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Precipitation and Rainfall Types with Their Characteristic Features

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Abstract

Precipitation is the general name given to all forms of moisture that falls from the atmosphere on to the ground. It includes rainfalls, snow, sleet, glaze and hail. Rainfall is the amount of rain that falls in a location over a period of time and therefore a type of precipitation that occurs when water vapor in the atmosphere condenses into droplets that can no longer be suspended in the air. This paper is written just to put readers on their toes in response to the formation of the three types of rainfall coupled with its relevance cum the abysmal performances at times and their characteristic features in disparity. Suggestive measures are not left out of the witness box at the latter part of it all.

Keywords: precipitation, rainfall, characteristics, condensation, features.

1. Introduction

Rainfall is formed when saturated air is heated (air that cools down at dew point) and rises either by a mountain, conventional currents or frontal action. The rising saturated air or water vapor cools down as it rises. It attaches itself to tiny particles of dust, salts, seeds or smoke in the atmosphere. These particles are commonly called condensation nuclei. Condensation takes place when the water droplets join together on the condensation nuclei to form raindrops. Clouds are formed as the rain drops develop.

As the cloud develops further, they become heavy and unstable, but cooling down at the dry adiabatic rate. This adiabatic rate means that for every 1,000 metres rise, temperature of the water droplets reduce by 10oC. Precipitation or rainfall comes to the ground when about 300 metres above the earth's surface, the cloud rises further. The rising clouds become warmer than the surrounding air. This makes it unstable. As it develops further, it becomes very heavy and falls to the ground as rain. The type of rain that falls depends on the factors responsible for rising of the saturated air. Each type of rainfall requires a different mechanism that triggers the vertical movement of unstable air.

The amount of rainfall recorded at a place is measured by an instrument called *Rain Gauge*. Rain Gauge is a copper cylinder with a collection Jar inside and a funnel on top. The gauge is placed into the ground leaving only 30cm of the top above the ground level to prevent splashing water from entering it. Rain falls through the funnel on top of the copper cylinder and is collected into the jar. The water is collected after 24 hours, and then poured into a measuring cylinder for measurement to be taken.

2. Types Of Rainfall

For condensation and precipitation to occur there must be an appreciable ascent of an air mass. Since this ascent is brought about in three ways, there are three main types of rainfall. These are: Conventional Rainfall Orographic or Relief Rainfall and Frontal or Cyclonic Rainfall. Each of these types of rainfall is characterized with its features and their diagrams are different from each other. Up next are the types and the characteristic features associated with them.

2.1 Conventional Rainfall

Conventional Rainfall is formed when air on the surface of the earth and few metres above it is heated by the sun. As the air is heated, it becomes lighter (water vapor). The lighter air rises, cools down, and then condenses on the condensation nuclei in the atmosphere. When water vapor rises further, it converges and moves gradual upwards. This is due to the fact that there are few areas to be covered by the converging air. As the air

converges, it condenses to form thick cumulous clouds. The rising clouds become heavier and unstable. This unstable cloud then drop to the ground as raindrops or rainfall.

This type of rainfall is common in West Africa and is followed by lightning and thunderstorms as its associated character.

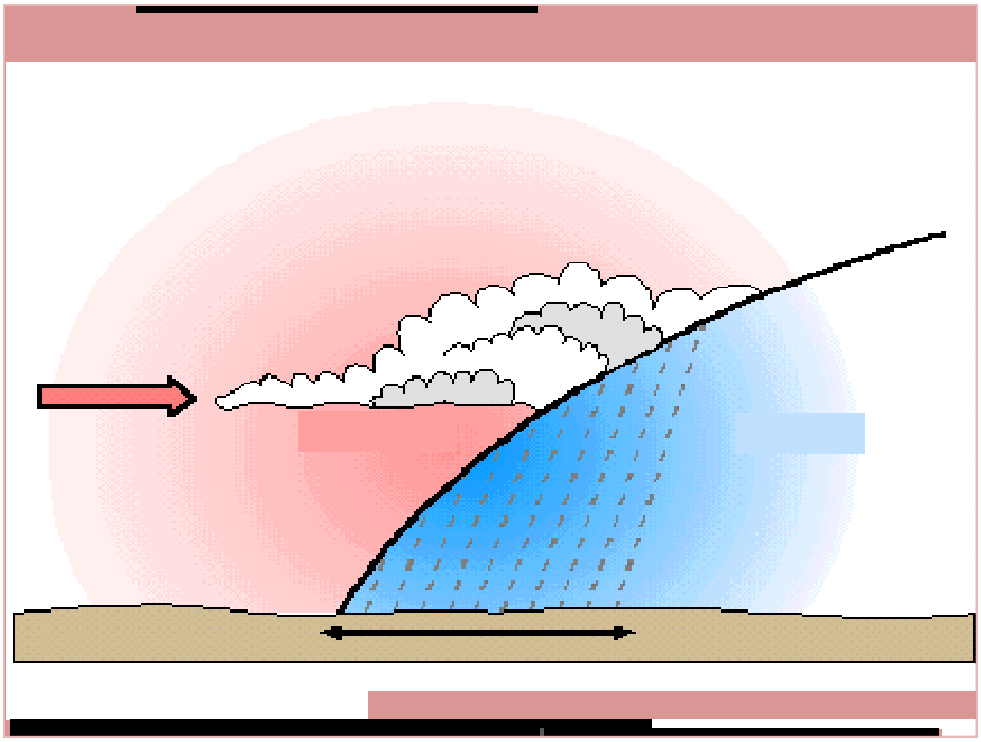

Fig. 1 showing formation of conventional rainfall. (Source; Google search)

2.2 Orographic Or Relief Rainfall

When wind forces moist air landwards towards mountainous terrain, the mountain lifts the moist air masses high into the atmosphere. Once the air rises, it cools and allows precipitation to occur.
As the wind or water vapor rises, they become unstable and heavy. They develop around condensational nuclei and form thick clouds. They rise further and become unstable water droplets. They fall to the ground as raindrops. This type of rainfall mostly occurs at the areas facing the hill or mountain called the **windward** side. The opposite side or **leeward side** receives the descending dry air and low or no rain At times, it comes as droplets or in a form shower.

Characteristically, orographic rainfall occurs in mountainous areas and along slopes of hills**.** The mountain or hill blocks and forces the rain bearing winds or water vapor to rise.

Notably, it is the mountain that serves as an obstacle that forces the vapor to rise and then gives us orographic Rainfall.

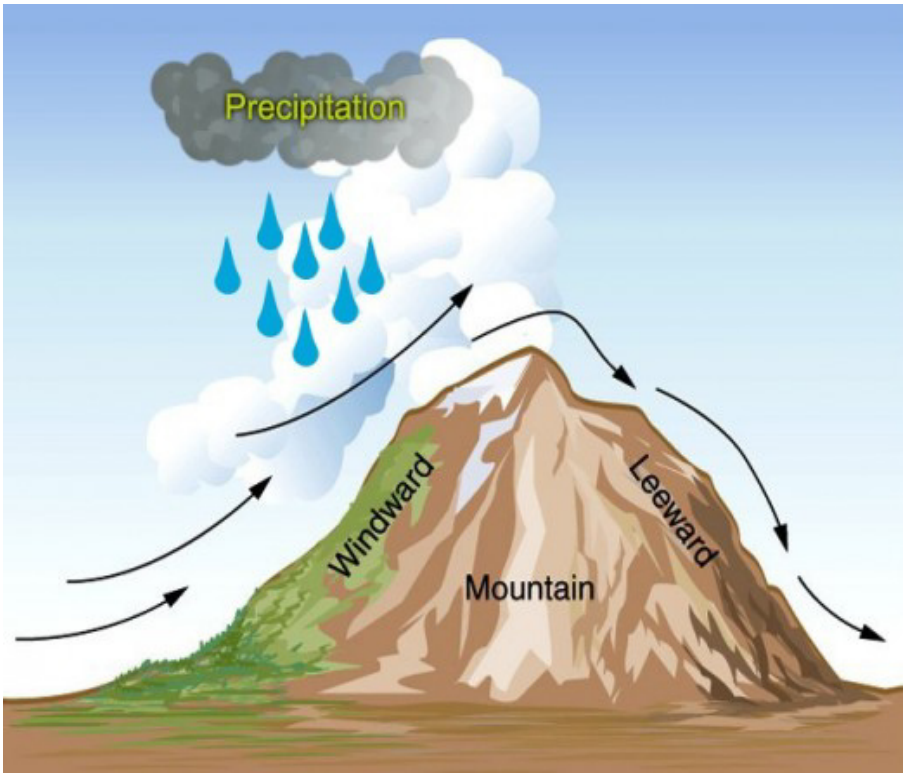

Fig. 2 showing the formation orographic or relief rainfall. (Source: Google search)

2.3 Cyclonic Or Frontal Rainfall

Finally, Cyclonic Rainfall is the last type of rainfall and it is also known as frontal rainfall. This occurs when two air masses of different characteristics meet or come together. For instance, when a warm maritime air mass (lighter) meets a cold air mass (heavier), the warm air mass is under-cut by the cold air mass. The warm air mass is forced to rise because it is lighter. The warm water vapor cools down as it rises. The rising air condenses or condensation takes place, and clouds are formed on the condensation nuclei (particles in the air) in the atmosphere. As the clouds rise further they become unstable due to more water droplets accumulating. They fall to the ground as cyclonic rainfall.

The characteristic feature of this rainfall is that, it is common in the Tropics (Latitude 23% Degrees North and South of the Equator), and the Temperate Zone (Latitude 66% Degrees North and South of the Equator).

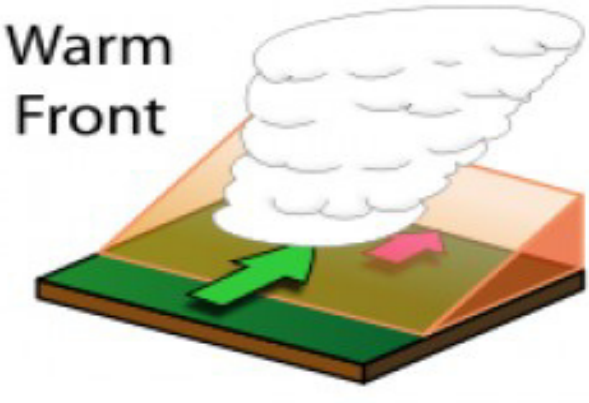

Fig. 3 showing the formation of cyclonic or frontal rainfall. (Source: Google search)

3. Effects Of Rainfall.

Water is one of the most valuable resources on Earth. Rainwater fills reservoirs that supply drinking water, provide a habitat for fish to live, and nourishes the soil with water necessary for vegetation. For growing crops during the farming season, helps people and animals for harvesting and consumption purposes respectively. It is believed that all the sources of water, rain are the best for use in our homes and also generates tropical humility. For harvesting. Most importantly, rainfall is ordained.

Rain water, however, can also have a negative effect on the Earth when it causes erosion or when it has a high pH and its characteristic features which are thunder and lightning. Also, it causes natural disaster which destroys properties and at times, takes lots of lives, it causes leaching to such a depth that, plant roots are lost in the process.

3.1 Conclusion And Recommendations.

In conclusion, it is apparent to note that, rainfall has three types and their characteristic features are also different from each other right from their conception to their final stages where they fall back to us as rain.

Having taken the trouble to know the types of rainfalls coupled with their diagrams in the world at large, we can now swallow easily with the fact that, rainfall is a good servant but a bad master, and a necessary evil. That's, when it has to do with the adverse aspects.

Dealing with the bad aspect for it to be termed good so as not to be frowned upon, individuals are advised humbly not to build on water ways and also avoid throwing litter into gutters or anywhere of their choices which impedes the flow of rain water. The two could possibly pave way for flood to occur.

Therefore, it is indispensable to note that, apparent, or effective, infiltration rates on grassland hillslopes vary with rainfall intensity and flow depth because of the interaction between rainfall, runoff, and vegetated microtopography. The higher parts of the microtopography are occupied by greater densities of macropores and therefore have much greater hydraulic conductivities than the intervening microdepressions. On short hillslopes and plots the apparent infiltration rate is simply the spatial average of the saturated and unsaturated conductivities of this surface. The proportion of the surface which is saturated and the value to which the unsaturated conductivity is raised depends on the rainfall intensity. On longer hillslopes the downslope increase in flow depth in microtopographic depressions progressively inundates more permeable, vegetated mounds so that the hydraulic conductivity of a greater proportion of the surface is raised to its saturated value. For this reason the apparent infiltration rate increases downslope, even in the absence of spatial trends in any of the surface characteristics that affect infiltration. Apparent, or effective, infiltration rate depends on hillslope length. Consequently, steady state discharge does not increase linearly with distance downslope.

Acknowledgment.

Glory is thy name for seeing us through this piece. This is an opportunity for us not only to get familiarized in the international arena, but also to bring our modest contributions in scientific research.

Our kinsmen are not left out of oblivious. We are thankful to all of them especially those of them who always wish us good and by way of praying for us and the remnants, our thanks.

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