FIELD GEOLOGY OF LANAI', MOLOKA'I AND KAHO'OLAWE

GG 213

SPRING, 2011

March 19 – 24, 2011

A five-day field course to the islands of Lanai', Molokai', with discussion of Kaho'olawe. A survey of Hawaiian volcanology and geomorphology illustrated by field studies of the four volcanoes that created these islands. Students are responsible for air and ground transportation, meals, and lodging [exceptions noted below].

1 credit hour; prerequisite – completion of or concurrent registration in GG 103 or GG 101, or consent of instructor; no recommended special preparation; basic reading skills required; partially satisfies natural science requirement for Assoc. in Arts degree in the community college.

Dr. Floyd W. McCoy  

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* a message is recorded here, changed weekly, concerning field trips, assignments, etc.

Consultation hours: Mon., 1000 – 1230; Tues. 0900 – 1:00 p.m.**  
other times by appointment

** best to look for me first in the laboratory, then at my office.

Recommended Reading:  
Macdonald, Abbott and Peterson; Volcanoes in the Sea, The Geology of Hawaii; Univ. Hawaii Press, 1983 (2nd edition); chapters 6 - 10, 14 - 16, & 20; or corresponding chapters in  

Ancillary Reading and Events: Supplementary, non-required reading is in the library, both on reserve and on open shelves; you are encouraged to peruse this literature; numerous seminars, talks, symposia and exhibits occur throughout the university system and at various museums, you are particularly encouraged and welcomed to these.

Course Objective: To spend 5 days on these islands to study the geologic structure and history of (1) the Lanai' volcanic shield; (2) the east and west Molokai' volcanic shields, the latter with its post-errosional volcanics at Kalaupapa; (3) post shield-building processes of erosion and deposition on these islands; (4) geological processes active in sculpting Hawaiian landscapes, including catastrophic events; and, (5) the future of the islands in terms of geologic and anthropogenic processes. A side trip to, or chartered flight over, Kaho'olawe will be offered if possible – access constraints at the moment make any landing and hiking on this island difficult, if not impossible given time constraints.

Field Conditions/Clothing: Most field sites are only a short hike from vehicles. The longest hike (ca. 3 hrs) will be down to Kalaupapa along a well-marked but rutted/muddy/rocky trail. It will be hot, dusty and dry during the day and chilly at night. You will need sweaters and jackets for cool nights, in addition to rain gear. Hats and sunscreen help. An optional short hike up Halawa valley on Moloka'i requires crossing a waist-deep stream a few times; bathing suits are nice here. You must have adequate hiking shoes. Shorts are adequate for all day trips and hikes. A day pack (backpack) is highly recommended for hikes.

CONSTRAINTS ON CHARTERED AIRCRAFT RESTRICT EACH STUDENT TO NO MORE THAN 40 LBS (18 KG) OF BAGGAGE

Transportation: On Molokai' we share in the rental of vans/cars. On Lanai', we rent four-wheel drive vehicles. Airplanes will transport all of us from Kalaupapa to Lanai' City; these are small chartered airplanes – commercial flights are not available for this part of the trip. One of these aircraft will fly baggage from "topside" Molokai' to Lanai' (so we don't have to backpack it down the trail) – remember that there is a 40 lb./18 kg. weight limit.

Facilities and food: The first two nights will be in or near Kaunakakai – arrangements are your responsibility. For the nights on Lanai' we'll sleep on beds/floors in three houses in Lanai City. If you do not wish to stay in the houses on Lanai', you shall have to make your own arrangements for those nights – be aware that accommodations on Lanai' are scarce and expensive. Lunch will be in the field, purchased at local stores that morning or the night before. Breakfast and dinner will be at local restaurants.

Travel arrangements to Molokai' and from Lanai': This is your responsibility. Plan your itinerary to correspond to the field trip schedule. Arrivals after field-trip starting times cannot be accommodated, but we will wait for late arrivals on delayed flights providing we know you are on the flight. Do not book your departure prior to the time scheduled for the end of the field trip - we will be out in the country and cannot get to the airport earlier; simply stated: you will miss your flight. Book flights as soon as possible. Commercial aircraft to these islands are small with a limited number of seats.
Expenses: As noted above, you are responsible for making your air travel arrangements to Molokai and from Lanai, and paying for them. Vans, four-wheel drive vehicles, gasoline and rooms on Lanai are shared costs; these are calculated and paid for via a deposit. Be aware that once you have committed to share in van rental/gas costs and vans are booked accordingly, you are expected to contribute to these costs even if you decide later in the trip to ride in a private car/van (unless other arrangements were made previously). You are also responsible for booking and paying for lodgings on Molokai. Food and drink also are your responsibility. Shared costs, paid for in the deposit, thus include: rental cars/vans, gasoline, lodging on Lanai, and air transportation from Molokai to Lanai.

Shared costs are paid to the WCC Business Office as a deposit – credit for the course may not be given until this deposit has been paid.

Deposit = $ 500 tentative, costs are still being assembled --- consult with Dr. McCoy if you are not clear about what this covers (it is discussed above - please do not ask the Business Office about costs because they do not have this information).

Final examination and grading: A course grade will be determined by accomplishment either in your final laboratory report or in a final written examination (if the latter, it will be on file at The Learning Center [at WCC] to be taken at your convenience but done prior to the end of finals period). Grades assigned with: A = 90-100 points, B = 80-89 points, C = 70-79 points, D = 60-69 points; less than 60 points = fail (F). Under special conditions, with consent of the instructor, a grade for no credit (NC) could be given; N can be assigned where unforeseen difficulties prevent completion, again with consent of the instructor.

Laboratory report: A major focus of this field course is to understand the scientific method and its use to resolve scientific questions (if it can be resolved), and in this course we shall find many questions as we study the landscape. As a science laboratory, we shall have a long field exercise on Molokai. You will be provided with all equipment needed for this exercise, including data sheets. You will be responsible for assembling, plotting, and discussing these data in your final field report, submitted before the end of the semester (last day of classes). It is also recommended that you bring a notebook for recording notes and thoughts as we discuss how this landscape came to be from a geological and historical perspective, and what its future might be.

Health alert: The hike down to Kalaupapa and around the peninsula is not particularly difficult (portions of the trail are in repair after being washed out). The alternate hike up Halawa valley is long and portions somewhat difficult. Swimming in the Halawa stream and pool is no longer recommended because of an infestation of leptospirosis - read the accompanying sheet concerning this disease - and by all means do not drink the stream water. The field exercise will be over irregular terrain on a wide cleared area under hot sun with no shade. Travel on Lanai is over very rough roads in open cars - you must drive slowly and wear a seat belt. Please read the accompanying material concerning health and physical conditions during this field trip.

Medical and waiver forms: these are available in a plastic tray outside Hale Imiloa 115 (to the right of the door attached to the display cabinet). All forms must be returned to Dr. McCoy prior to the trip. It is highly recommended that you not participate in this course if you have asthma or other respiratory problems, heart or circulatory problems, are pregnant, have problems hiking, get motion sickness, or have acrophobia.

Medical forms must be completed and submitted before you can participate in the course. If you have participated in a previous field course, you need not submit a new medical form.

Other notes and constraints: This is a University of Hawaii accredited course, thus no liquor or drugs are allowed during official activities.

Participation by spouses and children is not recommended - your full participation is required for credit. Travel in rental cars/vans/jeeps, participation in the segment on Kalaupapa, as well as travel on aircraft from Kalaupapa to Lanai, are restricted to those registered in the course. Vehicle rentals and accommodations are confirmed for only those registered in the course; others must make their own arrangements.

If you make private arrangements for rooms and cars, plan to meet each day at either the first field-site or at a pre-arranged location.

This is a one (1) credit course. No special preparation is required, but there are physical and health constraints. Recommended basic skill-levels are college level reading capability. At WCC, this course partially satisfies AA degree requirements and counts as a laboratory course in physical science. At UHM, this course partially satisfies the requirement in the General Education Core, as well as in the College of Arts and Sciences.

Portions of the trip involve hiking, sometimes over difficult terrain that can be physically demanding. Accordingly be aware that participation on such hikes requires appropriate physical prowess and conditioning. Flying from Kalaupapa to Lanai’i is via small airplanes, and the trip is rough and noisy; commercial flights are not available.

Realize that the schedule for daily activities is tentative and subject to change. Announcements of changes will be made prior to the trip in class and on messages at the office telephone number given above, or during the field trip.

Itinerary/dates: A tentative itinerary of daily activities is attached; important dates to remember are these:

MEDICAL AND WAIVER FORMS DUE TO DR. MCCOY PRIOR TO THE TRIP

DEPOSITS SHOULD BE PAID TO THE WCC BUSINESS OFFICE PRIOR TO THE TRIP

FIELD TRIP STARTS: HOTEL MOLOKA’I, 10 am, SATURDAY, MAR. 19th;

FIELD TRIP ENDS: LANAI AIRPORT, 1 pm, THURSDAY, MAR. 24th.
TENTATIVE ITINERARY - GG 213

Saturday March 19  Geology of East Molokai

1030  meet at Hotel Molokai, or Molokai Shores hotel [TBA] for lecture, safety briefing, etc.
1145  Kaunakakai - the later geological history of Molokai: sand dunes and sea-level fluctuations
1130  buy lunch/eat in Kaunakakai
1330  Kaunakakai – deposits left from giant tsunami (megatsunami) and implications of such an event
1500  Kamalo at St. Joseph’s church - post-caldera volcanism: trachyte dome and block flow
1545  Waialua – the latest history of Molokai: Weloka Heiau (if access is open)
1645  Pohakuloa Point – feldspar crystals in basalts; deep erosion of the shield volcano; spheroidal (chemical) weathering and soil development; the later geological history of Molokai; sea-level fluctuations
1715  Halawa Valley overlook – erosion and formation of deep valleys; influence of sea-level fluctuations on
1745  Halawa Valley – fluvial processes; influence of sea-level changes on valley formation; nearshore processes; ancient Hawaiian loi and auwe systems
1830  alternate hike up Halawa Valley (1st waterfall); return to Kaunakakai

--- purchase water and food for picnic lunch on Sunday ---

Sunday March 20  Geology of Central and West Molokai (Mauna Loa)

0830  depart Molokai Shores hotel
0900  Field Exercise - Kaunakakai – mapping deposits left from giant tsunami (megatsunami)
1145  Landfill road – the later geological history of Molokai; more deposits left from giant tsunami
1215  Kalaupapa overlook – rejuvenated volcanism; large landslides and collapse of volcano
1300  Paalau State Park (Kalaupapa overlook) – picnic lunch
1430  Maunaloa highway road cut – shield-building processes - thin aa lava flows; geological history of the Mauna Loa shield volcano
1600  Papohaku beach (south end) – the later geological history of Molokai; beaches and coastal processes; ancient sand dunes; sedimentary rocks; sea-level fluctuations
1645  Papohaku beach (north end) and Puu o Kaiaka – shield-building processes: rift zones and volcanism; cinder cones and pyroclastics; the later geological history of Molokai: sea-level fluctuations; formation of beach rock
1830  return to Kaunakakai

--- purchase water for hike to Kalaupapa and food for picnic lunch at Kalawao ---

Monday March 21  Kalaupapa/Kalawao

0800  depart hotel
0815  drop baggage at airport for transport to Lanai
0830  Kalaupapa overlook - collect at trailhead for instructions – hike down to Kalaupapa – upon arrival at the bottom of the trail, remain in grassy field and parking area and wait for others to arrive – under no circumstances either swim or hike into Kalaupapa town until we are all down the trail and our guide has arrived with the bus!
0845  rental cars returned to airport, drivers taken to trailhead for hike into Kalaupapa morning brief tour of town and its history; drive then hike up to Puu Oao – rejuvenated volcanism: Kauhako crater; lava tubes
noon  Kalawao – cultural history; historic churches and other buildings; “sea cliffs” and collapse of volcanic edifices; picnic lunch
afternoon drive/hike around peninsula to airport – lava flows; lava tubes
~1730  Kalaupapa airport for chartered flights to Lanai
~1845  Lanai; pick up cars; settle into houses, dinner in Lanai City
**Tuesday March 22 Lanai**

0900 meet at designated house, leave for Munro Trail
0930 Munro Trail [rugged and muddy four-wheel drive road], Lanaihale – geological history of the Lanai volcano; chemical weathering and soil-forming processes; aeolian (wind) erosion; orographic rainfall; former caldera in Palawai Basin
1230 lunch in Lanai City
1400 depart for “Garden of the Gods” – aeolian erosion; anthropogenic effects on the geological history of Lanai and historic (mis)mismanagement of the landscape
1530 Polihua - [rugged and rough four-wheel drive road] later geologic history of Lanai volcano (if exposures are uncovered); aeolian processes; contemporary beach and coastal processes; beachrock formation
1700 return to Lanai City for dinner

**Wednesday March 23 Lanai**

0900 meet at designated house, leave for Hulopoe and Manele Bay
0930 Hulopo‘e Bay – short hike on fisherman’s trail along cliff edge to Kapikaa Bay, later geological history of Lanai; deposits from giant tsunami (megatsunami)
1100 Manele Bay – shield-building and rejuvenated volcanism; rift zones; cinder cones; sea-level fluctuations; coastal erosion
1230 lunch in Lanai City
1330 depart for Keomuku road
1415 ancient Hawaiian petroglyphs at coastline – use of weathered lava surfaces in antiquity
1445 Laehi – later geologic history of Lanai; aeolian activity; sedimentary rocks; chemical weathering
1530 Option 1: drive to Naha [muddy bumpy road] – later geological history of Lanai: coastal plain evolution; beach rock and sea-level fluctuations
   Option 2: drive up Maunalei Gulch – ground water; springs; lo‘i; valley formation and stages
   Option 3: do both option 1 and 2 (if there is time)…
1745 return to Lanai City for dinner and night

**Thursday March 24 Lanai**

0900 meet at designated house; leave for Kaunolu (if road is passable)
1000 Kaunolu (extremely rugged and rough four-wheel drive road, may not be passable) - shield-building volcanism; stream valley evolution; ancient Hawaiian village
1230 airport, drop-off all but car drivers
1300 return cars in Lanai City; drivers catch bus to airport