

# 1.TROPICAL CYCLONE AND TEMPERATE CYCLONES

## 2.\_CYCLONES:-

3.Cyclones are centers of low pressure surrounded by closed isobars having increasing pressure outward and closed air circulation(convergent air circulation) from outside towards the central low pressure in such a way that winds blow in antic clockwise and clockwise directions in the northern and the southern hemisphere respectively.

4. **TYPES OF CYCLONES:-** There are two types of cyclones based on forms of locations are as:-  
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5.1. **Tropical cyclones** and 2. **Temperate cyclones** (extratropical cyclones)

**6.Tropical cyclones:-** cyclones developed in the regions lying between the tropics of Capricorn and Cancer are called tropical cyclones, which are not regular and uniform. The tropical cyclone is powerful manifestation of the Earth's energy and moisture system. They originate entirely within the tropical air masses. The weather conditions of low latitudes mainly rainfall regimes are largely controlled by cyclones.

**1.ORIGINE OF TROPICAL CYCLONES:-** The mechanism that leads to the origin and development of tropical cyclones is not fully known due to the inadequacy of data. There are, certain conditions which result in the origin of tropical cyclones. These conditions are:- large and continuous supply of warm and moist air. large value of coriolis force. weak vertical wind. large value of coriolis force. weak vertical wind. upper level anticyclone presence of anticyclonic circulation. In tropical cyclones, cyclonic motion begins with slow moving easterly waves of low pressure in the trade wind belt of the tropics, such as the Caribbean Sea and the China Sea.

**2.\_MAIN CHARACTERISTICS OF TROPICAL CYCLONES:-** Following are the main characteristics of tropical cyclones:-  
I. They have circular and enclosed isobars. II. The isobars are close to each other and consequently, the isobaric gradient is steep. III. Their diameter varies between 150 and 300 km.III. Their diameter varies between 150 and 300 km. IV. In initial stage their speed varies between 15 and 30 kmph which accelerates subsequently up to 200 km and even more per hour. V. Heavy rainfall continues even after the winds have become weak.

**3.DESIGNATION WINDS FEATURES** Tropical Disturbance Variable low Definite area surface low pressure, patches of clouds Tropical Depression Up to 34 kmph Gale force, organising circulation, light to

**4.CLASSIFICATION OF TROPICAL CYCLONES** circulation, light to moderate rain. Tropical Storm 35 to 64 kmph Close isobars, definite circular organization, heavy rain, Hurricane(Atlantic and Pacific), Cyclones Indian Ocean, Willy willy(Northern Australia). 40 to 200 kmph steep gradient, cumulus- nimbus clouds, heavy rains, thunder and lightning.

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## Temperate cyclones

Temperate cyclones are cold cored, and winds increase with height. Tropical cyclones have much more intense rainfall than temperate cyclones, since deep convection is their source of energy. Temperate cyclones tend to have more moderate rainfall, although in extreme cases still enough to cause destructive flooding.

Tropical cyclones have strongest winds in the lower troposphere, near the top of the boundary layer, a few hundred meters above the ground.

Temperate cyclones have their strongest winds at the top of the troposphere in the core of cyclones have their strongest winds at the top of the troposphere in the core of the jet stream.

There are many differences between these two cyclones like intensity, wind speed, eye diameter, maximum spatial and temporal extent of cyclone, landfall etc.. but Main differences among all are Source and the place where do they form. based on these two only they got named like tropical and temperate cyclones.

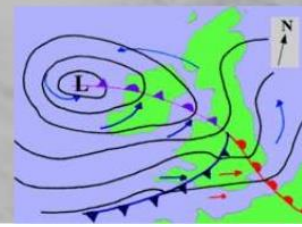
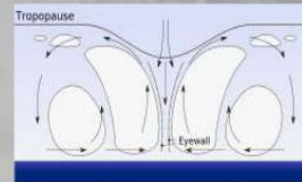
### EXTRATROPICAL CYCLONE

An extratropical cyclone is a synoptic scale low-pressure weather system that does not have tropical characteristics, being connected with fronts and horizontal gradients in temperature and dew point otherwise known as "baroclinic zones". These systems may also be described as "mid-latitude cyclones" due to their area of formation, or "post-tropical cyclones" where extratropical transition has occurred, and are often described as "depressions" or "lows" by weather forecasters and the general public. These are the everyday phenomena which along with anti-cyclones, drive the weather over much of the Earth.



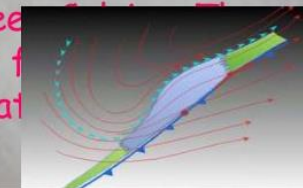
### FORMATION

The initial extratropical low-pressure area forms at the location of the red dot on the image. It is usually perpendicular to the leaf-like cloud formation seen on satellite during the



Tropical cyclones form when the energy released by the condensation of moisture in rising air causes a positive feedback loop over warm ocean waters.

Cyclones are made from a simple thunderstorm, with full cooperation from both the ocean and the atmosphere. The water in the ocean must be warmer than 26.5 degrees Celsius. The moisture and the heat from the ocean is the ultimate energy source for the cyclones.



**1. TEMPERATE CYCLONES (EXTRA-TROPICAL CYCLONES):-** Temperate cyclones, also called as extra tropical cyclones or wave cyclones or simply depressions are atmospheric disturbances having low pressure in the center and increasing pressure outward. The convergence of the cold front and the warm front in the temperate latitude cyclones conducive for the development of mid-latitude cyclone. The development and strengthening of a mid-latitude wave cyclone is known as cyclogenesis. They move counterclockwise in the Northern hemisphere and clockwise in the southern hemisphere. The temperate cyclonic motion is generated by the pressure gradient force, the Coriolis force, and the surface friction force. The temperate cyclone takes 3-10 days to complete its cycle from birth, maturity, and death.

**2. ORIGINE OF TEMPERATE CYCLONES:-** The first pioneer serious attempt was made by Fitzroy in the year 1863 in this precarious field. He postulated that extra tropical or temperate cyclones originated because of the convergence of two opposing air masses of contrasting physical properties i.e. temperature, pressure, density and humidity.

**1. POLAR FRONT THEORY** The Polar Front Theory was propounded by Bjerknes in 1918. It deals with the stages of development of temperate cyclones. According to Bjerknes, a cyclone originates through the following six stages. Bjerknes, a cyclone originates through the following six stages. **Stage I:-** Involves the convergence of two air masses of contrasting physical properties and directions. Initially, the air masses move parallel to each other and a stationary front is formed. This is called initial stage. **Stage II:-** is also called as 'incipient stage' during which the warm and cold air masses penetrate into the territories of each other and thus a wave-line front is formed. **Stage III:-** is the mature stage when the cyclone is fully developed and isobars become almost circular.

**2. Stage IV:-** warm sector is narrowed in extent due to the advancement of cold front than warm extent due to the advancement of cold front than warm front, as cold front comes nearer to warm front. **Stage V:-** starts with the occlusion of cyclone when the advancing cold front finally overtakes the warm front and an occluded front is formed. **Stage VI:-** warm sector completely disappears, occluded front is eliminated and ultimately cyclone dies out.

## 1. CHARACTERISTICS OF A TEMPERATE CYCLONE:-

2. Following are the main characteristics of a temperate cyclone:- i. The temperate cyclones may be more than 1600 km in diameter. ii. The isobars of a temperate cyclone are generally elongated or oval shaped. iii. They change their path with season. In the winter season they adopt a more southerly course covering the Mediterranean Sea, while in summer they move northward giving no rainfall in the Mediterranean region. iv. Their general direction of movement is from west to east. v. They are human friendly. The light showers of the temperate cyclone is highly effective and beneficial for the agricultural activities and human efficiency.

3.9. What is the difference between tropical and temperate cyclones? Major differences between cyclones in Tropical and Temperate climates. In general, the cyclones which form in tropical regions (0–30° N and 0–30° S) are called tropical cyclones. The cyclones which form in Temperate regions (30–60° N and 30–60° S) are called Temperate cyclones. One of the major differences between these is 'source' to form a cyclone. One of the major differences between these is 'source' to form a cyclone. i.e. in tropical regions, cyclones generally form by thermal convection but, whereas in temperate climates, cyclones form by fronts (Boundary between two different air masses). Tropical cyclones are mesoscale weather systems, the diameter of the storm is of the order a few hundred km. Temperate cyclones are synoptic scale systems, thousands of km across.

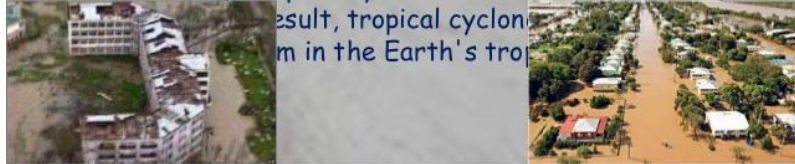
# NARGIS

Cyclone Nargis is the deadliest tropical storm in the recorded history of Burma (Myanmar). It devastated many areas in Burma, as well as some areas in Sri Lanka, Bangladesh and India.



# EFFECTS OF CYCLONE

Cyclones can produce extremely powerful winds and torrential rain, they are also able to produce high waves and damaging storm surge. They develop over large bodies of warm water, and lose their strength if they move over land. This is the reason coastal regions can receive significant damage from a tropical cyclone, while inland regions are relatively safe from receiving strong winds. Heavy rains, however, can produce significant flooding inland, and storm surges can produce extensive coastal flooding up to 40 kilometres (25 mi) from the coastline. Although their effects on human populations can be devastating, tropical cyclones can also relieve drought



As a result, tropical cyclones are the most destructive natural phenomenon in the Earth's tropics.



# SUBTROPICAL CYCLONE

A subtropical cyclone is a weather system that has some characteristics of a tropical cyclone and some characteristics of an extratropical cyclone. They can form between the equator and the 50th parallel. As early as the 1950s, meteorologists were unclear whether they should be characterized as tropical cyclones or extratropical cyclones, and used terms such as quasi-tropical and semi-tropical to describe the cyclone hybrids. By 1972, the National Hurricane Center officially recognized this cyclone category. Subtropical cyclones began to receive names off the official tropical cyclone list in the Atlantic Basin in 2002. They have broad wind patterns with maximum sustained winds located farther from the center than typical tropical cyclones, and exist in areas of weak to moderate temperature gradient. Since they form from initially extratropical cyclones which have colder temperatures aloft than normally found in the tropics, the sea surface temperatures required for their formation are lower than the tropical cyclone threshold by three degrees Celsius, or five degrees Fahrenheit, lying around 23 degrees Celsius.

# Tornado

A tornado is a violently rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Also referred to as twisters, a colloquial term in America, or cyclones, although the word cyclone is used in meteorology, in a wider sense, to name any closed low-pressure



# Dust Devil

A dust devil is a strong, well-formed, and relatively long-lived whirlwind, ranging from small (half a metre wide and a few metres tall) to large (more than 10 metres wide and more than 1000 metres tall). The primary vertical motion is upward. Dust devils are usually harmless, but can on rare occasions grow large





# Water Spout

A waterspout is a columnar vortex forming over water that is, in its most common form, a water that is connected to a cumuliform cloud. While it is often weaker than most of its land counterparts, stronger versions spawned by mesocyclones do occur.

# Steam devil

A gentle vortex over calm water or wet land made



# EMERGENCY RESPONSES

It was extremely hard for the emergency responses to help the people in Burma because the government would not let anyone into the country. Even when they eventually did gain entry into the country, the government insisted on distributing aids by themselves.

