

CLOUD AND PRECIPITATION

Clouds

Definition: Cloud is defined as “An aggregation of minute drops of water suspended in the air at higher altitudes”.
The rising air currents tend to keep the clouds from falling to the ground.

Cloud formation

- 1 When air rises due to increase in temperature the pressure being less it expands and cools until temperature is equalised. If the cooling proceeds further till the saturation point, the water vapour condenses and cloud is formed.
- 2 Clouds are also formed
 - When a current of warm air strikes the one that is cooler.
 - When moist air from sea blows over a cold land.

WMO cloud classification

- The World Meteorological Organisation (WMO) Classified the clouds according to their height and appearance into 10 categories. From the height, clouds are grouped into 4 categories (viz family A, B, C and D) as stated below and there are sub-categories in each of these main categories
- Classification see the xerox

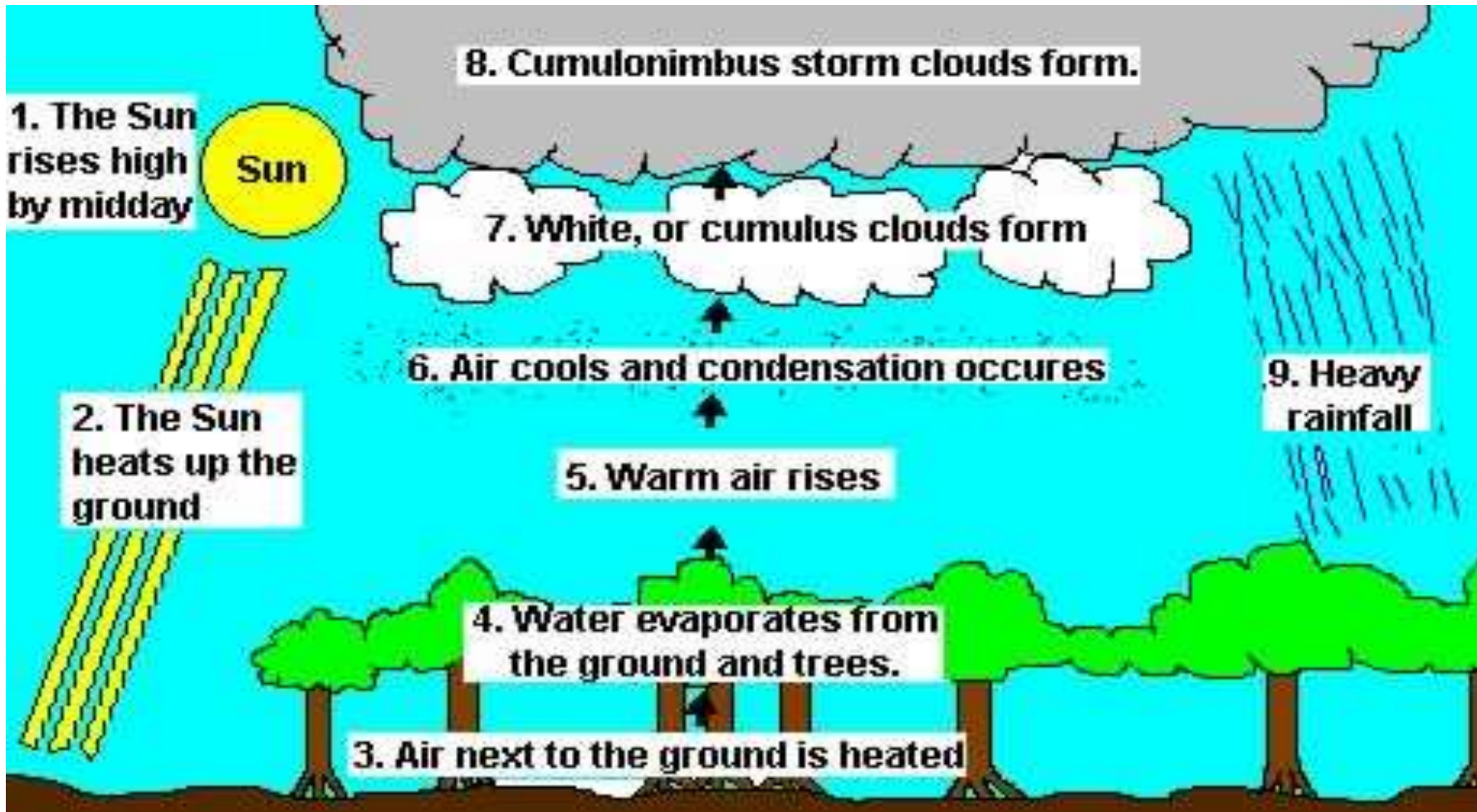
Types of rainfall

There are mainly 3 types of rainfall which are as follows:

1. Convictional rains

1. The air near the ground becomes hot and light due to heating. Then it starts upward movement. This process is known as convection .
2. As the air moves upward it cools at about 10oC per kilometer i.e., at dry adiabatic lapse rate.
3. As it becomes saturated, relative humidity reaches to 100 per cent and dew point is reached where the condensation begins. This level (height) is known as condensation level.
4. Above this level, air cools at about 4oC per kilometre slightly less than i.e., saturated adiabatic lapse rate. First, cloud is formed.
5. Then, the further condensation results into precipitation. These rains are known as convictional rains and mostly occurs in the tropics.

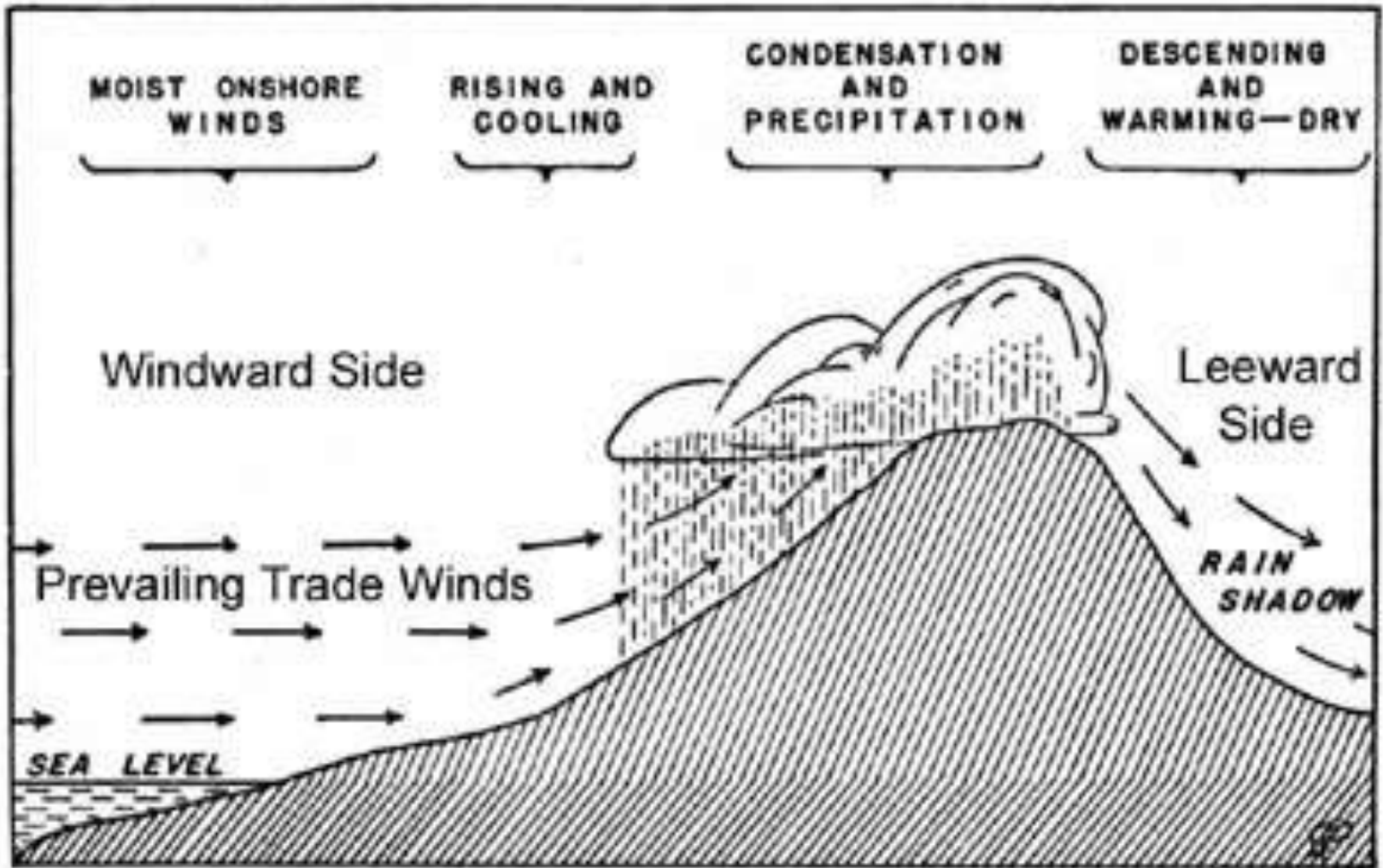
CONVECTIONAL RAIN FALL



2. Orographic rains

1. When moist air coming from the sea or ocean strikes mountain it can not move horizontally. It has to over come the mountations.
2. When this air rises upward, cools down, cloud is formed and condensation starts giving precipitation.
3. These rains are known as orographic rains.
4. These are also known as `relief rains" as the rains also occurs when the air from sea or ocean strike or pass over relief barriers.
5. Due to these processes rains with high intensity are possible on the windward side of the mountain.

OROGRAPHIC RAINFALL



3. Cyclonic and frontal rains

- 1 The rains received from cyclones are known as 'cyclonic rains'.
- 2 When two opposing air currents with different temperatures meet, vertical lifting takes place.
- 3 This convection gives rise to condensation and precipitation which is known as frontal precipitation.

Different forms and types of precipitation

I Liquid forms

1 Rain: It is defined as "Precipitation of drops of liquid water". The cloud consists of minute droplets of water and when these droplets combine and form large drops and can not remain suspended in the air they fall down as rain. These droplets are formed by rapid condensation. The size of rain drop is more than 0.5 mm in diameter. The imaginary lines drawn on a map connecting the points of equal rainfall are known as "Isohytes".

2 Drizzle: It is more or less uniform precipitation of very small and minute rain drops. These drops can be carried away even by light winds. The diameter of drizzle drop less than 0.5 mm. It falls from low lying nimbostratus cloud. Fog merges to form drizzle.

II Solid forms

- 1 Snow:** It is defined as “Precipitation of water in solid form of small or large ice crystals”. It occurs only when the condensing medium has a temperature well below freezing (0°C) temperature. It is also seen in the form of flakes which are aggregates of many crystals, formed due to sublimation of water vapour at sub-freezing temperatures.
- 2 Hail:** It is a precipitation of solid ice. A strong convective column on a warm sunny day may cause the formation of pellets of spherical shape with concentric layers of ice, which is known as hail. Hail falls from cumulo-nimbus clouds and is often associated with thunder and storm. The size of hail ranges from peanut to cricket ball. The rainfall associated with the hailstorms is called as "Hail Storm".

III Mixed

- 1 Sleet:** It is the simultaneous precipitation of the mixture of rain and snow. Occasionally half frozen drops also fall, as sleet forms when rain drops are frozen as they fall through a layer of cold air.
- 2 Glaze:** Freezing rain is known as glaze. This is formed at sub freezing temperatures when rain falls on objects or on ground. It looks like a sheet or coat.