ES322 Geomorphology Mid-Term Study Guide
Fall 2006

Study Tips

- go through the web site, look at the figures and slide shows, compare to notes
- use study guide in combination with notes
- go back through the in class / lab exercises, make sure you can work the math / units
- spend a couple days studying, the exam will be essay and there is much material.
- don't wait until the last minute!
- carefully go through the notes, some of the material we briefly discussed, but did not spend much time on in class... but the notes will give you the detail
-Exam format: Part 1. Closed book short answer / essay. Part 2. Open-book lab-style problem solving.

Key Words

Introduction

landscape construction
    tectonics
landscape destruction
    weathering
    erosion
    denudation
driving mechanisms
    climate / solar energy
    tectonics / internal
    gravity
process rates
Earth Systems
uniformitarianism
Davisian Cycle
    youth
    mature
    old age
    peneplane
process-response models
Systems
    mass and energy flux
    isolated system
    closed system
    open system
    steady state system
equilibrium concept
Hack / dynamic equilibrium
driving force vs. resisting framework
force
energy
kinetic energy
potential energy
work
climate controls
    insolation
    precipitation
    temperature
gravity controls
tectonic controls
resisting framework
    lithology
    rock structure
resistant vs. non-resistant lithologies
geomorphic thresholds
extrinsic vs. intrinsic
critical angle
Constructional landforms
destructional landforms
exogenic processes
endogenic processes
isostacy
isostatic rebound
crustal uplift / isostacy
rates of crustal uplift
rates of crustal denudation
Quaternary (when ?)
Pleistocene
Holocene

Weathering

mass transfer
weathering
sediment / grain size
"sediment" vs. rock
erosion
denudation
bedrock
regolith
residuum
colluvium
alluvium
diamicton
eolian
glacial
till
drift
lacustrine
deltal
pedogenesis
O,A,B,C, R
porosity
clay
clay size
clay minerals
joints
faults
permeability
physical weathering
frost wedging
unloading
sheeting
exfoliation
thermal expansion
organic activity

root wedging
clay expansion
thermal expansion
chemical weathering
water molecule
volume expansion
hydrolysis
pH
chelation
hydration
oxidation
ion exchange
solution
parent material
aspect
soil
horizonation
eluviation
illuviation
soil color / color index
soil profiles (A, B, C)
soil percolation
soil translocation
weathering rinds
relative dating
iron accumulation
phyllosilicates / clays
hydrous alumino silicates
bowen's reaction series
temp-pressure reactions

soil forming factors:
climate, parent,organic
time, slope/relief/aspect

coastal wave-cut terrace
soil correlation
hollow
side slope
channel
floodplain
dune
terrace
levee
sediment texture
diamicton
colluvial
alluvial
glacial

salt wedging
law of superposition
law of geomorphic position

Mass Wasting / Hillslope Process

potential energy
kinetic energy
force
stress
joules
newtons
shear force
normal force
shear stress
normal stress
shear strength
slope stability
internal friction
pore pressure
cohesion
safety factor
coulomb equation
mass wasting
angle of repose
slope angle
hillslope
rock
debris
earth
fall
topole
slide
slump
flow
lacustrine
eolian

head scar
creep
solifluction
avalanche
landslide classification
flow velocity
laminar vs. turbulent flow
channel erosion

Aerial Photographs

air photo
electromagnetic spectrum
wavelength
frequency
speed of light
reflected light
stereo pair
stereoscope
altitude / camera height
focal length
photo scale
relief displacement
principal point
vertical exaggeration
orthophoto

Geomorphic Mapping Criteria
(see new notes on web site)**
Landform
Material
Process
Age
nose

Quantitative Skills

Process Rate Calculations
Basic map reading / landform identification from a topographic map.
Given a rate of weathering and "soil erosion", calculate the equivlalent rate of crustal denudation and rock erosion

From a topographic map, caculate hillslope gradient (in degrees, in percent, in ratio form)

Draw a topographic profile from a topographic map.

Plot soil texture data on a triangular diagram, determine soil classification, calcuate soil texture parameters

calculate potential energy, kinetic energy, force, weight, stress

resolve weight, shear and normal stress from a basic slope problem
be able to work the Coulomb equation, and determine slope stability
air photo scale calculations, other air photo calculations as in lab

identification of basic landforms and geomorphic process by examining aerial imagery

calculating the slope of stream channel or hillslope from a topographic map (in degrees and percent)

Aerial photography calculations: photo scale, height-displacement calculations, photo distortion principles, 3-d viewing of landforms.

Key Concepts

What is convection? What drives it? Give examples of how it influences the Earth.
Give examples of resistant vs. non-resistant lithologies, and how they respond to erosion and landscape evolution.
List and discuss the driving mechanisms for geologic / geomorphic processes.
Give example rates of crustal uplift and crustal erosion
What is the significance of clay minerals at the Earth's surface
What factors effect rates of weathering?
What is the difference between soil and sediment?
What are the soil forming factors, and how are they used as a dating tool in geomorphology?
What are clast weathering rinds are how are they used as a dating tool in geomorphology?
What are the range of processes, landforms, and surficial materials found at the Earth's surface? in western Oregon? Can you make some general sketches showing these geomorphic elements?
What are the physical and chemical weathering processes?
How does the landscape evolve over time? How does this relate to systems theory? Thresholds theory?
What are the typical ranges of rates and processes of erosion and deposition found at the Earth’s surface?