



GEOGRAPHY

Oceanography

Ocean bottom topography

Ocean temperature

Salinity

Oceanic deposits

Coral reefs

Oceanic currents & circulations

El Nino and related phenomena

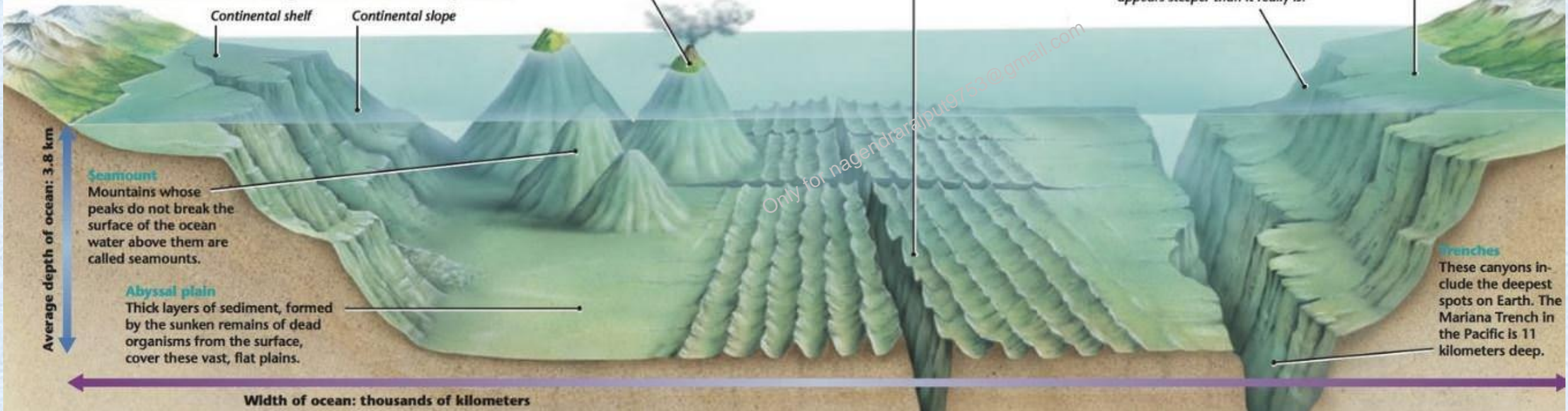
Tides



<https://www.youtube.com/watch?v=UwVNkfCov1k>

EXPLORING the Ocean Floor

Earth's oceans are thousands of kilometers wide. To show the width of the ocean floor in this illustration, the vertical and horizontal scales are not the same. The vertical scale, showing depth, has been stretched. The horizontal scale, showing distances, has been squeezed.



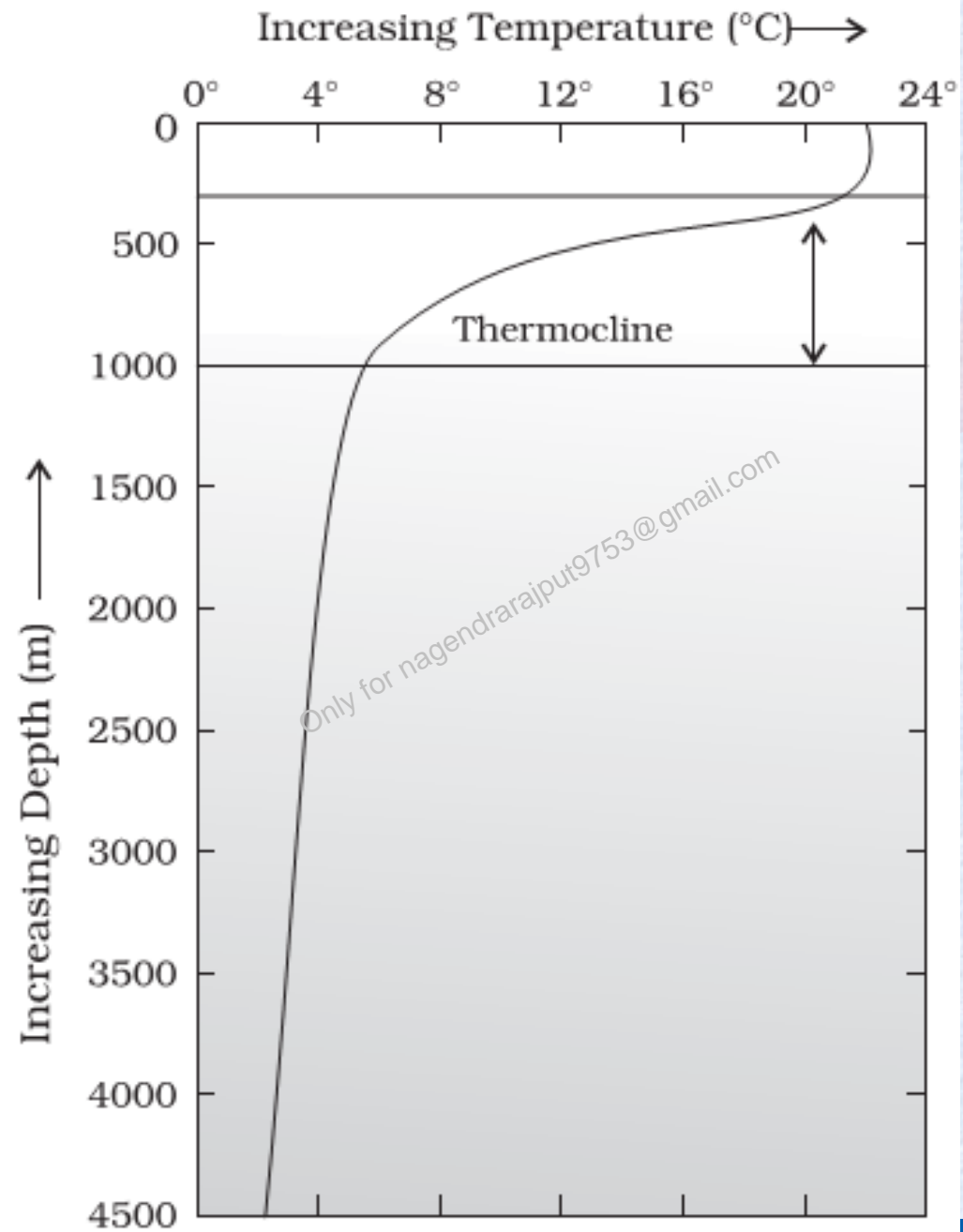


Figure 13.3 : Thermocline

**Table 13.4 : Dissolved Salts in Sea Water
(gm of Salt per kg of Water)**

Chlorine	18.97
Sodium	10.47
Sulphate	2.65
Magnesium	1.28
Calcium	0.41
Potassium	0.38
Bicarbonate	0.14
Bromine	0.06
Borate	0.02
Strontium	0.01

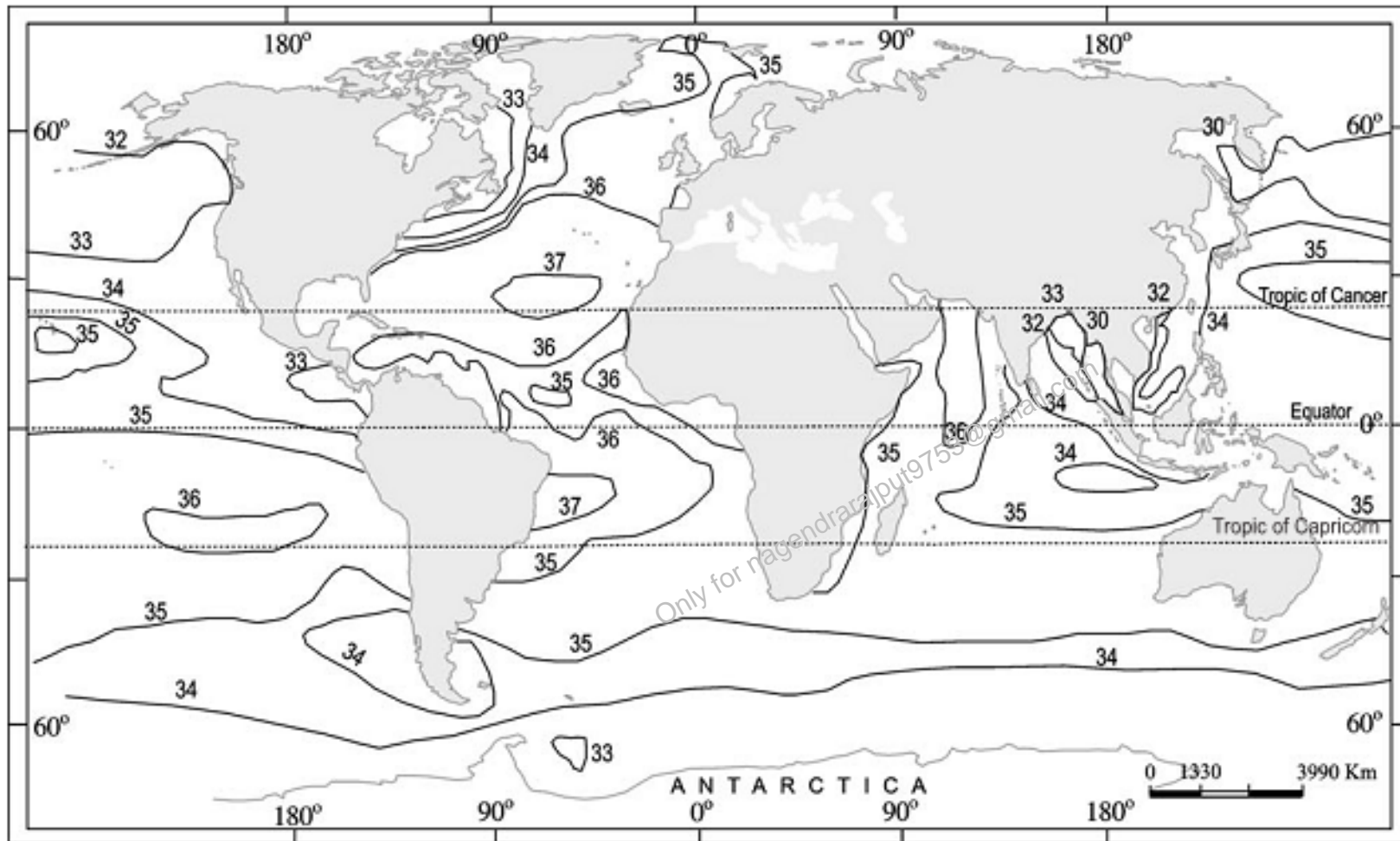


Figure 13.5 : Surface salinity of the World's Oceans



Types of coral reefs

- **Fringing reef**- directly attached to a shore or borders it with an intervening shallow channel or lagoon
Eg: **Greater Caribbean region**



- **Barrier reef**- separated from a mainland or island shores by deep channel or lagoon Eg: **Great Barrier Reef**

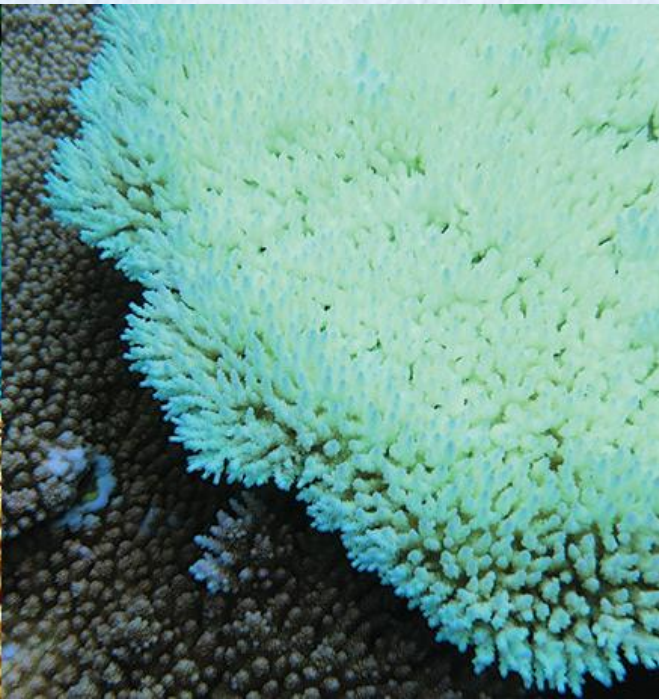


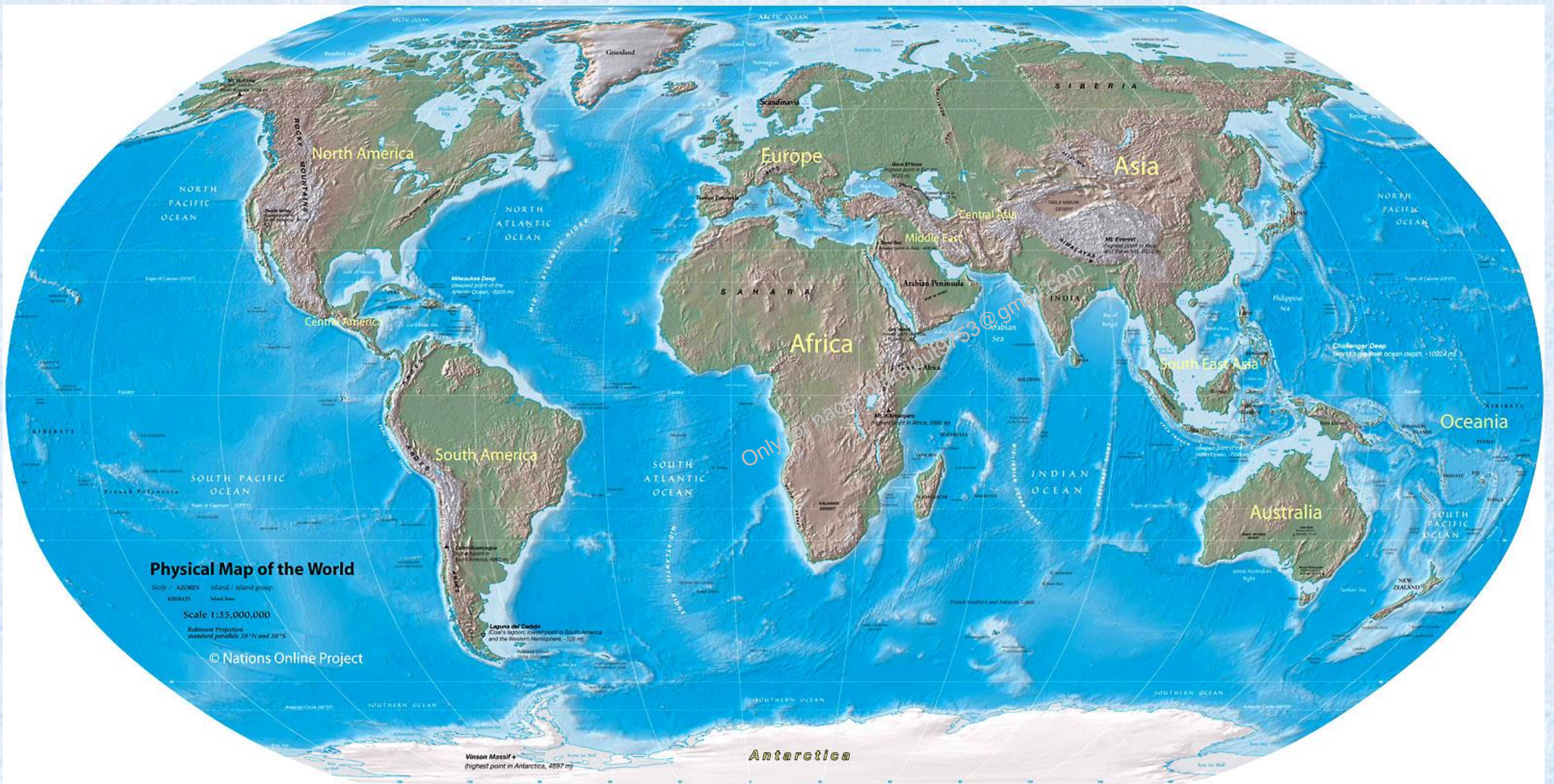
- **Atoll reef**- more or less circular or continuous barrier reefs extends all the way around a lagoon without a central island Eg: **The Pacific Ocean**

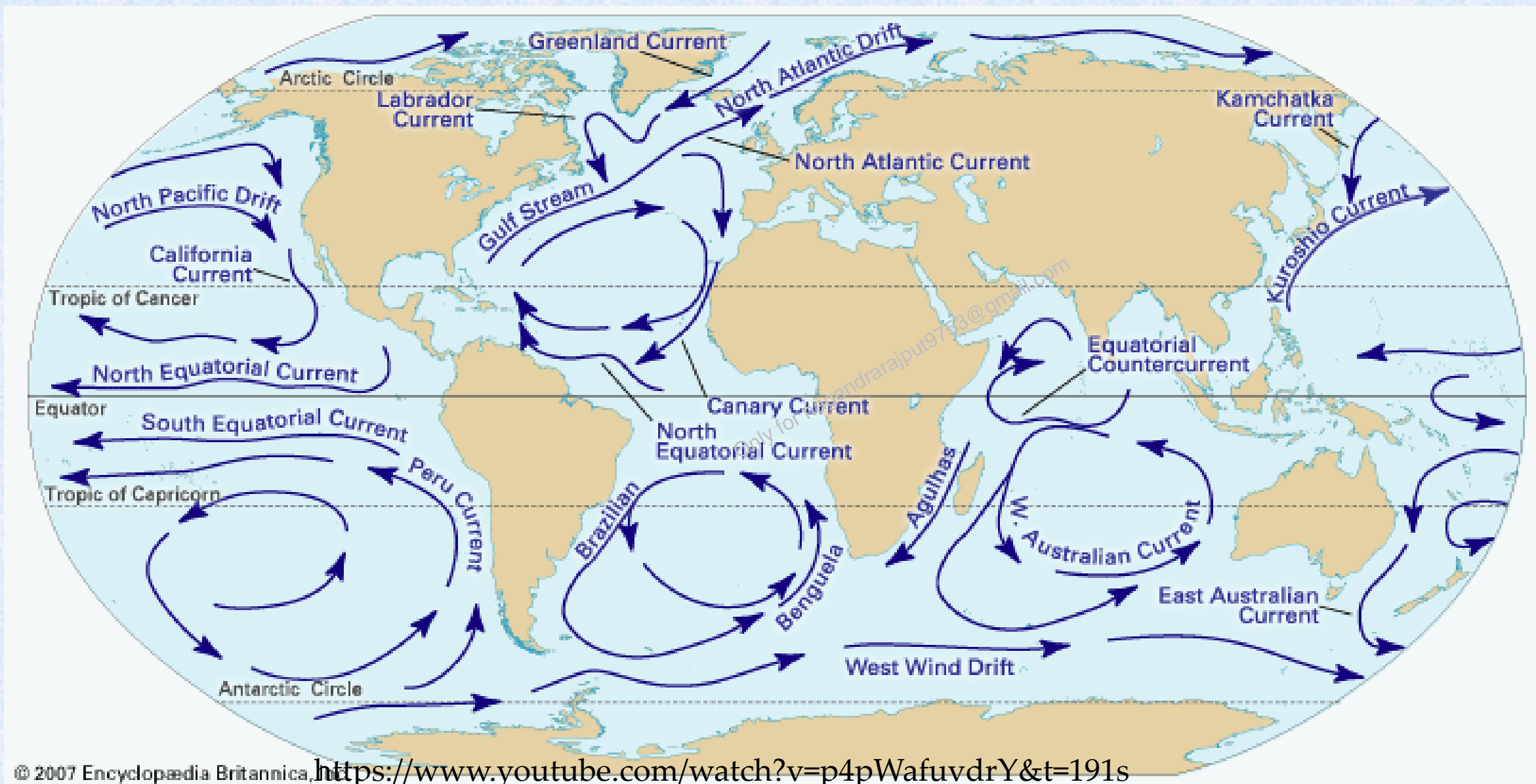


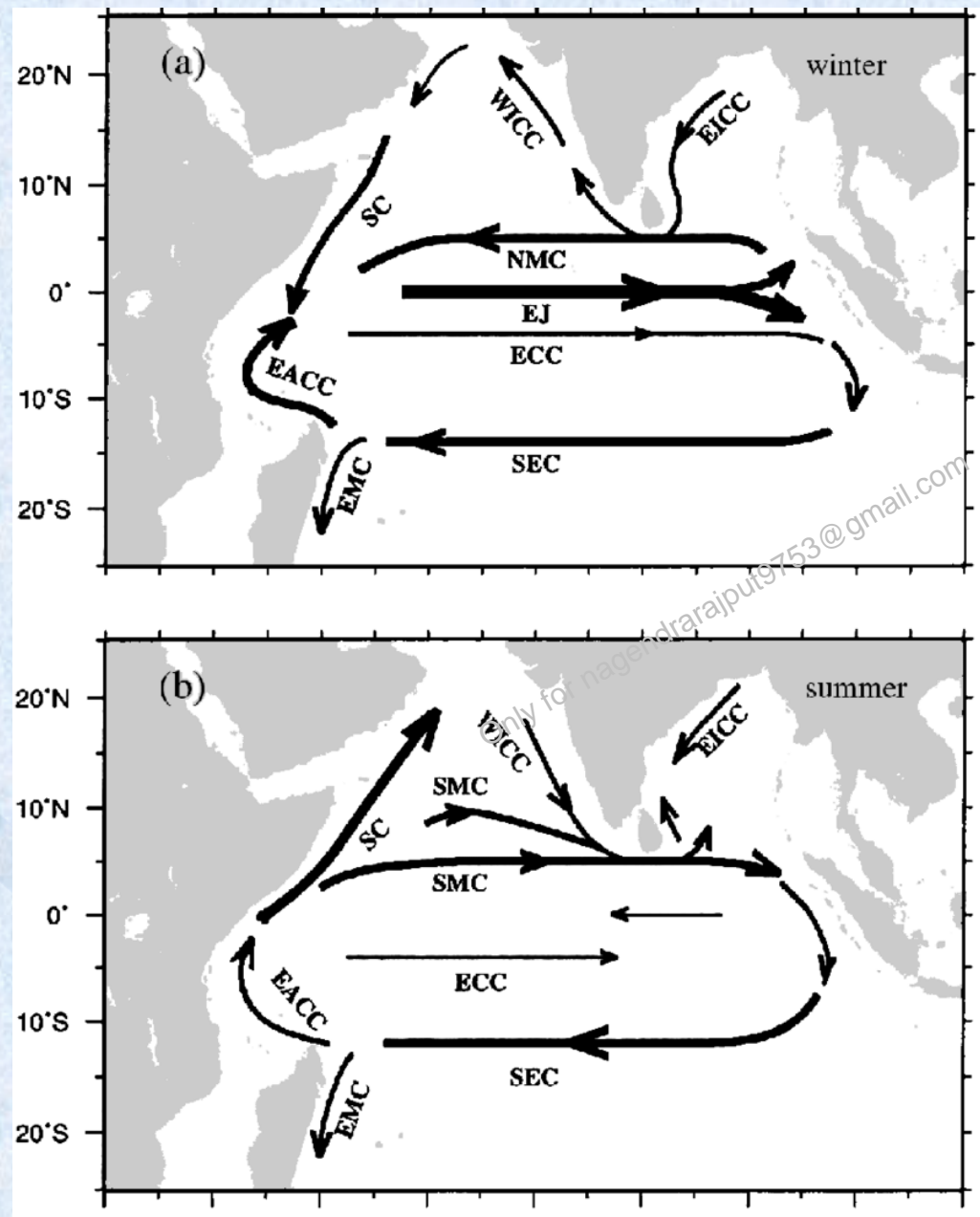


<https://www.youtube.com/watch?v=ZiULxLLP32s>







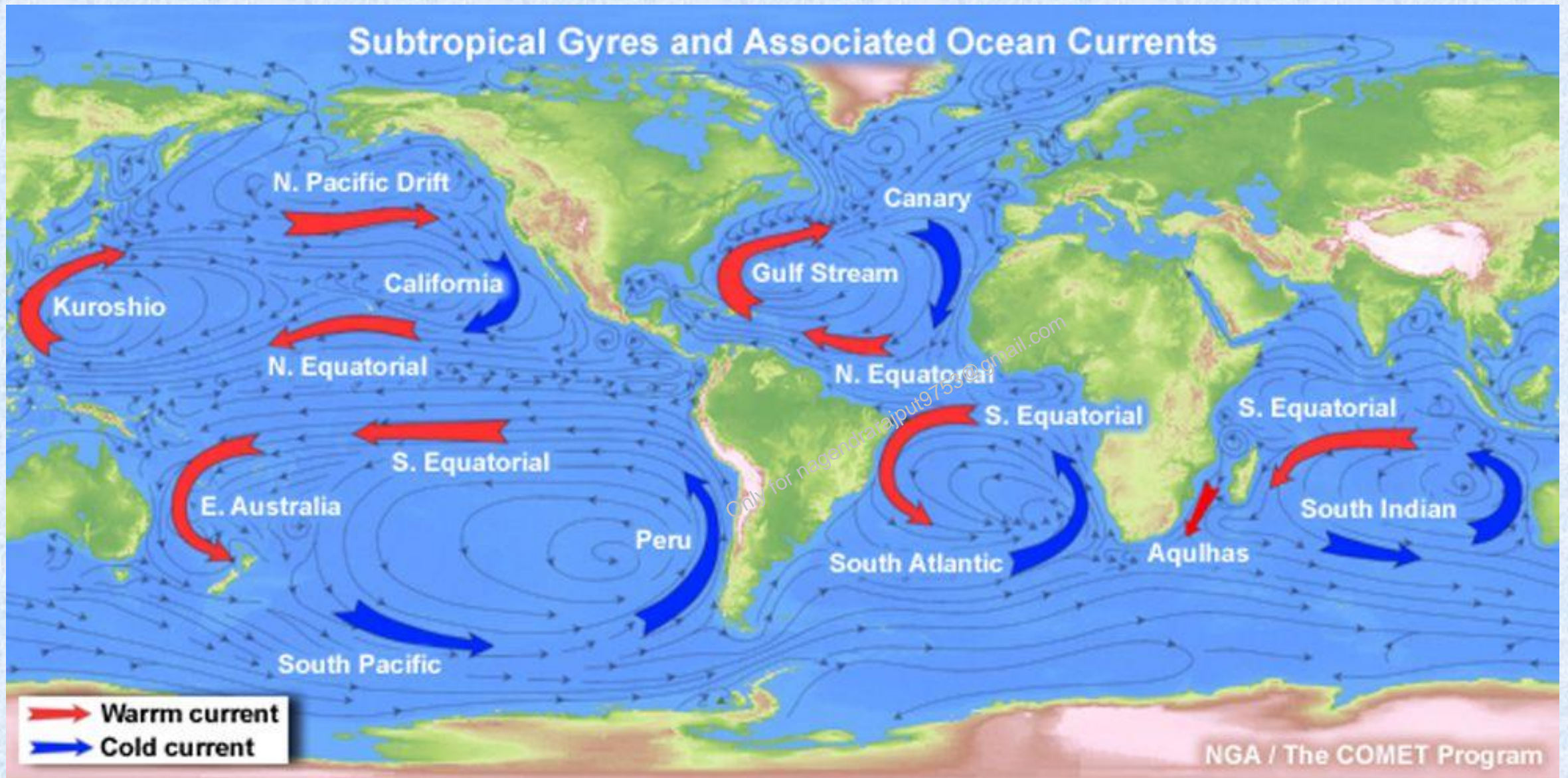


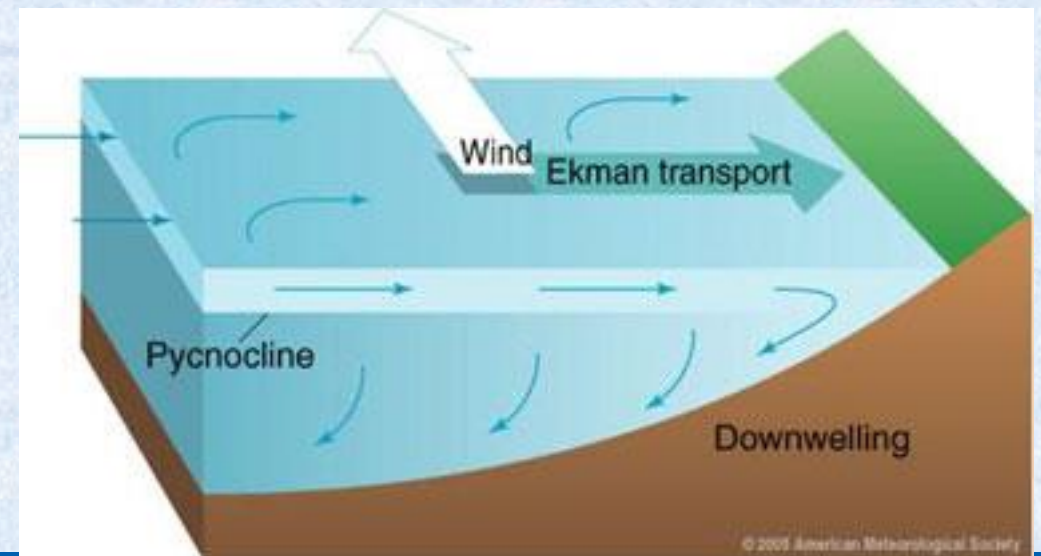
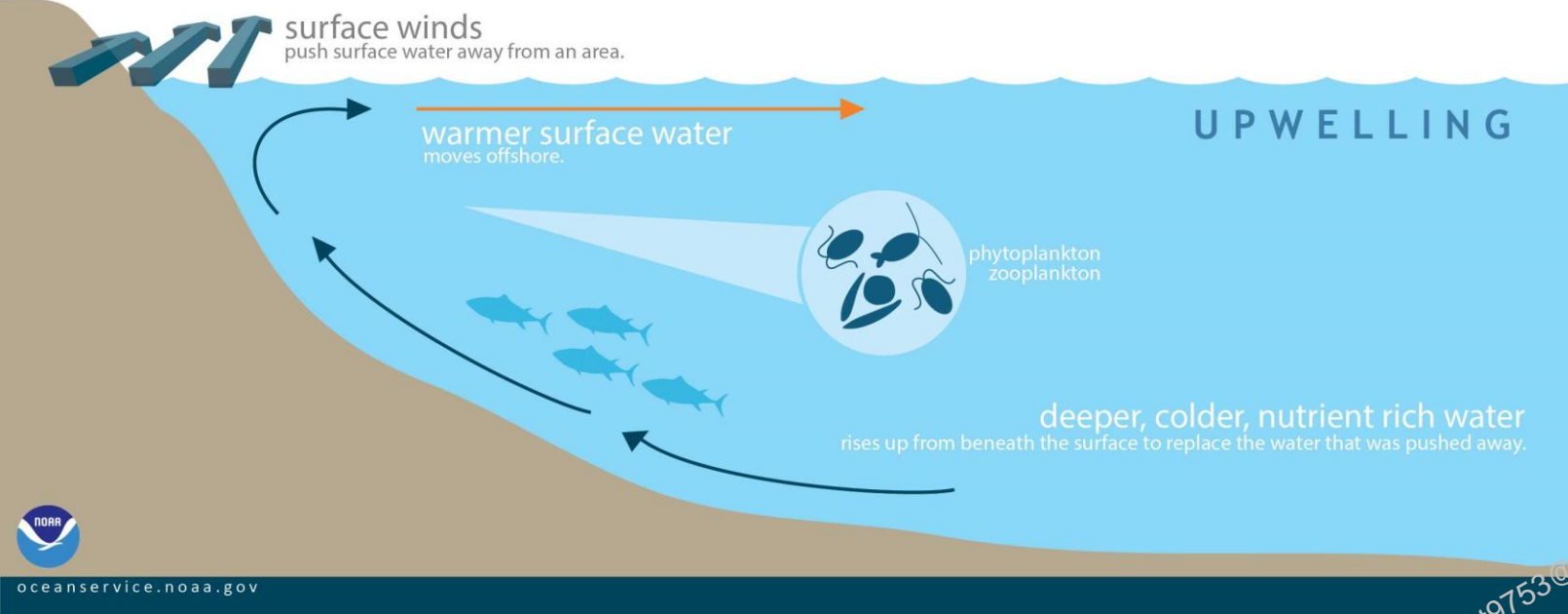
<https://www.youtube.com/watch?v=KhB9zLIN6BQ>

<https://earth.nullschool.net>

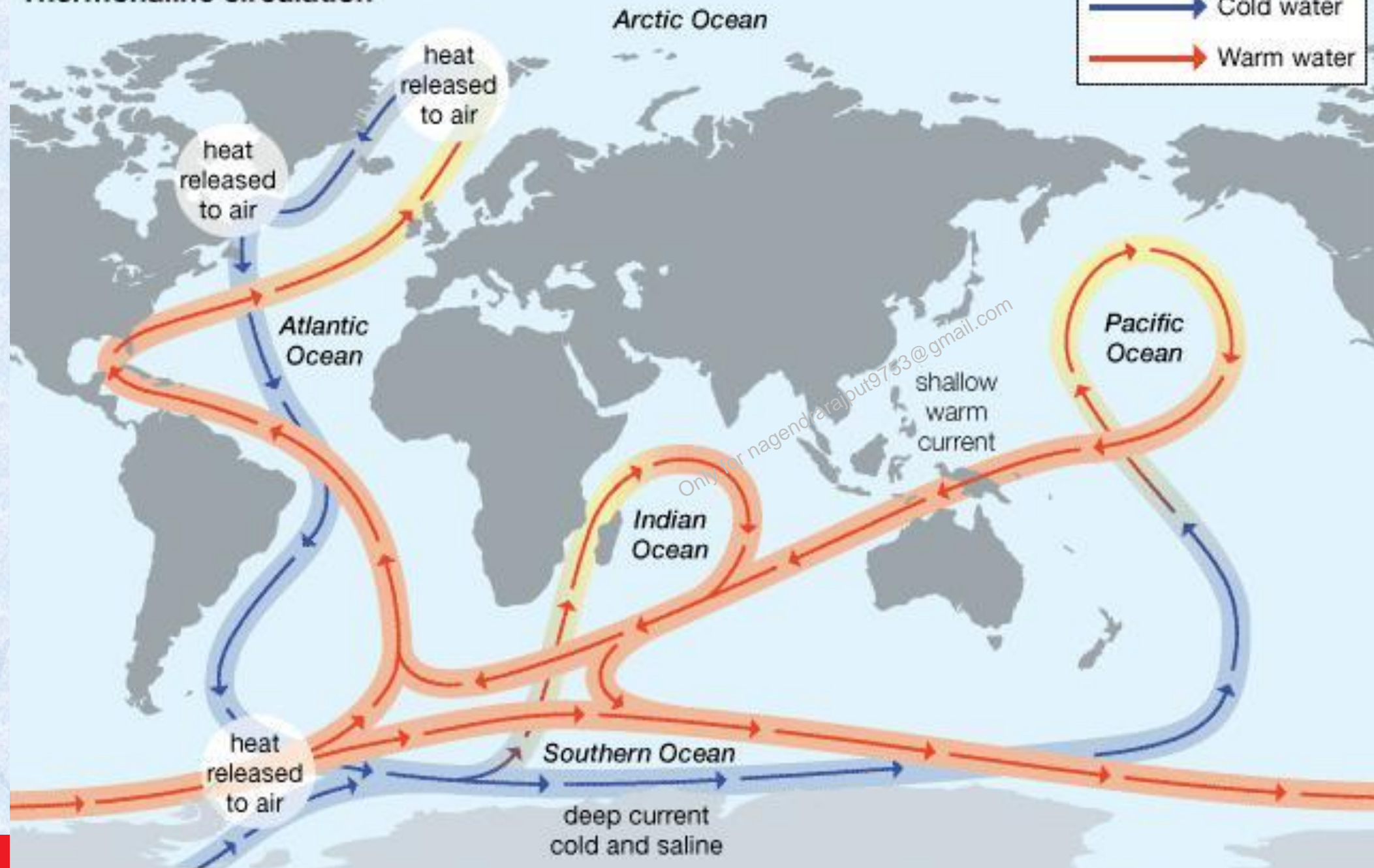
Only for nagendrarajput9753@gmail.com

Subtropical Gyres and Associated Ocean Currents

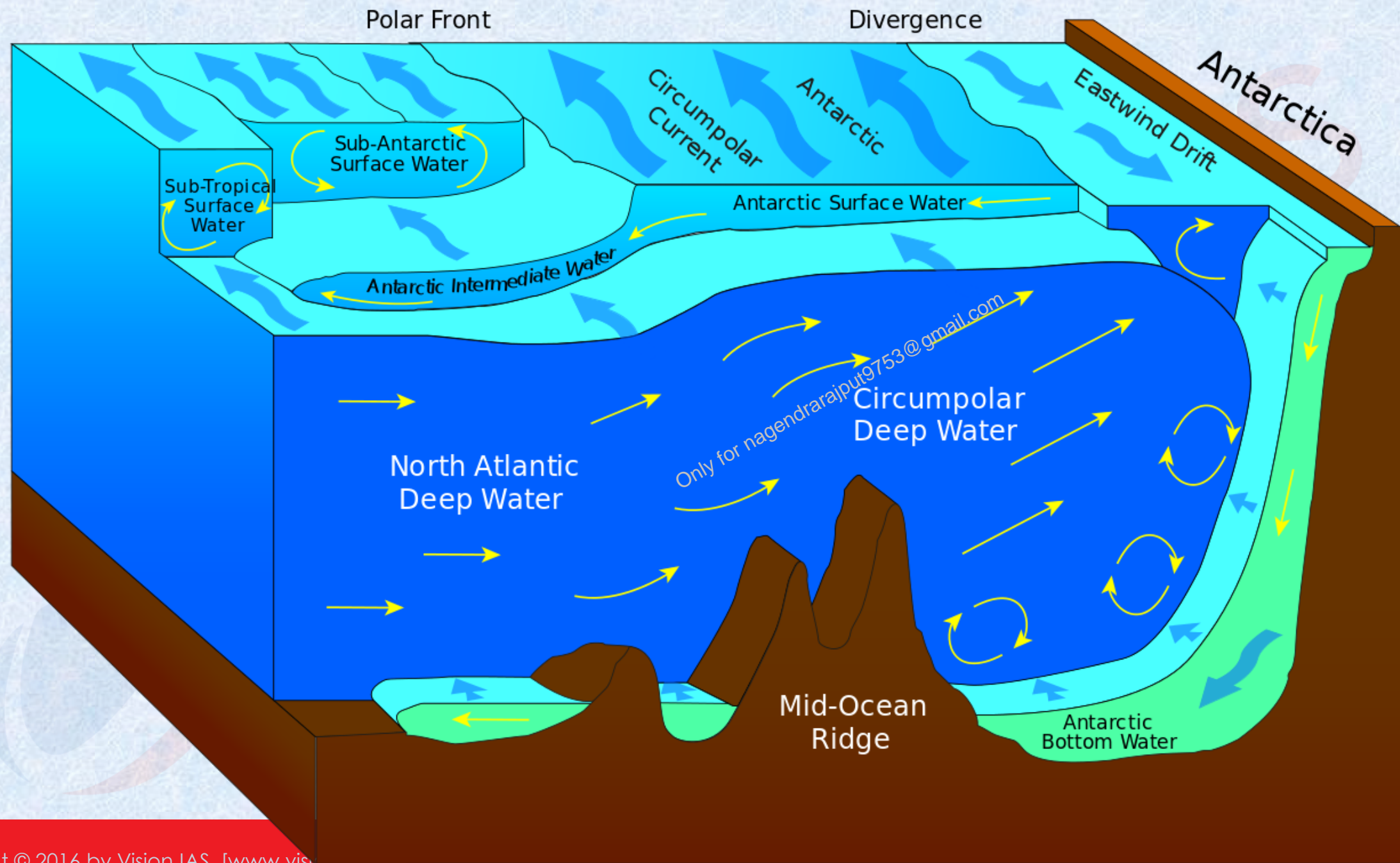




Thermohaline circulation



Source : Hugo Ahlenius, UNEP/GRID-Arendal, <http://maps.grida.no/go/graphic/world-ocean-thermohaline-circulation1>



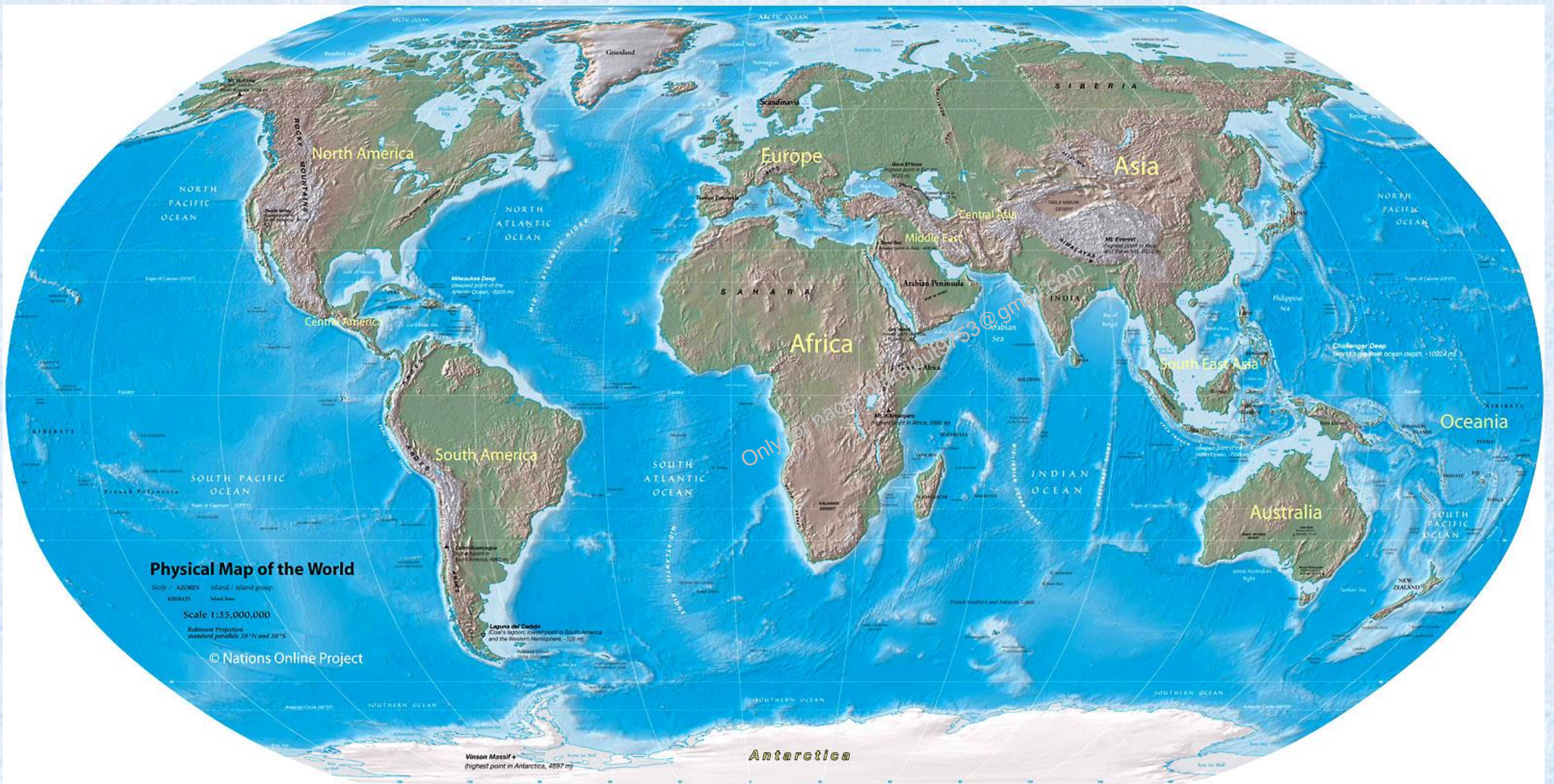
2015

Explain the factors responsible for the origin of ocean currents. How do they influence regional climates, fishing and navigation?

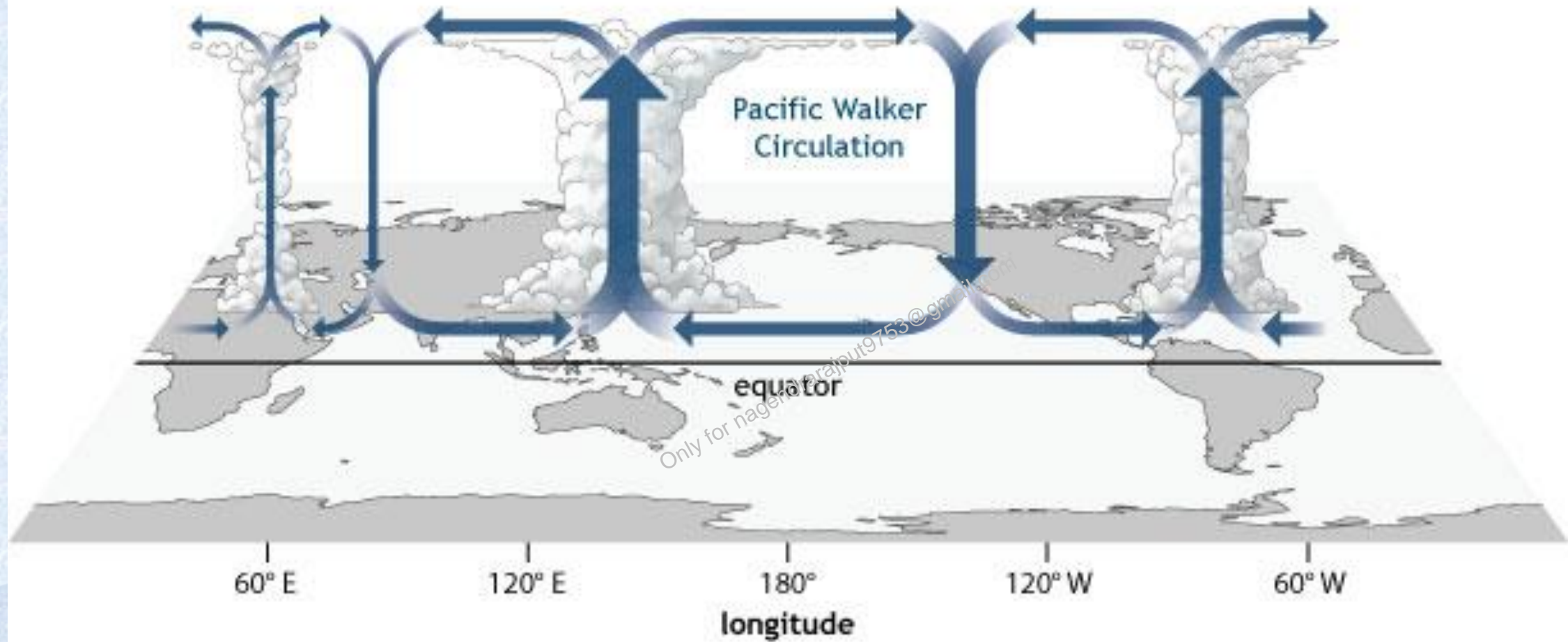
12.5

2011	<p>In the context of ecosystem productivity, marine upwelling zones are important as they increase the marine productivity by bringing the</p> <ol style="list-style-type: none">1. Decomposer microorganism to the surface.2. Nutrients to the surface.3. Bottom-dwelling organisms to the surface. <p>Which of the statements given above is/are correct?</p> <p>(a) 1 and 2 (b) 2 only (c) 2 and 3 (d) 3 only</p>
------	--

2012	<p>Consider the following factors:</p> <ol style="list-style-type: none"> 1. Rotation of the Earth 2. Air pressure and wind 3. Density of ocean water 4. Revolution of the Earth <p>Which of the above factors influence the ocean currents?</p> <p>(a) 1 and 2 only (b) 1, 2 and 3 (c) 1 and 4 (d) 2, 3 and 4</p>
2015	<p>What explains the eastward flow of the equatorial counter-current?</p> <p>(a) The Earth's rotation on its axis (b) Convergence of the two equatorial currents (c) Difference in salinity of water (d) Occurrence of the belt of calm near the equator</p>

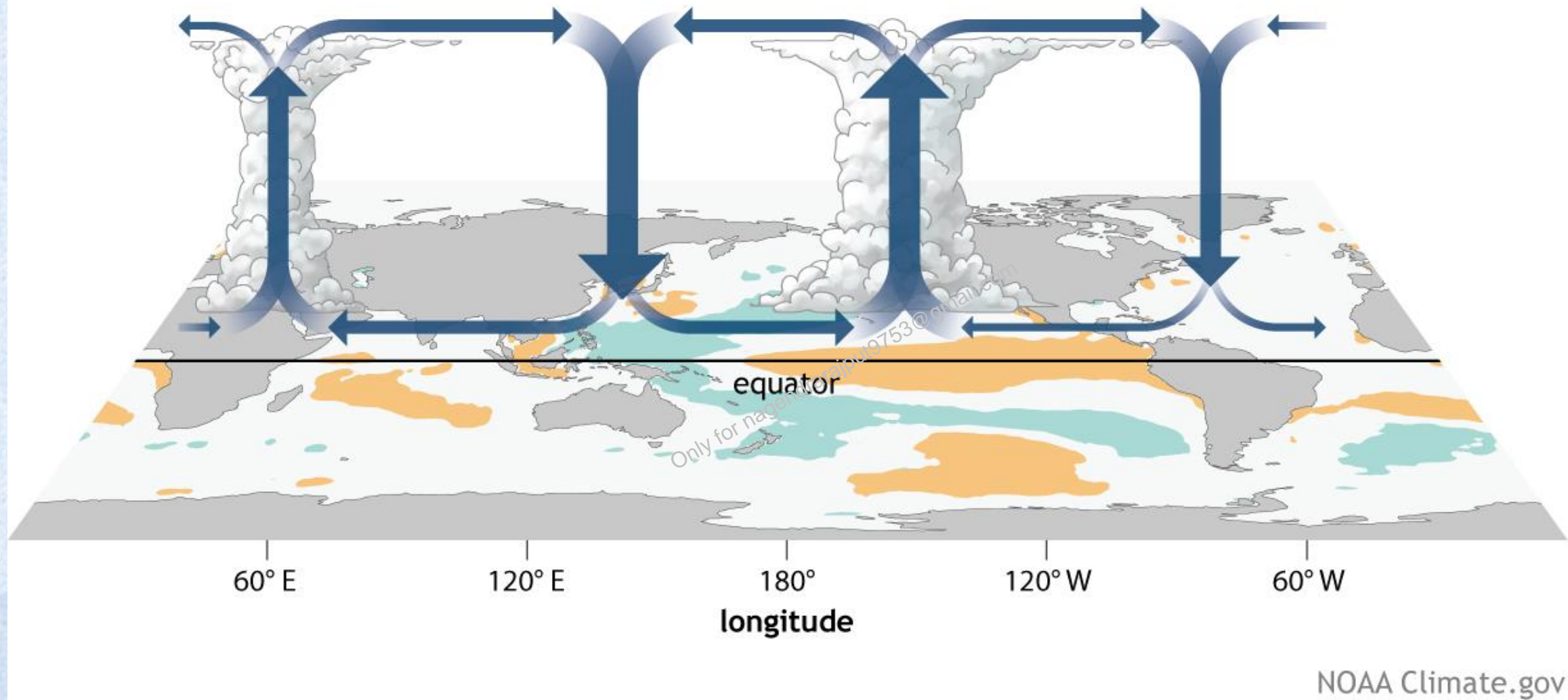


Neutral conditions

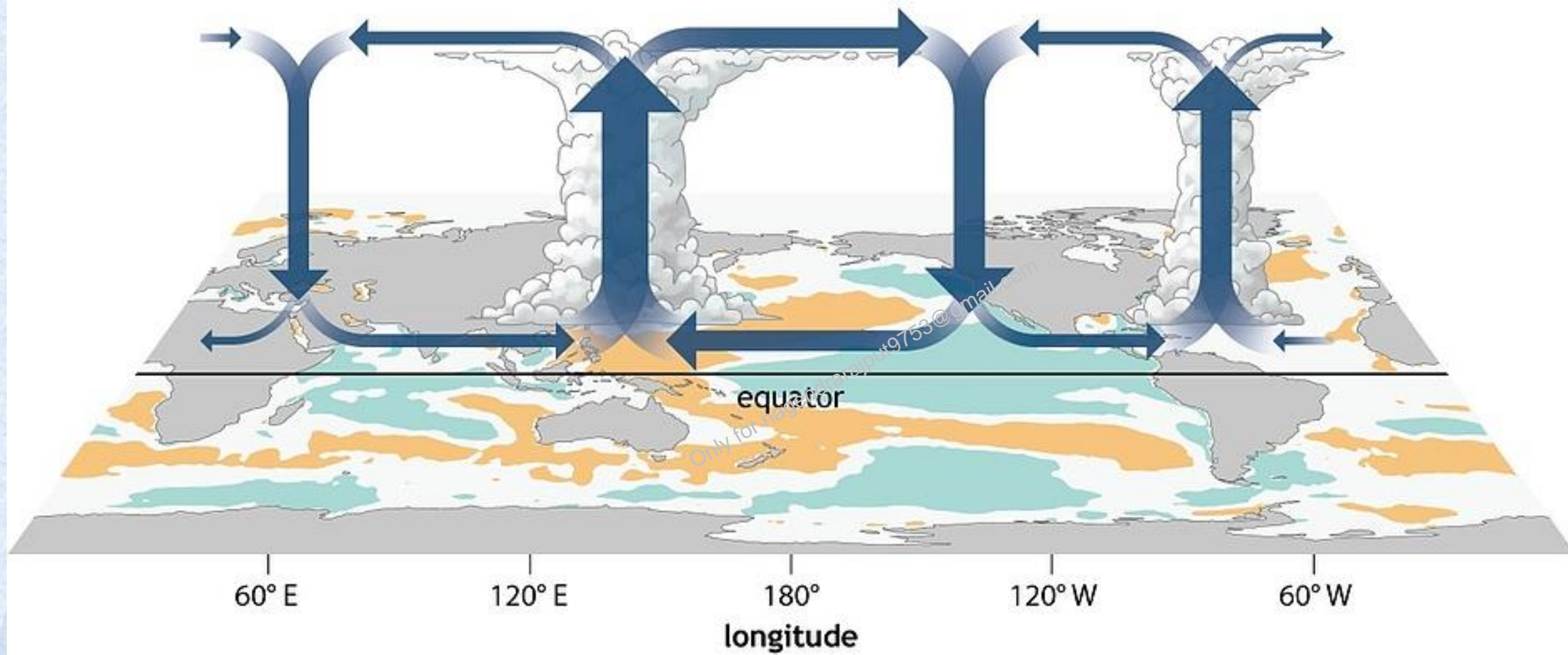


NOAA Climate.gov

El Niño conditions



La Niña conditions



NOAA Climate.gov

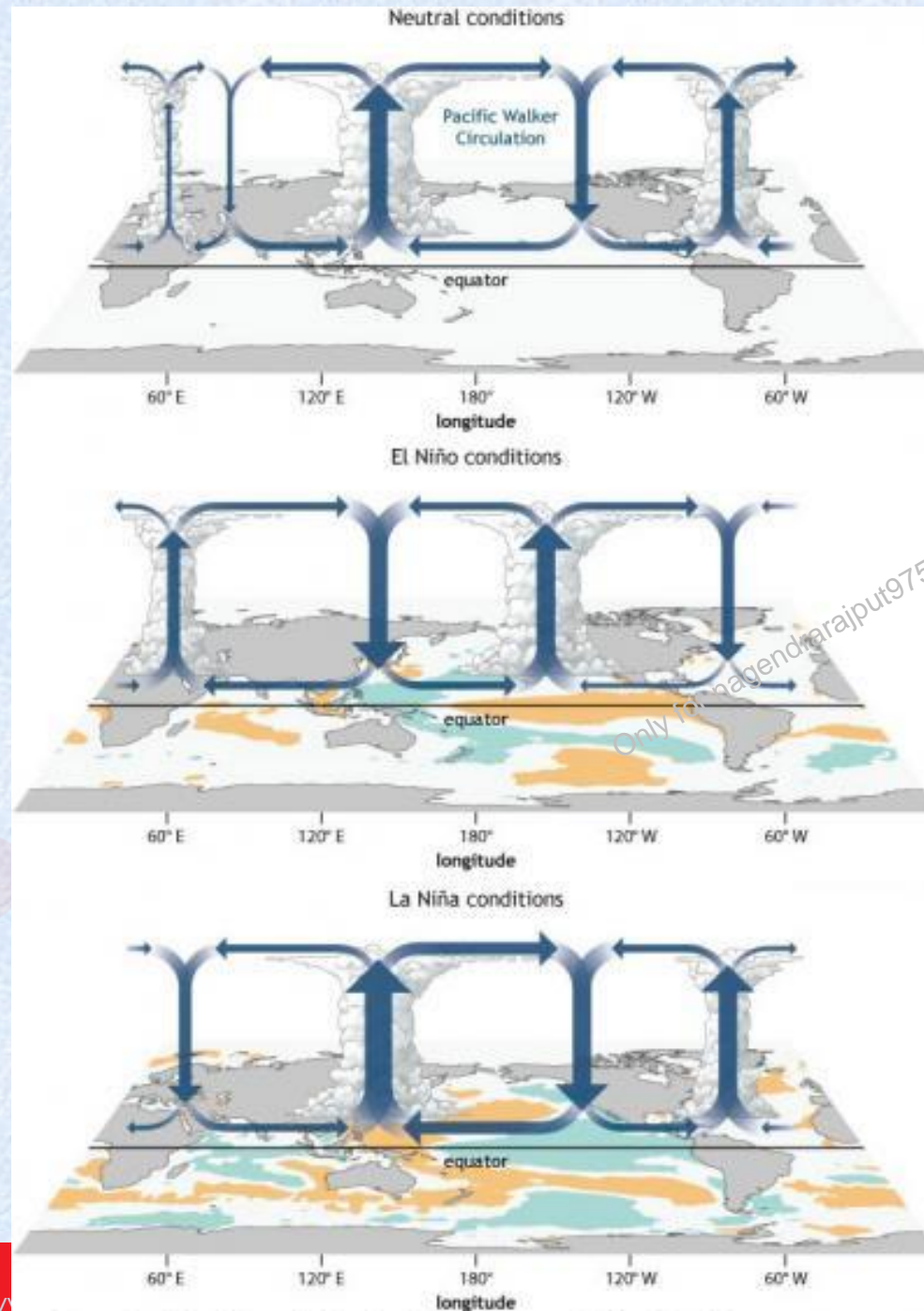


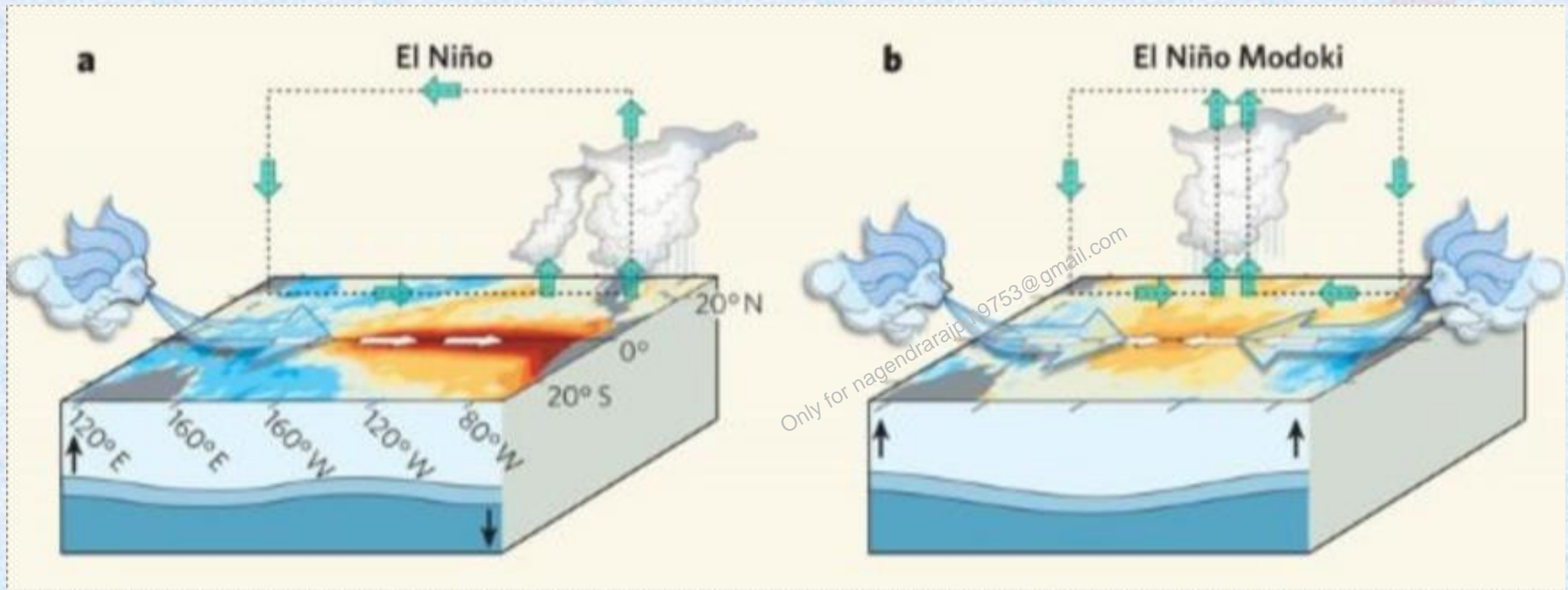
Figure 1: Global Atmospheric Circulation Patterns - Walker Circulation

NOAA Climate.gov

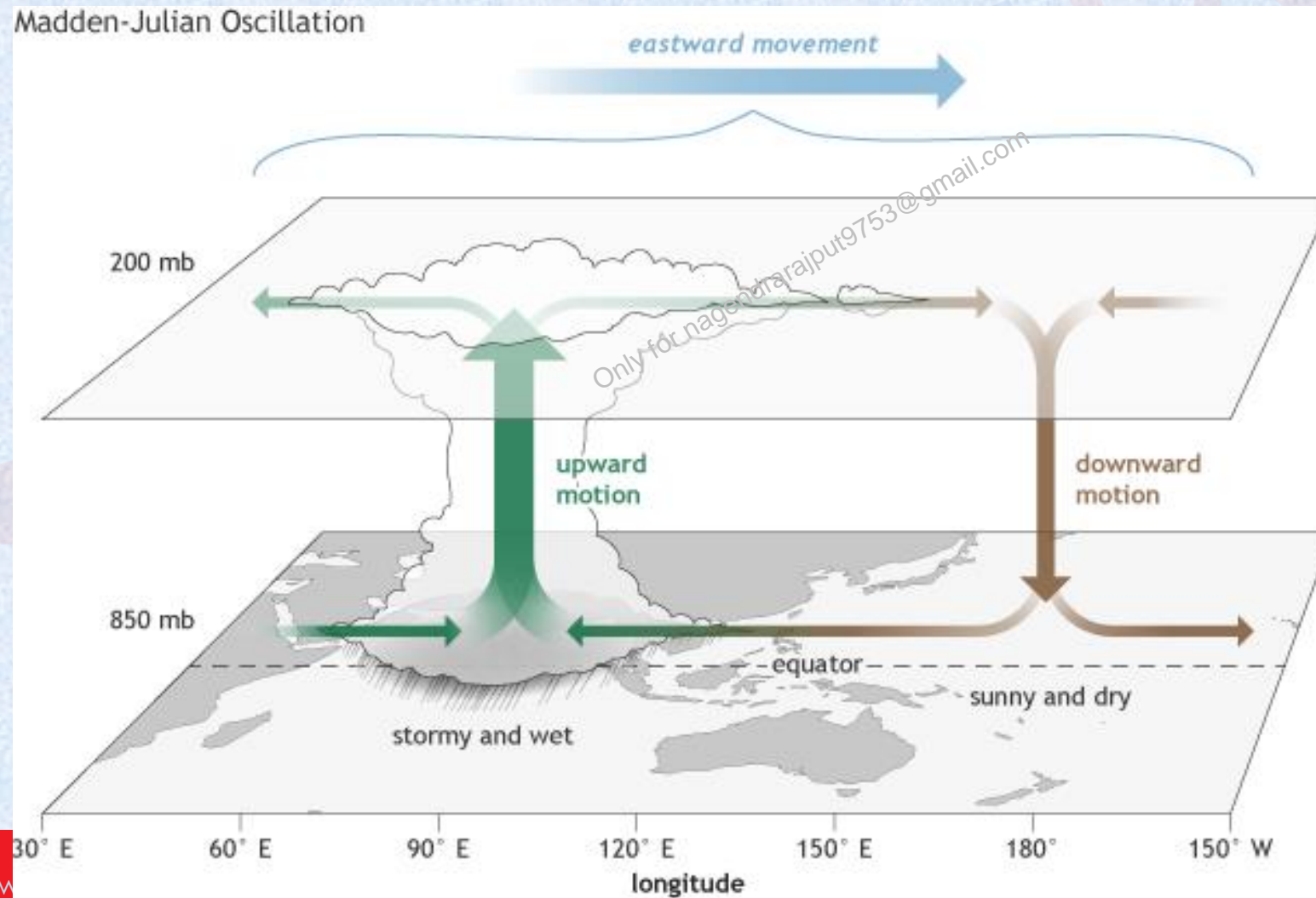
https://www.youtube.com/watch?v=tyPq86yM_Ic

<https://www.youtube.com/watch?v=d6s0T0m3F8s>

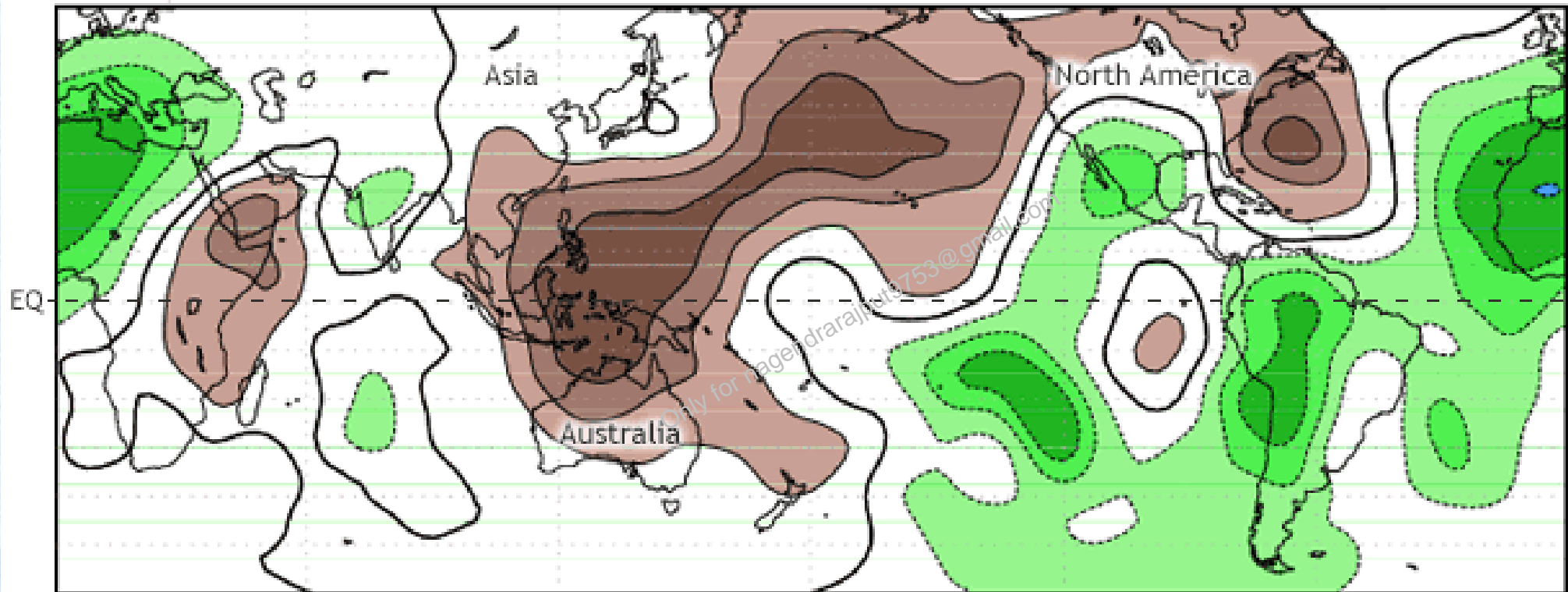
Only for nagendrapu0753@gmail.com



eastward moving disturbance of clouds, rainfall, winds, and pressure that traverses the planet in the tropics and returns to its initial starting point in 30 to 60 days, on average



Feb 22, 2005



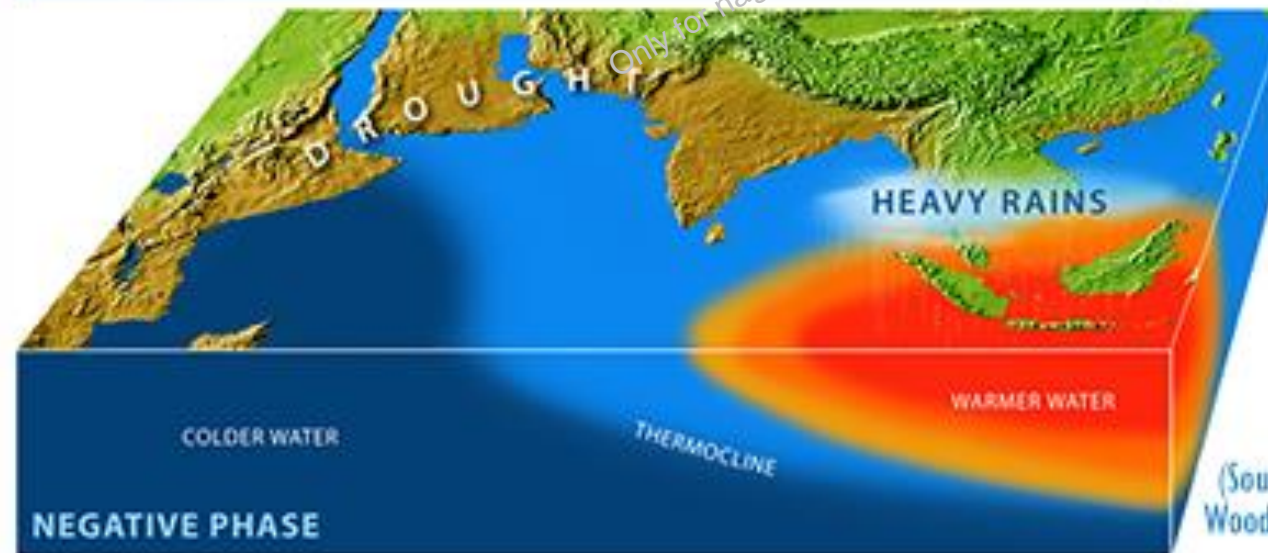
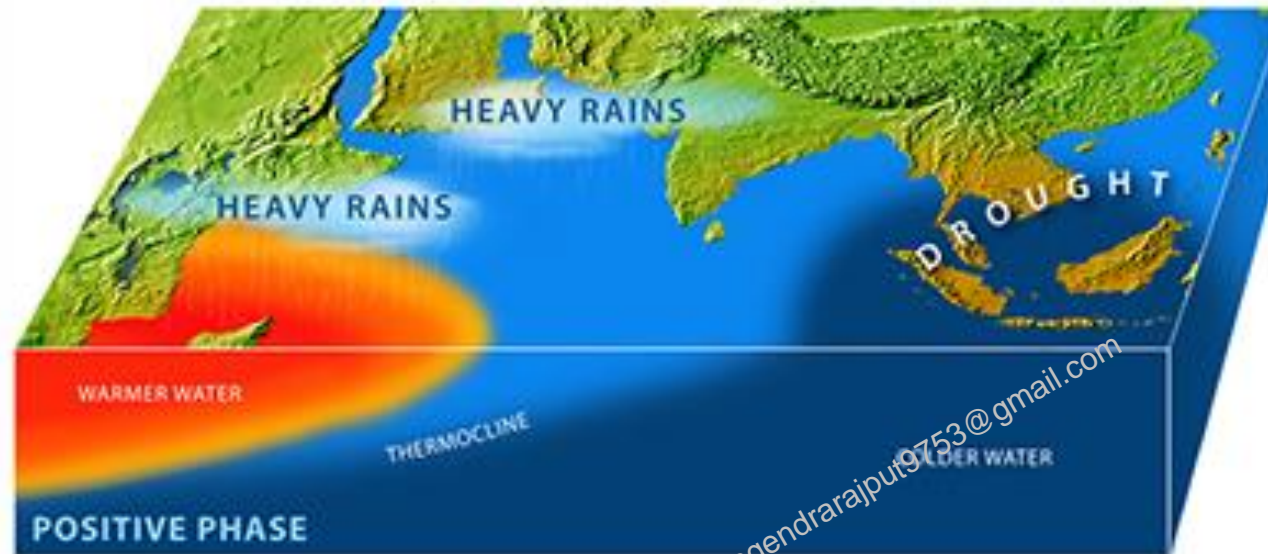
Potential for precipitation



favorable

unfavorable

Indian Ocean Dipole



(Source: Paul Oberlander,
Woods Hole Oceanographic Institution)

2014

Most of the unusual climatic happenings are explained as an outcome of the El-Nino effect. Do you agree?

10

2010

A new type of El Nino called El Nino Modoki appeared in the news. In this context, consider the following statements:

1. Normal El Nino forms in the Central Pacific ocean whereas El Nino Modoki forms in Eastern Pacific ocean.
2. Normal El Nino results in diminished hurricanes in the Atlantic ocean but El Nino Modoki results in a greater number of hurricanes with greater frequency.

Which of the statements given above is/are correct ?.

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

2011

La Nina is suspected to have caused recent floods in Australia. How is La Nina different from El Nino?

1. La Nina is characterised by unusually cold ocean temperature in equatorial Indian Ocean whereas El Nino is characterised by unusually warm ocean temperature in the equatorial Pacific Ocean.

2. El Nino has adverse effect on south-west monsoon of India, but La Nina has no effect on monsoon climate.

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

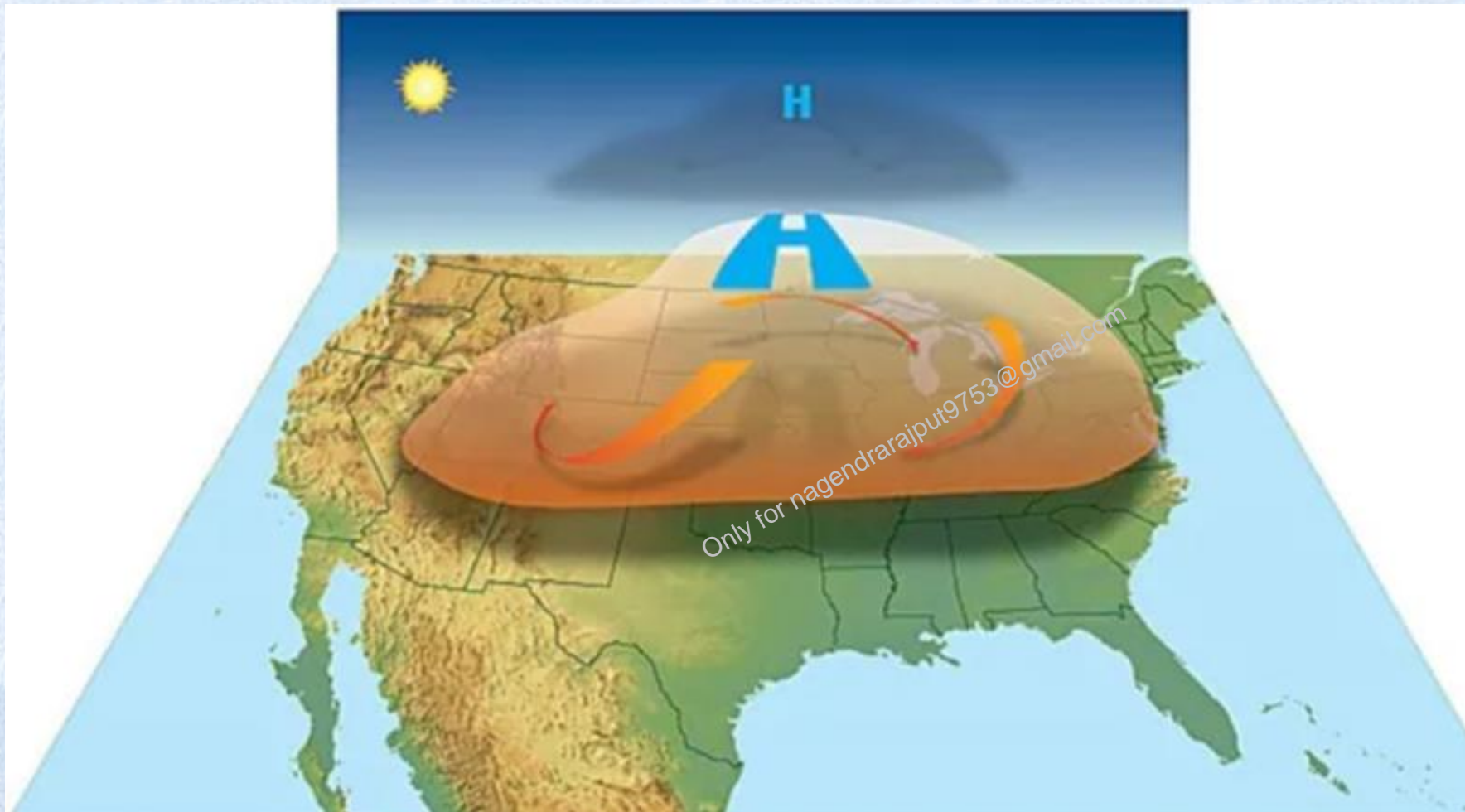
2017

With reference to “Indian Ocean Dipole (IOD)” sometimes mentioned in the news while forecasting Indian monsoon, which of the following statements is/are correct?

1. IOD phenomenon is characterised by a difference in sea surface temperature between tropical Western Indian Ocean and tropical Eastern Pacific Ocean.

2. An IOD phenomenon can influence an El Nino’s impact on the monsoon. Select the correct answer using the code given below:

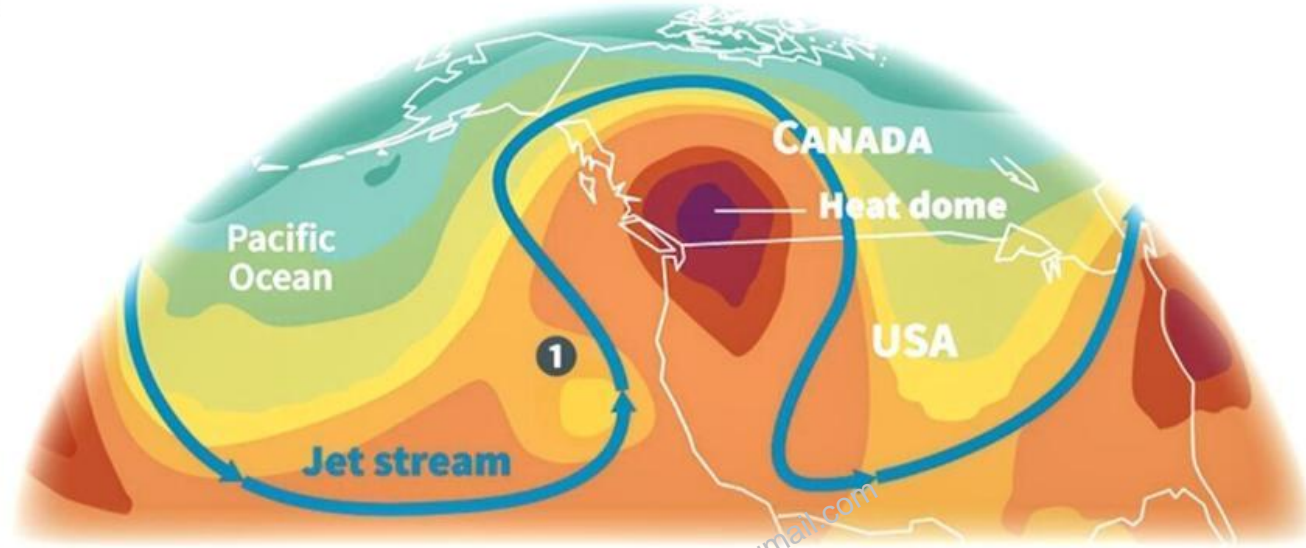
- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2



The 'heat dome'

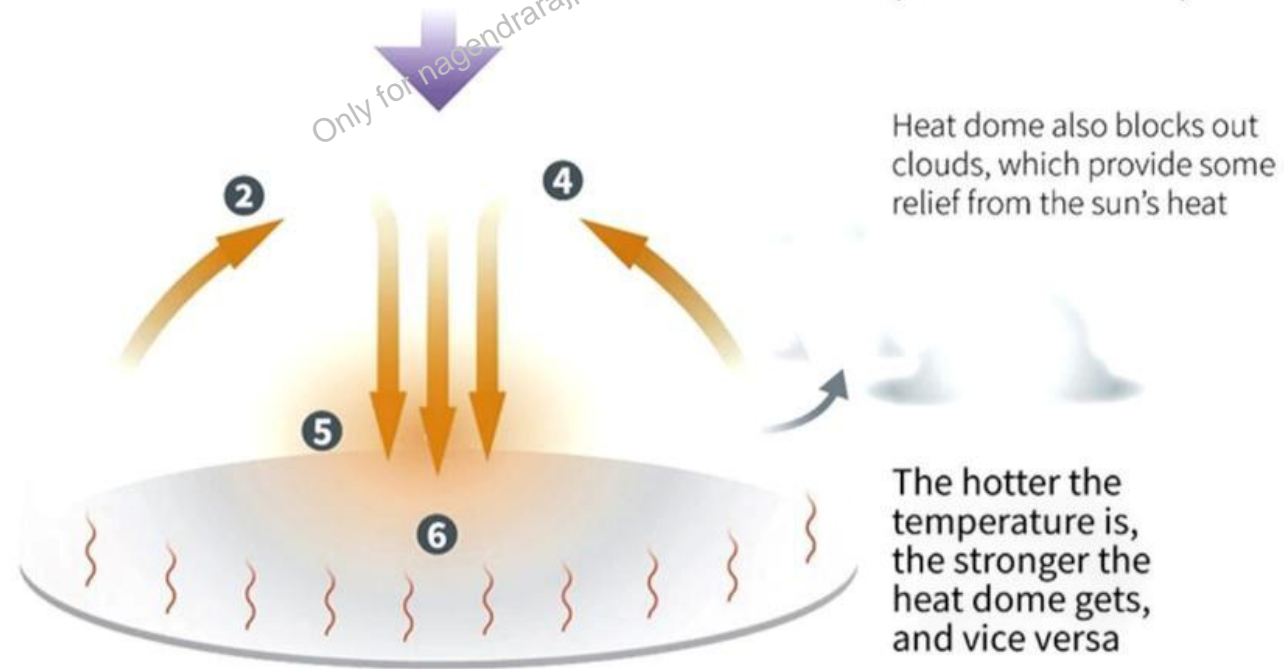
Occurs when the atmosphere traps hot ocean air like a lid or cap

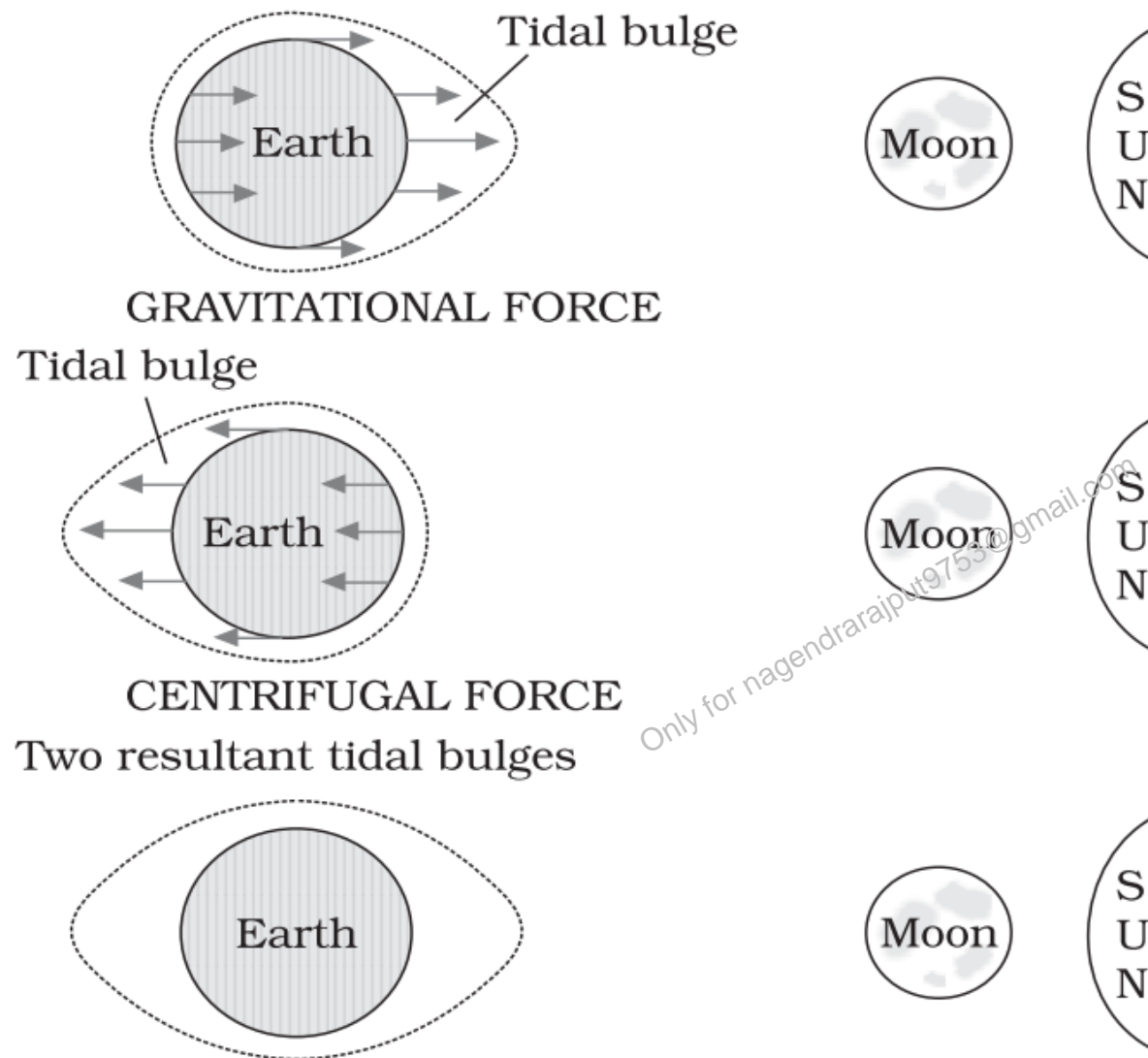
- 1 In summer, the **jet stream** (which moves the air) shifts northward
- 2 Hot and stagnant air **expands** upwards
- 3 Strong and **high-pressure** atmospheric conditions combine with influences from La Nina act like a dome or cap
- 4 In a process known as **convection**, hot air attempts to escape but high pressure pushes it back down
- 5 Under the dome, the air sinks and **compresses**, releasing more heat
- 6 As winds move the hot air east, the jet stream traps the air where it sinks, resulting in **heat waves**



3 High pressure

Temperature forecasts
(darker color = hotter)

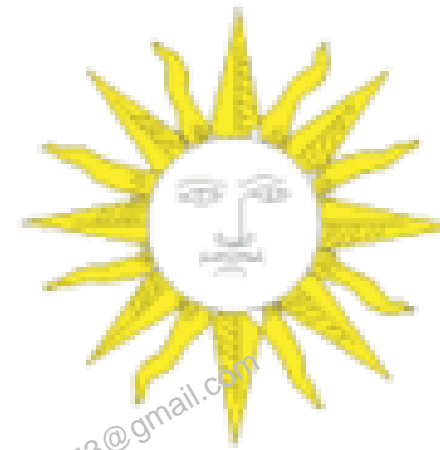
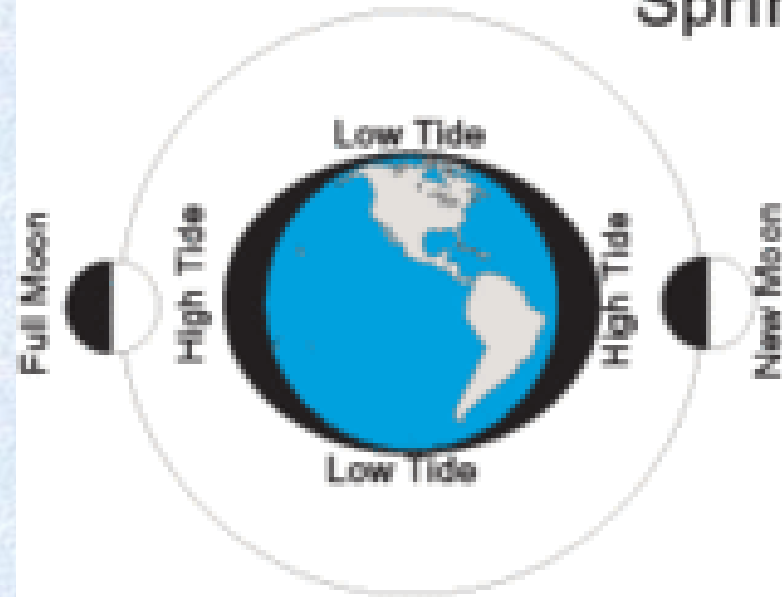




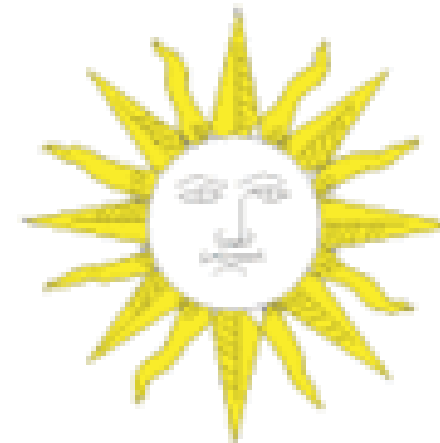
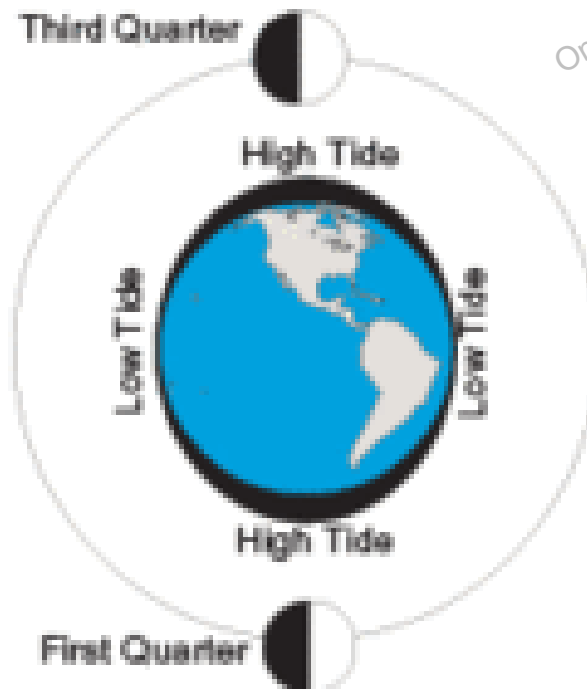
Gravitational and Centrifugal Forces

Figure 14.2 : Relation between gravitational forces and tides

Spring Tides



Neap Tides



<https://www.youtube.com/watch?v=NqDEaFjIXPw>

<https://www.youtube.com/watch?v=8bSXuxjIACU>

<https://www.youtube.com/watch?v=glbvw2MsxGQ>

Only for nagendrapu0753@gmail.com

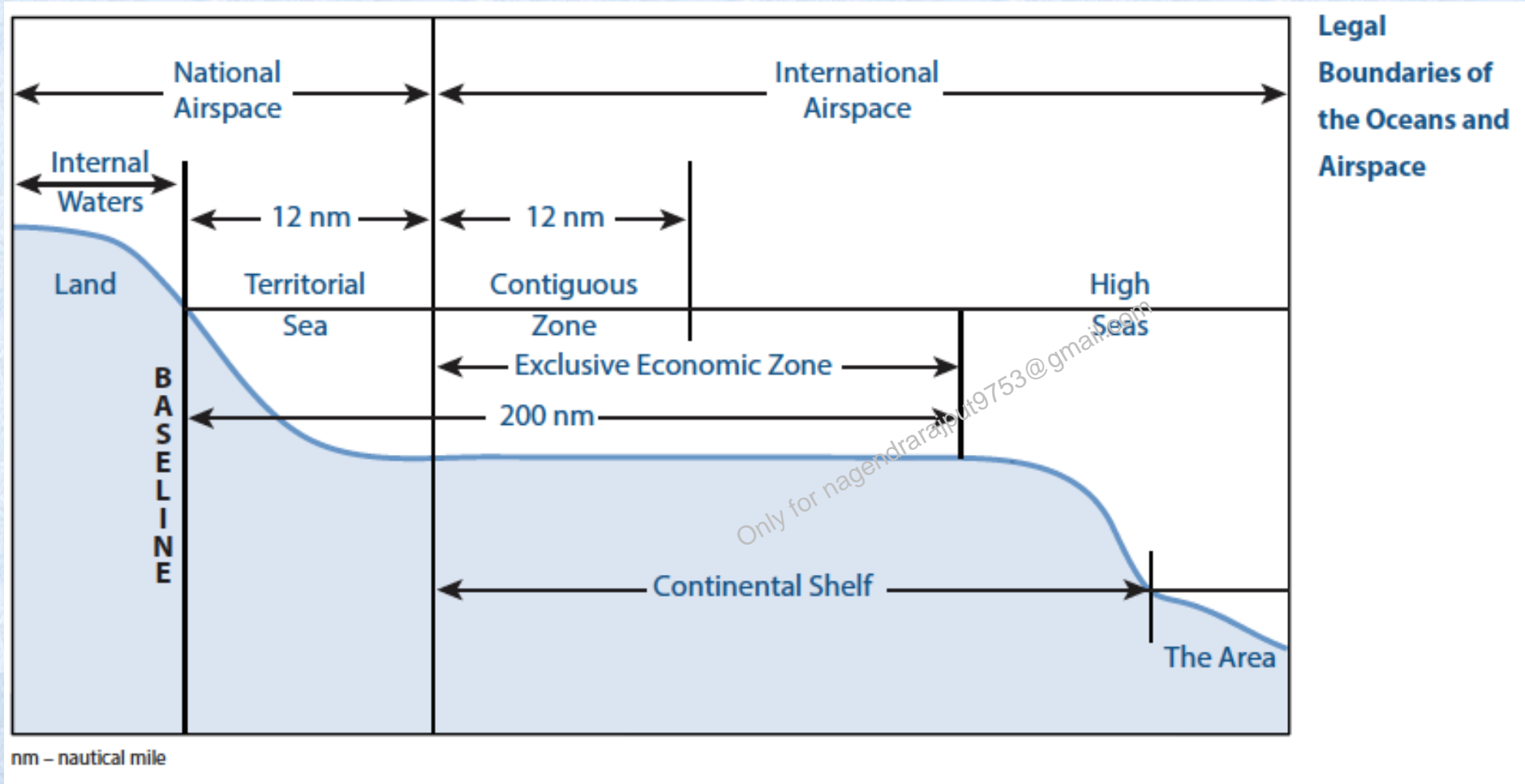
2015

Tides occur in the oceans and seas due to which among the following?

1. Gravitational force of the Sun
2. Gravitational force of the Moon
3. Centrifugal force of the Earth

Select the correct answer using the code given below.

- (a) 1 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3



Questions??



- Online query (For faster reply)
- Read and revise what is taught
- Read the reference material
- Mentoring sessions

If Dil Maange beyond MORE...

Mail: rajesh@visionias.in

Twitter: [@naturiousoul](https://twitter.com/naturiousoul)