

ERTH-605 Lava Flow Rheology and Morphology

This 3-credit course is designed to cover essential themes of effusive physical volcanology. Three lectures of 50 min will be given each week, supported by a series of projects driven by the class content as well as a field trip. Two options for field trip locations will be considered: Kilauea (Big Island, 5 days), or a trip to the Cascades (Mt. Shasta and Medicine Lake Volcano, 7 days). The course emphasizes observation of products from effusive volcanism at all scales (hand sample to a flow field), and integration of these observations with simple equations and computer-based models. Students will learn the basics of material behavior, deformation, viscosity, transport properties and be able to apply and understand the concepts they learned to natural settings. Students are required to be mathematically literate and know how to deal with basic spreadsheet calculations.

(Fall 2023 *Mon, Wed, Fri* lectures 10:30-11:20 am, POST 703)

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Office Hours: *by appointment*

Text: No text book required. Reading will be given as articles and book chapters in pdf format.

Grading: Based on the homework/project assignments (75%) and attendance/participation (25%).

Week	Topic	SLO*	Project/homework
1	INTRODUCTION, RHEOLOGY	1, 5	
2	RHEOLOGY	2,3,5	(I) Rheology
3			
4	EFFUSION RATE	2,3,4,5	
5	FIELD TRIP CALIFORNIA		Field exercises
6	EFFUSION RATE	2,3,5	(II) Viscosity
7	HEAT LOSS		
8	A'A, PAHOEHOE, INFLATION	1, 2,3,5	
9	CHANNELS		(III) Heat loss
10	LAVA TUBES	2,3,5	
11	LAVA DOMES AND SILICIC FLOWS	2,3,4,5	
	FIELD TRIP OAHU?		Field trip exercise
12	LAVA FLOW HAZARDS, MODELS & SIMULATIONS	1, 2,3,5	
13			
14	LAVA LAKES		(IV) Final Project
15		2,3,4,5	
16	SUBMARINE LAVA FLOWS	1,2,3,5	

***SLOs - Student Learning Objectives**

Earth Science undergraduate courses have to consider how they address a number of SLOs, which the ES department has decided are key attributes and/or abilities of any ES student:

1. Students can explain the relevance of earth sciences to human needs, including those appropriate to Hawaii, and be able to discuss issues related to geology and its impact on society and planet Earth.
2. Students can apply technical knowledge of relevant computer applications, laboratory methods, and field methods to solve real-world problems in geology and geophysics.
3. Students use the scientific method to define, critically analyze, and solve a problem in earth science.
4. Students can reconstruct, clearly and ethically, geological knowledge in both oral presentations and written reports.
5. Students can evaluate, interpret, and summarize the basic principles of geology and geophysics, including the fundamental tenets of the sub-disciplines, and their context in relationship to other core sciences, to explain complex phenomena in geology and geophysics.

Disability access: If you have a disability and related access needs the Department will make every effort to assist and support you. For confidential services, students are encouraged to contact the Office for Students with Disabilities (known as Kōkua) located on the ground floor (Room 013) of the Queen Lili'uokalani Center for Student Services.

URL: www.hawaii.edu/kokua and email: kokua@hawaii.edu

Academic Dishonesty: Academic dishonesty will be reported, and any exams or assignments affected by dishonesty will receive "0" credit and cannot not be retaken.

Title IX: The University of Hawaii is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking. If you or someone you know is experiencing any of these, the University has staff and resources on your campus to support and assist you. For more information regarding sex discrimination and gender-based violence, the University's Title IX resources and the University's Policy, go to: <http://www.hawaii.edu/titleix>