Geography Class 31

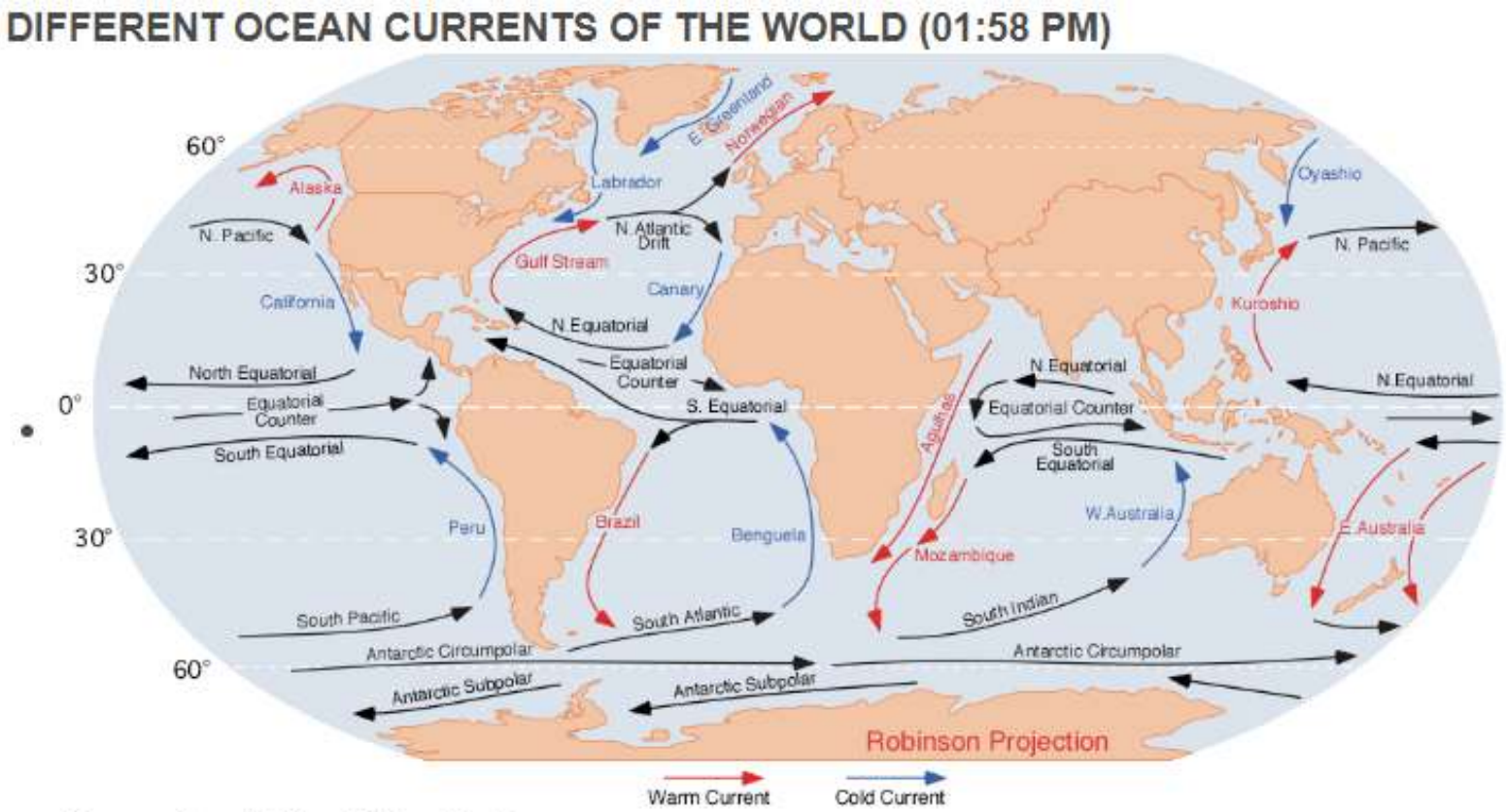
A BRIEF REVISION OF PREVIOUS CLASS (01:26 PM)

- Ocean Salinity
- Coral Reef

OCEAN CURRENTS AND CIRCULATIONS (01:33 PM)

- An ocean current is the general movement of surface water of the ocean in a definite direction over long distances.
- There are **two types of ocean currents:**
- **1) Warm current-** moving from Equatorial to Polar regions.
- **2) Cold Current-** moving from Polar to Equatorial regions.
- **Factors affecting Ocean currents:**
- **1) Winds-** A steady blowing of winds drags the surface water in its direction and brings about the surface flow and steadily sets the water currents in motion.
- 2) The **shape of the coastline and topography** modify the ocean current's direction.
- **3) Differences in temperature, salinity and density** cause the water to move and reduce the variations. Such differences guide the movement of ocean currents.
- **4) Coriolis force-** It causes ocean currents to deflect right in the northern hemisphere and left in the southern hemisphere.

Because of easterlies water near equator moves from east to west so, North Equatorial moves in north side and South Equatorial moves from in south side



- **Currents of the Atlantic Ocean-**
- North Equatorial current
- South Equatorial current
- Counter Equatorial current
- Antilles current
- Florida Current
- Gulf stream
- North Atlantic drift
- Norwegian current
- Canaries current
- Labrador Current

warm ocean currents

cold ocean current

Due to movement of water from east to west there is shortage of in east that is why Counter Equatorial current flows.

Some part of S. Equatorial current joins north going part of N. Equatorial which will be divided into two parts among which one part goes to Gulf of Mexico via Caribbean sea (which is west of Caribbean island) and the other part which goes to east of Caribbean island is known as Antilles and then this west going current combines with Antilles current and forms Florida current near coast of Florida.

When this Florida current passes coast of Florida it is directed to north-east which is known as Gulf stream or Gulf current.

Once this Gulf stream crosses New Foundland island of Cannada then due to influence of westerlies and coriolis effect it turns from west to east which is known as North Atlantic drift or North Atlantic current.

North Atlantic current diverges to north and south from western part of Europe so the part which goes to north and merges to Arctic ocean is called Norwegian current and the part which goes to south is called Canaries current because is passes through Canary islands which is near to Morocco.

Canaries current merge with N. Equatorial and forms a circle.

There are two more ocean currents, one moves from Cannada and Greenland and other from Greenland and Iceland so, the one which moves from in between Cannada and Greenland passes through a region Labrador in Cannada that is why it is known as Labrador current and meets with Gulf Stream near New Foundland island that is why New Foundland island is a good spot for fishing because of merge of hot and cold water creates optimum temperature and optimum level of oxygen in water which is ideal for growth of Phytoplankton and therefore fishes.
One which moves from in between Greenland and Iceland is known as East Greenland current and joins N. Atlantic drift.

Due to circular movement of these currents in North Atlantic sea the water of whole North Atlantic region starts to move circular this is what we called Gyre. This phenomenon helps in growth of a particular ocean weed which is called Sargasso that is why we call this as Sargasso sea also.

So, in North Atlantic sea western coast of continent have cold ocean current and eastern coast of continent have warm ocean current.

some part of South Equatorial current moves to south along coast of Brazil which is known as Brazilian warm current when this current moves ahead so due to westerlies and coriolis effect it turns to eastward and this further called as South Atlantic drift which is cold current and this S. Atlantic drift joins coldest west wind drift or Antarctic Circumpolar current. Some part of S. Atlantic drift joins ACC and some moves to northward along Namibia coast which is known as Benguela current and this Benguela current is cold current. This ACC continuously moves around Antarctic.

Due to this circular formation of current in South Atlantic sea there also form Gyre which is in opposite direction of the Gyre which forms in North Atlantic sea.

There is one more current which is known as Falkland current this is cold current and this moves along Falkland island which is present near southern part of Argentina and this Falkland current joins warm Brazilian current.

In Pacific ocean the North Equatorial current moves to north along the coasts of Philippines and Japan which is known as Kuroshio current and this Kuroshio current turns to rightward under the influence of westerlies and coriolis effect which is known as North Pacific drift.

- **Currents of the Pacific Ocean-**
- North Equatorial current
- South Equatorial current
- Counter Equatorial current
- Kuroshio current
- Oyashio current
- North Pacific drift
- Alaska Current
- Californian current

This North Pacific current hits to western part of America so one part moves to north along Alaska which is known as warm Alaska Current and the other part moves to southward along California which is known as cold Californian Current and due to this Gyre forms (Californian Current wali side me).

Two cold current comes from north to southward one along Sakhalin island (belongs to Russia) which is present above Japan this current is known as Okhotsk Current and other comes from east side of Kamchatk peninsula (of Russia) which is known as Oyashio Current.

In Pacific ocean some part of South Equatorial Current moves to southward along eastern coast of Australia which is known as East Australian Current, this current further comes under influence of westerlies and coriolis force and turns to rightward and joins West Wind drift and further some part of this current turns to northward along western coast of Peru which is known as cold Peru Current or Humboldt Current (Humboldt is the name of a Geographer which found this current) and finally this current joins back to South Equatorial current and forms Gyre.

CURRENT IN INDIAN OCEAN (02:45 PM)

- North Equatorial current
- South Equatorial current
- Mozambique current
- Agulhas current
- West wind drift
- West Australian Current

In Southern Indian ocean some part of S. Equatorial current turns to southward and split into two parts because of Madagascar island among them one moves along eastern coast of Mozambique (a country of Africa) which is known as Mozambique Current and other moves along eastern coast of Madagascar and further both currents join together to form Agulhas current. Agulhas current when comes under the influence of westerlies and coriolis force turns to rightward and joins West Wind drift and some part of this West Wind drift further turns to northward and moves along western coast of Australia which is known as cold West Australian Current and finally this West Australian Current joins back S. Equatorial Current and forms Gyre.

- **Currents of the Northern Indian Ocean-**
- During winter, the North Equatorial current flows westward above the equator and counter equatorial current flows between the North Equatorial current and the South Equatorial Current.
- The North East Monsoon causes the water of the Bay of Bengal and Arabian Sea to circulate in an anti-clockwise direction called as **North East Monsoon drift.**
- In summer, the entire water of the Northern Indian Ocean comes under the influence of southwest monsoon producing a clockwise flow of southwest Monsoon drift.
- During this time, the north Equatorial current and counter Equatorial current are nearly absent.

NE Monsoon drift is not so strong because NE Monsoon is not so strong.

SW Monsoon drift is very strong because SW Monsoon is very strong.

SIGNIFICANCE OF OCEAN CURRENTS (03:42 PM)

- 1) The continuous movement of water from east to west in tropical regions causes cold water upwelling along the Eastern parts, resulting in a drop in the temperature. i.e. cold water comes up from down of ocean and decreases temperature of surface water.
- Accumulation of warm water along the western part of tropical oceans leads to a rise in the water temperature. It results in favourable conditions for the formation of cyclones.
- 2) The higher temperature of water along the western part of tropical oceans provides favourable conditions for the formation of coral reefs.
- 3) The cold ocean currents along the west coast in tropical and sub-tropical regions suppress precipitation through the desiccation effect resulting in the formation of deserts.

Because cold ocean current limits evaporation and therefore formation of clouds. Other two reasons of formation of desert is Sub-tropical high pressure belt and offshore trade wind.

- **Examples:** the Sahara desert near the Canary Current, the Namib desert near the Banguela Current, the Atacama desert near the Humboldt Current, the Mojave desert near the Californian Current, and the Deserts of Australia near the West Australian Current.
- 4) The merging of warm and cold ocean currents results in favourable conditions for the development of fishing banks.
- **E.g.** Grand Bank, and Gorges Bank near New Foundland due to the merging of the Gulf Stream with Labrador Current, Dogger Bank near the East Atlantic and around Japan due to the merging of Kuroshio and Oyashio Currents.
- 5) The merging of warm and cold ocean currents results in fog formation which may obstruct ocean navigation.
- 6) The warm ocean currents in temperate regions keep winter mild and keep the ports ice-free. E.g. North Atlantic drift along Britain. (British type climate)
- The offshore winds near subtropical and tropical regions push the surface water away and cause cold water from the bottom to rise upwards to the surface. This brings cold and nutrient-rich water to the surface through upwelling. This resulted in the creation of large fishing banks.
- **E.g.** Cold Water upwelling along Peru Chile Coast.
- 7) The ocean currents are used in navigation in the open ocean.
- 8) The ocean currents help in the global distribution of temperature and salinity.

TOPIC OF THE NEXT CLASS- WATER MASS, EL NINO

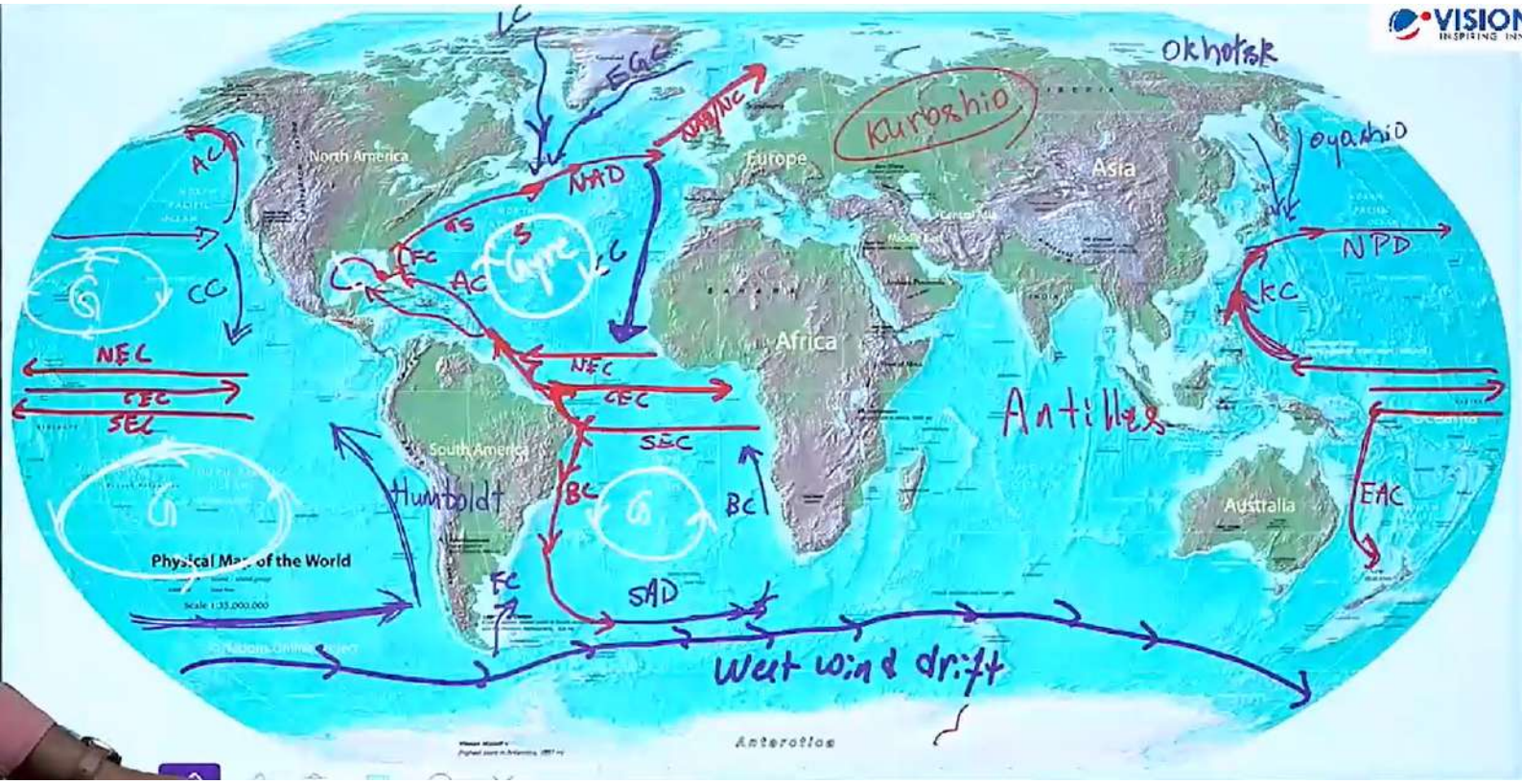
Because over warm ocean currents air will be rich in moisture and due to merge of cold dry air which present over cold ocean current that warm moisture air condenses and fog formation happens this is also an example of Advection fog.

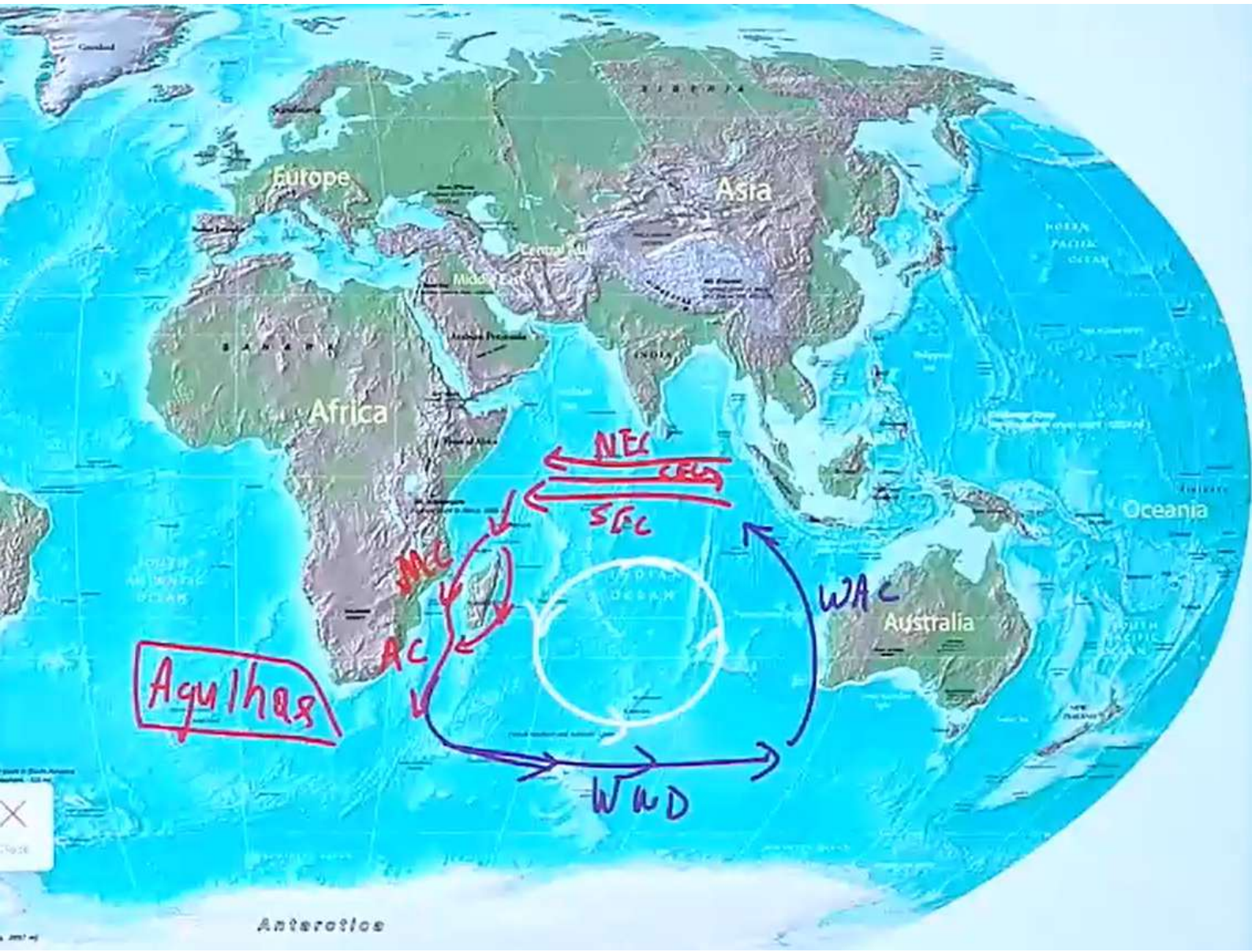
when cold ocean currents come in contact with offshore winds near tropical and subtropical region this happens and due to upwelling, rich nutrients which is formed from dead remains of sea comes out which stimulates growth of Phytoplankton which is source of sea food chain and due to this huge growth of fishes happens and because this large growth of fish so many birds come here and feed themselves by catching fish and they form nest there and because of their droppings fertilizers form there. Among them Humboldt Current is very famous so, half of economy of Chile and Peru runs because of fishing and fertilizer export. Most common fertilizer is Potash here.

The Gujarat coast experiences the Somali Current (a cold ocean current) during the summer monsoon (southwest monsoon), not during the northeast monsoon.
This cold current develops in response to the southwest monsoon winds over the Arabian Sea, bringing cooler waters toward the Gujarat coast.
The cold currents here are seasonal and occur in summer, not winter, meaning they are unrelated to the Northeast Monsoon.

During the southwest monsoon, strong winds blow from the southwest, pushing warm surface waters away from the Somali coast.
This creates upwelling, where deeper, colder, and nutrient-rich water rises to the surface to replace the displaced warm water.
As a result, the Somali Current becomes a cold current during the summer despite coming from equatorial regions. This is why waters along the Gujarat coast are cooler during this time.

In contrast, during the northeast monsoon, the winds reverse direction and blow from the northeast. This change in wind direction weakens the upwelling along the Somali coast, and the current carries relatively warmer waters.

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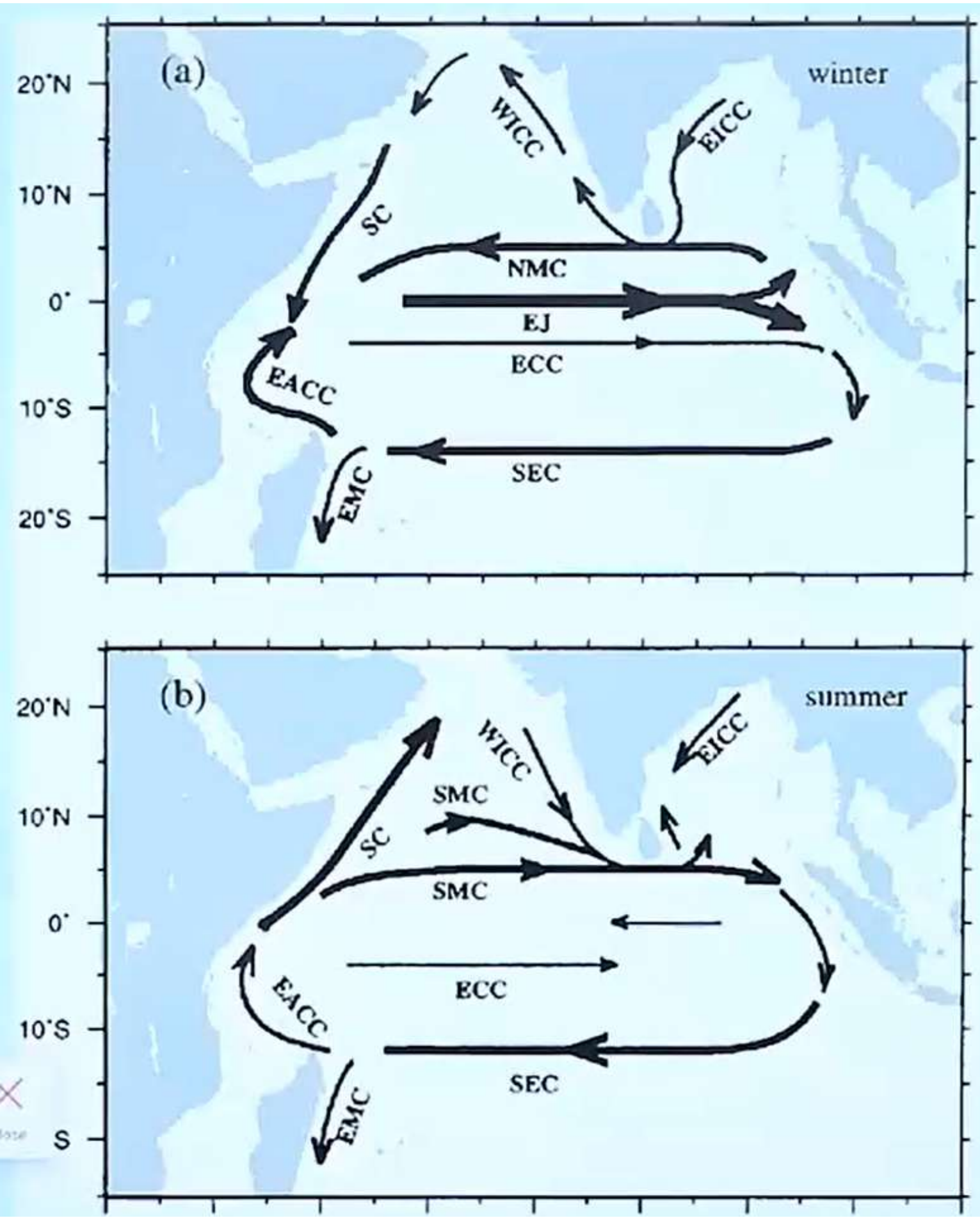
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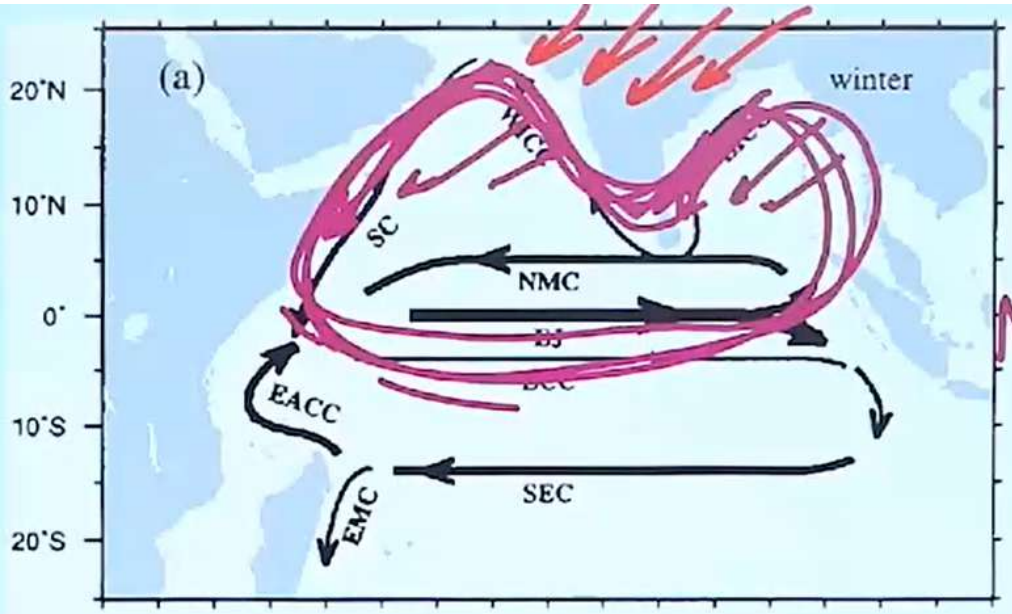
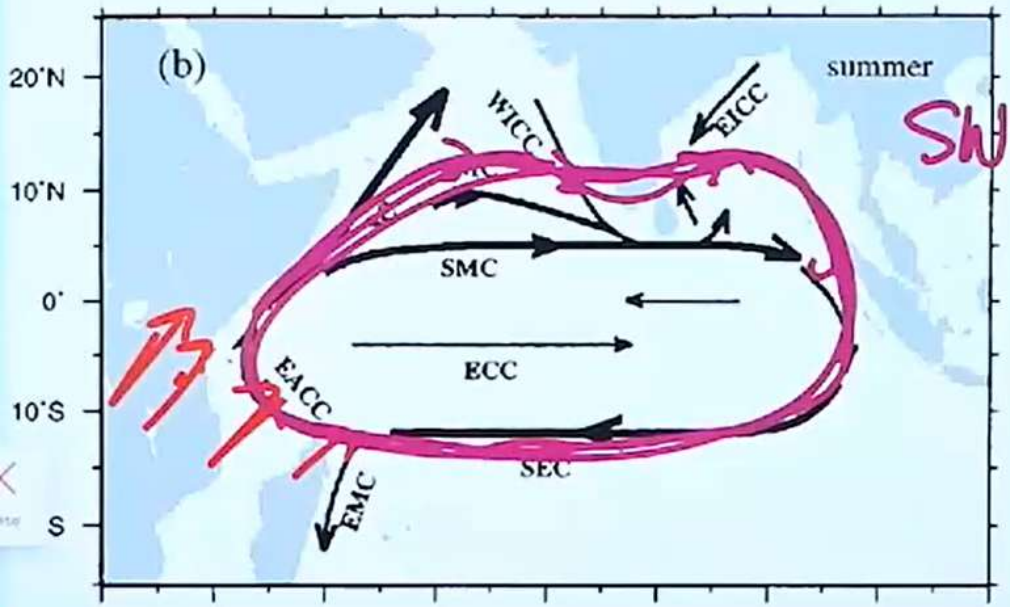
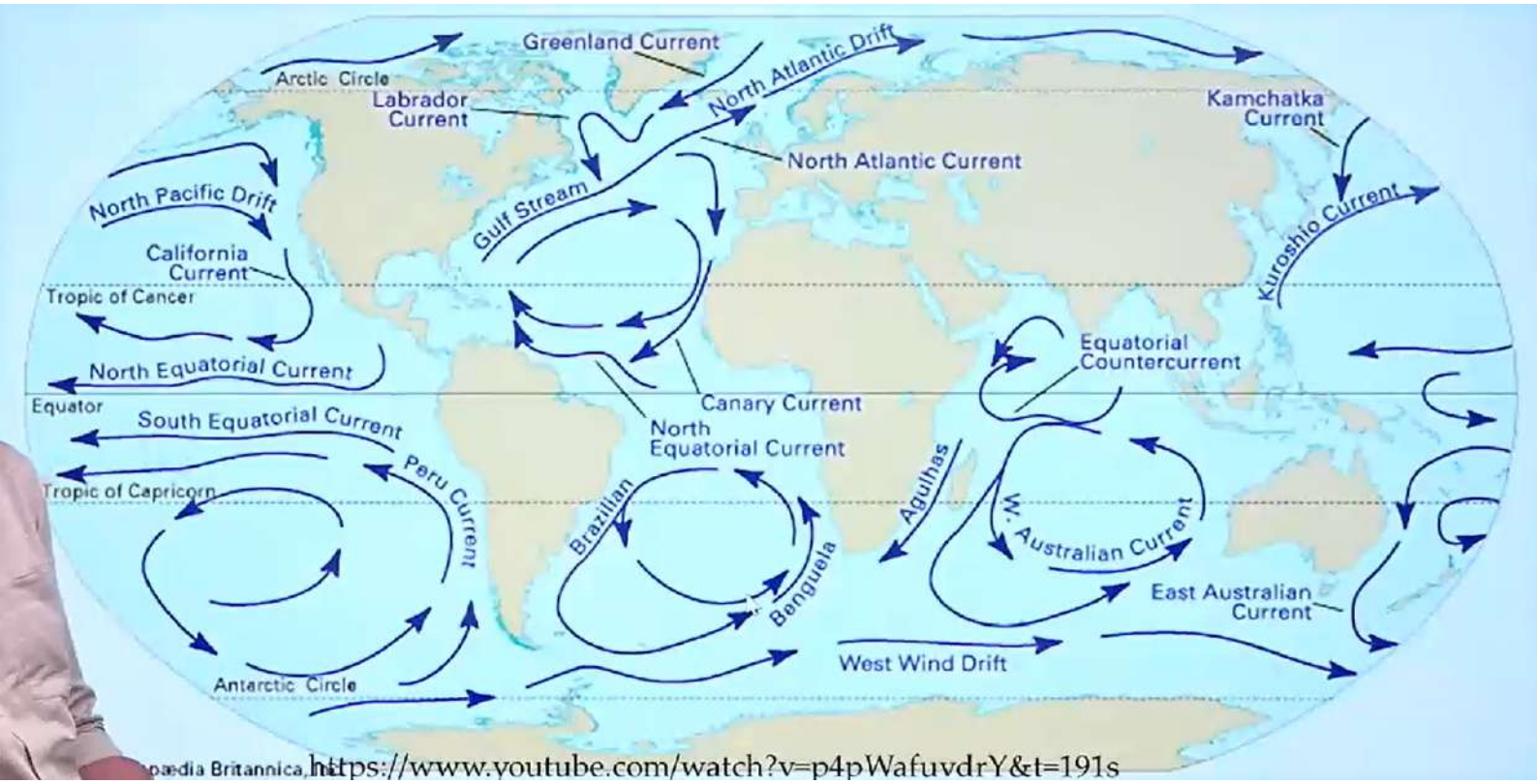


NE Monsoon drift



SW Monsoon drift



pædia Britannica, https://www.youtube.com/watch?v=p4pWafuvdrY&t=191s