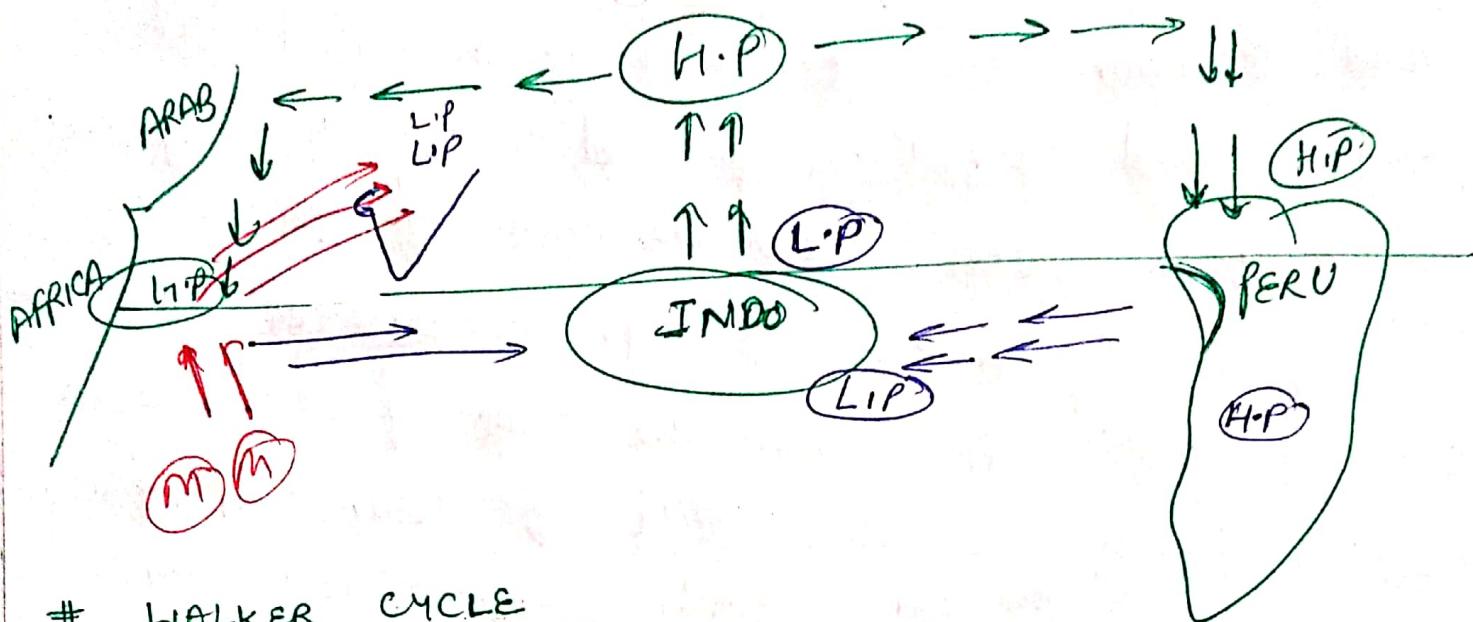
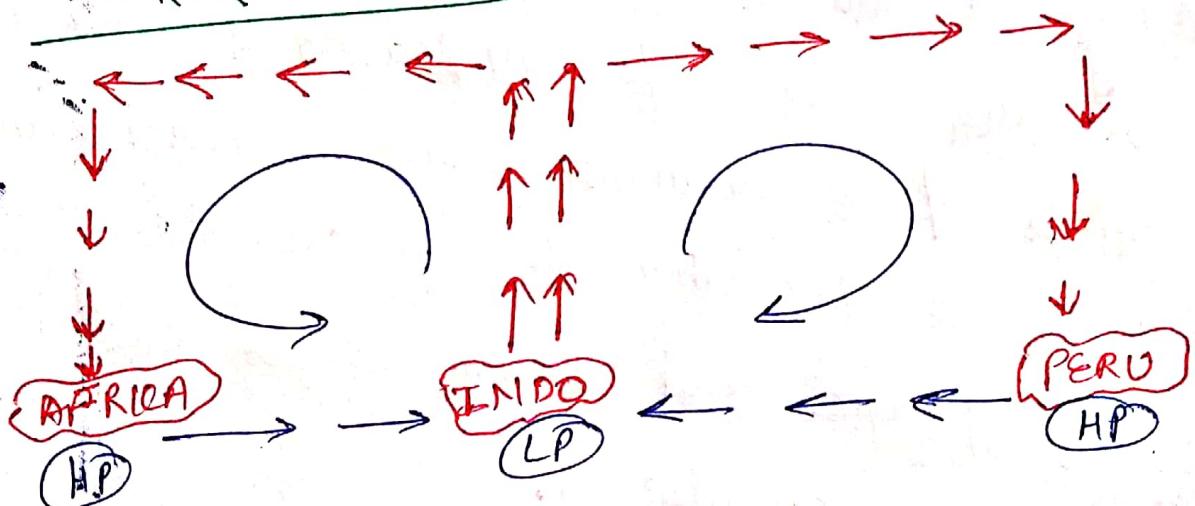


Date
16/09/20

Physical Geography



WALKER CYCLE



WALKER CELL

WALKER CYCLE

During normal years of atmospheric oceanographic circulation over Pacific and Indian Ocean, a tremendous amount of warm oceanic water mass accumulates near the coast of Indonesia at the same time the coast of Peru in eastern Pacific is characterised by the

(2)

predominance of cold water. The cold water piled up along the ^a cost of Peru by the merger of cold Peruvian current with south equatorial current and ^{upwelling} ~~upwelling~~ of cold water to ^{compensate} the surface water near the cost of Peru.

In this particular atmospheric scenario convection currents originating from the coast of Indonesia, subside / sink over the coast of Peru and Africa. subsequently a relative high pressure condition develop over the coast of Africa and Peru to diverge winds of or air masses towards Indonesia. As a result a circulation develop over the surface of pacific and Indian ocean called as the Walker circulation.

During normal walker circulation winds originating from the cost of Africa and advancing towards Indonesia drift or drag the branches of South-west monsoon towards India. Apart from this the high pressure condition along the cost of Africa also get influenced by the low pressure vacuum prevailing over India and

Tibetan plateau. Subsequently more moisture laden air parcel enter in Indian from June to September to make monsoon (precipitation) adequate over the surface.

El-Nino

El Nino is a warm oceanic current originating from the coast of Peru and having drastic meteorological impact over the mechanism of monsoon. The origin and mechanism of El Nino can be explained by taking the regard of solar insolation and insalational heating.

During the period of long sunspot cycle (Sunspot minima) when the impact of solar insolation decreases over the surface of earth, a weak low pressure condition develops over equator supplemented by the reduction in pressure gradient between subtropical high pressure belt and equatorial low pressure belt. By this resultant phenomena the propagation and velocity of Easterlies also become relatively weaker.

The weakening of Easterlies and Westerlies also make the oceanic circulation of Southern

(4) Pacific less voluminous to accumulate more watermass along the coast of Indonesia and Chilli, however at the same time more accumulation of warm watermass takes place along the coast of Peru. The accumulation of warm water along the ^acost of Peru create a relative low pressure condition to attracts winds from different direction it should be noted that the increase in the sea water level and strengthening of low pressure condition near Peru takes place three important oceanographical climatological factor-

1. Prolonged period of long sunspot cycle
2. Location of ITCZ over the surface of Peru in a particular threshold year.
3. In the same threshold year when north east trade winds cross equator and transform into equatorial westerlies, the propagation of counter equatorial current also become stronger. subsequently accumulates ^awarm more and more warm watermass near the cost of Peru.

(5)

By this resultant phenomena a time will come when the sea water level rise near Peru surpass the sea water level rise near Chili as a result a slope develop in North-South direction along the western margin of south America to generate a warm oceanic current called as El-NINO.

La-Nina

La Nino is an intense cold peruvian current propagating from chili to Peru during the period of short sunspot cycle that is sun spot maxima, during sun spot maxima, the impact of insolation heating is more over the surface of Earth to increase the pressure gradient between respective pressure belts. This will lead to the strengthening of prevailing winds. The strengthening of prevailing wind also make the propagation of several oceanic currents of southern pacific more stronger and voluminous. As a result abundant amount of water mass

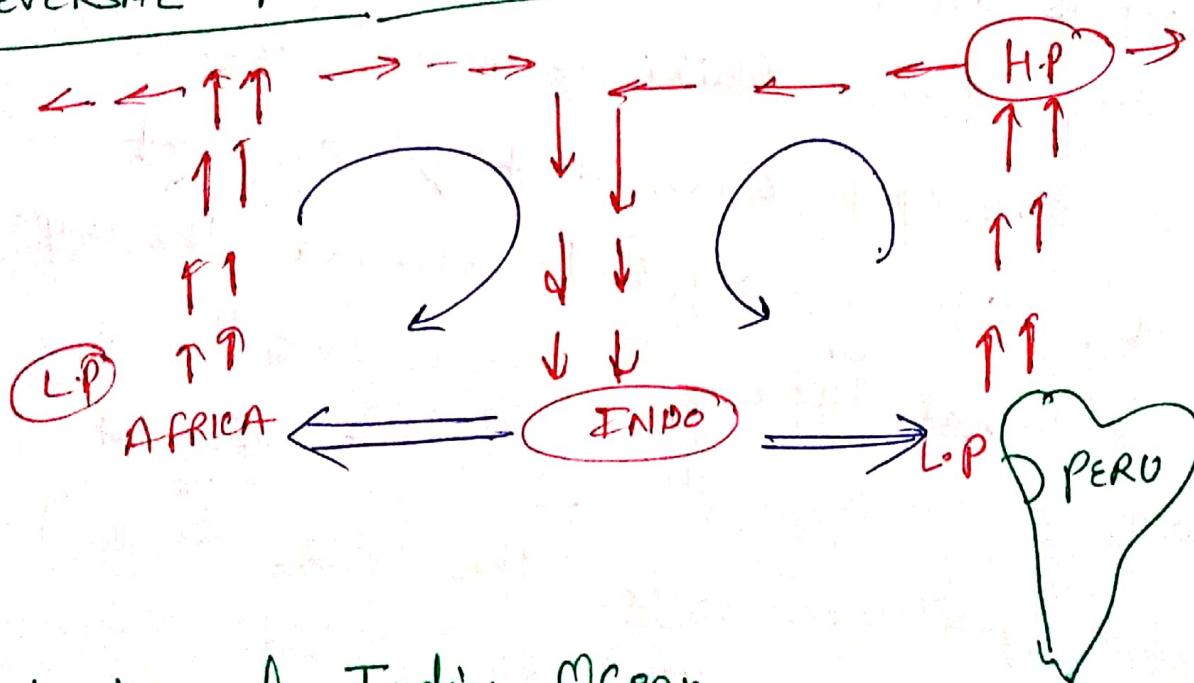
⑥

Accumulates along the cost of Indonesia and Chili.

In this changed atmospheric oceanographical scenario a much more steeper slope develop in south north direction along the western coast of south America to generate an extreme cold circulation or current called as LA-NINA

Impact of EL-NINO over Indian Monsoon

① REVERSAL OF WALKER CYCLE



② Heating of Indian Ocean.

③ Indian Ocean Dipole

(7)

The very first impact of ELNINIO is
reversal of Walker Cycle

During ElNino Years convection current originating from the surface of Peru subside over the coast of Indonesia. Similarly air parcels rising from the coast of Africa also sink over the coast of Indonesia in this change atmospheric scenario winds start diverging from the coast of Indonesia towards Peru and Africa. These resultant phenomena by which pressure system changes over pacific and Indian Ocean is regarded as reversal of Walker Cell or ENSO (ElNino Southern Oscillation) effect.

During the reversal of Walker Cell air masses originating from Indonesia and approaching towards the coast of Africa not only dragged the southwest monsoon branches away from India but also the low pressure condition prevailing over the coast of Africa reduces the possibility of more moisture laden monsoon branches entering in India.

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Heating of Indian Ocean

During El Nino years with the supply of warm water mass of El Nino in the prevailing South Pacific Drift the average temperature of South Pacific Drift also increases gradually. In the course of time when the South Pacific drift enters in Atlantic and Atlantic Drift inculcates in Indian Ocean, It increases the average temperature of central and southern Indian Ocean.

The Heating of Indian Ocean would develop a weak high pressure condition over subtropical high pressure belt and decreases the pressure gradient between Madagascar, Mauritius Island and subtropical India. As a result the prevailing south east trade winds and South-West Monsoon become weaker to cause sufficient precipitation over India.