

GEOL 1400 – 01
THEMES IN GEOLOGY
MID-OCEAN RIDGE: VOLCANOES, EARTHQUAKES, AND LIFE IN THE DEEP SEA

When: Tuesday & Thursday, 3:30 – 4:45, August 21 to September 20, 2007.

Where: Geology Building, Room 123 (Auditorium)

Instructor: MarieHelene Cormier

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Office Hours: Wednesday 9-10am & Thursday 5-6pm (and by appointment).

Overview: This five-week course will explore the various processes taking place along the mid-ocean ridge. The mid-ocean ridge constitutes the longest mountain chain on Earth, circling the oceans for over 45,000 miles. It is one of the last frontiers on our planet, hidden from view 2 to 3 miles below the sea surface. “Seafloor spreading” along the ridge length creates an estimated 6 square miles of new sea floor every year, a process that accounts for most of the volcanic and earthquake activity on Earth, as well as for the existence of unique ecosystems. This course will review our present state of knowledge about the mid-ocean ridge as well as the technologies deployed for its investigation.

Text: Three issues of the magazine *OCEANUS* that focus on the mid-ocean ridge and deep ocean exploration: Volume 41 No. 1 & No. 2, Volume 42 No. 2.

These issues are for sale at the MU bookstore shrink-wrapped together for < \$20.

PDF versions of the articles are also freely available at <http://www.whoi.edu/oceanus> ;
(Click on “Archives”, then “Printed issues” at left side of page).

Web resources:

<http://pubs.usgs.gov/gip/dynamic>

-> Plate Tectonics: an overview - U.S. Geological Survey

<http://www.ridge2000.org/>

-> RIDGE2000, a research program focusing on spreading centers and sponsored by the National Science Foundation (NSF)

<http://interridge.whoi.edu>

-> InterRidge, an international association for the study of spreading centers

<http://www.pmel.noaa.gov/vents/>

The Vents program, run by the National Oceanographic and Atmospheric Administration (NOAA), investigates hydrothermal venting along the spreading centers.

<http://www.oceanexplorer.noaa.gov/>

-> Ocean Explorer, a NOAA program dedicated to ocean exploration.

<http://www.divediscover.whoi.edu/>

-> Dive and Discover, a site designed to experience deep sea exploration

Reference Books (in the Geology Library)

Most textbooks on introductory geology or oceanography include chapters on plate tectonics and the mid-ocean ridges.

"The Mid-oceanic Ridges", by A. Nicolas (Springer-Verlag, 1995; out of print).

Grading

25% Midterm Exam, 75% Final Exam

Both will be multiple choices exams.

Final grade is assigned on a distribution curve.

Schedule

- 1) August 21: Plate tectonics, the theory that explains mid-ocean ridges
v. 42, No 2: "The Engine that drives the Earth" by Detrick
- 2) August 23: The mid-ocean ridge: its morphology
v. 41, No. 1: "Exploring the global mid-ocean ridge" by Macdonald
- 3) August 28: Deep ocean exploration, the technology
v. 42, No. 2: p. 20-24 (Fornari), p 28-31 (Chave), p. 32-35 (Normile & Kerr)]
- 4) August 30: The formation of new seafloor
v. 42, No. 2: p. 40-43 (Kelemen), p 44-47 (Tivey)
- 5) September 4: Midterm (30 min) / volcanism (movie)
- 6) September 6: Volcanism at mid-ocean ridges
v. 41, No. 1: "Mid-Atlantic Ridge Volcanic Processes" by Smith & Cann
- 7) September 11: Earthquakes at mid-ocean ridges
v. 42, No. 2: "Ears in the Ocean" by Smith
- 8) September 13: Hydrothermal circulation
v. 41 No 2 p 18-21 (Humphris & McCollon), v. 42 No 2 p. 60-65 (Kingston Tivey)
- 9) September 18: Life at the deep seafloor ****lecture by Prof. M. Schulte****
v. 42, No. 2: p. 72-77 (Wirsen), p. 78-85 (Shank)
- 10) September 20: Final exam

Special accommodations: If you need accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class, or at my office. To request academic accommodations (for example, a notetaker), students must also register with the Office of Disability Services, S5 Memorial Union, 882-4696.