

## 25. Atmosphere – pressure systems

The cause of air motions are *differences in air pressure* determined by unequal heating of air above land mass. Pressure differences equal by air blowing from high air pressure areas to low air pressure areas = **wind**

What could be a relation between air pressure and air temperature?

**Global circulation of the atmosphere** = complex system of horizontal and vertical atmospheric movements.

### **Tropical zone**

Along the equator, air is hot ⇔ hot land mass => rises up. This upward movement causes *equatorial low air pressure areas* (Intertropical Convergence Zone – ITCZ).

Air is rising and moving polewards => *subtropical high air pressure areas* ⇔ air descends and part of it returns back to equatorial low air pressure area = trade winds

⇒ northern hemisphere = *NE trade winds*

⇒ southern hemisphere = *SE trade winds*

### **Temperate zone**

From subtropical high air pressure areas, a part of air masses blow polewards creating westerlies (western winds) which prevail in Europe ⇔ *temperate low air pressure areas*.

### **Polar zone**

In polar areas, cold air lies there. It determines the formation of *polar high air pressure areas* => eastern winds blowing towards temperate zone.

Monsoons occur in subequatorial areas (especially in S+SE+E Asia) ⇔ unequal amount of heating between land mass and ocean.

⇒ *Summer monsoon* = wind blowing from ocean towards land mass => brings heavy rainfall

⇒ *Wintertime monsoon* = wind blowing from land mass towards ocean => dry

On local scale and during sunny days, valley winds emerge ⇔ warm slopes with southern aspect. During cold nights, cooler air blows downslopes as mountain wind.

If a warm wind traverses (interferes) certain mountains – Föhn. If a cold wind overruns certain mountain range – Bora.

Breeze = smaller “monsoons” = wind blowing from colder sea towards shore during day (marine breeze) and vice-versa during night (coastal breeze).

**Temperature inversion** (often in autumn and winter) = cool air stays in a valley (often accompanied with *fog*) => temperature increases with altitude up to foothills.

**Cyclone** (low air pressure area) = warmer, lighter air, *cloudy and rainy weather*

**Anticyclone** (high air pressure area) = colder, heavier air, *clear and dry weather*

= wind spirals with diameter 1000-2000 kms. Moving, they bring distinct (considerable) changes of weather.

**Tropical cyclones** = hurricanes (typhoons) and tornadoes

### **Keywords**

air pressure, wind, atmospheric circulation, trade winds, westerlies, eastern winds, summer/winter monsoon, valley/mountain wind, föhn, bora, breeze, temperature inversion, (anti)cyclone

