

Chapter 8 Geomorphology

Endogenic and Exogenic processes

Endogenic processes (internal driven) Exogenic processes (external driven)

Super-position Uniformitarianism

UPPER MOST MANTLE + CRUST = LITHOSPHERE
ATHENOSPHERE

What major elements make up the earth's crust?

CONTINENT crust vs OCEAN crust

Isostasy = balance between buoyancy and gravity regarding weight of the earth's crust.

Extrusive rock; from lava (i.e. molten rock exposed at the surface); fast cooling; volcano eruptions; lava flows on surface.

Intrusive rock; from magma (i.e. molten rock NOT exposed to surface); slow cooling; plutons; batholiths, dikes, sills etc. cooled under the surface.

Building Crust; craton, shield, sedimentation, Pluton terranes
Orogeny
Transform faulting on Ocean floor along plate boundaries

Rock cycle-

<u>Igneous</u>	<u>Sedimentary</u>	<u>Metamorphic</u>
Intrusive-Plutons-magma Examples:?	1) Clastic type Examples:?	heat/ pressure Examples:?
Extrusive-flow- lava Examples:?	2) Chemical Examples:?	
Various form and texture	Strata or layers	foliated texture
Variance in Crystal size Viscosity differences Cooling differences	Cementation Lithification Examples of Cementing agents??	Crystals Changed

High viscosity = sticky , stiff lava or magma creating composite volcanoes

Low viscosity = more liquid and flows easily creating shield volcanoes and flood basalts.

Chapter 9 Tectonic earthquakes and volcanoes

Topography =lay of the land

Plate tectonics: Convergent and Divergent plates, Where? What Why?

Subduction zones, Where? What Why?

Sea-floor spreading centers, Where? What Why?

Continental Drift

Hot spot.

Crustal Deformation-

Tectonic activity and landforms;

Ductile Rock v. Brittle rock What is the importance of this to landform topography?

Folded mountains vs

Fault Block mountains vs

Volcanic Mountains

Where? locations of each type in the US, **What?** form taken? **Why?** causes/forces involved.

3 Types of forces and resulting landscape fault types and features

Compression

Tension

Shear

Reverse fault

Normal Fault

Strike Slip Fault

Folded mountains

Fault block mountains

not necessarily mountain building

Where? What Why?

Where? What Why?

Where? What Why?

All of these can come together in areas due to complexities of nature. But dominate stresses occur in most regions,

Earth quakes Common locations of quake activity

Seismic waves

foci

epicenter

asperities

Elastic rebound theory

Volcanism Common locations of volcanic activity Where? What Why?

Explosive vs effusive landform features, conditions, viscosity and characteristics

Landform features: composite volcanoes, shield volcano, flood basalts, sill, dike, batholiths, and fissure

Study Guide GEOG 141

Chapters 10, 11, 14

Chapter 10 Weathering and Mass Movement Read pp. 319-331 and Review of Chapter on pp. 340-342

Terminology:

Denudation

Geomorphology

WEATHERING – disintegration of rock.

Remember Rock is unstable at earth's surface due to conditions upon which they were formed.

Mechanical /Physical Weathering

Frost action

Salt Crystal action,

Tree roots

Pressure release jointing

Chemical Weathering Processes

Oxidation

Hydration & Hydrolysis

Carbonation

Carbonation- Rain (H₂O) dissolves Carbon Dioxide CO₂
H₂O + CO₂ = H₂CO₃ carbonic acid- a weak natural occurring acid
H₂CO₃ = creates “carbonation process” which
Effectively disintegrates limestone, dolomite and carbonate
cemented sedimentary rock over time

All forms of weathering are enhanced by jointing.

Jointing is initiated by tectonic activity and is related to pressure release

Spheroidal Weathering

Regolith

Soil formation is caused by combination of : CLORPT Translated as (C)limate type ,
(O)rganisms/Vegetation types, (P)arent material , (T)ime.

Soil forms in layers called horizons A B C (see video notes)

Karst landforms examples

Stalactite formation, Stalagmite formation due to carbonation process

MASS MOVEMENT

Slope

Threshold = a point where the function of a system (landform or slope) can no longer maintain its functional integrity. It collapses to reach a new operational level.

Threshold of a slope is dependent on gravity, weight of rock, cohesiveness of material, resistance and friction.

Ch 11 River or Fluvial Landforms Read 346-360 plus Key Learning concepts and review

Drainage basin = Catchment area, Watershed 11.2

Drainage divide – highest elevation between watersheds 11.3

Base-level (local, artificial and ultimate)

Confluence

Stream profile 11.18

Sheet flow

Tributary Distributaries 11.26 11.27

Braided Stream 11.4

Alluvium Alluvial Fan 11.25

Aggraded stream (i.e. aggradation process)

Bed-load

Erosion- abrasion, hydraulic action, solution

Transport- suspended load (suspension), saltation, traction, and dissolved load 11.13

Deposition –aggradation; Braided rivers. River deltas, sand bars, point bar

Active floodplain

Terraces: paired landforms that change with climate cycles& human impact 11..24 a&b

Flow and Channel Characteristics

Meanders, point bar, undercut bank (aka cut-bank) 11.15 11.23

Incised or degraded channel, entrenched meander 11.19

Human impact of dam construction.

Glaciers and Landscapes. Chapter 13 pp 409--422 and 428-430

Isostasy regarding glaciers.

Open systems

Ice covers about 11% of planet.

% of fresh water is tied up as ICE

Two basic types of glaciers

Alpine: High elevation and or high latitude regions. Formation Alpine of glaciers Parts of an alpine glacier: Cirque basin 13.6 , **accumulation** zone 13.5 b, **firn** line, **tributary glacier**, 13.5 **Ablation** zone 13.5b 13.5a lateral moraine, end moraines 13.5a.

Landforms of Alpine Glaciers = fjord, see 13.12 U shaped glacial valleys, horns, moraines arêtes, cirques 13.9 compare with 13.10

Continental: 428-430 see all figures and maps

High to mid Latitude areas depending on climate cycle.

Glacial cycles nearly every 100,000 years. Followed by interglacial cycles. Milankovitch sun-earth relationship.

Ice domes, albedo rate changes, **sea level changes**, See maps and diagrams, part of continental glaciers: lobes domes, melt ponds, positive feedback loops.

Landforms of continental glaciers: Kettle lakes, kames, drumlins, eskers, outwash plain, till plain, **loess** (aka glacial dust or glacial flour).

Pluvial Lakes or Paleo-lakes of the American West (Lake Missoula video)

Flow of ice- internal and external , Plastic flow, basal slip, crevasses, glacial surges. P 416

See extent of Pleistocene Glaciation at 18K fig 13.25

Erosion- glacial plucking, abrasion, grinding, gouging, polishing, striations