

Study Guide for 2nd Midterm

The second midterm will consist of 22 - 25 short-answer, matching, and multiple-choice questions which will cover weathering through glaciers. About four to seven of these questions will be on slides. Questions will be similar to those on the first midterm— I will be looking for conceptual grasp and idea associations rather than rote memorization.

I have listed below the terms I expect you to be familiar with. In the test I will not introduce or ask you about other technical terms. The questions below are designed to guide your study, and to indicate the sorts of things and idea–associations I would like you to understand. All questions on the test will be related in some fashion to the study topics or listed terminology.

You may bring for use in the exam a single sheet of paper written on both sides with whatever you wish.

WEATHERING AND SOILS

Know and understand the following terms:

mechanical weathering	soil
chemical weathering	laterite (oxisol)
solution	podzol (spodosol)
exfoliation	desert soil (aridisol)
frost riving (frost wedging)	caliche
salt crystallization (cavernous weathering)	A-horizon
granular disintegration (grusification)	B-horizon
karst	
sinkhole	

1. What is **weathering**? How does it differ from **erosion**?
2. What are the processes involved in mechanical weathering? In chemical weathering?
3. In what environments would you expect mechanical weathering to be most important? Chemical weathering? Why?
4. How does climate affect weathering? How (generally) does it determine the products of chemical weathering? (Consider how climate affects acidity of water, and how that affects what is removed and what remains behind.)
5. What products are formed from weathering of common silicate minerals in cool humid, tropical, and arid climates? What kind of soil forms in each?
6. How do plants affect weathering?
7. By what process(es) do carbonates (limestones, marble, and dolomite) mainly weather? What sorts of distinctive landforms are created by the weathering of carbonates, and how are they created?
8. How are caves formed? Where do they form with respect to the water table?
9. How do sinkholes form? What sort of things tend to trigger their collapse?
10. What are the major geological hazards or problems in areas underlain by carbonates?

HILLSLOPE PROCESSES

Know and understand the following terms:

soil creep
slump

earthflow
colluvium (slide and creep debris)

debris slide/ debris flow

1. What factors tend to cause landsliding? How? (Why do landslides occur?)
2. How can you recognize areas which are likely to have landslide problems?
3. What can we do to try to control landslides?
4. What sort of slides are likely to be most hazardous to human life? To property? Why?
5. What mechanisms cause soil creep?

GROUNDWATER AND RUNOFF GENERATION

Know and understand the following terms:

porosity
permeability
infiltration
water table
groundwater
drainage basin
evapotranspiration

water budget
aquifer
spring
subsurface stormflow
overland flow (Horton overland flow)
saturation overland flow
variable source-area concept

1. What are the most important inflows of water to drainage basins? Outflows? What is usually the most important water loss from a basin?
2. What sorts of materials are very permeable (good aquifers)? Impermeable? Why? How are porosity and permeability related to water supply?
3. What is groundwater? What makes it flow? What determines its availability for use? What causes it to be depleted? How can it be polluted.
4. Be able to interpret a water-table map and determine the direction of ground-water flow. What factors affect the rate (velocity) of ground water flow?
5. How are streams supplied with water during periods of no rainfall or snowmelt?
6. How do springs form?
7. How is runoff generated in each of the following areas, and what implication does this have for the predominant type of erosion in each area?
 - a. arid and unvegetated areas
 - b. forests
 - c. grassland and woodland
8. What factors tend to increase surface erosion? To decrease it?
9. What are the main factors affecting infiltration rates?
10. How does infiltration capacity affect erosion?
11. How does the way in which runoff is generated affect the shape of the resulting hydrograph? (i.e., size of peak, duration of flow, quickness of stream response?)

RIVER PROCESSES

Know and understand the following terms:

floodplain	degradation (bed erosion)	sheetwash
point bar	aggradation (bed deposition)	gullying
river (fluvial) terrace	suspended load	hydrograph
meandering stream	bedload	discharge
braided stream	flood recurrence interval	alluvium
natural levees	bankfull discharge	alluvial fan

1. How does a river form its floodplain?
2. What are fluvial terraces? In what ways can they be formed? What are some causes for terrace formation?
3. What sort of processes supply sediment to a stream? What factors does the sediment load of a stream depend on? When is most of the sediment carried?
4. What factors in a drainage basin might affect or control the size of flood peaks occurring on a stream?
5. What sorts of things cause gullies to form?
6. Consider what the effects might be of building a large dam on a river which carries much sediment? (Consider effects upstream and downstream of the dam. Think of its effects on water flow, sediment load, stream gradient, erosion and deposition, groundwater levels above and below, and stream life. This is something to *think* about.
7. What determines whether a stream has a braided or a meandering pattern?
8. How/why are alluvial fans formed? What conditions favor their formation/preservation? How does an alluvial fan differ from a delta?

GLACIERS

Know and understand the following terms:

permafrost	till	cirque	fjord
glacier	glacial drift	U-shaped valley	esker
valley glacier	outwash plain	hanging valley	drumlin
continental glacier	lateral moraine	glacial polish	erratic
plucking	terminal (end) moraine	glacial striations	kettle

1. What conditions are necessary for a glacier to form?
2. What causes the terminus of a glacier to advance? to retreat? to stay in one place?
3. How do glaciers move?
4. How are moraines formed?
5. What sorts of features suggest or indicate glaciation? Consider those:
 - 1) indicative of valley glaciation only
 - 2) indicative of continental glaciation only
 - 3) characteristic of both types of glaciation
6. What sorts of sediments are deposited by glaciers and in association with them? How could you recognize (in outcrop) deposits of the glacier itself? What other sorts of deposits could glacier deposits be confused with?
7. Over the past two million years we have had several episodes of continental glaciation alternating with warmer interglacial periods. What are some theories as to what causes the glaciations? What is the evidence for them?
8. What has been the consequences of the glaciations on sea level? How has this affected the coastlines of the U.S.?
9. What would be some of the consequences of another glaciation on northern and southern coastal California ?

CLIMATE AND CLIMATIC CHANGE

1. Be familiar with the factors which can cause climatic change (e.g. continental drift, astronomical causes, variations in solar radiation, volcanic activity, carbon dioxide concentration, etc.) and understand *how /why* they cause the change.
2. What sort of evidence/techniques are used to determine climatic conditions in the past? What sort of evidence do we have for climatic change? How do we determine past temperatures?
3. How are oxygen isotopes used to deduce past climate?
4. What is the Milankovich theory? According to it, what factors affect the amount of solar radiation reaching the earth's atmosphere? How well do its predictions correspond with observed climatic fluctuations from the geologic record?
5. What do we think are the chief causes for the repeated glaciations the earth has experienced in the last 2 million years? How do these work? What sort of evidence do we have to support this?
6. How might changes in climate affect erosional processes? Think here about the relation of sediment production to climate. In particular, what sort of climatic shifts might cause a stream to aggrade (deposit)? to degrade (downcut)?