

Energy and the Hydrologic cycle

1. Force/Energy

Primary types

A. Endogenic - Tectonics

B. Exogenic - Solar radiation (primary variable in climatic variability)

2. Processes

3. Resistance

A. Lithologic differences

B. Structural variations – folds, faults, domes, basins etc.

4. Equilibrium versus Thresholds

A. Equilibrium is dependent upon time.

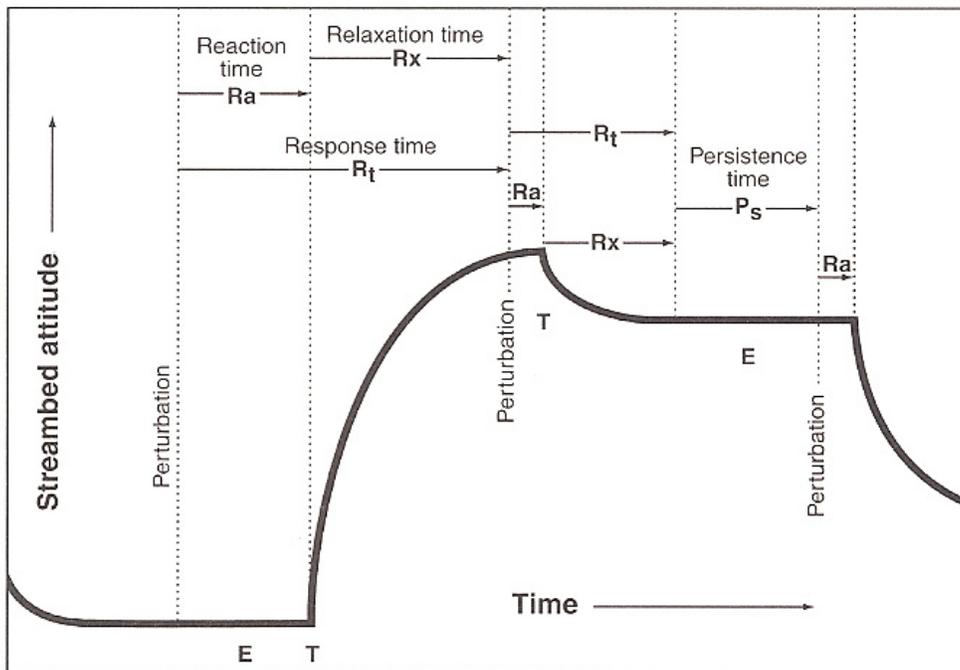
B. Thresholds are only reached/passed when changes in processes or form lead to an 'irreversibly' changed depositional/erosional system.

5. Change/adjustments/feedbacks

6. Time controls how these steps are measured, studied, and used! This course will use graded time to investigate the evolution of landform sediment-assemblages on the Earth's surface.

*No force or energy = No change

**Uniformitarianism allows us to use present day processes to interpret/'back-calculate' the evolution of past forces/energies, thresholds, and landscape changes.



The amount of water in the Earth's hydrologic system is transferred between the following reservoirs

- oceans
- glaciers
- groundwater
- lakes and rivers
- biosphere
- atmosphere

Important considerations

- Evapotranspiration: Almost all of the water, 72,000 Km³, annually evaporated from the land passes through a biologic cycle.
- Photosynthesis: Is vital to geomorphology because it permits plants and soil to cover most land surfaces. It also provides an opportunity for the storage of carbon (energy)
- Glaciers dramatically influence the hydrologic cycle. During glacial maximums, sea-levels are lowered as much as 140m. Thus altering the amount of water available to the hydrologic system and dewatering many coast lines (changes in gradient).
- It is possible to define the power available to induce landscape change.
 - o Hypsographic curve, states the average height of continental landmass on Earth, is approximately 838 m.
 - o By assuming the average amount of precipitation runoff, 45,000 km, it is possible to calculate the available power (12×10^9 kw)
 - o Much of this energy or power is lost in transfer by turbulence.
 - o The “geomorphology” machine is known to be capable of transporting 2×10^{10} Tonnes of sediment per year.

