

## Glossary:

<b>Terms</b>	<b>Definition</b>
<b>Types of forecast</b>	
Nowcasting	A short range forecast having a lead time/validity of less than 24 hrs
Short range forecasts	Forecasts having a lead time / validity period of 1 to 3 days
Medium range forecasts	Forecasts having a lead time /validity period of 4 to 10 days
Long range /Extended Range forecasts	Forecasts having a lead time /validity period beyond 10 days. Usually this is being issued for a season. IMD issues Long Range Forecast for southwest Monsoon rainfall and onset date for Kerala, Northeast Monsoon Rainfall and Winter precipitation over Northwest India.
<b>Seasons</b>	Meteorological seasons over India are: Winter Season: January – February Pre Monsoon Season: March – May Southwest Monsoon Season: June - September Post Monsoon Season: October - December
<b>Monsoon</b>	
Monsoon	The seasonal reversal of winds and the associated rainfall. This word is derived from the Arabic word “Mausim”. The annual oscillation in the apparent position of the Sun between the Tropics of Cancer and Capricorn causes the annual oscillation in the position of the thermal equator (region of maximum heating) on the Earth’s surface. This is associated with the annual oscillation of temperature, pressure, wind, cloudiness, rain etc. This is the cause of the monsoons. On the Earth’s surface, there are asymmetries of land and Ocean. The differential heating of land and Ocean cause variations in the intensity of the annual oscillation of the thermal equator and hence regional variations in the intensity of monsoon. Prominent monsoon region includes Africa, South Asia and north Australia.
Southwest Monsoon	The southwesterly wind flow occurring over most parts of India and Indian Seas gives rise to southwest monsoon over India from June to September.
Onset of southwest monsoon	Commencement of rainy season with the establishment of monsoon flow pattern Normal date for Onset of southwest monsoon south Andaman Sea : 20 May Kerala: 1 June

Mumbai: 10 June  
New Delhi: 29 June  
Entire country: 15 July

Withdrawal of southwest monsoon

Cessation of southwest monsoon rainfall  
Normal date of withdrawal from extreme west Rajasthan is 15 September.

Northeast Monsoon

With the withdrawal of the southwest monsoon from the northern and central India and the northern parts of the Peninsula by the first half of the October, the wind pattern rapidly changes from southwesterly to northeasterly and hence the term "Northeast Monsoon" is used to describe the period October to December.

This is the major period of rainfall in south peninsula. In Tamil Nadu, this is the main rainy season, accounting for nearly 60 % of annual rainfall in the coastal districts.

### **Weekly/Seasonal Rainfall Distribution**

Excess	percentage departure of realised rainfall from normal rainfall is + 20% or more.
Normal	percentage departure of realised rainfall from normal rainfall is between - 19 % to + 19 %.
Deficient	percentage departure of realised rainfall from normal rainfall is between – 20 % to - 59 %.
Scanty	percentage departure of realised rainfall from normal rainfall is between – 60 % to - 99 %.
No rain	percentage departure of realised rainfall from normal rainfall is– 100 %

### **Rainfall distribution on All India scale**

Normal	percentage departure of realised rainfall is within $\pm 10\%$ of the Long Period Average
Below Normal	percentage departure of realised rainfall is $< 10\%$ of the Long Period Average
Above Normal	percentage departure of realised rainfall is $> 10\%$ of the Long Period Average
All India Drought Year	When the rainfall deficiency is more than 10% and when 20 to 40% of the country is under drought conditions, then the year is termed as All India Drought Year
All India Severe Drought Year	When the rainfall deficiency is more than 10% and when the spatial coverage of drought is more than 40% it is called as All India Severe Drought Year

## Temperature

Temperature	The temperature of a body is the condition which determines its ability to communicate heat to other bodies or to receive heat from them. Meteorologists are interested in the temperature of the air, of the soil and of water bodies. Temperature is measured by means of a thermometer. Thermometers are graduated in different scales. The scale accepted for use in the India Meteorological Department is the Celsius scale giving temperature in degrees Celsius.
Air Temperature (reported by surface meteorological observatories)	The temperature measured in an enclosed space allowing free flow of air and not directly exposed to sunlight where the thermometer is kept at a height of 1.2 m above the surface.
Maximum Temperature	The highest air temperature recorded in a day.
Minimum Temperature	The lowest air temperature recorded in a day.
Dew Point temperature	It is defined as the temperature to which moist air must be cooled, during a process in which pressure and moisture content of the atmosphere remain constant. Lower value of the dew point temperature indicates lesser moisture content of the atmosphere.
Freezing point	The constant temperature in which the solid and liquid forms of pure water are in equilibrium at Standard Atmospheric Pressure.
Pressure	The pressure of the atmosphere at any point is the weight of the air column which stands vertically above unit area with the point as its centre. For meteorological purposes, atmospheric pressure is usually measured by means of a mercury barometer where the height of the mercury column represents the atmospheric pressure. The pressure is expressed in hPa (Hecta Pascal) which is defined as equal to $10^6$ Newton/sq. m.
Precipitation	Precipitation whether it is rain or snow is expressed as the depth to which it would cover a horizontal projection of the earth's surface, if there is no loss by evaporation, run-off or infiltration and if any part of the precipitation falling as snow or ice were melted. It is expressed in the units of mm or cm.
Rainfall	Liquid rainfall is expressed as the depth to which it would cover a horizontal projection of the earth's surface, if there is no loss by evaporation, run-off or infiltration. It is expressed in terms of mm or cm.  It is assumed that the amount of precipitation collected in the gauge is representative of a certain area around the point where the measurement is made. The choice of the instrument and the site itself, the form and exposure of the measuring gauge, the prevention of loss of precipitation by evaporation and the effects of wind and splashing are some of the important points to be considered in the correct

measurement of precipitation.

Snowfall

Snowfall is measured either as the depth of snow which has fallen in a stated period, or melted and measured as water. The depth of snow is usually measured in millimetres and its water equivalent in millimetres and tenths obtained by dividing the snow depth by 10, assuming the density of snow as 0.1.

### **Relative Humidity**

Relative Humidity is the ratio of the actual quantity of moisture at a certain temperature and pressure to the maximum it can hold at the same temperature and pressure.

It is usually multiplied by 100 and expressed in percent.

### **Spatial distribution of Rainfall**

Widespread (Most places)

75 % or more number of stations of a region (usually a meteorological sub-division) reporting at least 2.5 mm rainfall.

Fairly widespread (Many places)

51% to 74 % number of stations of a region (usually a meteorological sub-division); reporting at least 2.5 mm rainfall.

Scattered (at a few places)

26 % to 50% number of stations of a region (usually a meteorological sub-division) reporting at least 2.5 mm rainfall.

Isolated (At isolated places)

25% or less number of stations of a region (usually a meteorological sub-division) reporting at least 2.5 mm rainfall.

Mainly dry

No station of a region reported rainfall

### **Intensity of Rainfall**

No rain

Rainfall amount realised in a day is 0.0 mm

Trace

Rainfall amount realised in a day is between 0.01 to 0.04 mm

Very light rain

Rainfall amount realised in a day is between 0.1 to 2.4 mm

Light rain

Rainfall amount realised in a day is between 2.5 to 7.5 mm

Moderate Rain

Rainfall amount realised in a day is between 7.6 to 35.5 mm

Rather Heavy

Rainfall amount realised in a day is between 35.6 to 64.4 mm

Heavy rain

Rainfall amount realised in a day is between 64.5 to 124.4 mm

Very Heavy rain

Rainfall amount realised in a day is between 124.5 to 244.4 mm

Extremely Heavy rain

Rainfall amount realised in a day is more than or equal to 244.5 mm

Exceptionally Heavy Rainfall

This term is used when the amount realised in a day is a value near about the highest recorded rainfall at or near the station for the month or season. However, this term will be used only when the actual rainfall amount exceeds 12 cm.

Rainy Day

Rainfall amount realised in a day is 2.5 mm or more.

## Temperature

Normal	Departure of minimum/maximum temperature from normal is + 1°C to -1°C
Above normal	Departure of minimum/maximum temperature from normal is + 2°C
Appreciably above normal	Departure of minimum/maximum temperature from normal is +3° C to +4° C. The normal maximum temperature should be 40° C or less
Markedly above normal	Departure of minimum/ maximum temperature from normal is from + 5°C to+ 6°C. The normal maximum temperature should be 40° C or less
Hot Day	Whenever the maximum temperature remains 40° C or more and minimum remains 5° C or more above normal, provided, it is not satisfying the heat wave criteria.
Heat wave	<p>Departure of maximum temperature from normal is + 4° C to + 5° C or more for the regions where the normal maximum temperature is more than 40° C and departure of maximum temperature from normal is + 5° C to + 6° C for regions where the normal maximum temperature is 40° C or less</p> <p>(Heat Wave is declared only when the maximum temperature of a station reaches at least 40° C for plains and at least 30° C for Hilly regions).</p> <p>When actual maximum temperature remains 45°C or more irrespective of normal maximum temperature, heat wave is declared.</p>
Severe heat wave conditions	<p>Departure of maximum temperature from normal is +6 °C or more for the regions were the normal maximum temperature is more than 40 °C and +7 °C or more for regions were the normal maximum temperature is 40 °C or less.</p> <p>(Heat Wave is declared only when the maximum temperature of a station reaches at least 40° C for plains and at least 30° C for Hilly regions)</p>
Cold Day	<p>In the plains of north India, foggy conditions prevail during winter for several days or weeks. The minimum temperature on these days remains above normal, while maximum temperature remain much below normal. This creates cold conditions for prolonged period.</p> <p>When maximum temperature is less than or equal to 16°C in Plains, it will be declared "<i>Cold Day</i>".</p>
Cold Wave	<p>Wind chill factor is taken into account while declaring the cold wave situation.</p> <p>The wind chill effective minimum temperature (WCTn) is defined as the effective minimum temperature due to wind flow. For ex. When the minimum temperature is 15°C and the</p>

wind speed is 10 mph, WCTn will be 10.5 °C.

Departure of WCTn from normal minimum temperature is from -5°C to -6°C where normal minimum temperature  $\geq 10^\circ\text{C}$  and from -4°C to -5°C elsewhere, Cold Wave is declared.. For declaring cold wave etc. WCTn only is used and when it is  $\leq 10^\circ\text{C}$  only, cold wave is considered (this criteria does not hold for coastal stations).

Also cold wave is declared when WCTn is  $\leq 0^\circ\text{C}$  irrespective of the normal minimum temperature for those stations.

Severe cold wave

Departure of WCTn from normal minimum temperature is -7°C or less for the regions where normal minimum temperature is  $\geq 10^\circ\text{C}$  and -6°C or less elsewhere. (departure of WCTn from normal minimum temperature is from -5°C to -6°C where normal minimum temperature  $\geq 10^\circ\text{C}$  and from -4°C to -5°C elsewhere)

### **Synoptic Systems**

Cyclonic Circulation (Cycir)

Atmospheric wind flow in upper levels associated with any low pressure system. The wind flow is counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere

Anticyclonic circulation

Atmospheric wind flow in upper levels associated with any high pressure system. The wind flow is clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere

Low pressure Area (lopar)/well marked lopar

Area in the atmosphere in which the pressures are lower than those of the surrounding region at the same level and is represented on a synoptic chart by a system of one closed isobar (wind speed on the surface < 17 Kts when the system is at sea or one closed isobar in the radius of 3 Deg. from the centre over land)

Depression

Intense low pressure system represented on a synoptic chart by two or three closed isobars at 2 hPa interval and wind speed from 17 to 27 Kts at sea and two closed isobars in the radius of 3 Deg. from the centre over land.

Deep Depression

Intense low pressure system represented on a synoptic chart by two or three closed isobars at 2 hPa interval and wind speed from 28 to 33 Kts at sea and three to four closed isobars in the radius of 3 Deg. from the centre over land

Cyclonic Storm

Intense low pressure system represented on a synoptic chart by more than four closed isobars at 2 hPa interval and in which the wind speed on surface level is in between 34 – 47 Kts.

Severe Cyclonic Storm

Intense low pressure system represented on a synoptic chart by more than four closed isobars at 2 hPa interval and in which the wind speed on surface level is in between 48 – 63 Kts.

Very Severe Cyclonic Storm

Intense low pressure system represented on a synoptic chart by more than four closed isobars at 2 hPa interval and in which

	the wind speed on surface level is in between 64 – 119 Kts.
Super cyclonic storm	Intense low pressure system represented on a synoptic chart by more than four closed isobars at 2 hPa interval and in which the wind speed on surface level is 120 Kts. and above
Western Disturbance	Weather disturbances noticed as cyclonic circulation/trough in the mid and lower tropospheric levels or as a low pressure area on the surface, which occur in middle latitude westerlies and originate over the Mediterranean Sea, Caspian Sea and Black Sea and move eastwards across north India.
Western Depression	Weather system which originate over the Mediterranean Sea, Caspian Sea and Black Sea and approach northwest India and is defined by two or more closed isobars on the surface.
Induced low	Under the influence of the western disturbance, sometimes a low is developed to the south of the system called as induced low
Induced cyclonic circulation	Under the influence of the western disturbance, sometimes a cyclonic circulation is developed to the south of the system called as induced cyclonic circulation
Trough	A line or curve along which the atmospheric pressure is minimum. Pressure increases on both sides of the line or curve.
Trough in westerlies	A moving wave perturbation in mid latitude regions which are present throughout the year which move from west to east and entire globe. These systems generally affect the northern parts of India.
Trough in easterlies	A moving wave perturbation in the equatorial easterly wave, moving from east to west .
Easterly Waves	A shallow trough disturbance in the easterly current of the tropics, more in evidence in the upper level winds than in surface pressure, whose passage westwards is followed by a marked intensification of cloudy, showery weather. The southern peninsular region is affected by easterly waves.
Shear line	A line or narrow zone across which there is an abrupt change in the horizontal wind component; a line of maximum horizontal wind shear
Ridge	An elongated area of relatively high atmospheric pressure, almost always associated with and most clearly identified as an area of maximum anticyclonic curvature of wind flow.
High/High pressure area	Area in the atmosphere in which the pressures are higher than those of the surrounding region at the same level and is represented on a synoptic chart by a system of, at least, one closed isobar
Wind-discontinuity	A line across which there is an abrupt change in wind direction
Troposphere	An atmospheric layer in which all significant weather

phenomena occur. The troposphere is characterized by decreasing temperature with height.

Lower tropospheric level	Part of the troposphere upto 2.1 km a.s.l
Mid tropospheric level	Part of the troposphere from 2.1 km a.s.l. but below 7.6 km a.s.l
Upper tropospheric level	Part of the troposphere from 7.6 km a.s.l to a height upto which temperature decreases with height.

**Terms used during southwest Monsoon Season (June to September)**

Weak/subdued Monsoon	Rainfall less than half the normal (over the land area) Wind speed upto 12 knots (over the Sea)
Normal Monsoon	Rainfall half to less than 1½ times the normal (over the land area) Wind speed is between 13 to 22 knots(over the Sea)
Active Monsoon	i) Rainfall 1 ½ to 4 times the normal. ii) The rainfall in at least two stations should be 5 cm, if that sub-division is along the west coast and 3 cm, if it is else where. iii) Rainfall in that sub-division should be fairly widespread to widespread. (over the land area) Wind speed is between 23 to 32 knots(over the Sea)
Vigorous Monsoon	i) Rainfall more than 4 times the normal. ii) The rainfall in at least two stations should be 8 cm if the sub-division is along the west coast and 5 cm if it is elsewhere. iii) Rainfall in that sub-division should be fairly widespread or widespread. Wind speed is 33 knots and above(over the Sea)
Northern limit of Monsoon (NLM)	A line delineating the regions where the monsoon has advanced from the regions where the monsoon is yet to set in.
Axis of Monsoon trough	A northwest-southeast oriented trough across the northern plains, often extending over the Bay of Bengal. The normal position of the monsoon trough on sea level chart passes through Ganganagar-Allahabad-Kolkata to Head Bay.
Break Monsoon	Monsoon trough shifts northwards and runs close to foot hills of Himalayas, resulting in drastic reduction in rainfall over the country outside the foot hills and southernmost Peninsula
Off-shore trough	The trough along the west coast which generally runs from Gujarat to Kerala coasts and is generally seen from surface to 0.9 km. a.s.l.
<b>Northeast Monsoon</b>	
Weak Monsoon :	Rainfall less than half the normal.

Normal Monsoon :	Rainfall half to less than one and a half (1½) times the normal.
Active Monsoon :	<ul style="list-style-type: none"> <li>i) Rainfall 1½ to 4 times the normal.</li> <li>ii) Rainfall in atleast two stations should be 3 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 2 cm elsewhere.</li> <li>iii) Rainfall in that sub-division should be fairly widespread or widespread.</li> </ul>
Vigorous Monsoon :	<ul style="list-style-type: none"> <li>i) Rainfall exceeding 4 times the normal.</li> <li>ii) Rainfall in atleast two stations should be 5 cm in coastal Tamil Nadu and south coastal Andhra Pradesh and 3 cm elsewhere.</li> <li>iii) Rainfall in that sub-division should be fairly widespread or widespread.</li> </ul>

### Terms used in Local Forecast

#### Local Forecast

In local forecast, whenever any weather phenomenon is expected, its intensity, frequency and time of occurrence is indicated. In the absence of a weather phenomenon, the local forecast describes anticipated sky conditions. The other parameters for which the local forecast issued include maximum temperature and/or minimum temperature, rainfall, wind and special phenomenon.

It is valid for a radius of 50 km around the station and is updated 4 times in a day.

#### Sky Conditions

Reported in terms of Octa wherein the sky is divided into 8 equal parts

0 octa	Clear sky
1-2 octa of sky covered	Mainly clear
3-4 octa of sky covered	Partly cloudy
5-7 octa of sky covered	Generally cloudy
> 7 octa of sky covered	Cloudy

#### Winds

Wind	Atmospheric motion characterized by direction and speed. The direction of the wind is the direction from which the wind approaches the station (Example Northerly wind – Wind approaching the station from North)
Gales	A gale is a very strong wind (34 to 47 knots)
Squall	A sudden increase of wind speed by atleast 3 stages on the

	Beaufort Scale, the speed rising to force 6 or more, and lasting for atleast one minute is called a squall
Gust	A rapid increase in the strength of the wind relative to the mean strength at the time
<b>Weather phenomena</b>	
One or two spells of rain	In a 24 hrs time, rainfall occurring with a frequency of 1-2 spells.
A few spells of rain	In a 24 hrs time, rainfall occurring with a frequency of more than 2 spells but with well defined dry spells in between.
Intermittent rain	In a 24 hrs time, rainfall occurring with a frequency more than that defined in "A Few Spells" but is discontinuous and without presenting the character of a shower.
Drizzle	Liquid precipitation in the form of water drops of very small size (by convention, with radius of water drops between about 100 and 500 $\mu\text{m}$ ).
Rain	Liquid precipitation in the form of water drops of radius between about 500 and 2500 $\mu\text{m}$ .
Shower	Solid or liquid precipitation from a vertically developed cloud is designated a shower and is distinguished from the precipitation, intermittent or continuous, from layer clouds. Showers are often characterized by short duration and rapid fluctuations of intensity.(by convention, with radius of water drops more than 2500 $\mu\text{m}$ ).
Hail	Solid precipitation in the form of balls or pieces of ice (hailstones) with diameters ranging from 5 to 50 mm or even more.
Thunderstorm	One or more sudden electrical discharges manifested by a flash of light (Lightning) and a sharp rumbling sound (thunder).
Duststorm	An ensemble of particles of dust or sand energetically lifted to great heights by a strong and turbulent wind. Surface visibility is reduced to low limits; the qualification for a synoptic report is visibility below 1000 m.
Mist	Mist is a phenomenon of small droplets suspended in air
Dew	Condensation of water vapour on a surface whose temperature is reduced by radiational cooling to below the DEW-POINT of the air in contact with it
Fog	Fog is a phenomenon of small droplets suspended in air and the visibility is one kilometer or less
Frost	Frost occurs when the temperature of the air in contact with the ground, or at thermometer-screen level, is below the freezing-point of water ('ground frost' or 'air frost', respectively). The term is also used of the icy deposits which may form on the ground and on objects in such temperature conditions (glaze, hoar-frost).

Haze	Haze is traditionally an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky.
Smog	Smoke and fog together reduce the visibility
Squally weather	Squally weather is meant to cover occasional or frequent squalls with rain or persistent type of strong gusty winds (mean wind speed not less than 20 knot) accompanied by rain. Such conditions are associated with low pressure systems or onset and strengthening of monsoon.

**Visibility** The greatest distance that prominent objects can be seen and identified by unaided, normal eyes.

**Part of the Day**

Early hours of (date)	0000 – 0400 hrs. IST
Morning	0400 – 0800 hrs. IST
Forenoon	0800 – 1200 hrs. IST
Afternoon	1200 – 1600 hrs. IST
Evening	1600 – 2000 hrs. IST
Night	2000 – 2400 hrs. IST

**Terminologies used in Sea Area Bulletins**

State of Sea	Wave height in metres /Wind speed (kts)
Calm (glassy)	0/0
Calm (rippled)	0-0.1/0
Smooth (waveless)	0.1-0.5/5-10
Slight	0.5-1.25/11-16
Moderate	1.25-2.5/17-21
Rough	2.5-4/22-27
Very Rough	4-6/28-33
High	6-9/34-47
Very High	9-14/38-63
Phenomenal	Over 14/=64

Tidal waves Tides are the rising and falling of Earth's ocean surface caused by the tidal forces of the Moon and the Sun acting on the oceans. Tidal phenomena can occur in any object that is subjected to a gravitational field that varies in time and space, such as the Earth's land masses.

Storm surge A storm surge or tidal surge is an offshore rise of water associated with a low pressure weather system, typically a tropical cyclone. Storm surge is caused primarily by high winds pushing on the ocean's surface. The wind causes the water to pile up higher than the ordinary sea level.

Swell waves

Swell is wave motion in the ocean caused by a disturbance which may be at some distance away; the swell may persist after the originating cause of the wave motion has ceased or passed away. It often continues for a considerable time with unchanged direction, as long as the waves travel in deep water. The height of the waves rapidly diminishes but the length and velocity remain the same, so that the long, low, regular undulations characteristic of swell are formed.

**Some General terms:**

**Clouds ( Low/ Medium/ High)**

An aggregate of very small water droplets, ice crystals, or a mixture of both, with its base above the earth's surface. A classification is made in level – high, medium, or low – at which the various cloud genera are usually encountered. In temperate regions the approximate limits are high, 5-13 km (16500 – 45000 ft); medium, 2-7 km (6500 – 23000 ft); low, 0-2 km (0 – 6500 ft). The high clouds are Cirrus (Ci), Cirrocumulus (Cc), Cirrostratus (Cs). The medium clouds are Altocumulus (Ac), Altostratus (As) (the latter often extending higher) and Nimbostratus (Ns) (usually extending both higher and lower); The low clouds are Stratocumulus (Sc), Stratus (St), Cumulus (Cu), and Cumulonimbus (Cb).

**Condensation :**

The process of formation of a liquid from its vapour; in meteorology, the formation of liquid water from water vapour.

**Convection**

A mode of heat transfer within a fluid, involving the movement of substantial volumes of the substance concerned. The convection process frequently operates in the atmosphere and is of fundamental importance in effecting vertical exchange of heat and other air-mass properties (water vapour, momentum etc.) throughout the troposphere.

**Freezing-Level**

Commonly the lowest height above mean sea level at which , for a given place and time, the air temperature is 0°C

**Isobar**

A line of constant (atmospheric) pressure.

**Isohyet**

A line of constant rainfall amount.

**Isotach**

A line of constant wind speed

**Isogon**

A line of constant wind direction

**Isotherm**

A line of constant temperature

**Streamline**

A line which is parallel to instantaneous direction of the wind vector at all points along it.

**Jet Stream**

A fast narrow current of air, generally near the tropopause, characterized by strong vertical and lateral wind shears. A jet stream is usually some thousands of kilometers in length, hundreds of kilometers in width and some kilometers in depth. The vertical and horizontal shears are as a rule of the order 5 to 10 m s<sup>-1</sup> (10 to 20 kn) per km and 5 m s<sup>-1</sup> (10 Kn) per 100 Km, respectively, but much stronger shears can occur with more intense jet streams

**Latent heat**

The quantity of heat absorbed or emitted, without change of temperature, during a change of state of unit mass of a material. The dimensions are  $L^2 T^2$ .

In meteorology, the energy transformations associated with changes of state of water are very important; heat is absorbed in the changes from ice to water to water vapour and is released in changes which are in the opposite sense.

**Radiation****Land and Sea Breezes**

The transmission of energy by electromagnetic waves.

Local winds caused by the unequal diurnal heating and cooling of adjacent land and water surfaces; under the influence of solar radiation by day and radiation to the sky at night, a gradient of pressure near the coast is produced. During the day, the land is warmer than the sea and a breeze, the Sea Breeze, blows onshore; at night and in the early morning the land is cooler than the sea and the land breeze blows off shore.

**Tornado**

A tornado is a violent, rotating column of air which is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Tornadoes come in many sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris.

**Water Spout**

A waterspout is an intense columnar vortex (usually appearing as a funnel-shaped cloud) that occurs over a body of water and is connected to a cumuliform cloud. In the common form, it is a nonsupercell tornado over water, and brings the water upward. Also, it is weaker than most of its land counterparts