

Chapter 15, Physical Geography: Gradation, Weathering, and Mass Wasting

Gradation is accomplished through erosion.

Erosion:

Once erosion occurs, the material is then transported a distance, and then deposited.
Remember our sandstones:

<u>Maturity</u>	<u>Particle Characteristics</u>	<u>Environment</u>
Arkose		
Graywacke		
Quartz Sandstone		

Theoretically, the ultimate effect of gradation (and erosion) is the reduction of the land surface to base level, which is a surface that is so flat that erosion can not affect it.

Weathering and Mass Wasting

Weathering:

- 1) Mechanical or Physical Weathering:
- 2) Chemical Weathering:

Rates of weathering depend on four major factors:

- 1) Structure and Composition of Rocks
- 2) Climate
- 3) Land Surface Configuration
- 4) The Vegetative Cover

Types of Physical Weathering

- 1) Ice Wedging or Frost Wedging

Special Case: Salt Weathering

Talus:

- 2) Sheetting (including Exfoliation and Spalling)

Special Case: Spheroidal Weathering

3) Distintegration

Chemical Weathering

1) Hydrolysis and Hydration

2) Oxidation

3) Dissolution or Solution

Differential Weathering

Cliff Formers and Slope Formers

Examples:

Mass Wasting

Also called mass movement, is the downslope movement of materials in direct response to gravity.

Related to the Angle of Repose:

Classification of Mass Movements

Three Major Factors:

1) Speed of Movement: can range from fast to slow

2) Kind of Materials that Moved

- a) rock
- b) soil
- c) snow and ice
- d) debris: a mix of rock and soil
- e) mud: fines with rocks

3) Type of Motion

- a) falls
- b) slides
- c) slumps
- d) creep

Rapid Mass Movements

1) Landslides: rapid downslope movement of a mass of material that moves as a unit and carries with it loose material that sometimes includes great masses of bedrock.

2) Rockslides: huge volumes of rock move.

3) Rockfall: an individual rock free falls down a cliff or slope.

4) Slumps: collapse of soil and rock in a backward rotation.
(and Earthflows: slower moving slump materials)

5) Debris Flows and Mudflows: the movement of water and rock debris.

Volcanic Mudflow: Lahars

Slow Mass Movements

1) Creep: slow downhill movement of soil and regolith.

2) Solifluction: slow downslope movement of regolith that is saturated with water.