SCIENCE

THE MOVEMENT OF AIR, AIR POLLUTION AND ITS CAUSES

THE MOVEMENT OF AIR : WINDS

Air is seldom stationary.

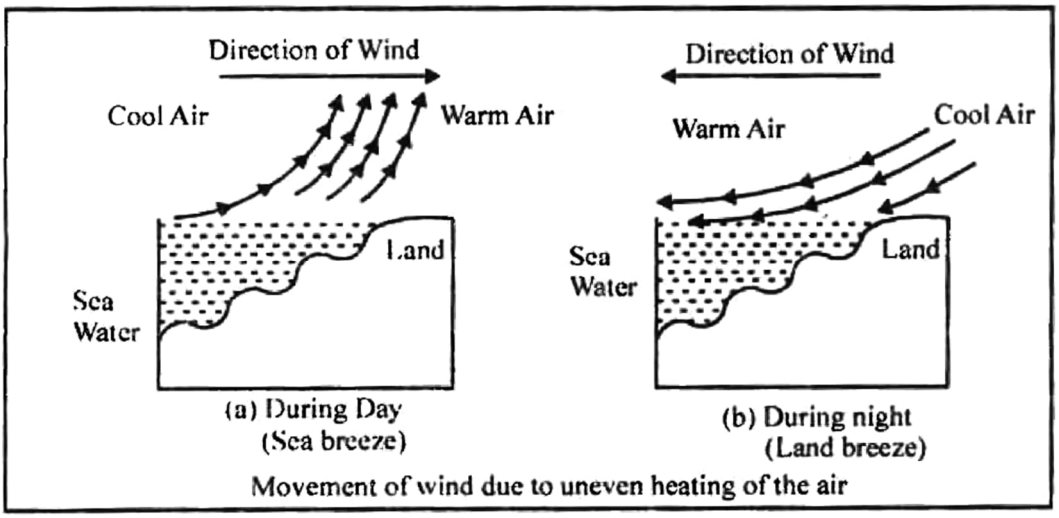
When moving, it could vary in intensity : a gentle breeze or a strong wind or a terrible storm. It could also be accompanied by drizzle or downpour or torrential rain. All these phenomena occur due to

(i) Heating of air, and

(ii) Formation of water vapours

- Heating of air occurs either by direct insolation or by reradiation from land and water bodies.
- The warm air rises up. As it rises, it produces a low pressure region.
- Now, air from high pressure area moves towards this low pressure area, and this results in a breeze or wind.
- As the warm air rises upwards, it carries water vapour with it.
- As the warm air rises, it expands and cools down.
- With this cooling, the water vapour condenses so as to form tiny droplets.
- The presence of dust particles would assist the formation of tiny droplets, since these particles act as 'nucleus' for these drops to form around.
- Now, these droplets grow bigger by the 'condensation'.
- When the drops turn big and heavy, they come down as rain. However, in case thc temperature is low, precipitation could be in the form of snow, sleet or hail.
- Snow is frozen water vapour falling as flakes; hail is precipitation in the form of small pellets of ice and sleet is rain and snow (or hail) falling together.
- Wind has a great role to play in deciding the rainfall patterns.
- A very common example in this regard is the role of winds (south-west or north-east monsoons) in bringing rainfall during monsoons.
- In the coastal areas, during day, the land gets heated faster than water body.
- As a result, the warm air of land rises up, creating a low pressure area.
- Cooler air from water body moves into this low pressure area.
- However, during night time, the reverse happens.

- Land cools morc rapidly than the water body.
- As a result, warm air over the water body rises up.
- Air from land, which is cooler, moves into the low pressure area created over water body.



Movement of wind due to uneven heating of the air

Factors influencing the movement of air:

The various factors that influence the movement of air are

(i) Uneven heating of land in different parts of earth.

(ii) Differences in the heating and cooling of water bodies and panel mass.

(iii) Extent of vaporization and condensation of water vapours.

(iv) Rotation of earth .

(v) High mountains which act as natural obstructions.

(vi) Topography over which wind passes.

AIR POLLUTION

(i) Air pollution is the addition of unwanted substances into the atmosphere that has an adverse effect on organisms and the environment.

(ii) It is caused due to an increase in the content of harmful substances (air pollutants) in air such as oxides of nitrogen and sulphur, etc. The major sources of air pollution are burning of fossil fuels like coal and petroleum. automobiles, thermal power plants and industries.

Sources of air pollution:

The sources of air pollution can be divided into two categories.

(i) Natural sources

(a) Forest fire

(b) Dust storm

(c) Pollen grains from flowers.

(d) Smoking volcanoes

(ii) Man-made sources

(a) Burning of fossil fuels in industries, vehicles and thermal power plants.

(b) Emissions form industries.

(c) Vegetable oils, kerosene, and coal as household fuels

(d) Pesticide residues in air

(e) Sewers and domestic drains emitting foul smell

(f) Deforestation (cutting down of trees)

HARMFUL EFFECTS OF AIR POLLUTION

(I) Air pollution affects the respiratory system causing breathing difficulties and diseases such as bronchitis, asthma, lung cancer, tuberculosis and pneumonia.

(II) Burning of fossil fuels like coal and petroleum releases oxides of nitrogen and sulphur inhalation of these gases is dangerous. These gases also dissolve in rain to give rise to add rain.

(III) The combustion of fossil fuel also increases the amount of suspended particles in air. These suspended particles could be unburnt carbon particles or substances called **hydrocarbons**. The presence of high levels of all these pollutants, reduce visibility in cold weather where water also condenses out of air forming smog. Smog is an indication of air pollution.

(IV) Regular breathing in the polluted air increases the incidence of allergies, cancer and heart diseases.

Do you know?

Bioindicators

Certain organisms are very sensitive to pollutants in air, water or soil. A very good example of bioindicators is lichens. Lichens are very sensitive to the levels of contaminants in air, particularly SO_2. As the level of SO_2 in air increases, lichens are not able to grow and their number diminishes.