Lecture 1
GEOL/GEOG 321
Geomorphology

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GEO 321 Crew
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  – 293-5603 x 4330 (Good Luck!)
Handouts

Description – “Final”
*Tentative Schedule – is on-line*
Lab Description - Monday
Lab Schedule - Monday

Miscellaneous

321 Labs met Monday but not next week.
Check out:
http://www.geo.wvu.edu/~kite/teaching.htm

Purchase Items for Lab

Readings


*Outside Readings On-Line or Colson Library, ask at desk - Kite: Geo 221:*
name of author (year), e.g. Hooke, 1994
What is Geomorphology?
Bloom, 2nd Edition (p. 1)
The systematic description and analysis of (physical) landscapes & the processes that change them.

What is Geomorphology?
Ritter, Kochel & Miller, 4th edition (p.3):
... the study of landforms.....

What is Geomorphology?
Rhodes Fairbridge (1968)
preface to the Encyclopedia of Geomorphology
"The Science of Scenery"
General Systems Theory

What is a system?
A collection of related objects and the processes relating these objects.

Types of Systems

Isolated system:
nomatter leaks out of system & none comes in.
Closed System:
nomatter leaks out of system & none comes in.
Open system:
energy or matter leaks out of, or is added to system.

Natural Systems

Most geomorphic systems are open.

Steady state (type of open system)
balance between input and out flow.
Steady state implies balance between Driving Forces and Resisting Forces.
“Grade”

- Balance between sediment supply and ability to transport sediment
- Textbook: "delicate balance"

Base Level

Lowest elevation to which a stream can erode

Local Base Level: Rock Outcrop, Lake Level, etc.
Ultimate Base Level: Sea Level

Equilibrium States

- steady state
- dynamic state
- metastable equilibrium
- dynamic metastable equilibrium
Equilibrium States

steady state

Any Property

Time

Equilibrium States
dynamic equilibrium

Any Property

Time

Equilibrium States
metastable equilibrium

Any Property

Time
Equilibrium States

*dynamic metastable equilibrium*

![Diagram of equilibrium states](image)

- steady state
- dynamic state
- metastable equilibrium
- dynamic metastable equilibrium
Geomorphic Thresholds

Straw that breaks camel’s back

Small energy or mass input that produces a change in equilibrium conditions within a geomorphic system

Geomorphic Thresholds

• **Intrinsic:**
  – e.g. collapse of cave roof

• **Extrinsic:**
  – e.g. climate, meteorite impact
Geomorphic Thresholds

Intrinsic:
- e.g. collapse of cave

Extrinsic:
- e.g. climate, humans

Real world geomorphic systems not as simple as in the lab!
= the frustration = the attraction of geomorphology

Concepts = Simple

Real world geomorphic systems not as simple as in the lab!
= the frustration = the attraction of geomorphology
When do you measure stability?

instantaneous? or short term?
or long term?
minute, day, year, 100 years, or
20 million years
"Grade" is time-dependent

time scales and geomorphology

(Schumm & Lichty, 1965)
tens to 100’s of m.y. - cyclic time
intermediate - graded time
minutes to centuries - steady time

hard to find steady time in
terms of water movement

steady time varies in sediment transport
• suspended load?
• dissolved load?
• bed load?
Assignments

Buy Text
Read Chapters 1, 2 & 3 ASAP
Gather Items for Lab:

- Calculator
- 10 sq/in graph paper
- 10 sq/cm graph paper
- Ruler with 1/10ths of inch AND cm (e.g. C-Thru)
- 2H-4H Pencils
- Good Quality Colored Pencils
- Good Soft Eraser
- 3 Ring Binder
- Protractor?
- Tracing Paper?

Next Topic:
TECTONIC GEOMORPHOLOGY