GROUNDWATER LEVEL FLUCTUATION

GROUNDWATER LEVEL: water table of an unconfined aquifer or the piezometric surface of a confined aquifer, indicate the elevation of atmospheric pressure on the aquifer.

Any factor that produces a change in pressure on Groundwater will cause the fluctuation in Groundwater level.

Difference between recharge and discharge (withdrawl) of Groundwater leads to change in its level.

Types of Groundwater fluctuation :

1. **Time variation of Groundwater level**
   - **Secular variation** :
   - fluctuation in groundwater level over a longer duration – several years or more.
   - Alternation wet and dry climatic spells causes such long period fluctuation.
     Eg. In Ethiopia, sonalia of Africa due to very long dry climatic spells groundwater level has drastically gone down
   - **Seasonal Variation** :
     Groundwater level fluctuate – seasonal dry wet condition, but may also cause due to anthropogenic activities.
     Causes :
     Alternate rainy and rainless period.
     Seasonal withdrawl of groundwater for consumption.
2. **Short Term variation**
   Short term groundwater level fluctuation may be
   - Diurnal
   - Use of groundwater in the region.

❖ **Earthquake**:
- May affect Groundwater level
  In confined
  - Sudden rise or fall in water level due to compression
  - Change in discharge of springs.
  - Appearance / disappearance of spring.
  - Water spouts formation.
- Hydroseismic fluctuation are little in confined aquifer.
  Such fluctuation result from compression and dilation of elastic confined aquifer by passage of Rayleigh wave.

❖ **External Loads**:
- Elastic property of confined aquifer results in change in hydrostatic pressure when changes in (sudden) loading eg- by passing basin occur.

- Application of a load compresses the aquifer and increases the hydrostatic pressure.

❖ **Fluctuation due to Evapotranspiration:**

- Diurnal fluctuation in Groundwater level is generally observed in unconfined aquifer which may be due to

- Evaporation
- Transpiration
- **Evaporation Effect:**
  Evaporation from groundwater increases as the water table approaches ground surface. Another controlling factor is soil structure which influence the capillary tension above water table which in turn controls its hydraulic conductivity.
- **Transpiration Effect**
  Blooming growth of plant during particular seasonal period causes (daily) fluctuation of water table does not occur in non-vegetated area or where water table is far below ground surface.
  The uptake of water by roots are roughly equal to transpiration rate.
  The nature and degree of such fluctuation depends upon the type of vegetation, season and weather condition.