

well developed low pressure centres or cells over the oceans in the northern hemisphere.

(iv) **Polar High Pressure Belt**—The high pressure belt persists at the poles throughout the year because of prevalence of very low temperature (below freezing point) throughout the year. Here both thermal & dynamic factors operate. There is thinning out of layers of air due to diurnal rotation of the earth as the air spreads outward due to this factor but this effect is overshadowed by thermal factor and hence high pressure is produced due to very low temperature.

General Circulation of Winds

Winds blow from high pressure belts to low pressure belts. The direction of some winds remains more or less same throughout the year. This type of wind is termed as **planetary wind**. These winds include trade winds, westerlies and polar winds.

The following wind belts are found on the earth's surface in each hemisphere—

- (i) Doldrums
- (ii) Trade wind belt
- (iii) Prevailing westerlies
- (iv) Polar easterlies

(i) **Doldrums**—The doldrum is the equatorial belt of calms and variable winds lying over the equatorial trough of low pressure. Average location of the doldrums is roughly between 5°N to 5°S latitudes. This belt of calm lies between the two trade wind belts. In the late afternoon, there is strong convection which brings about heavy thunderstorm. Because of prevailing calm conditions, the atmosphere in the doldrums is hot, oppressive and sticky. Since this is the zone of meeting place of two trade winds, it is also known as the **inter-tropical convergence zone (ITCZ)**.

(ii) **Trade Wind Belt**—On either side of the equatorial trough of low pressure lie the trade wind belt extending roughly from 5° to 30° of latitudes. Here the surface flow is equatorward, and the flow in upper troposphere is poleward. Trade wind originates due to the pressure gradient from Sub tropical high pressure belt to the equatorial low pressure belt. In the northern hemisphere these are called north east trade wind and in the southern hemisphere they are called southeast trade winds.

The zone of trade winds is also called the **Hadley Cell**, because it resembles the convective

model used by Hadley for the whole earth. The energy to drive this cell is believed to come from the latent heat released during the formation of Cumulonimbus clouds in the equatorial region.

(iii) **Prevailing Westerlies**—This belt lies between 30° to 60° latitudes in both the hemispheres. The westerlies move out from the poleward margins to the subtropical high pressure belts. These winds while moving into higher latitudes are deflected and become the south westerly and the north westerly winds in the northern and the southern hemisphere respectively.

In the northern hemisphere, because of the larger percentage of land areas with their high mountains and plateaus and changing seasonal pressure systems, the westerly flow is nearly obscured. But in the southern hemisphere where there is preponderance of water over land, the westerlies are stronger and retain their direction. The westerlies blow throughout the year, but are stronger in cold season, particularly in the north Atlantic and north Pacific. This is due to the steep pressure gradients from the Aleutian and Icelandic low pressure areas towards the extremely cold continental interiors during winter. In the southern hemisphere, between the latitudes 40° and 60°S due to presence of water the westerlies become so powerful and persistent that the sailors use such expressions as 'roaring forties', 'furious fifties' and 'screaming sixties' for these high velocity winds in the latitude belts of forties, fifties and sixties respectively.

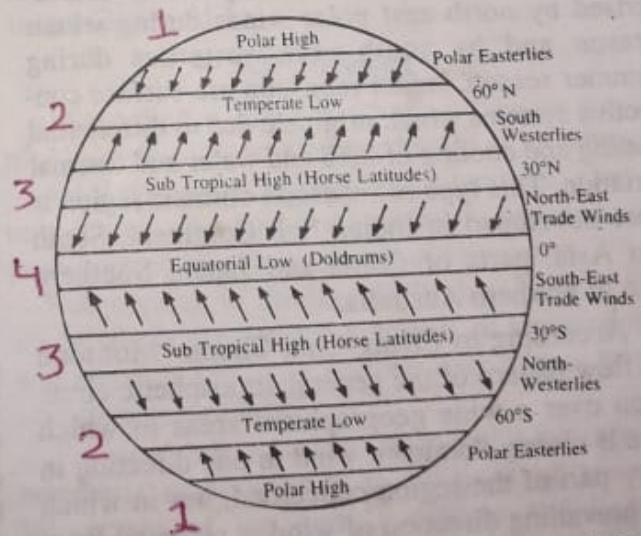


Fig. World Pressure belt and Planetary winds