LANDFORMS OF THE WORLD

GEOGRAPHY 175

FALL 2004

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OVERVIEW

The goal of this course is to help you understand how landforms develop. The term geomorphology *is often used for the topic.*

- *This knowledge is an essential part of our comprehension of the world because of the many ways in which landforms affect the human and non-human environments.*

- *The skills involved in landform study are important because they are so easy to generalize to other inquiries: the basic lesson is that we can teach ourselves about the world through our own powers of observation and analysis.*

CONTENT

The landforms of the world -- plains, coasts, mountains, valleys -- have been created by sets of forces acting together or in opposition over exceedingly long periods of time.

Two major types of forces work on the landscape:

- *endogenic* forces within the earth (the same forces that drive earthquakes and volcanoes) create, deform, and push-up the rock that is the framework of all landforms;

- *exogenic* forces upon the earth (such as streams, glaciers, and waves) sculpt that rock into the topographic shapes around us.

The analysis of landforms is the process of learning to recognize the particular sets of forces -- and the particular length of time -- responsible for a particular landscape. We have some precise terms to identify the more common or more important landforms.

A powerful idea within geomorphology is equilibrium . . . the presumption we make that natural systems are usually stable. We expect, for example, that the soil on a hillside is eroding away at the same rate that it is being formed; we expect that the types of processes working on the earth today to be the processes that worked on the earth a billion years ago.

Essential to the study of the landscape is our ability to observe it. We will work both with the actual land -- during our field trips -- and with various models -- maps, photos, graphs, diagrams, and descriptions.

ORGANIZATION

The course has several components:

1. Lecture period is devoted to introducing new ideas, processing reading material and homework, discussing and answering questions. I intend to provide daily outline of the essential points & terms from lecture.

2. Lab period is meant to provide more direct experience with actual landforms and landform components . . . through fieldtrips, map work, and data manipulation.

3. Readings will come from two books and from handouts. The books are:

   - *The Control of Nature* — by John McPhee—provides case studies of dramatic geological hazards.

   - *Geosystems: An Introduction to Physical Geography* — by Robert W. Christopherson — a physical geography textbook to give you descriptions, diagrams, and examples of the topics we cover in class.

4. Expect a quiz every Friday on the material covered since the previous one. No make-ups, but I'll drop your lowest grade.

5. Two projects will be assigned. The first will be a brief report about a type of landform, and the second will be a detailed analysis of a landscape, based on your own observation.

6. Three exams are scheduled (including the final). You will need to be able to use the ideas from the course (and not simply to remember the terms); we'll have lots of preparation for this before the first one.

EVALUATION

Here are the projected grade weights. All grades are scaled against your colleagues, and rescaled at the end of the semester with these relative weights.

- Two hourly exams, 15% & 17% 32%

- Weekly quizzes 14%
- Final exam 25%
- Lab reports +10% to -30%
- Landscape project 15%
- Class participation +/-5%
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HELP

Please see me if I can give you advice on how to study, if I can guide you to other books to help you, or if I can help clarify specific concepts. I am generally available in my office MWF 11 & 3, or you may make an appointment by e-mail or after class.

TENTATIVE SCHEDULE

Date	Day	topic	Readings
25-Aug	W	Introduction	Ch 1 to p.8; pp 13 - 4
26-Aug	Th	***LAB I: Maps & air photo***	Ch 1, pp 15 +
27-Aug	F	Why do we still have mountains?	pp 8 - 13
30-Aug	M	Endogenic & exogenic forces	pp 320 – 1, pp 356 – 61
1-Sep	W	Landscape evolution	pp 399 - 403
2-Sep	Th	***LAB II: Introduction to streams (field)***	
3-Sep	F	Water cycle	Ch. 7 to p.189
6-Sep	M	Groundwater & stream lag	Ch. 9 (esp. to p. 265)
8-Sep	W	Stream transport	pp 428 – 33, 437 - 43
9-Sep	Th	***LAB III: Rain and runoff***	
10-Sep	F	Graded stream	pp 443 - 6“
13-Sep	M	Alluviation	pp 446 – 53“
15-Sep	W	Deltas & fans	Mcphee: Atchafalaya;
16-Sep	Th	***LAB IV: Nittany mountain (field)***	
17-Sep	F	Stream pattern	pp 433 – 6
20-Sep	M	Landscape evolution	
22-Sep	W	Evidence of changing conditions	
23-Sep	Th	***LAB V: The work of streams***	
24-Sep	F	***EXAM I***	
27-Sep	M	Flood hazard	pp 453 – 8
29-Sep	W	Slope processes	pp 411 - 23
30-Sep	Th	***LAB VI: Rocks & weathering (half field)***	
1-Oct	F	Slope hazard	McPhee – “Los Angeles against the mountains”
4-Oct	M	Weathering	pp 403 - 411

6-Oct	W	Differential erosion	
7-Oct	Th	***LAB VII: Bear Valley (field)***	
8-Oct	F	Landscapes of weathering	
11-Oct	M	Rock types	pp 321 - 39
13-Oct	W	Rock cycle	
14-Oct	Th	***LAB VIII: Nippenose (field)***	
15-Oct	F	no class scheduled	
18-Oct	M	Plate tectonics	pp 340 – 52
20-Oct	W	Types of plate margins	pp 361 - 75
21-Oct	Th	***LAB IX: Computers and physical geography***	
22-Oct	F	Global tectonic patterns	pp 375 - 95
25-Oct	M	***BREAK***	
27-Oct	W	The geological map	
28-Oct	Th	***LAB X: Structure and topography***	
29-Oct	F	***EXAM II***	
1-Nov	M	Plateaus & cuestas	
3-Nov	W	Landscape evolution on folded structure	Lewis & Marsh
4-Nov	Th	***LAB XI: Flood frequency***	
5-Nov	F	The Ridge & Valley	
8-Nov	M	Physiographic regions of the US	
10-Nov	W	Glacial processes	Ch. 17
11-Nov	Th	no class scheduled	
12-Nov	F		
15-Nov	M	Features of continental glaciation	
17-Nov	W	Glacial regions	
18-Nov	Th	***LAB XII: Glaciated landscapes***	
19-Nov	F	Pleistocene & humans	
22-Nov	M	Aeolian & arid landscapes	Ch. 15
24-Nov	W		
25-Nov	Th	***BREAK***	
26-Nov	F		
29-Nov	M	Work of waves	Ch. 16
1-Dec	W	Emergent & submergent shorelines	
2-Dec	Th	***LAB XIII: Coastal landscapes***	
3-Dec	F	Coastal hazards	
6-Dec	M	Human response to hazard	