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Origin of Rainfall

- The presence of warm, moist and unstable air and sufficient number of hygroscopic nuclei are prerequisite condition for rainfall.
- The warm and moist air after being lifted upward becomes saturated and clouds are formed after condensation of water vapour around hygroscopic nuclei (salt and dust particles) but still there may not be rainfall unless the air is supersaturated.
- The process of condensation begins only when the relative humidity of ascending air becomes 100% and the air is further cooled through dry adiabatic lapse but first condensation occurs around larger hygroscopic nuclei only. Such droplets are called cloud droplets.

Condensation

For condensation there are following pre conditions:

- The air becomes warm and goes vertical and then spreads;
- To come into contact of warm air with high mountains and then to climb over then and to come close to the top layer of ice and become cool;
- To become cool by approaching the colder latitudes;
- To come in contact with colder air or currents.

Theories of Rainfall Cloud Instability

- Theory of Bergeron Findeisen: This theory was postulated in 1933; also called Ice crystal theory.
- This theory is based on the fact that relative humidity of air is greater with respect to an icesurface than with respect to water surface.
- Air temperature ranges between 5°C to 25°C, then water droplets become supersaturated.

- The aggregation of ice crystals is more prevalent when air temperature ranges between 0 degree to 50 degree C
- When the ice crystals fall and pass through layer of air with temperature more than 0 degree C, they change into raindrops.

Collision Theory

- The Bergeron process could not explain the mechanism of rainfall in tropical areas.
- The Collision Theory involving collision, coalescence and sweeping for the formation and growth of rain drops was postulated by many meteorologists.
- According to this theory, the collision may cause splitting and scattering of cloud droplets.
- Longmuir modified this theory saying that the larger drops fall with greater velocity than smaller drops hence absorbing them.