

GLG 101 – CHAPTER 16 - RUNNING WATER

- The **hydrologic cycle** describes the interaction and movement of water in the oceans, atmosphere and on/under the land surface. It is powered by energy from the sun, which leads to evaporation of water from the oceans.
- **Evaporation, precipitation, infiltration** (water soaking into the ground through pore spaces), **runoff** (water flowing downhill across the land surface), and **transpiration** (the release of water vapor to the atmosphere by plant metabolism). **Runoff** of water is the most important process that sculpts the Earth's land surface.
- A stream's ability to erode and carry away sediment is controlled by its **velocity**. The stream's velocity is a function of its **gradient** (how steeply it slopes downhill), **cross-sectional shape**, channel size and **roughness**, and the stream's **discharge** (how much water is flowing through its channel).
- Streams flow down to their **base level**, which is the low point at which the water stops moving and collects. For most streams, **sea level** is the ultimate base level. However, lakes and reservoirs represent temporary or local base levels. Lowering a stream's base level will steepen the overall slope, causing it to increase in velocity and to **erode**. Raising the base level of a stream will lessen the overall slope, causing it to slow down and **deposit** sediment.
- Eroded rock and soil transported by a stream is called its sediment "load". **Dissolved load** (sediment in solution), **suspended load** (held aloft in the water at all times), and **bed load** (in periodic or constant contact with the streambed while moving) are all components of this. Most streams carry the greatest part of their sediment load by suspension.
- The ability of a stream to carry sediment is described as its **capacity** (the maximum load of solid particles it can carry), and its **competence** (the largest particle it can move). If stream velocity doubles, competence increases by four times.
- Stream sediment deposits in the channel are called **bars**. Those deposited along stream banks adjacent to the **floodplain** are called **natural levees**, and the deposits produced by velocity decrease at the edge of the mountains or when the stream enters a lake or sea are called **alluvial fans** and **deltas**, respectively. Stream sediment deposits in general are known as **alluvium**.
- Steep streams will typically erode downward quickly, producing **v-shaped** valley cross-sections. Low-gradient streams (low slopes) will typically erode only side-to-side in their floodplains, producing **wide valleys with flat floors**, most of which is the floodplain. Low-gradient streams commonly **meander** back and forth across the floodplain. Floods are common geological events and involve the stream leaving its channel and filling part or all of the floodplain, blanketing it with fresh sediment after the flood subsides. When meanders get "cut off", an **oxbow lake** results.
- The land area that contributes to the flow of a stream is called the stream's **drainage basin**. Drainage patterns (as seen from above) include: **dendritic** (the most common), **radial**, **rectangular**, and **trellis**. The last three are produced by specific geologic/landform conditions.