Registrar's Office
Fall '92

GEOGRAPHY 130

Introductory Physical Geography I
Introduction to Geomorphology

Lectures: T,R - 9:30 - 11:00 Room J201

Text: Strahler and Strahler, 1987, Modern Physical Geography, Third Edition. Wiley.

Instructor: J. A. Campbell Office: L111

Labs: Lab 1 - R, 3:00 - 5:50 Room J101

Course Background

Geomorphology is the scientific study of landscape; the word derives from various Greek roots - *geo* (earth), *morphē* (form) and *logia* (science). Taken literally, this would mean that geomorphology was the study of the form of the earth, but geomorphology more specifically is the study of landforms: it includes not only the forms but the materials of which they are composed and the processes responsible for their formation. The surface of the earth is a very dynamic zone, representing the interface between the atmosphere (the gaseous envelope that surrounds our planet) and the lithosphere (the outer layers of rocks which form the earth's crust). One of the most important components in this interface is water and the hydrosphere often acts as a barrier between the atmosphere and the lithosphere. Geomorphologists (who include physical geographers and geologists) are concerned with the origin of landforms; how landforms change over time and how the various landforming processes influence the way in which the landscape evolves.

It is important to have an understanding of how temporal and spatial scales affect the way in which we view landforms and landscapes. It is, for example, impossible to understand the landscape of the Peace region without knowing that about thirteen thousand years ago an ice mass, several hundreds of metres thick, covered the area. Geomorphology is not a static science. The forms that compose landscapes are everchanging, some rapidly and some imperceptibly. Together they give a character to the scenery which has often inspired great writers and artists. The science of geomorphology is a necessary adjunct to areas of study such as ecology, anthropology and even history, as well as other more directly related fields such as agriculture, soil science and civil engineering. More importantly, geomorphology forms a vital part of our environment. We have had, and are increasingly having, massive impacts on the landscape. Human activities can have important geomorphological effects which may, like purely natural processes, be adverse of beneficial.

Course Organization

In addition to lecture materials you will be expected to be thoroughly familiar with the assigned readings from the textbook. These are keyed to the lecture topics in the attached lecture schedule. As with any book, some material is covered well and other topics are not so well discussed. You will therefore find it desirable, and probably essential, to make use of other references. There are a number of relevant texts on reserve in the Learning Resource Center to which frequent reference should be made. Ask for the Geography 130 reserve list of texts. You will gain more from the course if you read "ahead" of my lectures so that you will be familiar with some of the terms and concepts before I have discussed them.

Project, examination and mark weights

1. Mid-term project. Due week of Oct. 19. Weight - 25%.

2. Final examination. Date and place as specified in examination schedules. Short answers, diagrams and essays. Will cover entire course but stress will be on material covered since mid-term. Weight - 40%.

3. Laboratory exercises. The total weight for the laboratory work is 35% of the course. There are 8 labs to be completed (see attached list for schedule and topics).

Laboratory Exercises

There are eight lab exercises to be completed. The following list indicates the title of the lab and gives the date of the week in which the lab occurs. Note that labs for this section of Geography 130 are done on either Tuesday or Thursday depending on your lab registration.

Bring your text, a ruler, a scratch pad and a couple of coloured pencils to the lab. Labs may be done in pencil or ink. A calculator will be required for a least the first two labs and may be useful in other labs.

Lab	Lab Title	Week of (Tues/Thurs.)
1	Introduction to Topographic maps I	Sept. 6
2	Topographic maps II	Sept. 13
3	Maps and geology	Sept. 20
4	Hydrology	Sept. 27
5	Karst landscapes	Oct. 4
6	Stream processes	Oct. 11
7	Fluvial geomorphology	Oct. 18
8	Glacial landforms	Oct. 25

TIMETABLE

No.	Date	Lecture Topic	Strahler Text Readings* 3rd Edition	Strahler Text Readings* 4th Edition
1	Sept 8-12	Introduction, spatial and temporal scales, systems	Intro. p218-219 p47-52	Intro. p33-37, 229-231 Chapter 25
2	Sept 14-18	Maps and landforms, location, contour maps	Chapter 1 p68-77, Append. III	Chapter 1 p3-12, p38-41 Append. I, II, III & IV
3	Sept 21-25	Earth Materials, rocks and minerals	Chapter 12	Chapter 12
4	Sept 28-Oct. 2	Earth Building, continental drift, earthquakes, vulcanism, structures	Chapters 13, 14 & 18	Chapters 13, 14 & 19
5	Oct 5-9	Hydrology, hydrologic cycle, runoff	p166-171, Chapter 11	Chapter 16, p161-170
6	Oct 12-16	Weathering, erosion, slopes, mass movements	Chapter 15, p292-296	Chapter 15, p343-353
7	Oct 19-23	Karst landforms and processes	p262-263	p359-361

No.	Date	Lecture Topic	3rd Edition	4th Edition
8	Oct 26-30	Fluvial geomorphology, streamflow, drainage systems	Chapter 16	Chapter 17
9	Nov 2-6	Glacial geomorphology, the Pleistocene, glacier dynamics	Chapter 21	Chapter 22
10	Nov 9-13	Periglacial geomorphology, permafrost, patterned ground	p269-273, p349	p294-297, p436
11	Nov 16-20	Desert Geomorphology, dunes, fans, pediments	p296-303, p342-347	Chapter 21, p347 -351, p535-539
12	Nov 23-27	Coastal geomorphology, wave action shorelines	Chapter 19, p347-349	Chapter 20, p364-366

* Be sure to examine the various colour plates that are referred to in the readings and pay special attention to the diagrams in the text. Diagrams can be a very useful way of expressing concepts and it is often easier to remember what a diagram means than a page of text.

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READING PLANET UNDER STRESS

Planet Under Stress, 1990. eds. Constance Mungall and Digby J. Mclaren, Oxford University Press, Toronto.

1. SPATIAL AND TEMPORAL SCALES, AND ENERGY FLOW

Our Planet Observed: The Assault by Homo Sapiens; Dynamics of Planet Earth. William S. Fyfe, Surprise and Opportunity In Evolution, In Ecosystems. In Society, C. S. Holling and Stephen Bocking, 1990. Chapters 1, 2 & part of 14 pp. 1-45, & 245-292.
Summing It Up, J. Stan Rowe, Chapter 16, pp 322-332.

2. MAPPING & REMOTE SENSING

Satellite Remote Sensing, Ursala M. Franklin, pp263-268.

4. EARTH BUILDING: CONTINENTAL DRIFT, EARTHQUAKES, VULCANISM, STRUCTURES

Our Fragile Inheritance, W. Richard Peltier, Chapter 3 pp 80-95.

5. HYDROLOGY

Fresh Waters in Cycle D. W. Schindler & S. E. Bayley, Chapter 7 pp149-167

9. GLACIAL GEOMORPHOLOGY, GLACIOLOGY

Approaching Today John V. Mathews Jr 1990. Chapter 4 pp96-114.

11. DESERT GEOMORPHOLOGY

Grasslands into Deserts, John Stewart, Holm Tiessen, 1990. Chapter 9 pp188-208.

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READING REFERENCE TEXT LIST

GENERAL REFERENCE

Oxford Illustrated Encyclopedia: The Physical World, 1986, Sir Vivian Fuchs (Ed.) pp 374.

Penguin Dictionary of Physical Geography, 1987, J. Whitlow

Briggs, D., P Smithson and T. Ball. 1989. Fundamentals of Physical Geography. Canadian Edition, Copp Clark Pitman Ltd., Toronto.

The Geomorphology of Canada: An Introduction, Alan S. Trenhaile 1990, Oxford University Press, Toronto.

6. WEATHERING: SLOPES, EROSION, MASS WASTING

Weathering Processes, Chapter Three in Pedology Weathering and Geomorphological Research, 1974. Peter W. Birkeland, Oxford University Press, New York, pp 52-80.

7. KARST

Chapter 10: Karst, In The Geomorphology of Canada: An Introduction, Alan S. Trenhaile 1990. Oxford University Press, Torontopp-209.

10. PERIGLACIAL GEOMORPHOLOGY

Chapter 7: Periglaciation, In The Geomorphology of Canada: An Introduction, Alan S. Trenhaile 1990. Oxford University Press, Toronto. pp119-139.

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READING REFERENCE LIST

2. MAPPING & REMOTE SENSING

Uncommon Landscapes: Maps in a New Age of Scientific Discovery, Stephen S. Hall, 1991. The Sciences, September/October 1991, pp16-21.

4. EARTH BUILDING: CONTINENTAL DRIFT, EARTHQUAKES, VULCANISM, STRUCTURES

Plateau Uplift and Climatic Change, William F. Rudmann and John E. Kutzbach, 1991. Scientific American, March 1991, pp66-75.

Icebound Eden, Harry Thurston, 1986. Equinox, 27, May/June 1986, pp72-85.

There's Geothermal Energy Down in the Mines: A hard luck Nova Scotia town finally has something to cheer about, Ralph Surette and Wayne Barrett, 1991. Canadian Geographic June/July '91, pp78-82.

5. HYDROLOGY

The Role of Soil Physics in Modern Agriculture, Keynote Address, Daniel Hillel, 1990 In Proceedings of The International Symposium on Applied Soil Physics in Stress Environments, 22-26 January 1989, Islamabad Pakistan, Barani Agricultural Research And Development Project, Pakistan Agricultural Research Council, Islamabad, pp5-8.

Saving Water for Agriculture, Chapter Three, Sandra Postel, 1990. In State of the World, A Worldwatch Institute Report on Progress Toward a Sustainable Society, W. W. Norton & Co. New York, pp38-58.

Age Old Challenge: Water and the West - The wasteful use of water may be how the west is lost, Bruce Babbit, 1991. National Geographic June 1991, pp2-35.

The Trouble at Great Whale, Augusta Dwyer, 1992. Equinox January/February 1992, pp28-41.

7. KARST

Charting the Splendors of Lechuguilla Cave, Tim Cahill, 1991. National Geographic, March 1991, pp29-58.

8. FLUVIAL GEOMORPHOLOGY, STREAMFLOW

Lash of The Dragon, Daniel Hillel, 1991. Natural History 8/91, 28-37.

Dammed and Diverted: Hydro projects in northern Manitoba have irreversibly disrupted the landscape and a way of life. Permafrost was the unknown factor. Larry Krotz, 1991. Canadian Geographic Feb/March 1991, pp36-44.

River Under Siege: B. C.'s wetlands face an uncertain future, Kevin Higham, Betty Baird and Terry Willis, 1991. Canadian Geographic April/May 1991, pp54-65

11. DESERT GEOMORPHOLOGY

Northern Dunes: The Strange ice-age desert of Lake Athabaska, Robin and Arlene Karpan, 1991. Canadian Geographic June/July '91, pp43-50.

Expansion and Contraction of the Sahara Desert from 1980 to 1990, Compton J. Tucker, Harold E. Dregne and Wilbur W. Newcomb, 1991. Science 253, pp299-301.

12. COASTAL GEOMORPHOLOGY

The Folly at Folly Beach: and other failings of U. S. Coastal Erosion Policy. Rutherford H. Platt, Timothy Beatly and Crane Miller, 1991. Environment Vol. 33, No. 9, November 1991, 6-32.

North Carolina's Outer Banks: Awash in Change. Charles E. Cobb, Jr. and David Alan Harvey, 1987. National Geographic Vol. 172, No. 4, October 1987, 485-513.