Competitive Exams: Climatology Winds

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Temperature is affected by:

1. Latitude: at high latitude there is low temperature and at low latitude, there is high temperature due to longer and shorter distances. Thus equator will be affected due to isolation or sunstroke and tropics will be most affected between 6° north- 6°South. Because the vertical motion is relatively rapid during its passage over the equator, but its rate slows down as it reaches the tropic;
2. Altitude: places near the earth's surface are warmer, thus the temperature decreases with the increasing height above the sea level because of the lapse rate i.e. every 1 km decreases by 6.5 degree c.
3. Continentality: Continental Climate: summer - 70 degree F; winter - 28 degree F; range - 42 degree F.; Maritime Climate: summer -62 degree F; winter- 48 degree F; range - 14 degree F. 4)Oceanic Currents and Winds

Pressure And Planetary Winds

1. 0'-5 degree North South:
2. Called Equatorial Low Pressure Belt;
3. Intense heating, with expanding air and ascending convection currents;
4. It is the closest point to the sun, therefore, the air is relatively more hot due to which, the air becomes less denser, lighter and moves upward.
5. It is called DOLDRUMS or calm;
6. It is a Zone of Wind Convergence.

2) 10°-15° North and South:

1. Due to high pressure belt around this area, there is subtropical high pressure belt where the air is comparatively dry, light and calm.

2. This is very beneficial in maritime trade, hence, is called maritime trade.
3. Since the air becomes hotter at the equator, it raises upward and around 30 degree north and south starts coming down. Due to this, a high-pressure belt is created. Hence, horse latitude i.e. 25° -35° north and south, no wind blows.

3) 30°- 45° North- South:

1. Subtropical High Pressure Belt;
2. Air is comparatively dry and winds are calm and light.
3. It is a region of descending air currents of wind divergence with cyclonic activity;
4. Referred as HORSE LATITUDE.

4) 30°-60° North and South:

1. It is the area of temperate low pressure belt or the antitrade wind area. There is rainfall all round the year and cyclones and anti-cyclones are developed.
2. Comparatively, anti-trade winds are faster in southern hemisphere than in the northern;
3. Due to Coriolis force, they become South Westerlies in the north and North Westerlies in the south.
4. In the southern hemisphere, due to oceans between 40 degree-60 degree South Westerlies blow with much greater force with regularity throughout the year. Here three types of winds are found: Roaring 40s, Furious 50s, and Shrieking or Storming 50s.

5) 60°-North-South:

1. Two Temperate Low Pressure Belts which are also zones of convergence with cyclonic activity;
2. The sub-polar low pressure areas are best developed over oceans.

6) 90°-North-South

1. Temperatures are permanently low, are the Polar High Pressure Belt. HORSE LATITUDE -The dynamically induced subtropical high pressure belt extends between 30°-35° (25°-35°) latitudes in both the hemispheres.
2. This belt separates two wind systems, viz. trade winds and westerlies.
3. This zone 30°-35° is characterized by weak and variable winds and calm.
4. It is known as horse latitude because of the fact that in ancient times had be sailed through the calm conditions of these latitudes.

Doldrum

- A belt of low pressure, popularly known as equatorial trough of low pressure, extends along the equator within a zone of 50 degree N and 50 degree S latitudes. This is the belt of calm or doldrums because of light and variable winds. -This belt is subjected to seasonal and spatial variations due to northward and southward movement of the overhead sun (summer and winter solstices). Polar Belt:
- Temperature is permanently low, so this region is the high pressure belt. In the northern hemisphere, they blow north east and in southern hemisphere, south east. The polar easterlies blows towards the temperate low pressure belt. They are extremely cold as they come from Tundra and Icecap region. They are more regular in the south than the north. Planetary Winds: Winds tend to blow from the high pressure belts to the low pressure belts, are the planetary winds. Coriolis Force or Ferrel's Law of Deflection:
- Instead of blowing directly from one pressure belt to another, however the effect of the rotation of the earth (Coriolis force) tends to deflect the direction of the winds. In the northern hemisphere, winds are deflected to their right and in the southern hemisphere to their left.
- This is known as Ferrel's Law of Deflection.
- The Coriolis Force is about along the equator but increases progressively towards the Poles.

Trade Winds

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- These winds blow out from the Sub-Tropical High Pressure Belt in the northern hemisphere towards the Equatorial low become North East Trade Winds and those in the southern hemisphere become the South East Trade Winds. These trade winds are the most regular of all the planetary winds.
- They blow with great force and in constant direction.
- Therefore, helpful to traders to sail. Trade winds bring heavy rainfall.
- They sometimes contain intense depressions.
- The word 'trade' comes from the Saxon word 'tredan' which means to tread or follow a regular path.
- They blow from north -east towards the equator, in the northern hemisphere and from south-east towards the equator, in the southern hemisphere.

Permanent Winds

They blow throughout the equator.

Westerlies

- From the Subtropical High Pressure Belts, winds blow towards the Temperature Low Pressure Belts.
- Under the effect of Coriolis Force, they become the South-Westerlies in the northern hemisphere and North-Westerlies in the southern hemisphere.
- This warming effect and other local pressure differences have resulted in a very variable climate in the temperature zones, dominated by the movement of cyclones and anti-cyclones.
- In the southern hemisphere, where there is a large expanse of ocean, from 40 degree south to 60 degree south; westerlies blow with much greater force and regularity throughout the year.
- There is much variation in the weather conditions in their poleward parts where there is convergence of cold and denser polar winds and warms and lighter westerlies.
- Their velocity increases south ward and they become .stormy. They are also associated with boisterous gales. The velocity of the westerlies be-cpme so great that they are called:
- Roaring forties between the latitudes 40-50 degree S;
- Furious fifties at 50 degree S latitude; and
- Shrieking sixties at 60 degree S'latitude. Polar Easterlies:
- It blows from the Polar Easterlies towards the Temperate Low Pressure Belts.
- It is extremely cold winds as it comes from Tundra and Ice-Cap regions. y It is more regular in the south than in the north.
- It is defected to the right to become the N.E. Polar Winds in the Northern Hemisphere and to the left to become the S.E. Poter Winds in the Southern Hemisphere.
- These polar cold winds converge with warm westerlies near 60-65 latitudes and form polar front or mid-latitude front or mid-latitude front, which becomes the centre for the origin of temperate cyclones.

Fohn and Chinook

Fohn is a warm, dry and local wind- Northern Alps- Switzerland in spring; and called climate oasis.

Chinook is a warm, dry and local wind- Eastern slopes in Rockies in USA and Canada in winters.

- It increases temperature 35 degree F within 15 minutes.

- It causes Avalanches.
- In North America, it is called Chinook, meaning 'the snow eater'.
- Chinook winds are more common during winter and early spring along the eastern slopes (leeward side) of the Rocky Mountains from Colorado (USA) in the south to British Columbia (Canada).

Sirocco

Sirocco is a warm, dry and dusty local wind, which blows in northerly direction from Sahara desert and after crossing over the Mediterranean Sea, reaches Italy and Spain,

- Becomes extremely warm and dry while descending through the northern slopes of the Atlas Mountain.
- It is known as Khamsin in Egypt; Gibli in Libya; Chili in Tunisia; Simoom in Arabian Desert; Blood Rain in South Italy; Leveche in Spain; Gharbi in Adriatic and Aegean Sea.

Mistral

- It is a cold wind which blows in Spain and France from North-east direction; especially in winter
- The average velocity of mistral is 56-64 km/h to 128 kmph Bora:
- Bora is an extremely cold and dry north-easterly wind in Adriatic Sea, with a velocity of 128 kmph to 196 kmph
- It is also called Tramontana and Gregale. Harmattan:
- It is warm and dry winds blowing from north-east and east to west in the eastern part of Sahara desert.
- Called as Doctor in Guinea coastal of Western Africa
- Called Brickfielder in Victoria in Australia; Blackroller in the Great plains of USA; Shamal in Mesopotamia; Norwester in New Zealand.

Blizzard

- It is a violent stormy cold and powdery polar wind laden with dry snow and is prevalent in North and South polar regions, Siberia,-Canada and the USA.
- Northers in the Southern USA and Burran in Siberia. Tropical Cyclones: Typhoons: It occurs mainly in the region 6 degree and 20 degree North and South of the equator and are most frequent from July to October. It's velocity is 100 m.p.h. Torrential downpour is accompanied by Thunder and Lightening. Hurricanes: Same feature, but only differs in intensity, duration and locality. It has calm, rainless centres, where pressure is lowest.

Tornadoes

Its velocity is 500 m.p.h. It appears as a dark funnel cloud. 250-1400 ft. in diameter. It is most frequent in spring.

Discussions & Questions

Is a belt of low pressure between 5 degree north and 5 degree south of the equator? (- dk...@ on 10-Aug-2016)

1 Answer

Yes these are known as equatorial low pressure belt.

- Examrace on 10-Aug-2016