

**Geology Problems (GEOL 4863)**  
**Volcano Studies in Hawaii**  
May 15-26, 2005

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Course Goals

At the end of this course, it is expected that students will:

- Identify and describe different types of volcanoes, their behavior, and their products.
- Be familiar with the tectonic setting and geologic history of the Hawaiian Islands.
- Be able to describe the structure of a Hawaiian volcano and contrast that with the size and structure of other types of volcanoes.
- Understand the scientific methods used to monitor active volcanoes.
- Recognize volcanic features at many scales and interpret their geologic significance.
- Determine the relative ages of volcanoes based on the stage of erosion.
- Appreciate relationships between magmatic, tectonic, and groundwater systems.
- Put the volcanic history of the island into a cultural, historical, and geological context.

Required Texts: *Volcanoes, 3<sup>rd</sup> Edition* by Decker and Decker-- available online through barnesandnoble.com, bigwords.com, amazon.com, etc. Other course materials will be provided to you at the beginning of the trip.

Attendance Policy

Students will have online homework assignments to complete before the field trip (Due May 10, 2005). The only formally scheduled class meeting time is from May 15-26 in Hawaii. Students must attend the field trip in Hawaii during this time, and participate in all activities for which he/she is physically able.

Academic Honesty Policy

Any student caught plagiarizing a paper, copying answers to questions, or otherwise representing someone else's work as his/her own will receive an F in the course. Not knowing the rules of plagiarism is not an excuse! Visit this site to refresh your memory on what is and is not considered plagiarism: <http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

Grading Policy

The grade for this course will be determined by a combination of participation, written responses to questions, a field notebook, a short presentation, and a term paper completed in the month after the field trip. Your grade will be determined by the following formula:

Pre-field trip reading questions	20%	Due May 10
Field trip participation	20%	During field trip
Presentation during field trip	10%	Research done before trip
Field trip questions/field book	20%	Due May 25
Term paper	<u>30%</u>	Due June 28
Total	100%	

### Presentation Guidelines

The topic for your presentation will be determined soon after you sign up for the class. I will have a list of appropriate topics for you to choose from. Your presentation should be 10-15 minutes long and will be given one evening during the trip. (We will have a maximum of two presentations per day.) The use of visual aids is encouraged, but we will likely not have access to any electrical or computer equipment. As such, the presentations will be somewhat informal. If you wish to use visual aids (maps, pictures, diagrams, etc.), please print your materials before you leave for the island.

### Term paper guidelines

You will choose your own topic for your term paper. Your topic must be approved by the instructor no later than the last day of the trip.

The term paper is to be comprised of 5-7 pages of text (1" margins, double-spaced, no larger than 12-point font). At least 4 sources must be used, and these sources must be cited in the text as you would for any research paper using standard USGS or GSA format [Author(s), Year]. Full references must be given in a bibliography. Title page, photos/diagrams/tables, and the bibliography do not count toward the total of 5-7 text pages. You may choose a geologic topic of interest to you, as long as there is enough reliable source material.

Appropriate sources for your paper must be used. Appropriate sources include journal articles, books, USGS publications, and theses. Websites are unacceptable as sources unless the website is a means to access a peer-reviewed journal article (for example, the online version of the *Bulletin of the Geological Society of America*) or a government publication such as a USGS Professional Paper or Open File Report. If your library does not have these types of publications, make use of Interlibrary Loan.

The order in which the paper should be constructed is: Title page, Text, Bibliography. Figures should be numbered appropriately, have original captions written by you, and have a reference to the source where it was found. The figures should either be neatly integrated into the text or placed on separate pages and inserted immediately after the reference in the text. Again, figures may not be taken from websites unless they are from online journals or government publications. If you have any questions about how figures should be included, see any journal article or ask one of your geology professors about correct format.

**The term paper is due by 5pm on June 28, 2005.** Start early, especially if you will need to use Interlibrary Loan.

### Tentative Course Schedule

#### ***Before the trip***

- Students will receive packet of information about field trip logistics including a syllabus, instructor's expectations for the course, a safety briefing sheet, initial assignments, maps of the island, and instructions on buying plane tickets and required texts.
- Students will read textbook *Volcanoes, 3<sup>rd</sup> Edition* by Robert and Barbara Decker.
- Students will participate in email discussions about the textbook, information from the Hawaiian Volcano Observatory website, and online publications of the USGS.
- Students will provide written answers to a set of questions, due May 10, 2005.

***During the trip***

- May 15 Arrival of students in Hilo, Hawaii
- May 16 Safety briefing – island hazards  
Initial exposure to the caldera of Kilauea Volcano  
Monday morning staff meeting at the Hawaiian Volcano Observatory  
Overview of island geology  
Summit features on Kilauea Volcano  
Location: summit area of Kilauea Volcano in Hawaii Volcanoes National Park;  
Hawaiian Volcano Observatory; Jaggar Museum
- May 17 Safety briefing, hazards specific to lava viewing  
Visit active lava field; trip to recent active and lava flows  
After Dark in the Park (Educational Lecture Program at Hawaii Volcanoes National  
Park Visitor Center)  
Location: Visitor's Center and coastal area of Hawaii Volcanoes National Park, Chain  
of Craters Road
- May 18 Recent volcanism in Kilauea's summit area  
Role of lava tubes in eruptions; Lava tube characteristics  
Importance of rift zones in the development of shield volcanoes  
Beach development in a volcanic setting: Case study of Punalu'u black sand beach  
located down current from the eruption site  
Evening discussion: Comparison of Hawaiian volcanism with Mt. St. Helens on the  
25<sup>th</sup> anniversary of its catastrophic eruption  
Location: Kilauea Iki crater, Thurston Lava Tube, Punaluu black sand beach
- May 19 Comparison of landscapes developed on each of the island's volcanoes  
Relationship between volcano age and stage of landscape/stream development  
Location: volcanoes Mauna Kea, Mauna Loa, Kohala
- May 20 Recent volcanism on the lower East Rift Zone of Kilauea  
Communities at risk from future eruptions  
Geothermal resources on the island of Hawaii  
Location: Lava Trees State Park, Kapoho area, Ahalanui State Park, Geothermal  
power plant, Kalapana area
- May 21 Tsunami occurrences and hazards in Hawaii  
Stream development in the Hawaiian Islands; relation between volcanic features and  
streams  
Location: Pacific Tsunami Museum, downtown Hilo, Laupahoehoe Point, Akaka  
Falls, Rainbow Falls, Hawaii Tropical Botanical Garden
- May 22 Comparison of Mauna Loa and Kilauea features  
Location: Mauna Loa Strip Road, Bird Park, native koa forest
- May 23 Morning staff meeting at the Hawaiian Volcano Observatory  
Large earthquakes and related fault scarps on the island of Hawaii  
Beach development in a volcanic setting: Case study of a very rare olivine [green]  
sand beach in an eroding littoral cone  
Location: South Point, Green Sand Beach (KaLae), flanks of Mauna Loa

- May 24 Nearshore reefs on an isolated volcanic island; relationship between hot spot activity, island formation, and coral reef development  
Location: Kona coast, Puuhonua o Honaunau National Historic Site, reefs in Honaunau Bay
- May 25 Analog to the current eruption site: features of a volcanic vent  
Location: Mauna Ulu, Chain of Craters Road
- May 26 Leave island on overnight flight home (You will be home on May 27.)

***After the trip***

- June 28 Term paper due by 5pm. It may be emailed as an attachment or sent through the regular mail.