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TOPIC - CYCLONE & OCEAN CURRENTS



Cyclone



- Cyclone are rotating mass of air.
- They are large powerful storm that forms over warm ocean waters, with strong winds and Heavy rains.

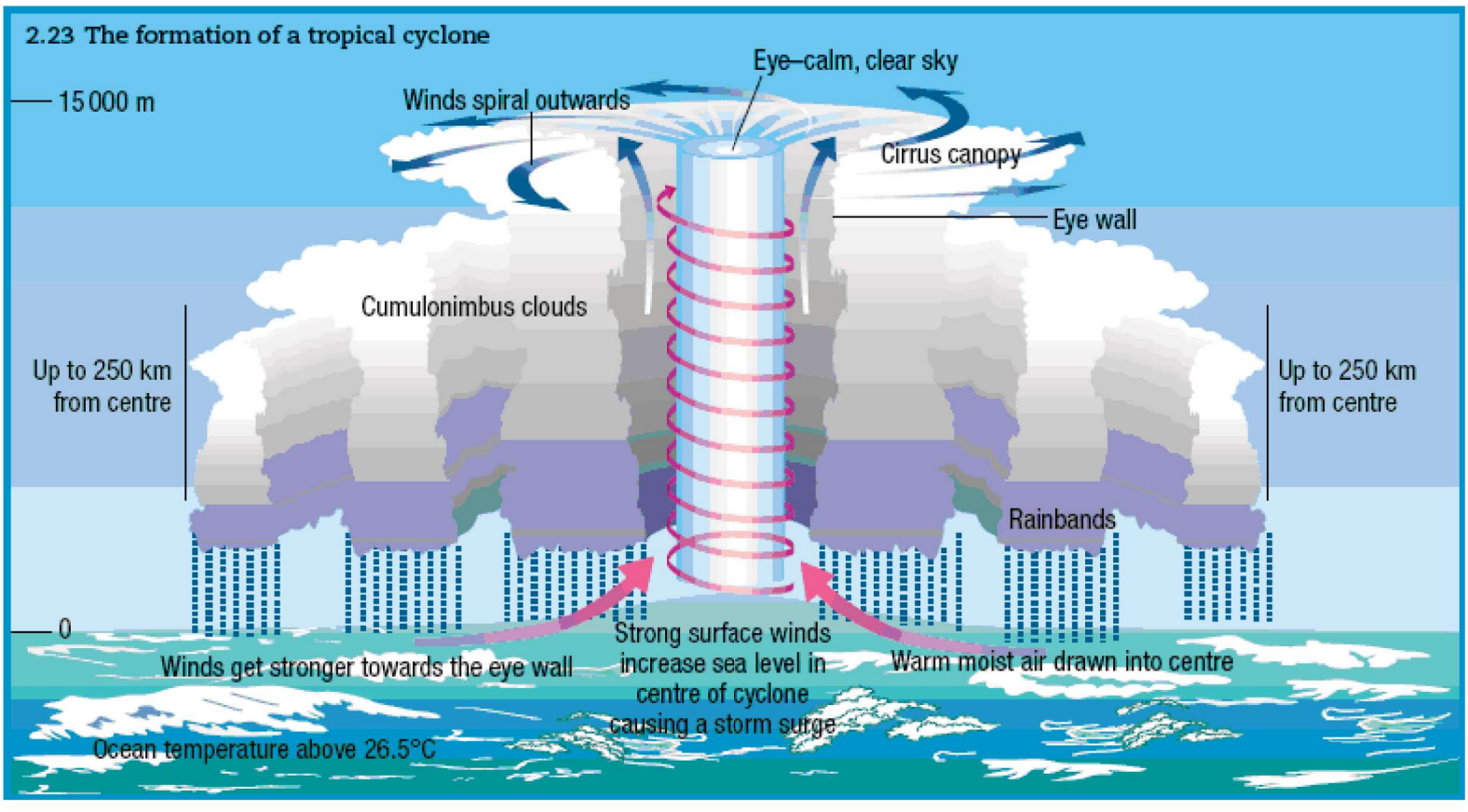
Formation of Cyclone

- Cyclones form when warm, moist air rises over the ocean.
- As the air rises, it creates weak low pressure, and cooler air rushes in to replace it.
- The Earth's rotation causes the air to Spin, and the storm grows stronger.
- When the storm gets big enough, it becomes a cyclone with strong winds and heavy rain.

A Cyclone Rotates anti-clockwise in Northern Hemisphere and Clockwise in southern Hemisphere

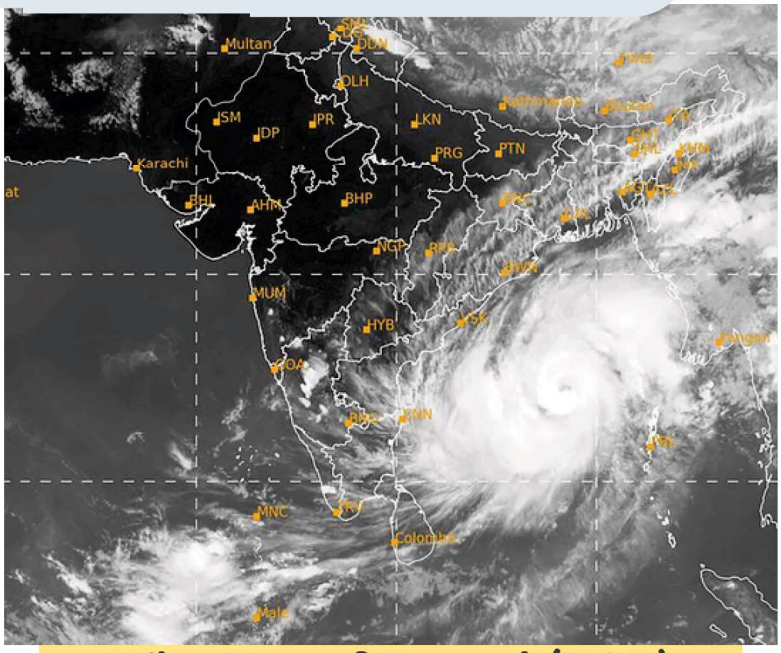
Favorable Conditions For Formation of Cyclone

1. Large Sea Surface Temperature
2. Atmospheric Instability
3. Coriolis Force
4. Pre-Existing weak low pressure Area
5. Sea Temperature must be at least 27° C or higher.



Different Names of Cyclone Around the World

- **Hurricane** : Atlantic Ocean
- **Typhoon** : South China Sea & Western Pacific Ocean
- **Willy-Willy** : Australia
- **Cyclone** : India





Why Bay of Bengal (BOB) Experience More Cyclones than Arabian Sea ?

- BOB is surrounded by landmass which leads to more heat transfer in BOB.
- It is Funnel shaped, hence wind rushes in BOB from all direction.
- More Fresh water Influx.
- Monsoonal trough

How naming of a Cyclone is decided ?

- Cyclone names are decided by regional committees, like the WMO/ESCAP Panel on Tropical Cyclones for the Bay of Bengal and Arabian Sea, that use pre-approved, sequentially assigned lists of names.
- There are total of 13 countries in this list including India, Iran, Maldives, Myanmar, Oman, Pakistan, Bangladesh, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates, and Yemen

Formation of Temperate Cyclone

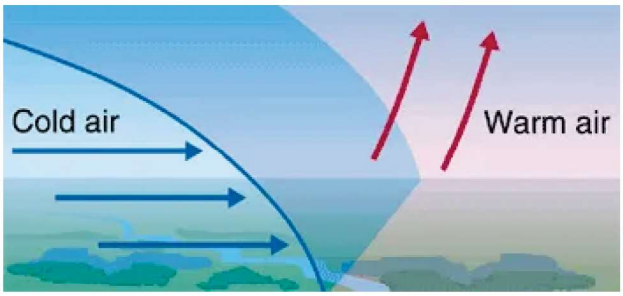
Mid-latitude cyclones or temperate cyclones or extra-tropical cyclones occur due to frontogenesis.

Frontogenesis

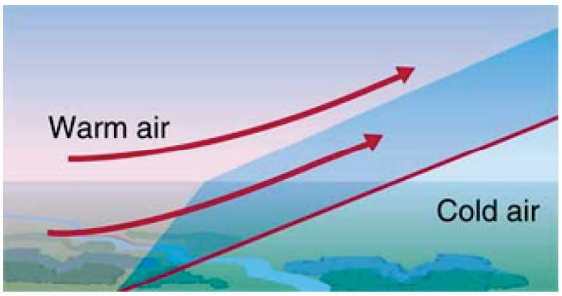
- Frontogenesis involves convergence of two distinct air masses.

Frontolysis

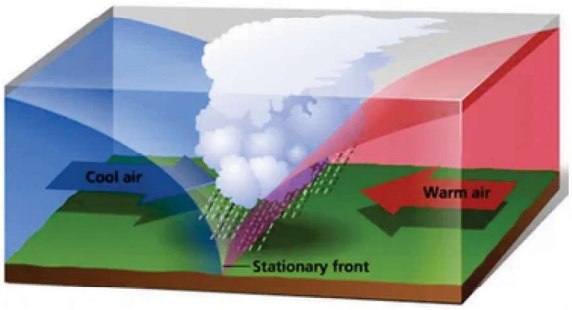
- Frontolysis involves overriding of one of the air mass by another



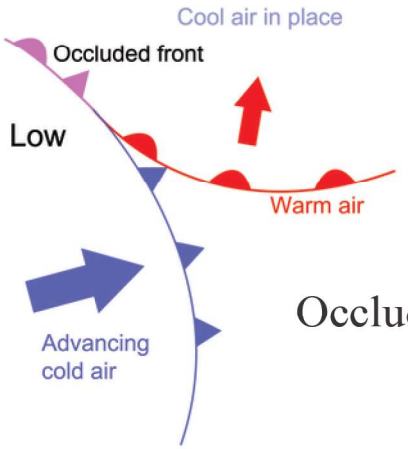
Cold Front



Warm Front

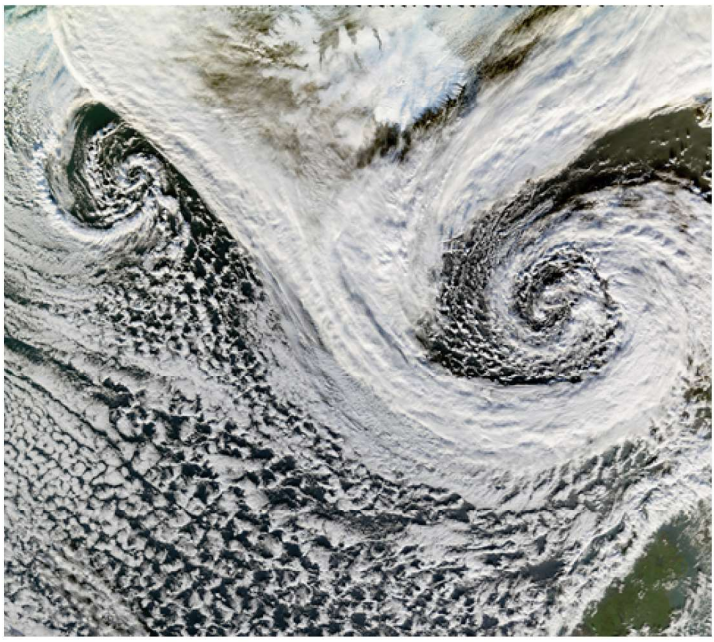


Stationary Front



Occluded Front

- Temperate cyclone originates due to convergence of polar easterly cold air mass and sub-tropical westerly warm air mass in sub polar low pressure belt around 60° to 65° latitudes.
- Since the air masses are of two different properties, so they can't intermingle readily. They mix with each other very slowly. As a result, front develops between them.
- Temperate Cyclones move from West to East under the influence of Westerlies.

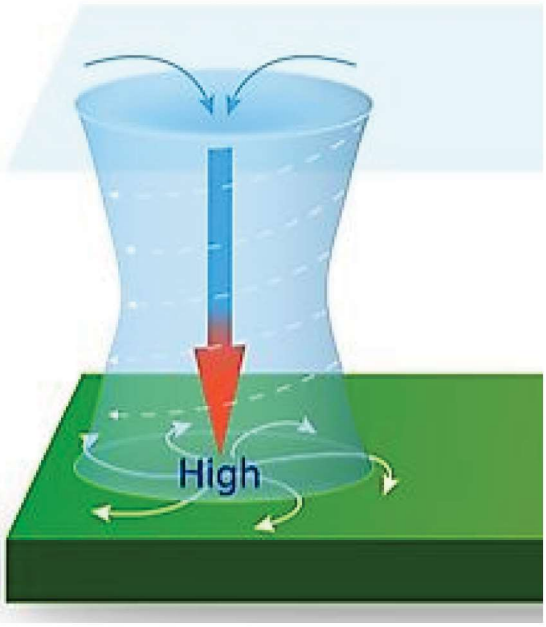


Difference Between Tropical & Temperate Cyclone

Tropical Cyclone	Temperate Cyclone
• They originate over sea.	• They originate over sea and land.
• They are formed due to certain favourable condition over the sea.	• They are formed due to Frontogenesis.
• They cover less area but cause more destruction	• They cover large area but cause less destruction.
• They occur rarely	• They occur frequently.
• They move from east to west	• They move from west to east

Anticyclone

- An anticyclone is formed around an area of high pressure where the air sinks, causing clear skies and calm weather.
- It usually brings dry and sunny condition.
- An anticyclone rotates clockwise in Northern Hemisphere and anti-clockwise in Southern Clockwise.



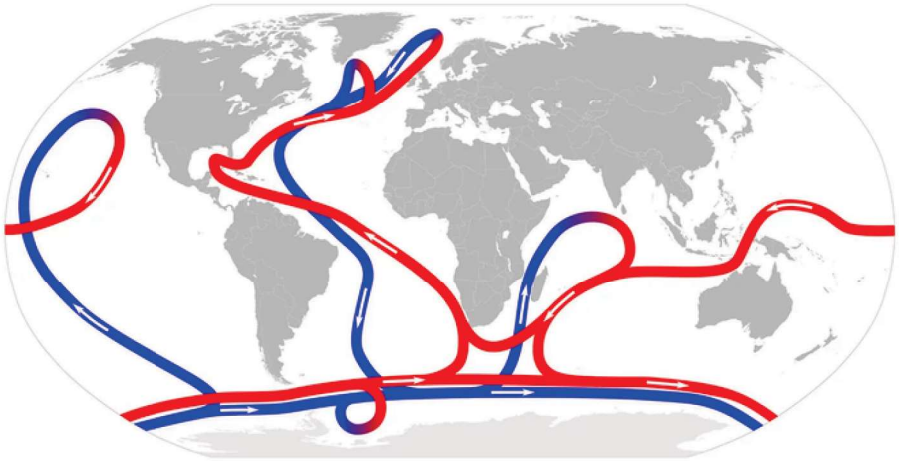
Note:
Cyclones do not form in Equator as there is lack of Coriolis Force at Equator.

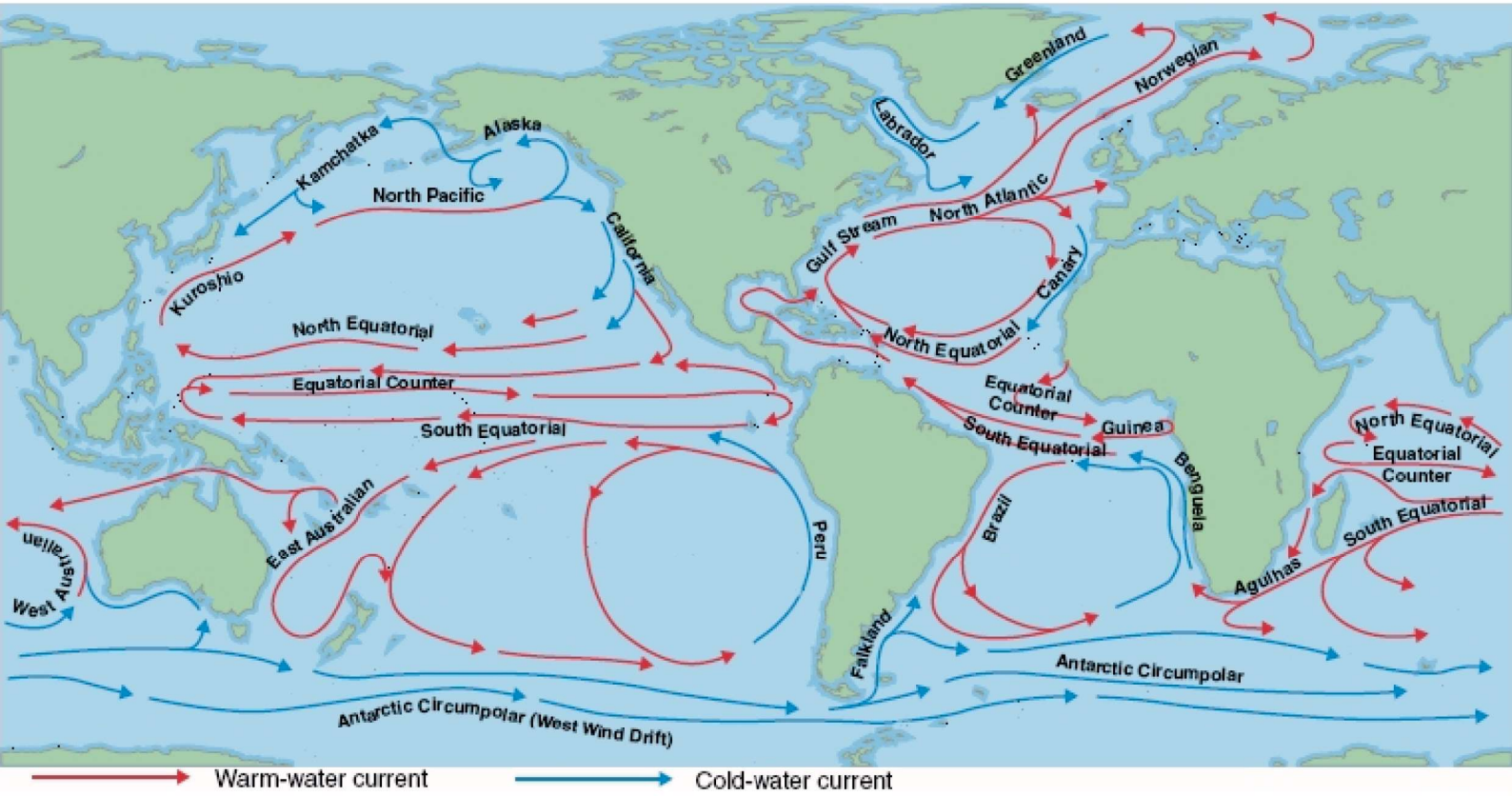
Ocean Currents

- Ocean currents are large movements of water in the ocean that flow in a specific direction.
- Ocean water moves in two directions: horizontally and vertically.
- Horizontal movements are referred to as currents, while vertical changes are called upwellings or downwellings.

Thermohaline Circulation

It is a global ocean current system driven by differences in seawater temperature and salinity, which affect its density. This process, often called the "global conveyor belt".





Reason of Movement of Ocean Currents

01 **Wind**

- Cold water moves from Poles to Equator.
- Warm Water moves from Equator to Poles.

02 **Density difference**

03 **Gravity**

Thermocline is the point below which temperature declines suddenly.

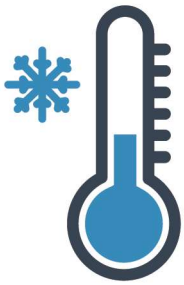
04 **Coriolis Force**

Halocline is the point below which Salinity increases rapidly in sea

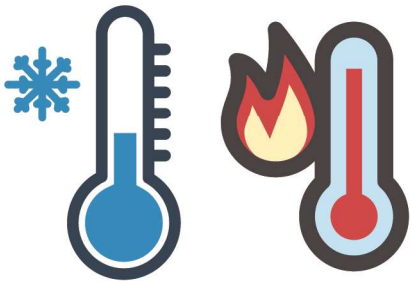
05 **Coast Line**

Effect of Ocean Currents

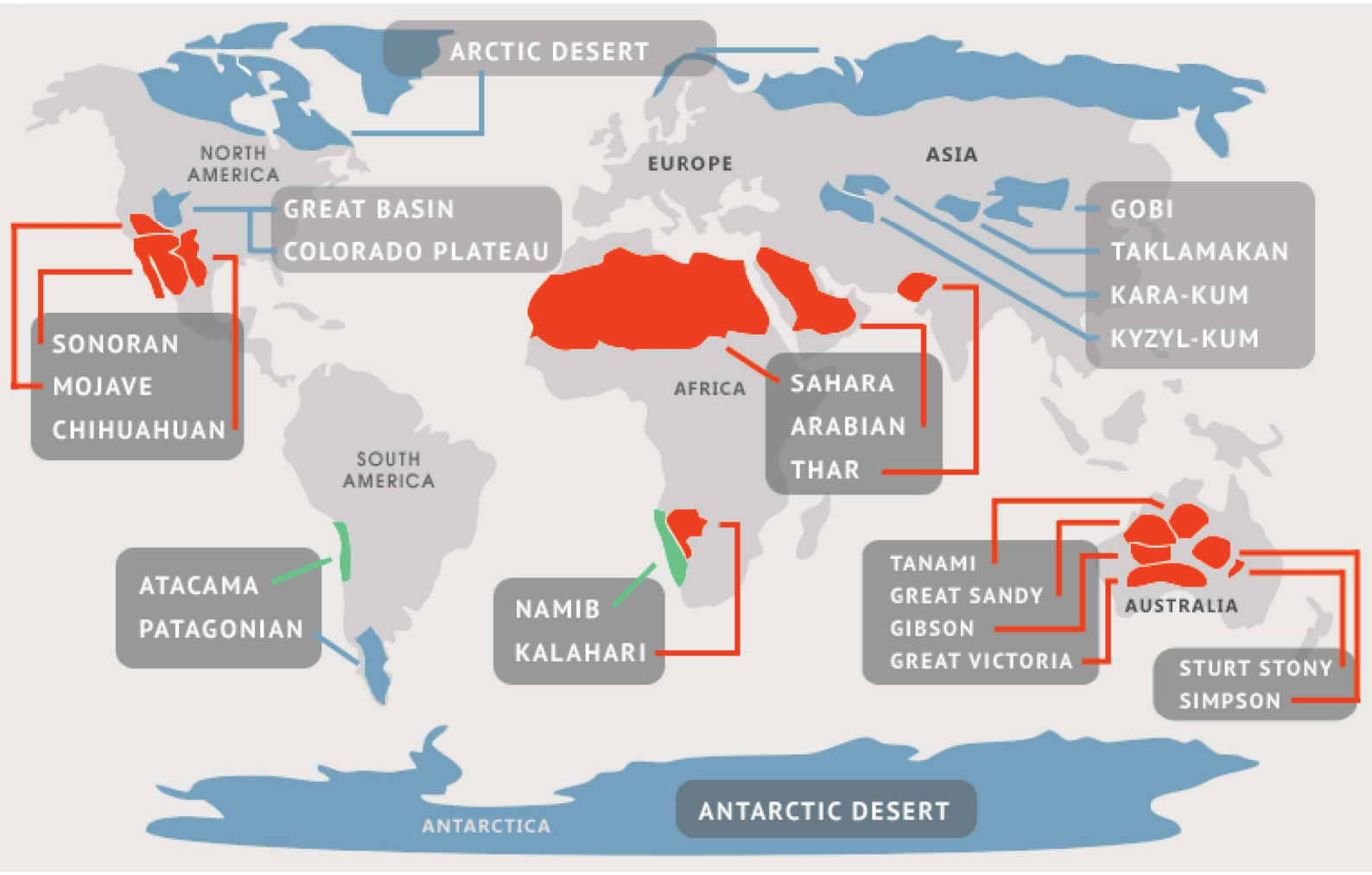
Cold ocean currents: They largely contribute to the formation of coastal deserts in west coast regions of tropical and sub-tropical continets. This is because the cold water makes the air above it cooler and less able to hold moisture.



Warm ocean currents + Cold ocean currents: Together they create best fishing zones due to deposition of planktons. The meeting of warm and cold ocean currents also creates fog that is dangerous for harbouring.



Desertification due to Cold Ocean Currents



Warm Ocean Currents

- Brazil
- Mozambique
- East. Australian
- Agulhas
- Gulf Stream
- Alaska
- Norwegian
- Kuroshio

Cold Ocean Currents

- Bengula
- Peru / Humbolt
- Greenland
- Oyashio
- Labrador
- Falkland
- West Australian Drift
- Canary
- California

Trick (Cold Current) : BP GOLF World Cup in California.