

Thunderstorms and Tornadoes

Other severe local storms are thunderstorms and tornadoes. They are of short duration, occurring over a small area but are violent. *Thunderstorms* are caused by intense convection on moist hot days. A thunderstorm is a well-grown cumulonimbus cloud producing thunder and lightening. When the clouds extend to heights where sub-zero temperature prevails, hails are formed and they come down as hailstorm. If there is insufficient moisture, a thunderstorm can generate dust-storms. A thunderstorm is characterised by intense updraft of rising warm air, which causes the clouds to grow bigger and rise to

greater height. This causes precipitation. Later, downdraft brings down to earth the cool air and the rain. From severe thunderstorms sometimes spiralling wind descends like a trunk of an elephant with great force, with very low pressure at the centre, causing massive destruction on its way. Such a phenomenon is called a *tornado*. Tornadoes generally occur in middle latitudes. The tornado over the sea is called *water spouts*.

These violent storms are the manifestation of the atmosphere's adjustments to varying energy distribution. The potential and heat energies are converted into kinetic energy in these storms and the restless atmosphere again returns to its stable state.

EXERCISES

1. Multiple choice questions.
 - (i) If the surface air pressure is 1,000 mb, the air pressure at 1 km above the surface will be:

(a) 700 mb	(c) 900 mb
(b) 1,100 mb	(d) 1,300 mb
 - (ii) The Inter Tropical Convergence Zone normally occurs:

(a) near the Equator	(b) near the Tropic of Cancer
(c) near the Tropic of Capricorn	(d) near the Arctic Circle
 - (iii) The direction of wind around a low pressure in northern hemisphere is:

(a) clockwise	(c) anti-clockwise
(b) perpendicular to isobars	(d) parallel to isobars
 - (iv) Which one of the following is the source region for the formation of air masses?

(a) the Equatorial forest	(c) the Siberian Plain
(b) the Himalayas	(d) the Deccan Plateau
2. Answer the following questions in about 30 words.
 - (i) What is the unit used in measuring pressure? Why is the pressure measured at station level reduced to the sea level in preparation of weather maps?
 - (ii) While the pressure gradient force is from north to south, i.e. from the subtropical high pressure to the equator in the northern hemisphere, why are the winds north easterlies in the tropics.
 - (iii) What are the geotrophic winds?
 - (iv) Explain the land and sea breezes.

3. Answer the following questions in about 150 words.
- (i) Discuss the factors affecting the speed and direction of wind.
 - (ii) Draw a simplified diagram to show the general circulation of the atmosphere over the globe. What are the possible reasons for the formation of subtropical high pressure over 30° N and S latitudes?
 - (iii) Why does tropical cyclone originate over the seas? In which part of the tropical cyclone do torrential rains and high velocity winds blow and why?

Project Work

- (i) Collect weather information over media such as newspaper, TV and radio for understanding the weather systems.
- (ii) Read the section on weather in any newspaper, preferably, one having a map showing a satellite picture. Mark the area of cloudiness. Attempt to infer the atmospheric circulation from the distribution of clouds. Compare the forecast given in the newspaper with the TV coverage, if you have access to TV. Estimate, how many days in a week was the forecast were accurate.

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