

Geosciences 211 **Physical Geology**
Study Guide for Test # 2, March 3rd, 2005
March 1, 2005

Please note: I modified this study guide to reflect 2 things. 1.) Addition of Tsunamis, and 2.) Removal of the Structural Geology and Deformation and Deep Time chapter questions from the 2004 Study Guide. Subject areas for this test include Marshak, 2004, chapters 5, 6, 7 and 8 with a special tsunami section.

1. Weathering, Sediments and Sedimentary Rocks (Marshak Chapter 5)

- a. Know definitions to the Key Terms listed on the webpage.
- b. What characterizes the major types of rock weathering?
- c. What settings are dominated by physical weathering? Chemical weathering?
- d. Describe the different types of physical weathering and where these occur.
- e. Write chemical reactions that involve hydrolysis. Repeat for oxidation.
- f. How are physical and chemical weathering linked?
- g. What factors control rates of rock weathering?
- h. What processes cause soils to develop distinct horizons?
- i. What are the 5 soil forming factors?
- j. Describe the 4 major types of sedimentary rocks.
- k. How are sedimentary rocks classified?
- l. What are the characteristics of: Breccia? Conglomerate? Arkose? Black shale?
- m. Describe textural and compositional maturity?
- n. What evidence is provided by grain size? Sorting? Roundness? Maturity
- o. How is limestone formed? What does it indicate about depositional conditions?
- p. Describe how coal is formed.

- q. What are evaporites and what do they indicate about depositional conditions?
- r. How do ripples form? Cross-beds? Graded beds? Mudcracks?
- s. What is a depositional environment?
- t. Describe some depositional environments from terrestrial, transitional and marine settings.

2. Metamorphic Rocks (Marshak Chapter 6)

- a. Know definitions to the Key Terms listed on the webpage.
- b. How do metamorphic effects differ from igneous effects?
- c. What control does the protolith have on the type of metamorphic rock formed?
- d. How can metamorphic rocks be distinguished from igneous rocks? Sed rocks?
- e. Describe recrystallization. How does it contribute to compositional banding?
- f. What are the agents of metamorphism?
- g. What is foliation and how is it formed? Why are some meta rocks non-foliated?
- h. How does brittle deformation differ from ductile deformation? Where do these occur in the crust?
- i. How are metamorphic rocks classified?
- j. What are the most common foliated metamorphic rocks? Non-foliated?
- k. What is metamorphic grade? How does grade relate to tectonic history?
- l. What common index minerals are used to determine metamorphic grade?
- m. Describe the characteristic features of contact metamorphism. Regional metamorphism.

3. Volcanic Eruptions (Marshak Chapter 7)

- a. Know definitions to the Key Terms listed on the webpage.
- b. Why and how do volcanoes pose a threat to humans?
- c. How does magma composition influence the properties of lava?
- d. What is the difference between pahoehoe and aa?
- e. List different types of pyroclastic debris.
- f. Describe the origin and the potential threat posed to humans by pyroclastic flows. By lahars.
- g. How do magma composition and volatile content influence eruptive style?
- h. Compare and contrast shield volcanoes, stratovolcanoes and cinder cones.
- i. What plate tectonic settings are characterized by eruption of basalt? Rhyolite?
- j. Draw a diagram that illustrates the formation of a caldera like Crater Lake, Oregon.
- k. Describe the events of May 18, 1980.
- l. By what means do geologists predict volcanic eruptions?
- m. How can humans protect themselves from volcanic hazards?
- n. How do volcanic eruptions influence climate.

4. Earthquakes (Marshak Chapter 8)

- a. Know definitions to the Key Terms listed on the webpage.
- b. What is seismicity and what are the tectonic settings where it is most often observed?
- c. What types of faults are linked to crustal extension? Crustal compression? Lateral shear?
- d. What is stick-slip behavior and how does it contribute to earthquake events?

- e. What are the characteristics of P-waves? S-waves? Rayleigh waves? Love waves?
- f. Describe the operation of a seismograph.
- g. How can geologists locate an earthquake epicenter anywhere on the planet?
- h. How do Mid-Ocean Ridge earthquakes differ from those observed at subduction zones?
- i. What are the hazards to humans associated with earthquakes?
- j. How do geologists predict earthquakes?
- k. How can humans protect themselves from earthquake hazards?

5. Tsunamis

- a. List the ways that tsunami waves differ from wind-driven waves.
- b. What causes tsunamis? Where do they form?
- c. Describe how changes in the seafloor result in tsunami generation.
- d. What are indications that a tsunami may be imminent?
- e. What behavior should you expect from a tsunami?
- f. What is the tectonic situation that resulted in the 12/26/05 earthquake?
- g. What factors contributed to the magnitude of the death toll from the Indian Ocean tsunami?
- h. If you were in charge, what would you do to reduce tsunami hazards around the Pacific Rim.
- i. What tsunami risks threaten the Atlantic and Pacific coastlines of the United States?
- j. What are megathrusts and why do they generate large tsunami-spawning earthquakes?