web Site: <http://blackboard.dartmouth.edu>

Required Texts: 1) *The Ocean Basins: Their Structure and Evolution, 2nd Edition* (Open University Course)
2) *The Sea Floor, An Intro to Marine Geology, 3rd Edition* (Seibold and Berger)

Course Objectives: This course investigates the geology, processes, and paleoarchives hidden beneath the world's oceans. The course material is necessarily broad, covering marine geography, plate tectonics, active and passive margins, coastal processes, ocean processes, sediment processes, and climate interactions. However, we will focus on Lake Champlain and use a term-long research project to focus the curriculum. We will also investigate a few specific case studies in detail to relate the course material to current events and the recent scientific literature.

A key objective of this course is for you to use the data and samples that we collect on the Lake Champlain research cruise to investigate specific scientific questions and test hypotheses that we will develop together. We do not have a lab for this course, but we will use class time and homework assignments to work on these samples and data throughout the term. There will be a final write-up and presentation on this project at the end of the term.

A second objective is for you to use case studies to practice how to critically evaluate and synthesize published marine geological data, and to construct, in writing, sound, logical, succinct arguments based on your analyses.

Course Requirements and Grading:

Class Participation (10% of grade): Includes attending classes prepared, and promoting class interaction. We will also be using interactive classroom software which will include some questions for credit.

Homeworks (20% of grade): There will be 3-4 homework problem sets during the term. You will have ~1 week to complete each. Some of these may pertain to an aspect of the final project, and some will be on the lecture material.

Abstracts (15% of grade): You will write an abstract for 3 published manuscripts (that I provide), one for each of the 3 “case studies” we investigate. This is intended to develop your critical reading and writing skills. The abstracts will be in the very specific format specified by Nature magazine (which is not the journal in which they were originally published). Detailed information about these assignments will follow.

Term Project (25% of grade): We will conduct a term-long project working with data and samples that we collect on the Lake Champlain research cruise. We will decide on the main topic and goals of this project together, and then likely break into smaller groups to focus on specific tasks. You will be responsible for writing up a final report and making a final presentation to the class.

Midterm Exam (15% of grade): **Scheduled on Wed October 16th (subject to change)**

Final Exam (15% of grade): **Sunday November 24, 3:00 pm**

Late Assignments: 10% will be deducted for each day that an assignment is late unless you **discuss the situation with me prior to the original due date**. If you are unable to complete an assignment on time due to illness or other personal reasons, you may be eligible to have this penalty waived. You are encouraged to **talk to me as soon as possible**, and if necessary, meet with your Dean to discuss your situation.

Unexpectedly Missing Quizzes and Exams: If you have to miss a quiz or exam, ***YOU MUST CONTACT ME BEFORE THE QUIZ OR EXAM STARTS*** to explain your absence and make plans for taking the exam/quiz at the next available time. Email (erich.c.osterberg@dartmouth.edu) and telephone (603-646-1096) are ways to contact me. If I do not answer the phone, **leave a message!** You may be expected to provide a letter from your doctor, dean, family member (etc.) explaining that your absence was justified.

FAILURE TO CONTACT ME BEFORE THE EXAM/QUIZ OR FAILURE TO PROVIDE A VALID REASON FOR YOUR ABSENCE MAY RESULT IN YOU RECEIVING A 0% ON THE EXAM OR QUIZ

Planned Absences during Quizzes or Exams: If you know ahead of time that you will be absent from a quiz or exam (e.g. for a college-affiliated extra-curricular activity, job interview, etc.), speak with me about it **as soon as you know** so that accommodations can be made. In general, my policy is to allow students to take exams and quizzes **early** for a planned absence, but not to take it late unless there are special circumstances.

Disability-Related Accommodations: Students with disabilities enrolled in this course and who may need disability-related academic adjustments and services are encouraged to see me privately as early as possible in the term. Students requiring disability-related academic adjustments and services **MUST** consult the Student Accessibility Services office (301 Collis Student Center, 646-9900, student.accessibility.services@dartmouth.edu). Once SAS has

authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to me. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

Religious Observances: If you have a religious observance that conflicts with your participation in this course, please meet with me **as early as possible** to discuss accommodations.

Academic Honor Principle: You should be aware of and conform to the Dartmouth Honor Code as expressed in the ORC. For this course, this means:

Homeworks: You may discuss the homework problems with each other and work together towards solutions, but you must write up your solutions in your own words showing your thinking and work where appropriate.

Abstracts: The published papers for which you will be writing abstracts have existing abstracts as published. The papers as you receive them from me will have the abstracts removed, but you can easily find them online. You are expected not to do so. If you come across the published abstract and feel that you would like a different paper to work on, please see me.

Exams: All work on exams is your own.

Course Schedule (Subject to Change: Updated 9/10/13)

Date	Topic	Reading	Assignments
9/16 (M)	Course mechanics, into to Marine Geology		
9/17 (Tu)	X-Hour: Lake Champlain intro	<i>Sea Floor:</i> Intro & Ch 1	
9/18 (W)	Ocean basins & passive margins	<i>Sea Floor:</i> Ch 2	
9/20 (F)	Special Class: Career Services		
9/23 (M)	Ocean Morphology III: Active Margins	<i>Ocean Basins:</i> Ch 2	
9/25 (W)	Continental drift, assembly of NE	<i>Ocean Basins:</i> Ch 3	
9/27 (F)	Formation and evolution of oceanic lithosphere	<i>Ocean Basins:</i> Ch 4	
9/30 (M)	Case Study I: 2011 Japan tsunami	Papers	Abstract #1 due
10/1 (Tu)	X-Hour: Lake Champlain project discussion		
10/2 (W)	Mid-Ocean Ridges and Hydrothermal activity	<i>Ocean Basins:</i> Ch 5	
10/4 (F)	Lake Champlain Cruise		
10/7 (M)	Plate tectonics summary: bringing it together		
10/9 (W)	Waves and currents	<i>Sea Floor:</i> Ch 4	
10/11 (F)	Lithogenic sediments and near-shore processes	<i>Sea Floor:</i> Sections 3.1-3.5	
10/14 (M)	Case Study II: Mississippi Delta Erosion	Papers	Abstract #2 due
10/15 (Tu)	X-Hour: Review Session		
10/16 (W)	MID-TERM EXAM		
10/18 (F)	Biogenic Sediments	<i>Sea Floor:</i> Sections 3.6-3.9	
10/21 (M)	Deep Sea Sediments I	<i>Sea Floor:</i> Ch 8	
10/23 (W)	Deep Sea Sediments II		
10/25 (F)	Marine Sediments in VT		
10/28 (M)	Marine productivity	<i>Sea Floor:</i> Ch 6	
10/30 (W)	Paleoceanography and paleoclimate proxies	<i>Sea Floor:</i> Ch 7	
11/1 (F)	Marine paleoclimate record	<i>Sea Floor:</i> Ch 9	
11/4 (M)	Paleoceanography record		
11/6 (W)	Plate tectonics and paleoclimate	<i>Ocean Basins:</i> Ch 6	
11/8 (F)	Sea-level I: causes of sea-level fluctuations	<i>Sea Floor:</i> Ch 5	
11/11 (M)	Sea-level II: history of sea-level fluctuations		
11/13(W)	Case Study III: Future sea-level rise	Papers	Abstract #3 due
11/15 (F)	Ocean resources	<i>Sea Floor:</i> Ch 10	
11/18 (M)	Final Presentations		
11/19 (Tu)	X-Hour: Final Presentations (if needed)		
11/24 (Sun)	3:00 pm: FINAL EXAM		