50 IMPORTANT TOPICS

FOR PRELIMS 2024

GEOGRAPHY REVISION-III

CURRENT AFFAIRS SPECIAL (CONCEPTS IN NEWS)

SHRADHA MA'AM

50 Important Topics - 2024 [2 PM]	
Scheduled Date	**Subject**
01/04/24	Economy
02/04/24	Science & Technology
03/04/24	Environment & D.M.
04/04/24	Science & Technology
05/04/24	Environment & D.M.
06/04/24	----------
07/04/24	----------
08/04/24	Economy
09/04/24	Science & Technology
10/04/24	Economy
11/04/24	English
12/04/24	International Relations
13/04/24	----------
14/04/24	----------
15/04/24	Geography
16/04/24	----------
17/04/24	Geography
18/04/24	----------
19/04/24	Polity & Governance
20/04/24	Polity & Governance
21/04/24	----------
22/04/24	Maths
23/04/24	Geography
24/04/24	Reasoning
25/04/24	Polity & Governance
26/04/24	International Relations
27/04/24	Environment & D.M.
28/04/24	Social Schemes
29/04/24	History
30/04/24	History

Sleepy Classes IAS
Awakening Toppers

RAPID REVISION

CSAT	₹1,500	GS	₹3,500
CSAT + General Studies	₹4,000		

MOST IMPORTANT TOPICS FOR PRELIMS 2024

50 HOURS

1500 TOPICS

11th April 2024 - 29th April 2024

Special Inclusions

- 6 FLTs (3 GS+ 3 CSAT)
- Value Additions Material
- Subject Specific MCQS

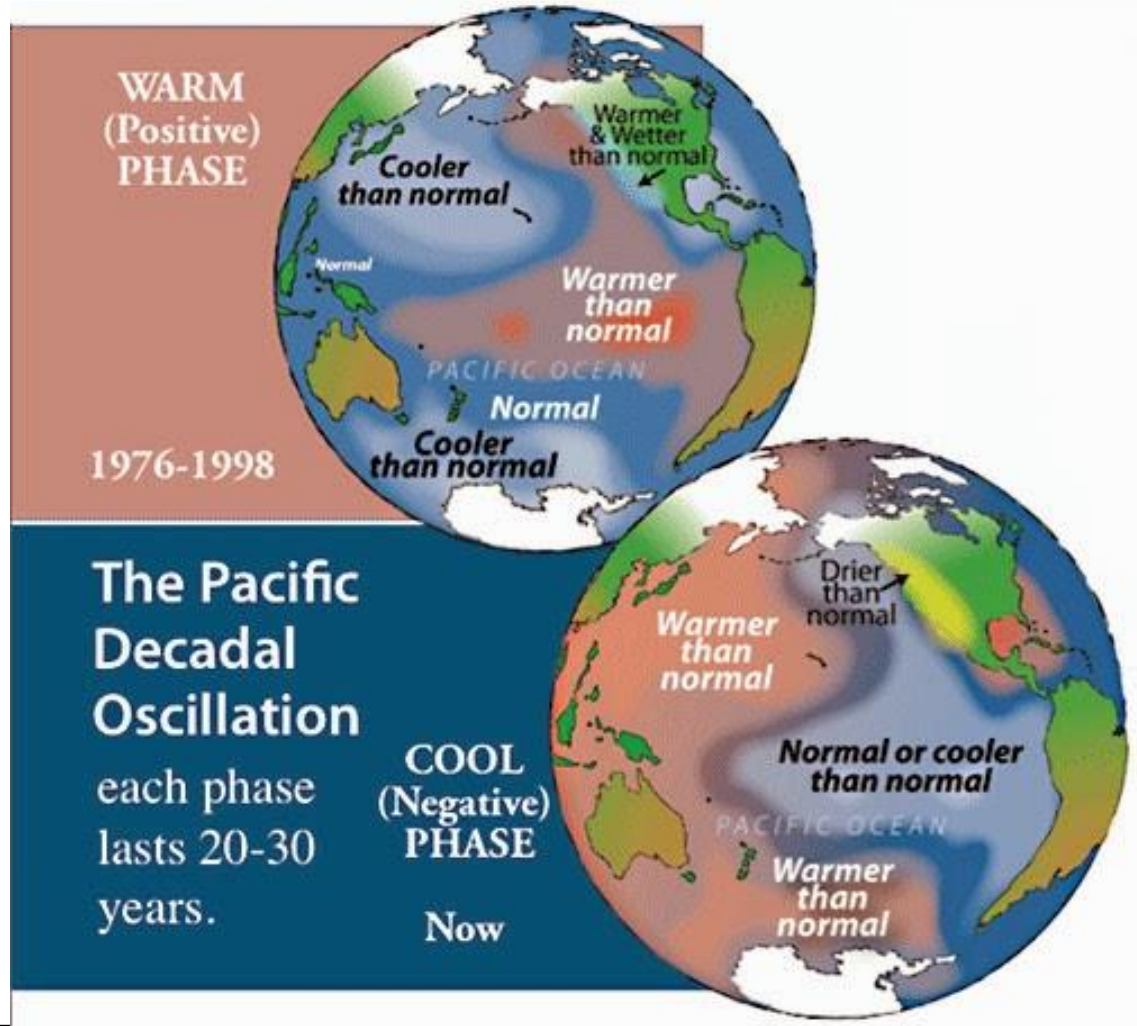
1800-890-3043 sleepy.classes@gmail.com

Pacific Decadal Oscillation

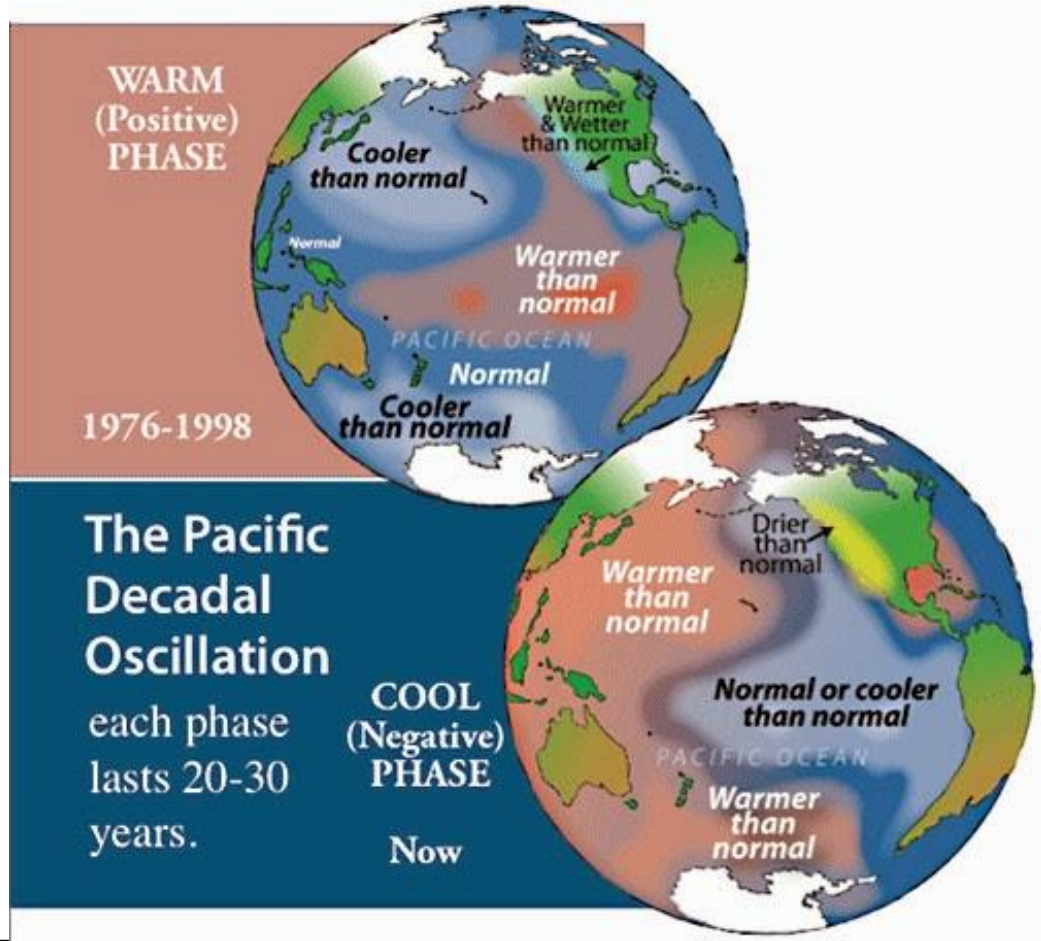
- long-term ocean fluctuation in vast areas of Pacific Ocean.
- 20-30 years

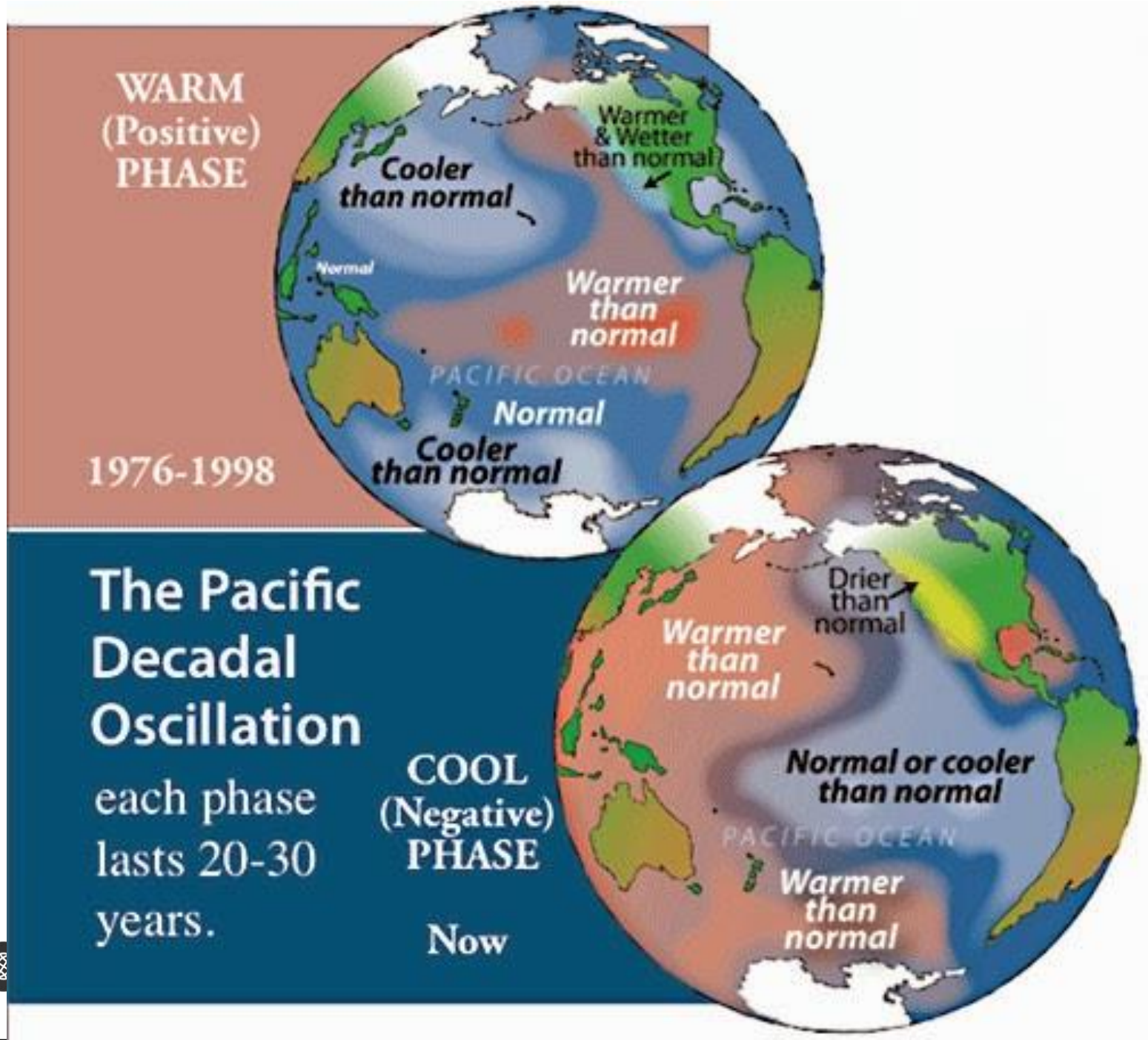
- **Positive or Warm Phase** – Higher than normal sea surface temperatures are found stretching from western coast of North America down to the equator .These patterns produce horse shoe shaped pattern which surrounds a core of cooler waters in the central and northwestern pacific .
- **Negative or Cool phase** – This pattern is **reversed** . Cooler sea surface temperatures in the horseshoe pattern surrounds a core of warmer waters. Cold PDO events have been linked to severe droughts spanning many years in south western USA and increased rainfall over eastern Australia .

Positive or Warm Phase- Higher than normal sea surface temperatures are found stretching from western coast of North America down to the equator .These patterns produce horse shoe shaped pattern which surrounds a core of cooler waters in the central and northwestern pacific .



Negative or Cool phase - Negative or Cool phase – This pattern is **reversed** . **Cooler sea surface temperatures in the horseshoe pattern surrounds a core of warmer waters**. **Cold PDO events have been linked to severe droughts spanning many years in south western USA and increased rainfall over eastern Australia** .





Additional Information

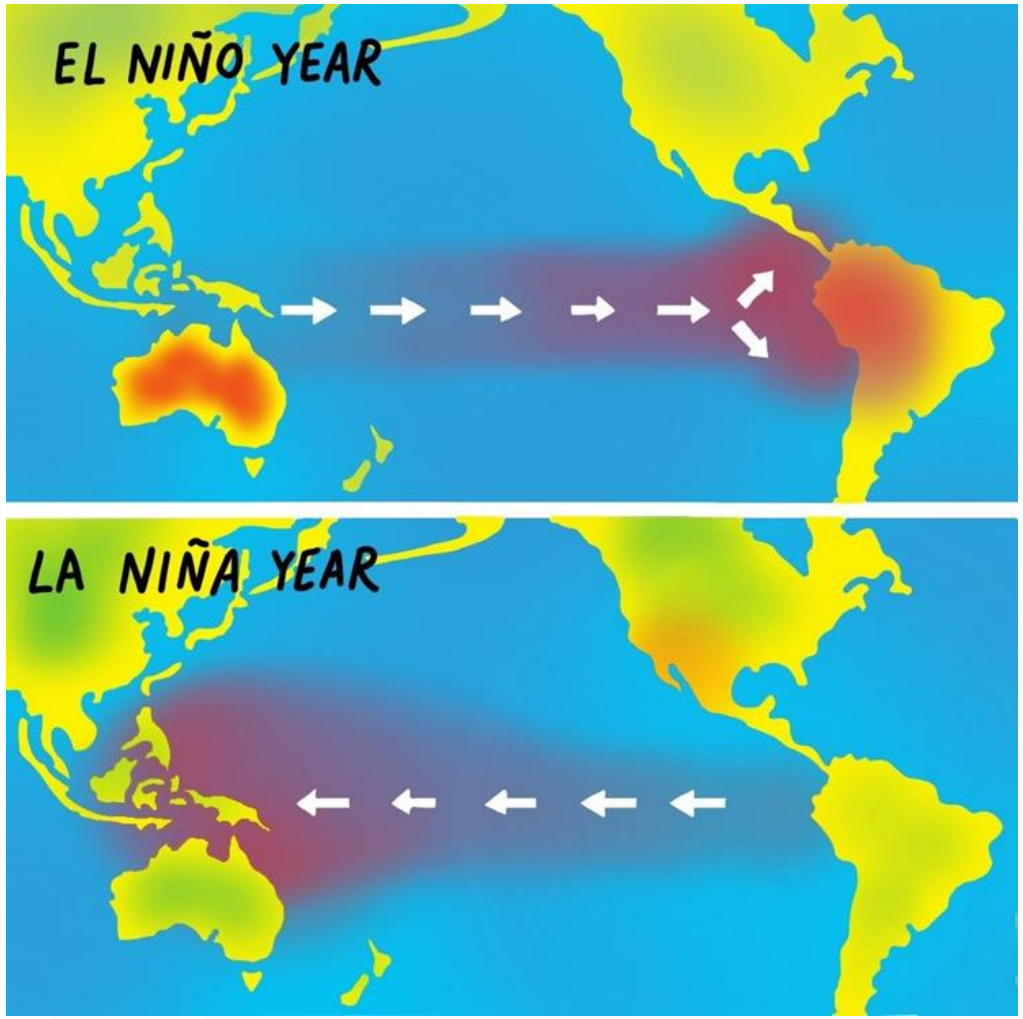
Trends to Remember

- **El Nino & Positive PDO**– Not good for Indian Monsoon
- **La Nina & Negative PDO** – Intensify Indian Monsoon

- **Negative PDO or Cool Phase -** Global Warming Slow
- **Positive PDO or Warm Phase** – Vice Versa

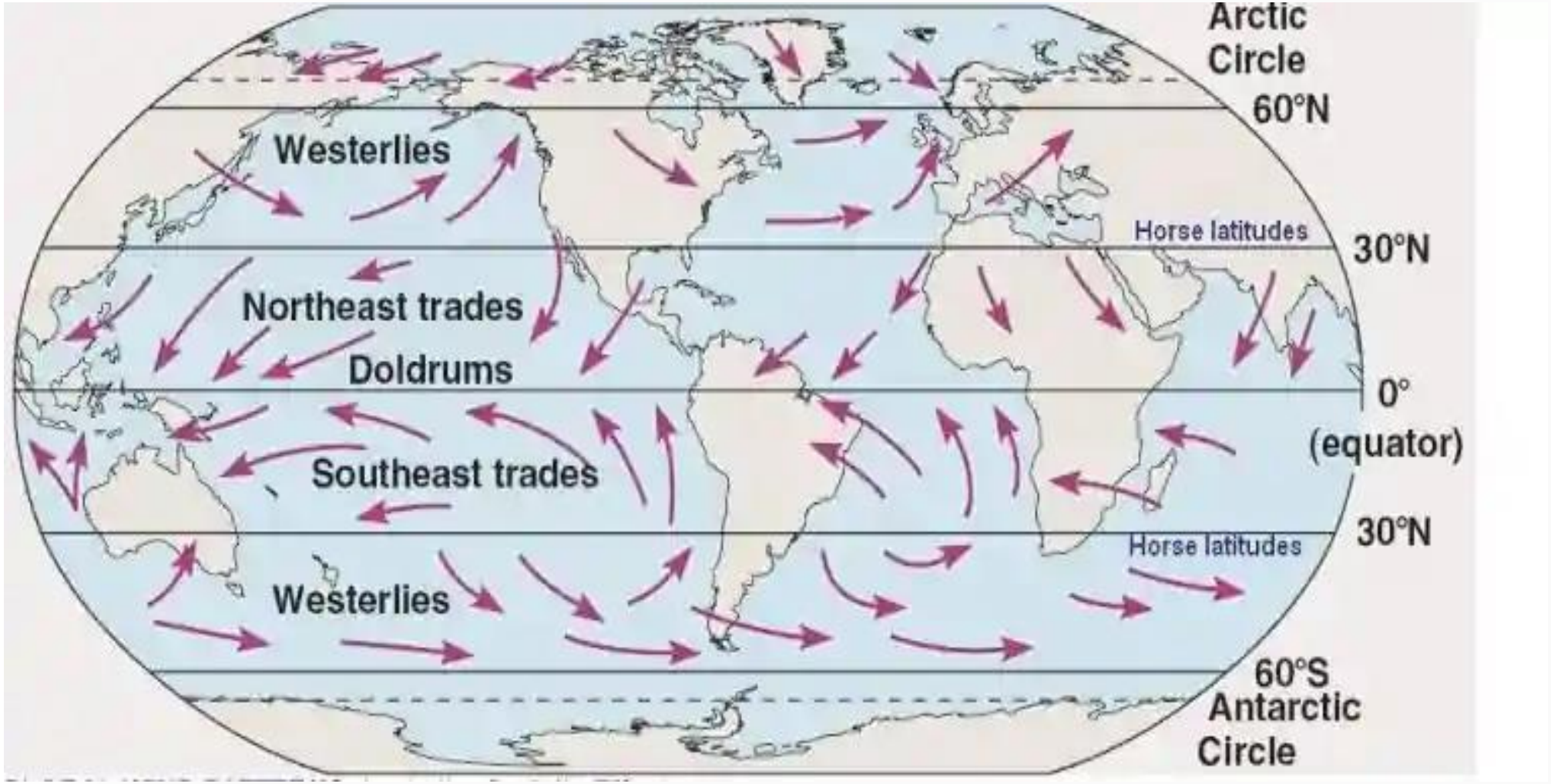
Note – Study - Pacific Decadal Oscillation, which repeats every 20-30 years, **could make cyclones that originate near the Equator more frequent in the coming years.**

Quick Revision - El – Nino and La Nina

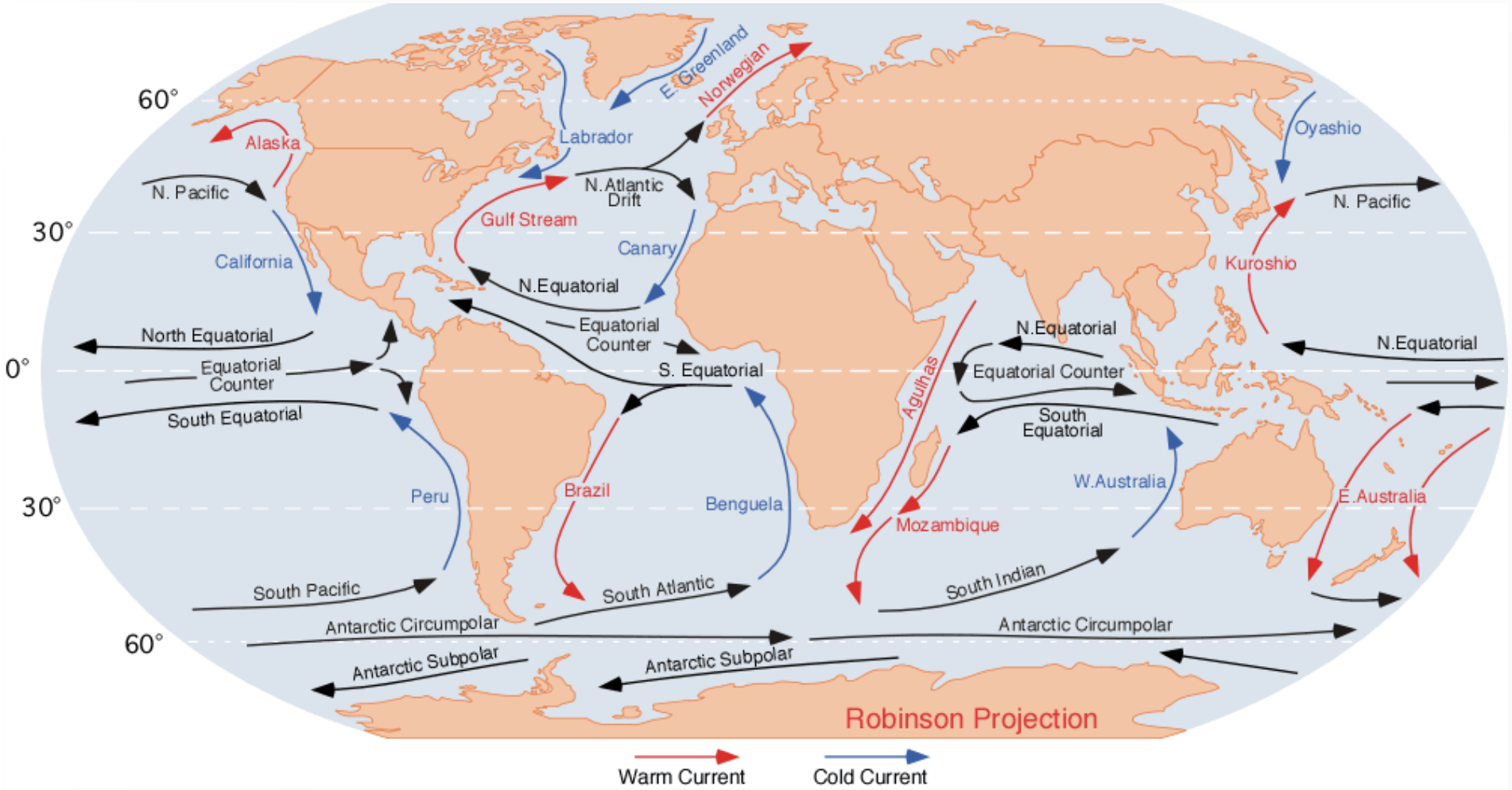


BASICS

Trade Winds

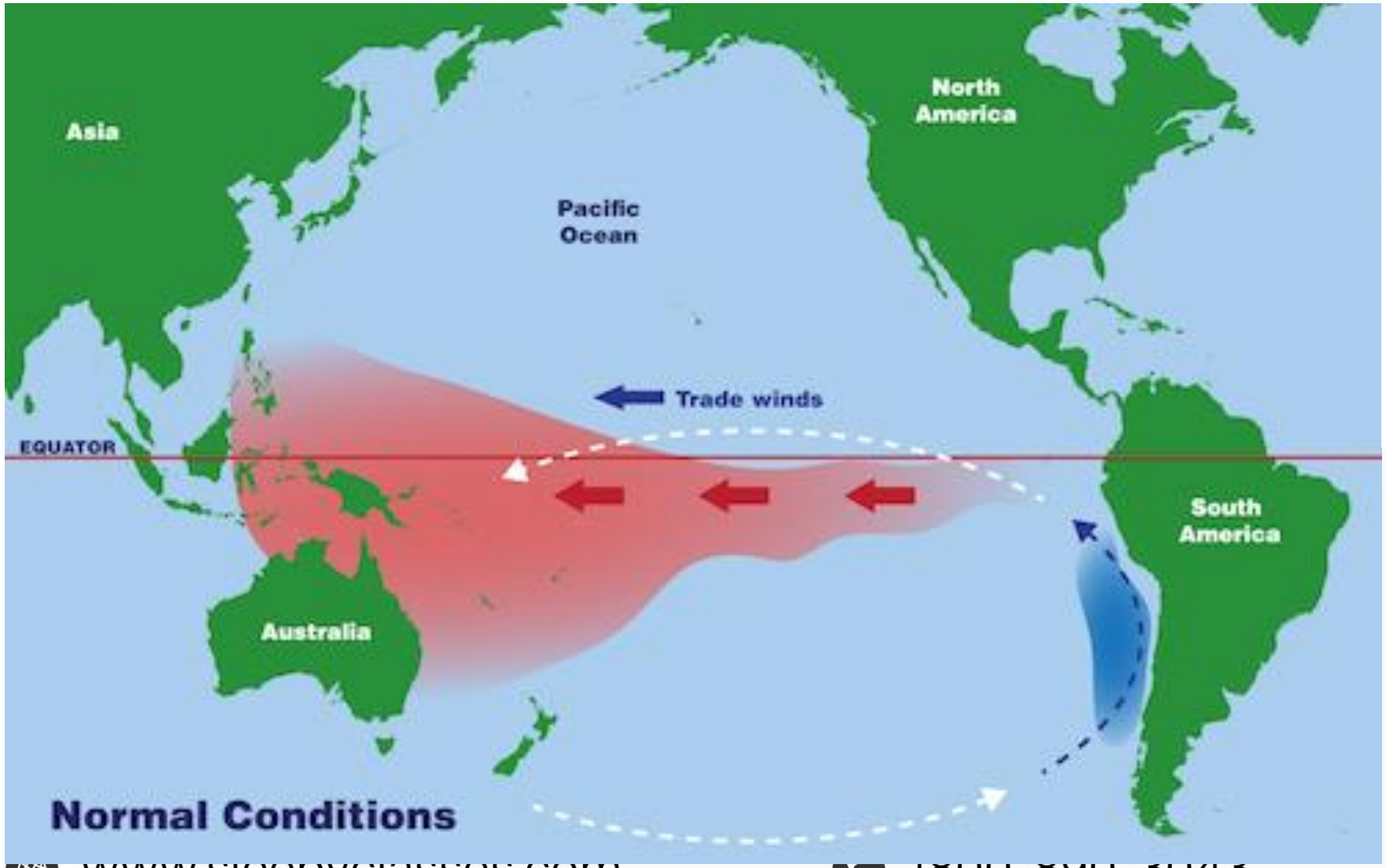


Peru Current



REVISE -La -Nina

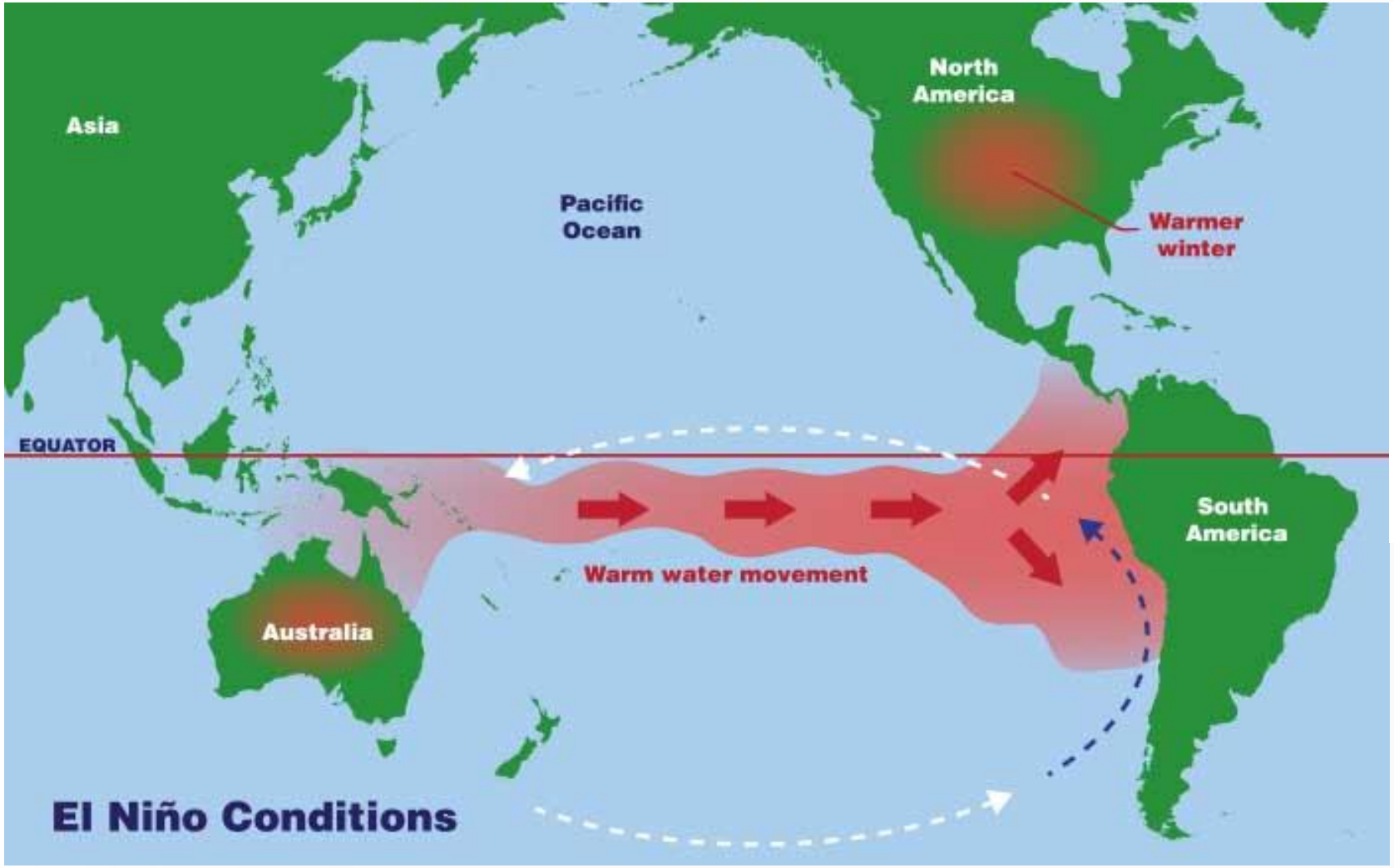
Sleepy Classes
Awakening Toppers



LA – NINA

1. Western Pacific Warm Pool- Australia
2. Trade Winds
3. Low Pressure – Australia
4. Rainfall – Australia
5. Cold Current – Peru
6. Upwelling zones
7. Good – Fishing Industry
8. Deserts with Cold Current
9. High Pressure – Peru
10. Mascarene High
11. Rainfall in India - Favorable

REVISE - EL - Nino

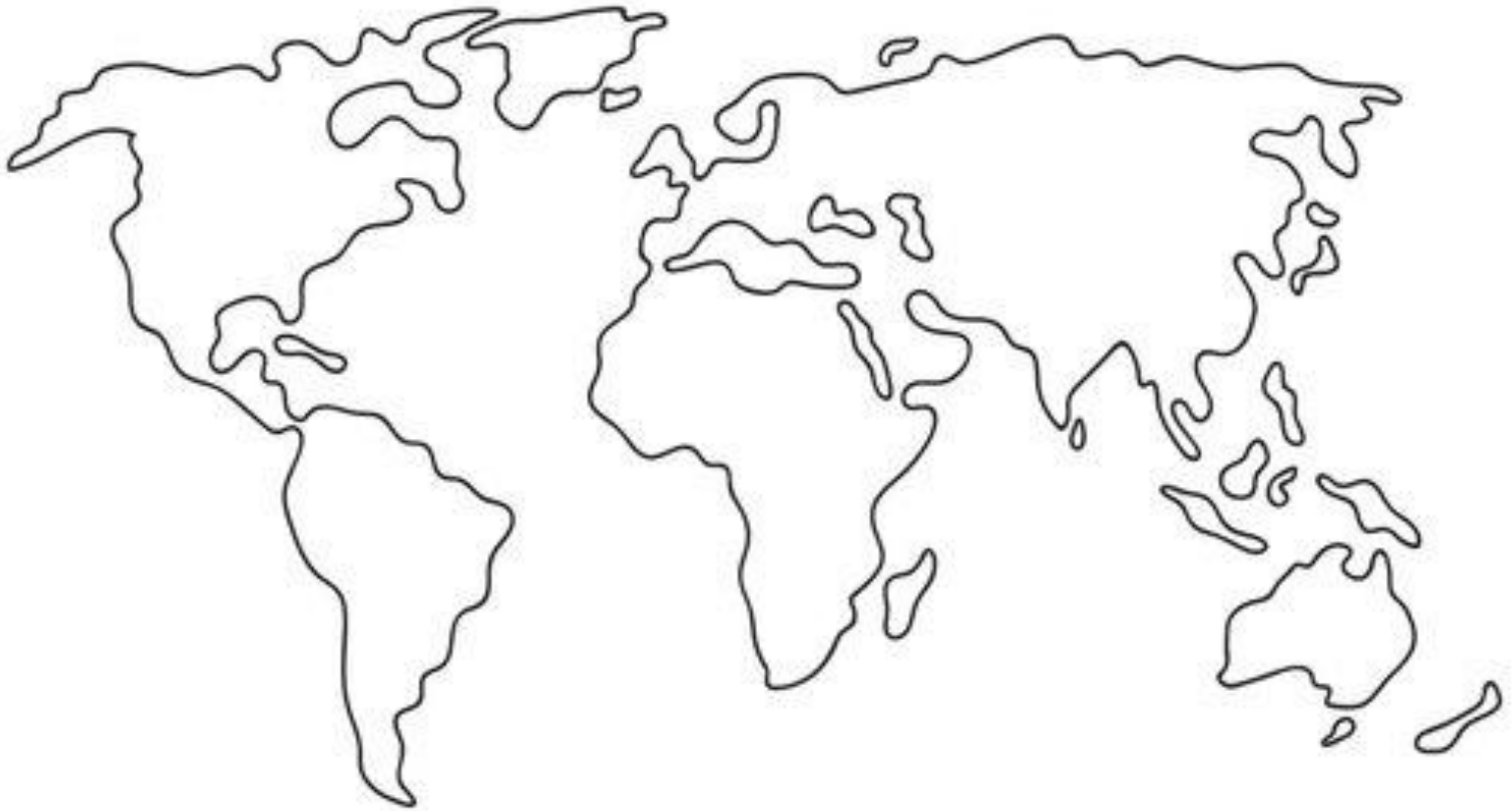


EL – NINO

1. Peruvian Coast - Downwelling zones
2. Issue with Fishing Industry
3. Peruvian Coast - Low Pressure
4. Peruvian Coast - Rainfall
5. Trade Winds Weakens
6. Drought – Australia + Forest Fires
7. India – Drought

Kalakaddal

- Flooded - several coastal areas of Kerala - **due to high sea waves - Kallakkadal.**
- Lakshadweep and Tamil Nadu coast - often affected
- Coastal flooding caused by **swell waves** - pre-monsoon season (April-May) + post monsoon - southwest coast of India.
- Waves formed by ocean swells - which originate from distant storms such as hurricanes - usually in the southern part of the Indian Ocean
- Storms transfer **significant energy from the air into the water -** formation of extremely high waves - travel vast distances from the storm center until they reach the shoreline.



Kalakaddal

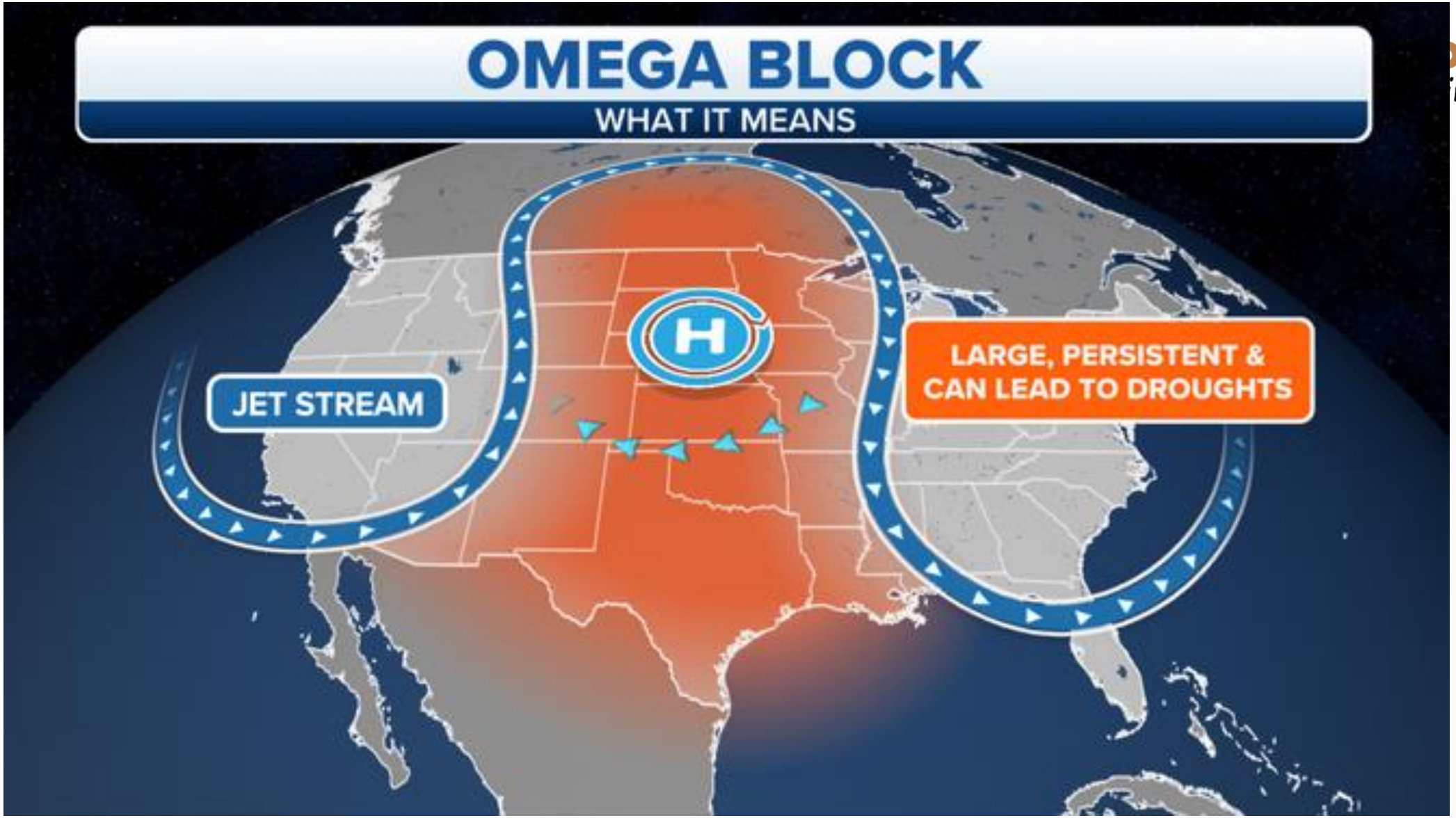
- occurs without precursors or any kind of local wind activity
- The latest instance took place after a **low atmospheric pressure system moved** over the region around March 25 from the **South Atlantic Ocean — 10,000 kilometres off the Indian coast**.
- **The arrival of the pressure system resulted in strong winds, which** led to the formation of swell waves of up to 11 metres in height.
- These waves were hitting the Kerala coast and Lakshadweep.

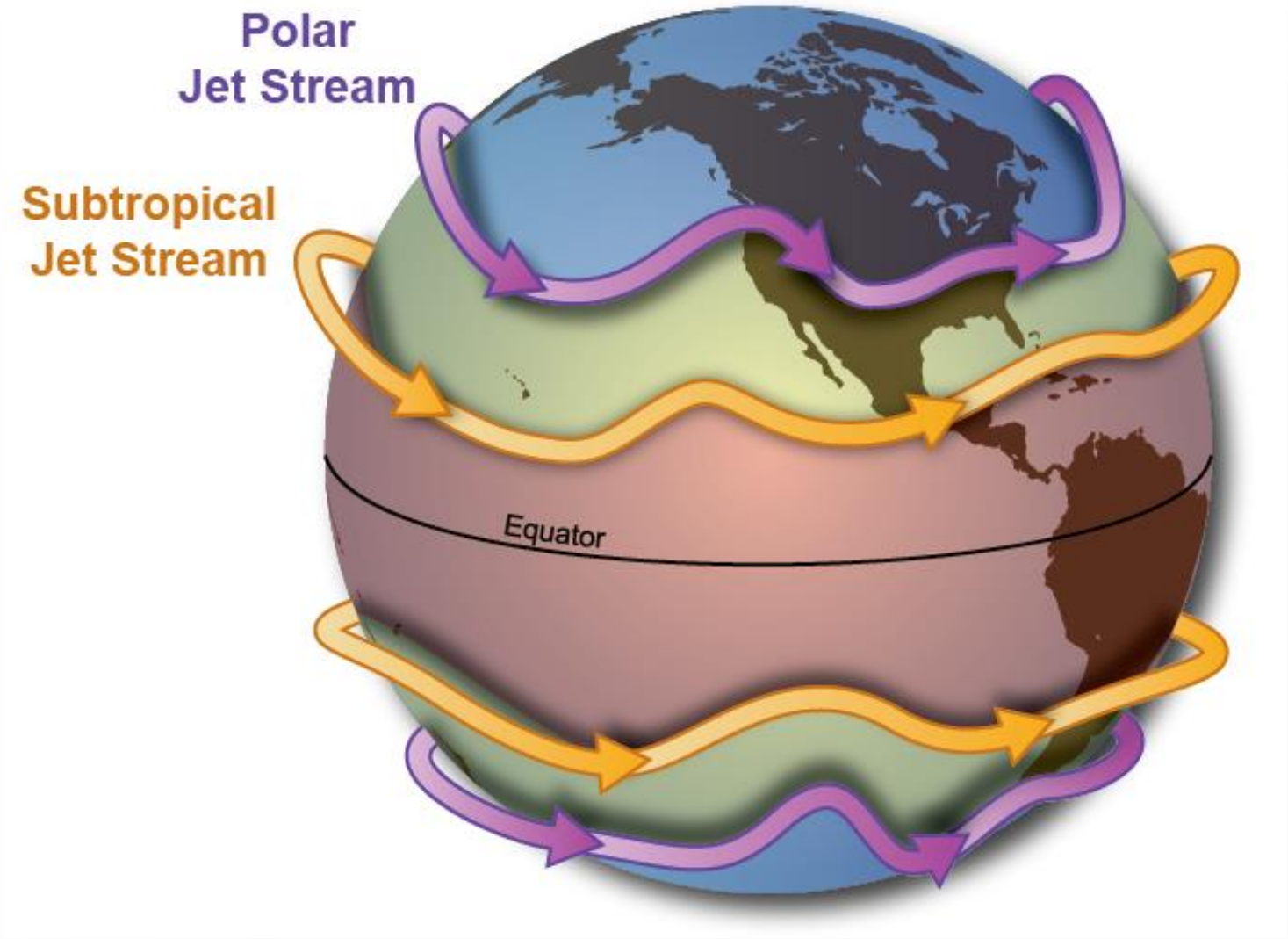
Kalakaddal

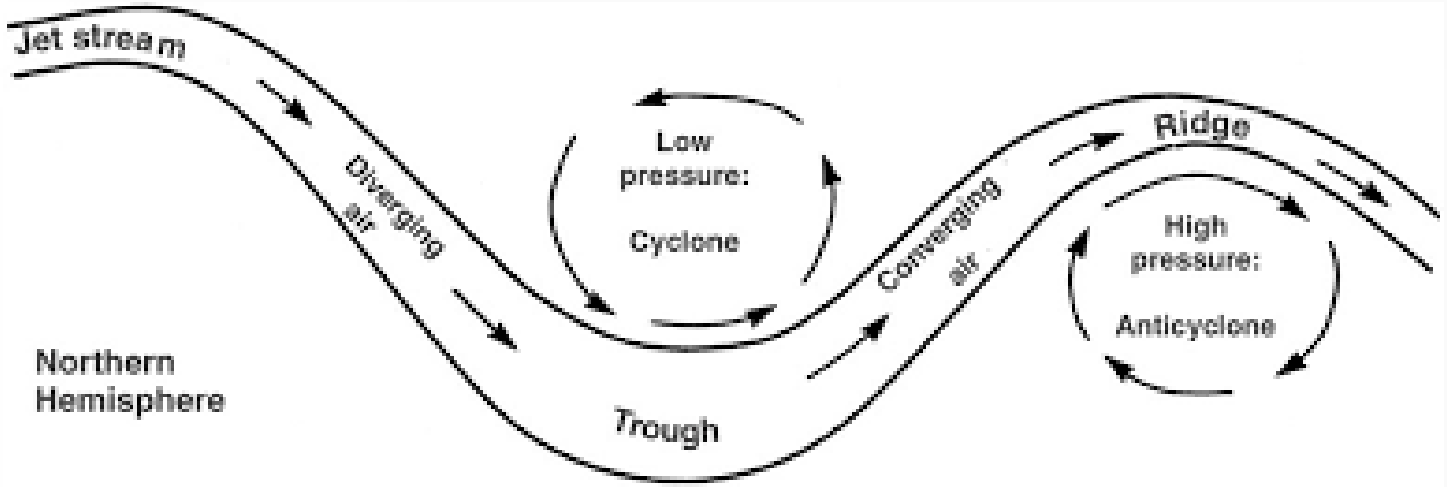
- In **2012, the term was formally approved by the United Nations Educational, Scientific and Cultural Organization (UNESCO)**.
- early warning systems like the **Swell Surge Forecast System — launched by the Indian National Centre for Ocean Information Services (INCOIS) in 2020**
- However, **Kallakkadal is often mistaken to be a tsunami**, which is a series of enormous waves created by an underwater disturbance usually associated with earthquakes occurring below or near the ocean.

Omega Blocking

- Omega blocks are a type of **upper-level weather pattern**.
- Omega block occurs when **two low-pressure systems become cut off from the main flow of the jet stream, sandwiching a high-pressure system between them** .
- Pakistan floods in 2011, 2019 heatwaves during May in France and July in Germany etc.


OMEGA BLOCK
WHAT IT MEANS
H
JET STREAM
LARGE, PERSISTENT &
CAN LEAD TO DROUGHTS


Polar
Jet Stream
Subtropical
Jet Stream
Equator

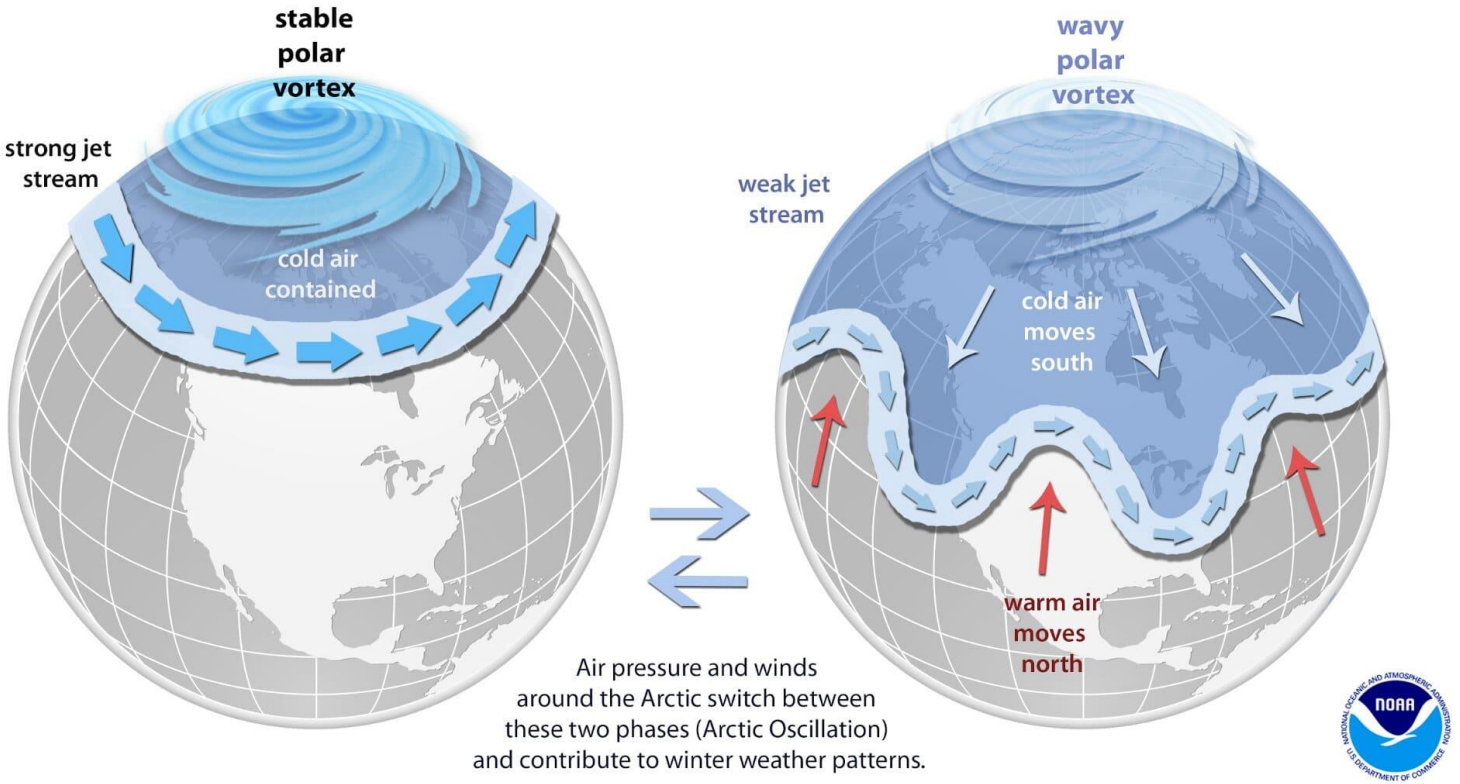

Jet stream
Diverging air
Low pressure:
Cyclone
Converging air
Ridge
High pressure:
Anticyclone
Northern Hemisphere
Trough

Polar Vortex

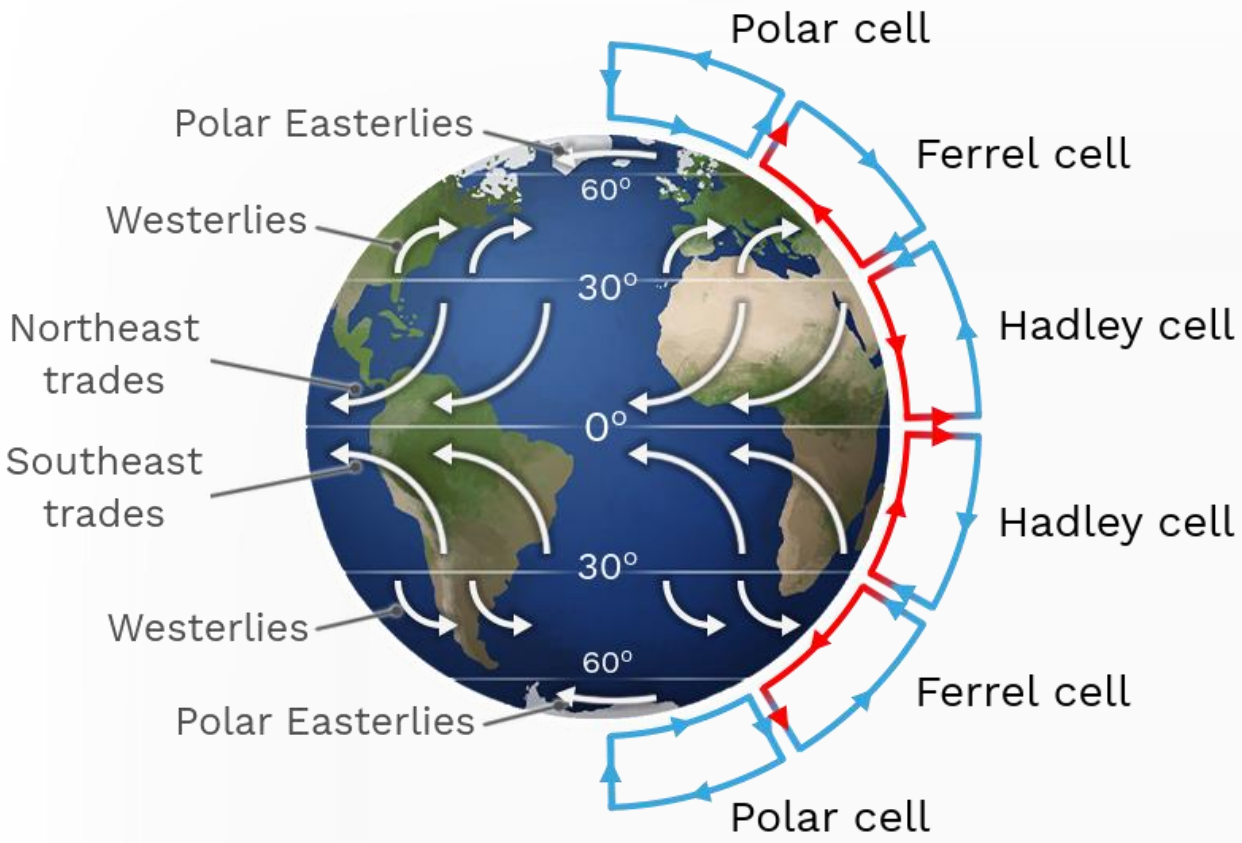
- A polar vortex or **polar low-pressure** area is a vast region with low-strain and **freezing air covering both the planet's poles.**

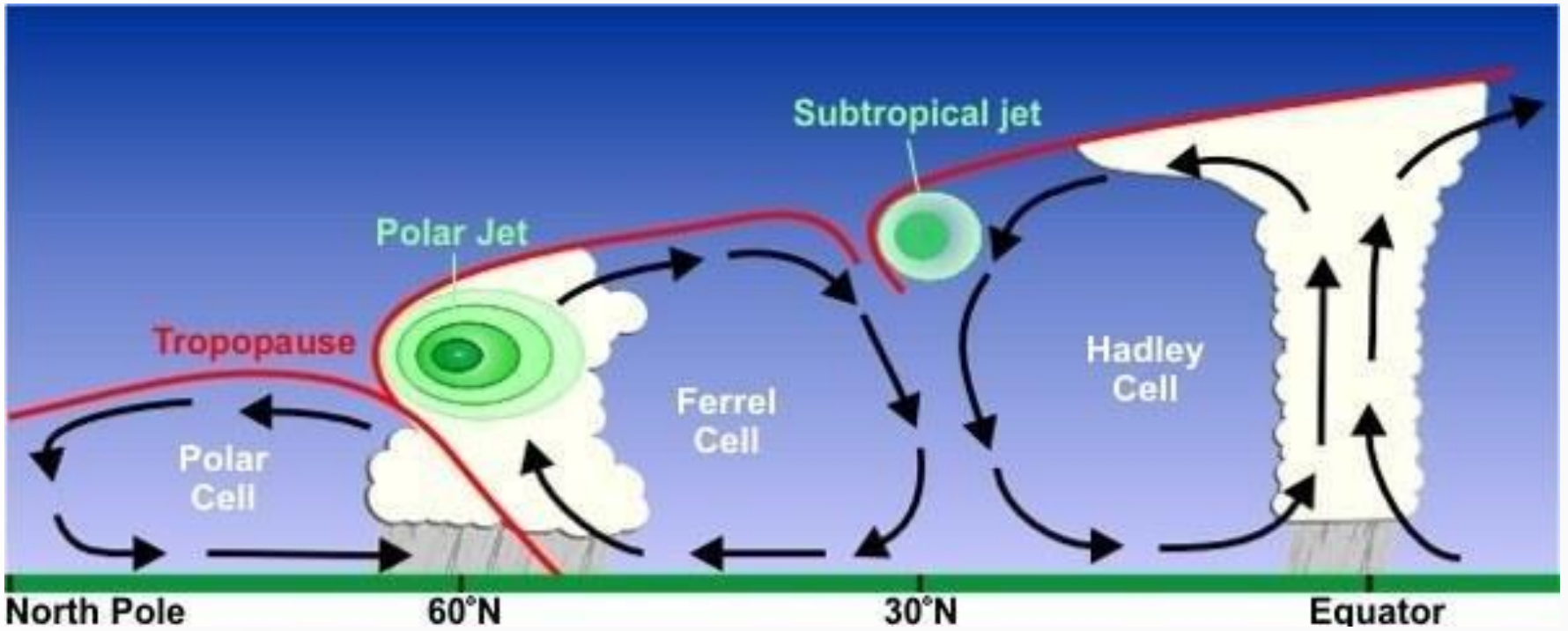
The Science Behind the Polar Vortex

The polar vortex is a large area of low pressure and cold air surrounding the Earth's North and South poles. The term vortex refers to the counterclockwise flow of air that helps keep the colder air close to the poles (left globe). Often during winter in the Northern Hemisphere, the polar vortex will become less stable and expand, sending cold Arctic air southward over the United States with the jet stream (right globe). The polar vortex is nothing new — in fact, it's thought that the term first appeared in an 1853 issue of E. Littell's *Living Age*.



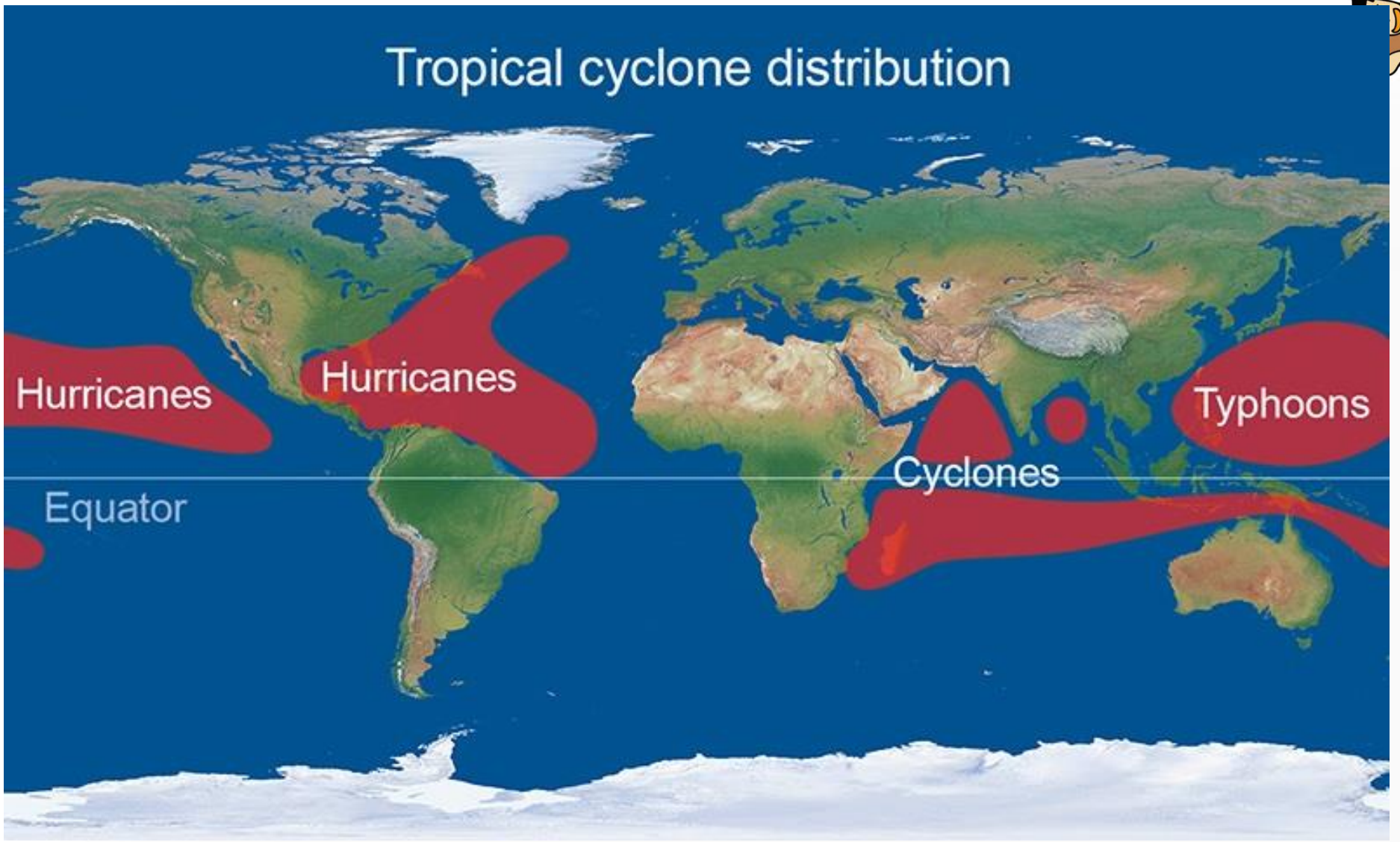
Air pressure and winds around the Arctic switch between these two phases (Arctic Oscillation) and contribute to winter weather patterns.


Polar cell
Polar Easterlies
Ferrel cell
60°
Westerlies
30°
Hadley cell
Northeast trades
0°
Southeast trades
Hadley cell
30°
Westerlies
Ferrel cell
60°
Polar Easterlies
Polar cell


Subtropical jet
Polar Jet
Tropopause
Ferrel Cell
Hadley Cell
Polar Cell
North Pole
60°N
30°N
Equator

Medicanes -

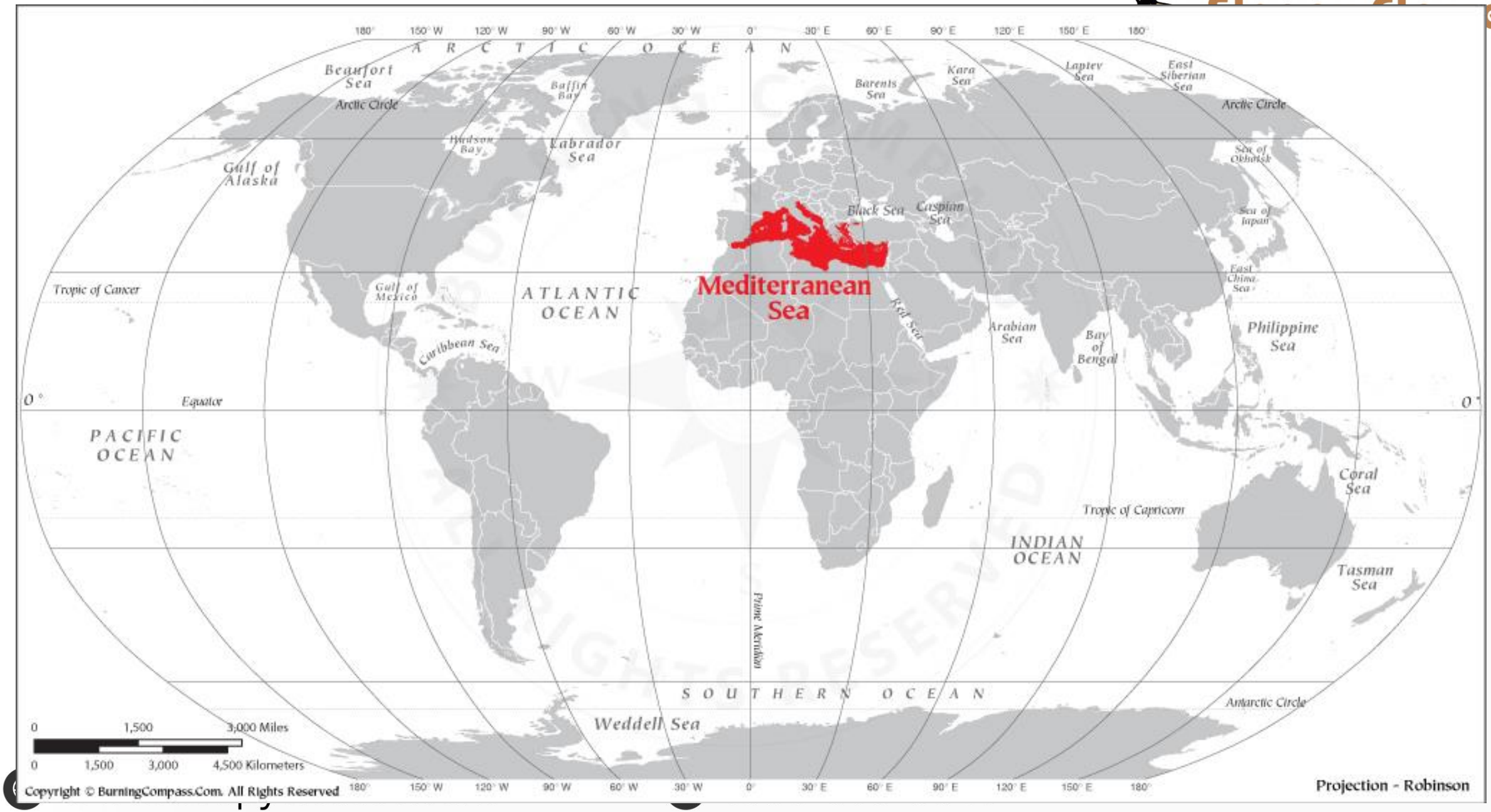
- Medicane is often is used to describe a deep area of **low pressure that forms in the Mediterranean Sea**, **acquires the characteristics of a tropical cyclone** and **sometimes has the appearance of a hurricane.**


Tropical cyclone distribution
Hurricanes
Hurricanes
Typhoons
Cyclones
Equator

Libyan flood wipes out quarter of coastal city of Derna

At least 10,000 people were feared missing in floods that swept away a quarter of the Libyan city of Derna, following a huge storm that had crossed the Mediterranean after wreaking havoc in Greece.

Source: Datawrapper


ARCTIC OCEAN
Beaufort Sea
Arctic Circle
Baffin Bay
Hudson Bay
Labrador Sea
Gulf of Alaska
Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Arctic Circle
Sea of Okhotsk
Sea of Japan
East China Sea
Black Sea
Caspian Sea
Mediterranean Sea
Red Sea
Arabian Sea
Bay of Bengal
Philippine Sea
Tropic of Cancer
Gulf of Mexico
ATLANTIC OCEAN
Caribbean Sea
0°
Equator
PACIFIC OCEAN
Coral Sea
Tropic of Capricorn
INDIAN OCEAN
Tasman Sea
Prime Meridian
SOUTHERN OCEAN
Weddell Sea
Antarctic Circle
0 1,500 3,000 Miles
0 1,500 3,000 4,500 Kilometers
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Projection - Robinson

Medicanes - Storm Daniel

- The factors required for the formation of medicanes are somewhat different from Tropical Cyclones.
- Medicanes can develop when **cold air intrusions move far southward over the Mediterranean Sea.**
- Although the **lower atmosphere warms over the warm water, the upper atmosphere remains cold**, **thus increasing the lapse rate** - essentially the rate at which the temperature changes with changes in altitude - and **instability.**
- **Convection can develop near the center of a pre-existent, cold core, low pressure area**.
- In time, **latent heat released aloft by the convection can convert the cyclone to warm core with associated tropical characteristics.**

Medicanes

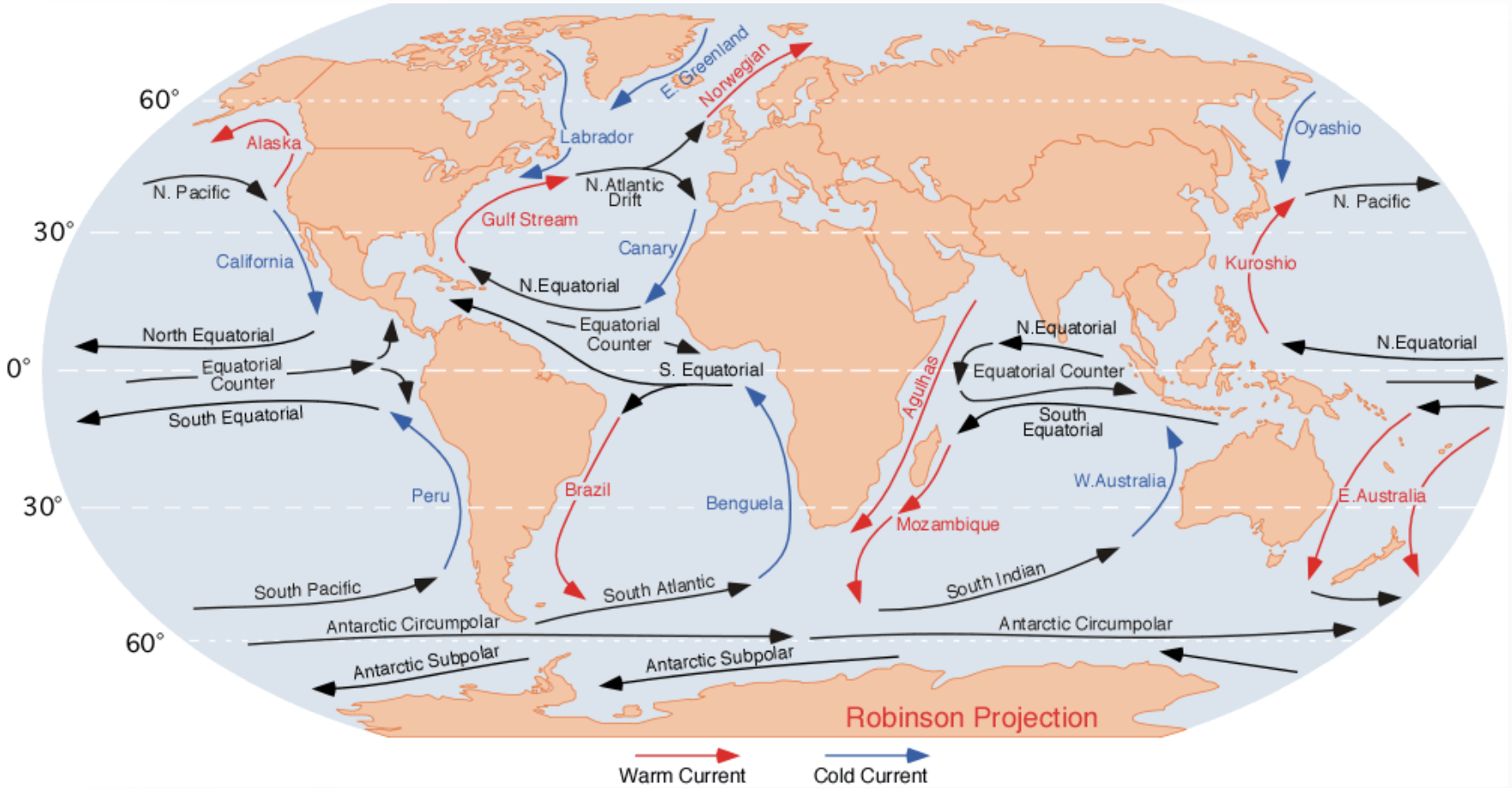
- The **cold air aloft allows for unstable lapse rates** and **convective activity even when water temperatures are too cold for typical tropical cyclone development**.
- Because **they have less warm water over which to traverse, medicanes have less time to intensify and only persist for a few days before coming ashore.**

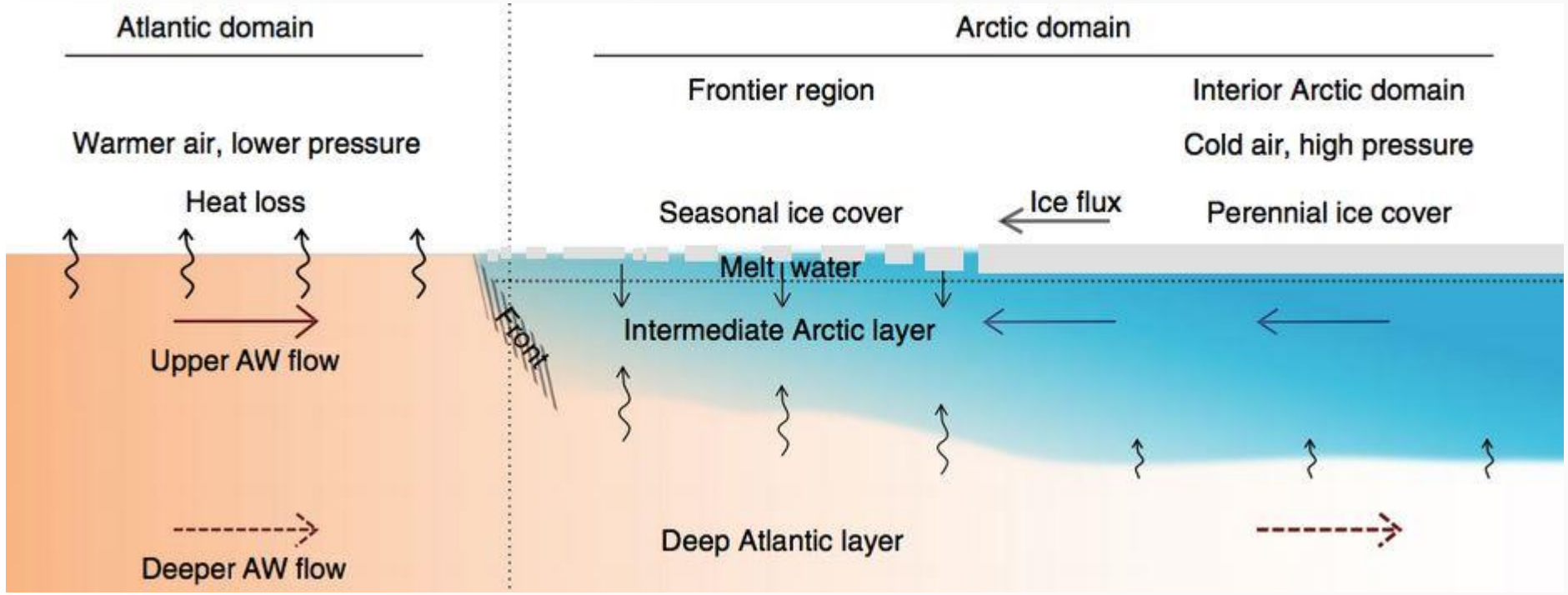
- **Note - The storm became stronger as it drew energy from the abnormally warm waters (the Mediterranean has been 2 to 3 degree Celsius warmer this year than in the past),** before drifting to the south and unloading excessive rainfall over northeastern Libya, where rain flowing down the mountainous terrain overwhelmed dam

Atlantification

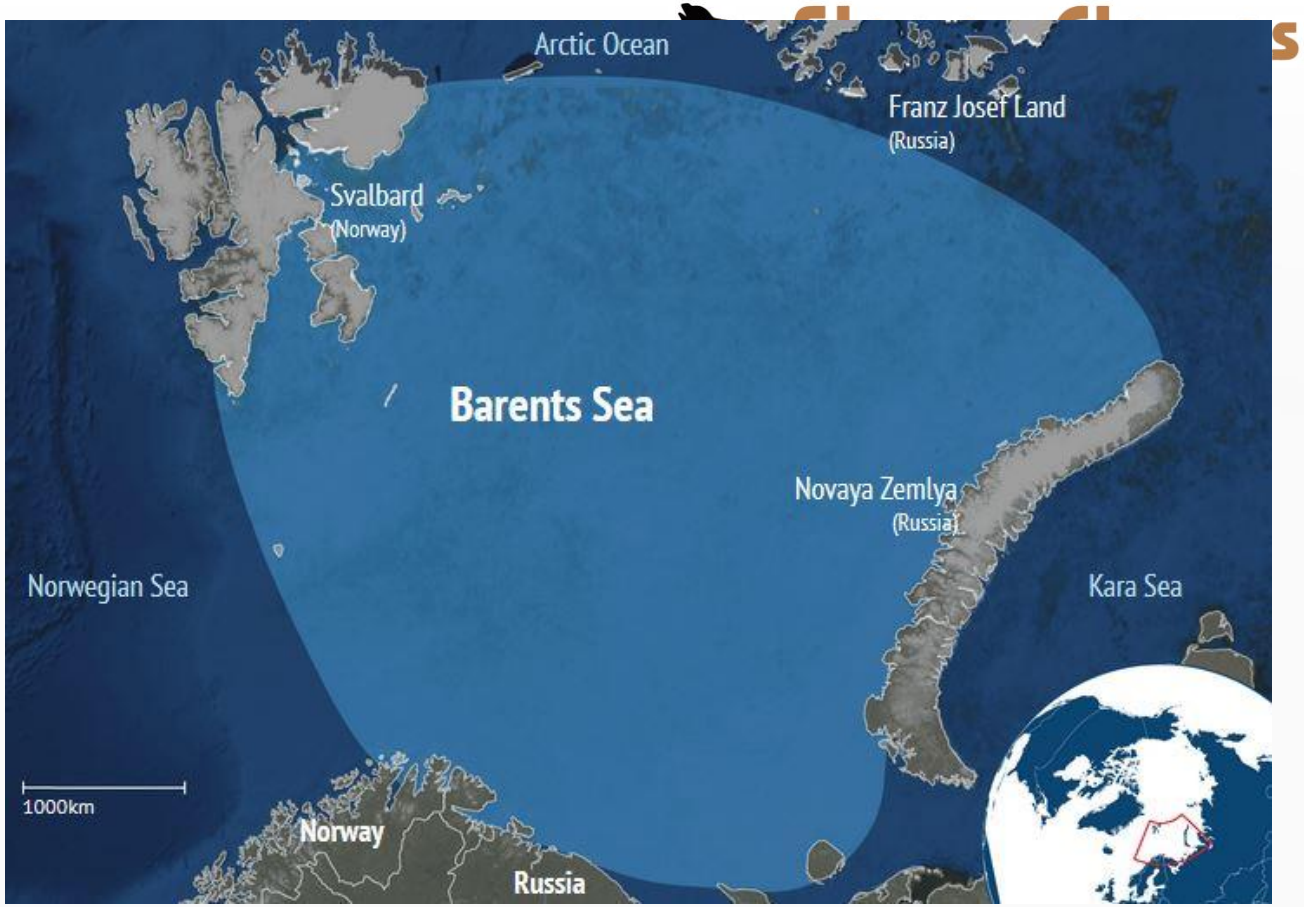
- **Streams of warmer water from the Atlantic Ocean flow into the Arctic at the Barents Sea.**
- This warmer, saltier Atlantic water is usually fairly deep under the more buoyant Arctic water at the surface.
- Lately, however, the Atlantic water has been creeping up. That heat in the Atlantic water is helping to keep ice from forming and melting existing sea ice from below.
- It's a process called "**Atlantification**".
- The ice is now getting hit both from the top by a warming atmosphere and at the bottom by a warming ocean. It's a real double whammy.
- **Note** – Sea Ice + Cool Freshwater + Saltier Water

- In the background of all of this is **global climate change.**
- The Arctic sea **ice extent and thickness have been dropping for decades as global temperatures rise**.
- **As the Arctic loses ice and the ocean absorbs more solar radiation, global warming is amplified.**
- That affects ocean circulation, weather patterns and Arctic ecosystems spanning the food chain, from phytoplankton all the way to top predators.


60°
30°
0°
30°
60°
Alaska
N. Pacific
California
North Equatorial
Equatorial Counter
South Equatorial
Peru
South Pacific
Antarctic Circumpolar
Antarctic Subpolar
Labrador
E. Greenland
Norwegian
N.Atlantic Drift
Gulf Stream
Canary
N.Equatorial
Equatorial Counter
S. Equatorial
Brazil
Benguela
South Atlantic
Antarctic Subpolar
Aguilhas
Mozambique
Oyashio
N. Pacific
Kuroshio
N.Equatorial
Equatorial Counter
South Equatorial
W.Australia
South Indian
Antarctic Circumpolar
N.Equatorial
E.Australia
Robinson Projection
Warm Current
Cold Current


Atlantic domain
Arctic domain
Frontier region
Interior Arctic domain
Warmer air, lower pressure
Cold air, high pressure
Heat loss
Seasonal ice cover
Ice flux
Perennial ice cover
Melt water
Front
Intermediate Arctic layer
Upper AW flow
Deep Atlantic layer
Deeper AW flow


GREENLAND
Arctic Ocean
Franz Josef Land
(Russia)
Svalbard
(Norway)
Greenland
Sea
Novaya
Zemlya
Jan Mayen
Barents
Sea
Kara
Sea
Bear Island
Norwegian
Sea
Murmansk
White
Sea
SWEDEN
Archangel'sk
FINLAND
NORWAY
RUSSIA
North
Sea
Baltic
Sea
St. Petersburg
ESTONIA
DENMARK
LATVIA
LITHUANIA
Moscow
GERMANY
POLAND
NORTH
0 200 400 600 800
Kilometres


Arctic Ocean
Franz Josef Land
(Russia)
Svalbard
(Norway)
Barents Sea
Novaya Zemlya
(Russia)
Norwegian Sea
Kara Sea
1000km
Norway
Russia

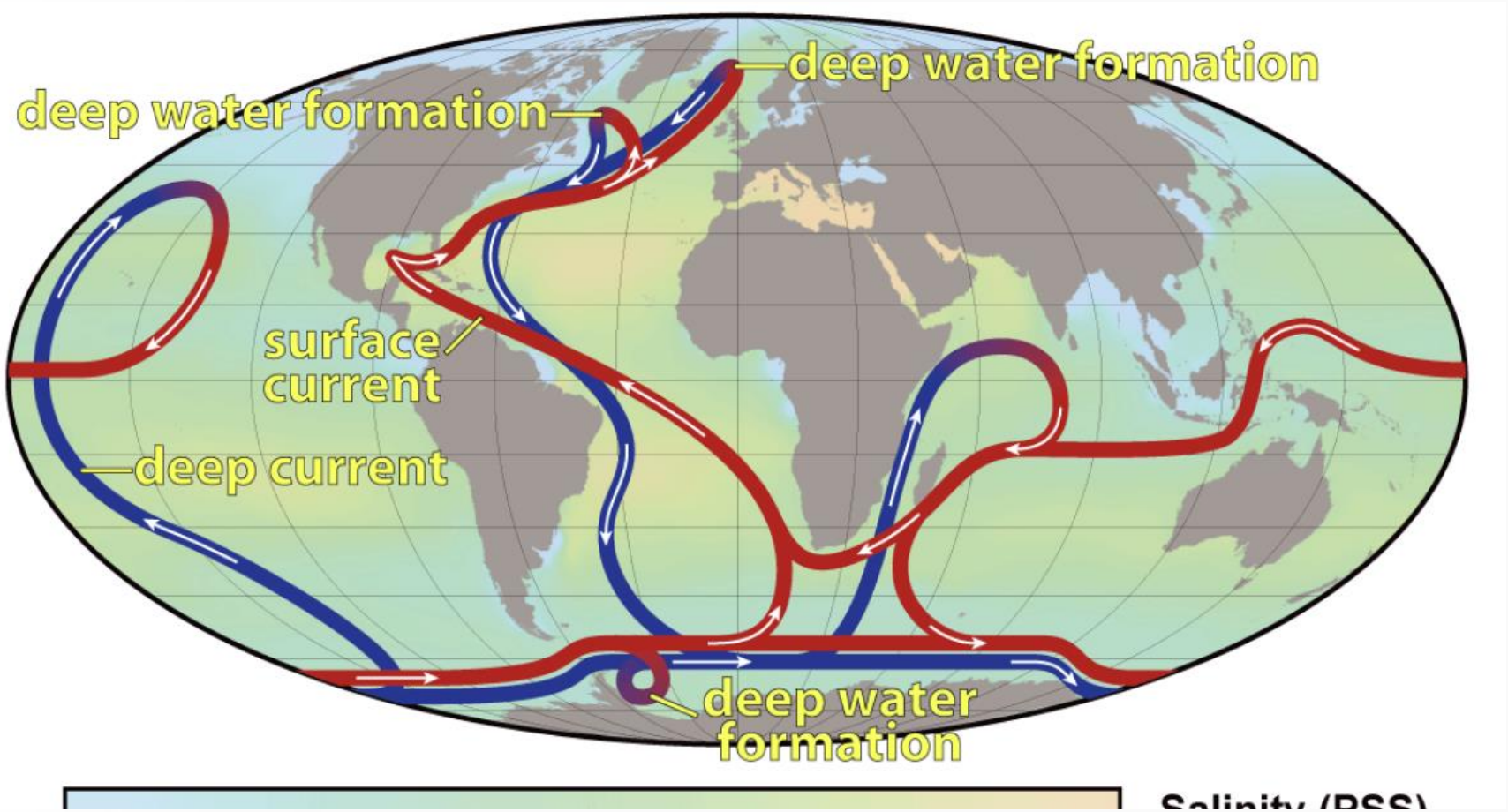
Arctic Amplification

- Atmosphere's net radiation balance is affected by an increase in greenhouse gases.
- More pronounced at the northern latitudes

Impact :

- Thining of Greenland Ice Sheet
- Rise in Sea Level
- Impact on Biodiversity – AMOC

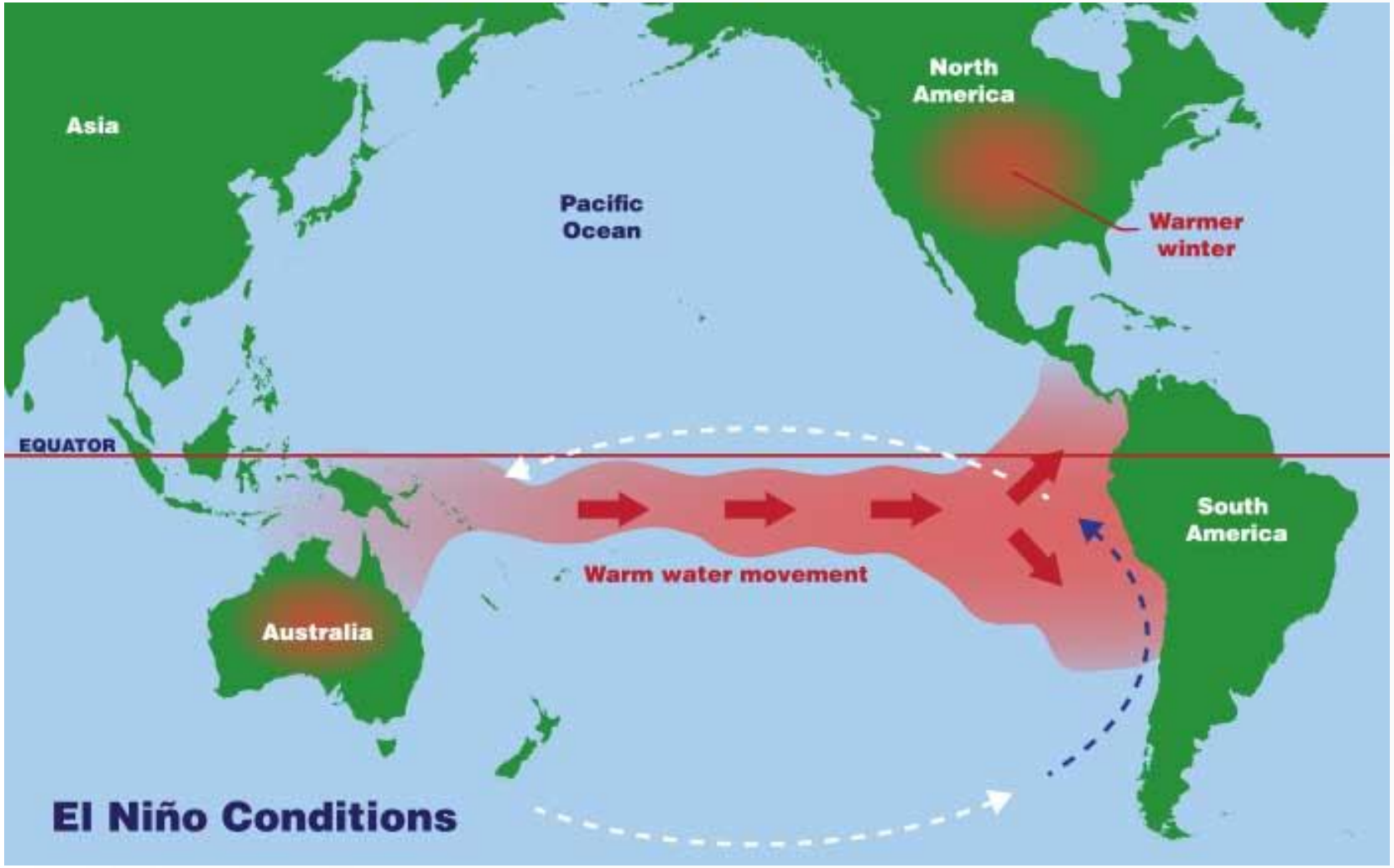
AMOC- AMOC stands for Atlantic Meridional Overturning Circulation. The AMOC circulates water from north to south and back in a long cycle within the Atlantic Ocean.



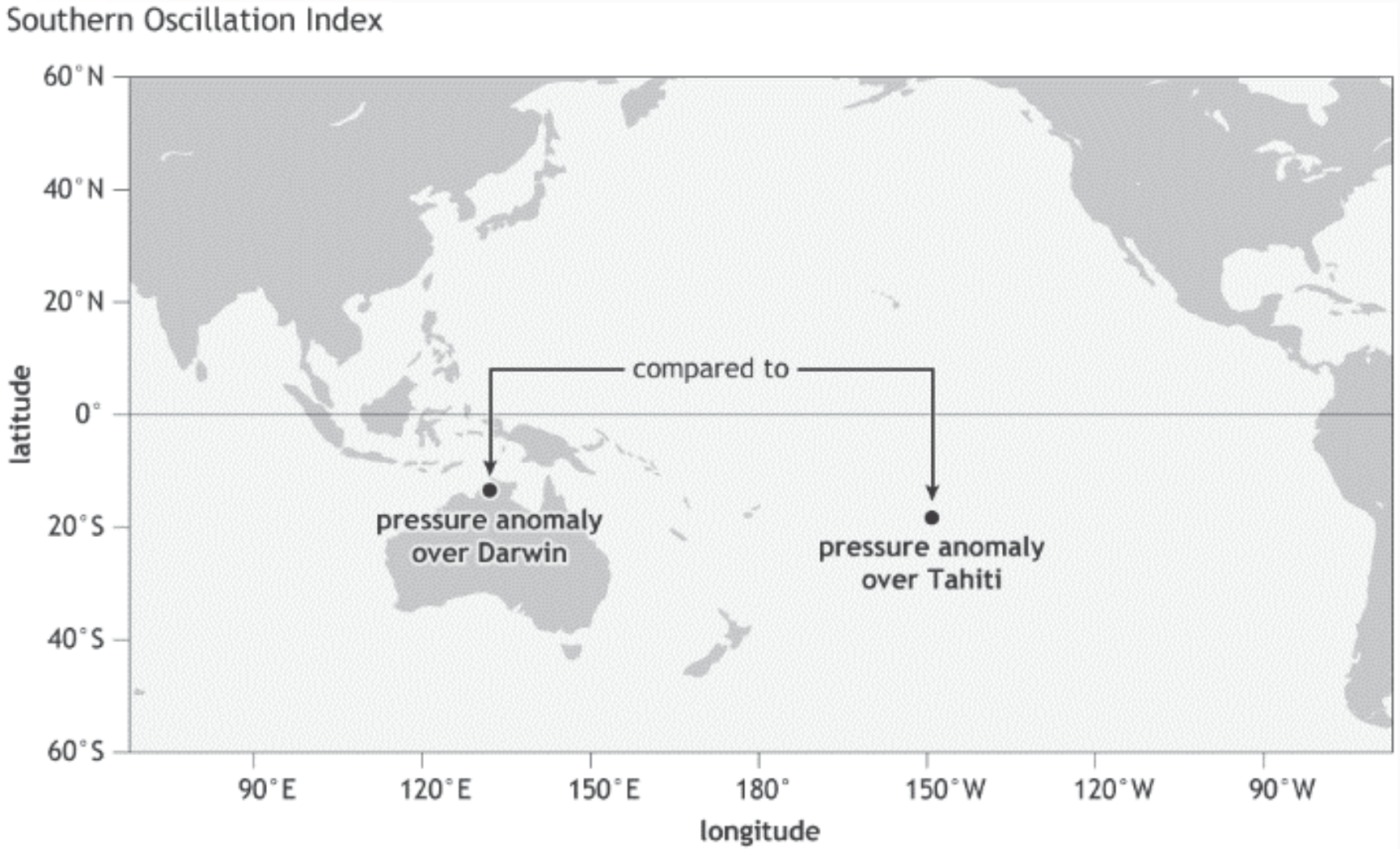
Oceanic Nino Index

- National Oceanic and Atmospheric Administration's (NOAA) primary indicator **for monitoring the ocean part of the seasonal climate pattern called the El Niño-Southern Oscillation, or "ENSO".**
- The ONI tracks the running **3-month average sea surface temperatures in the east-central tropical Pacific between 120°-170°W, near the International Dateline, and whether they are warmer or cooler than average.**
- Index values of +0.5 or higher indicate El Niño and values of -0.5 or lower indicate La Niña.

EL - Nino



REVISE - Southern Oscillation



Zombie Fire

- **Fire from a previous growing season that can smoulder under the ground which is made up of carbon-rich peat**
- Zombie fires mainly originate in the **cool boreal conifer forests found in Canada, Alaska, Northern Europe, or Siberia**, where the ground is covered with a thick layer of needles and other vegetation that burns easily.
- The **soils in these regions are also often very peaty**.

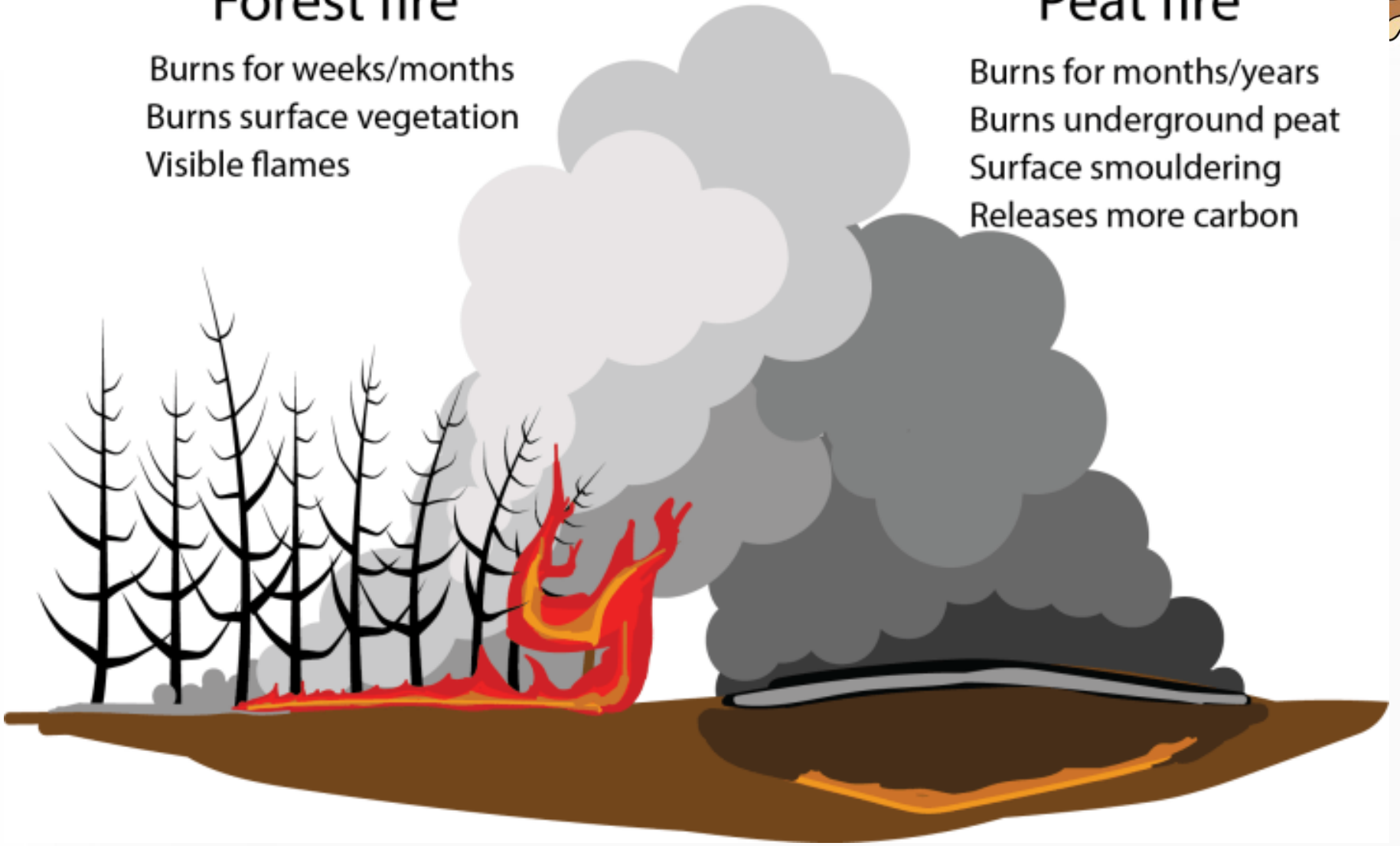
Sleepy Classes
Awakening Toppers

Forest fire

Burns for weeks/months
Burns surface vegetation
Visible flames

Peat fire

Burns for months/years
Burns underground peat
Surface smouldering
Releases more carbon



Zombie Ice

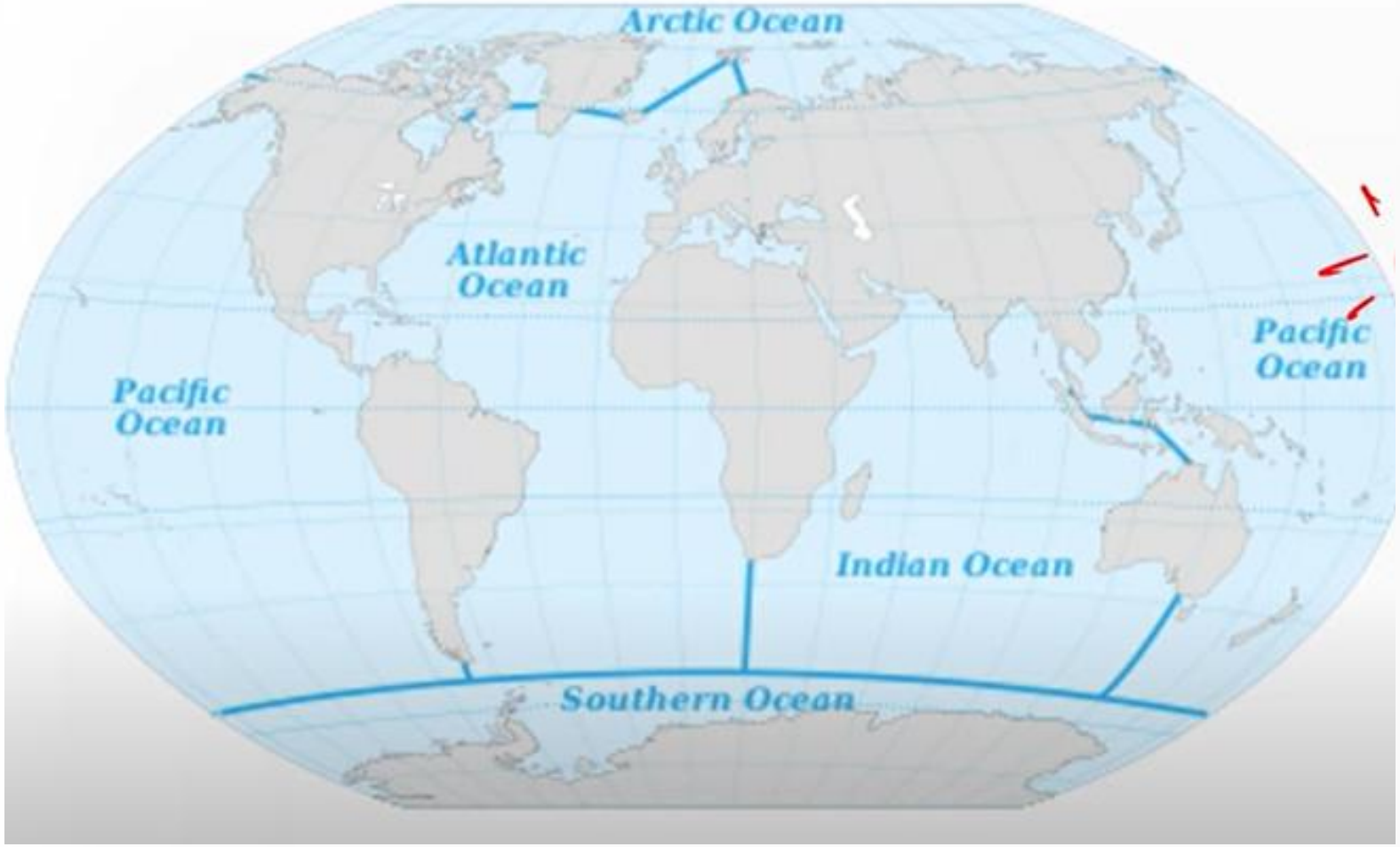
Sleepy Classes
Awakening Toppers

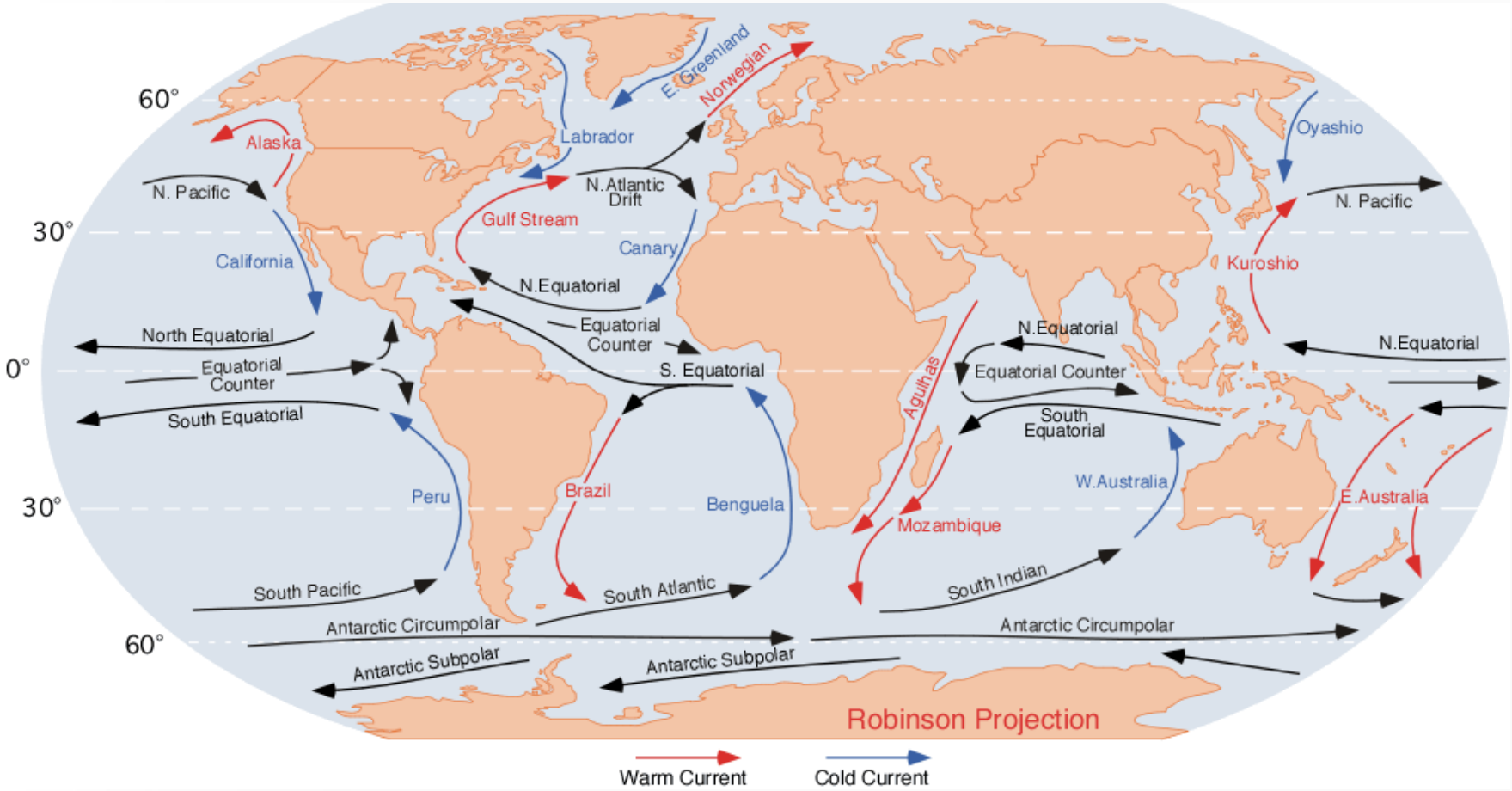
- Zombie ice is **one that is not accumulating fresh snow even while continuing to be part of the parent ice sheet.** .

Tropicalisation and Borealisation

Tropicalisation

- Rising sea temperatures due to climate change are causing tropical marine species to move from the equator towards the poles, according to a study.
- This mass movement of marine life, termed tropicalisation, is changing the ecological landscape of our oceans and leading to a cascade of consequences for ecosystems, biodiversity, and potentially the global economy.


Arctic Ocean
Atlantic Ocean
Pacific Ocean
Pacific Ocean
Indian Ocean
Southern Ocean


60°
30°
0°
30°
60°
Alaska
N. Pacific
California
North Equatorial
Equatorial Counter
South Equatorial
Peru
South Pacific
Antarctic Circumpolar
Antarctic Subpolar
Labrador
E. Greenland
Norwegian
N. Atlantic Drift
Gulf Stream
Canary
N.Equatorial
Equatorial Counter
S. Equatorial
Brazil
South Atlantic
Benguela
Agulhas
Mozambique
South Indian
Antarctic Circumpolar
Antarctic Subpolar
Oyashio
N. Pacific
Kuroshio
N.Equatorial
Equatorial Counter
South Equatorial
W.Australia
E.Australia
N.Equatorial
Robinson Projection
Warm Current
Cold Current

Points to Know :

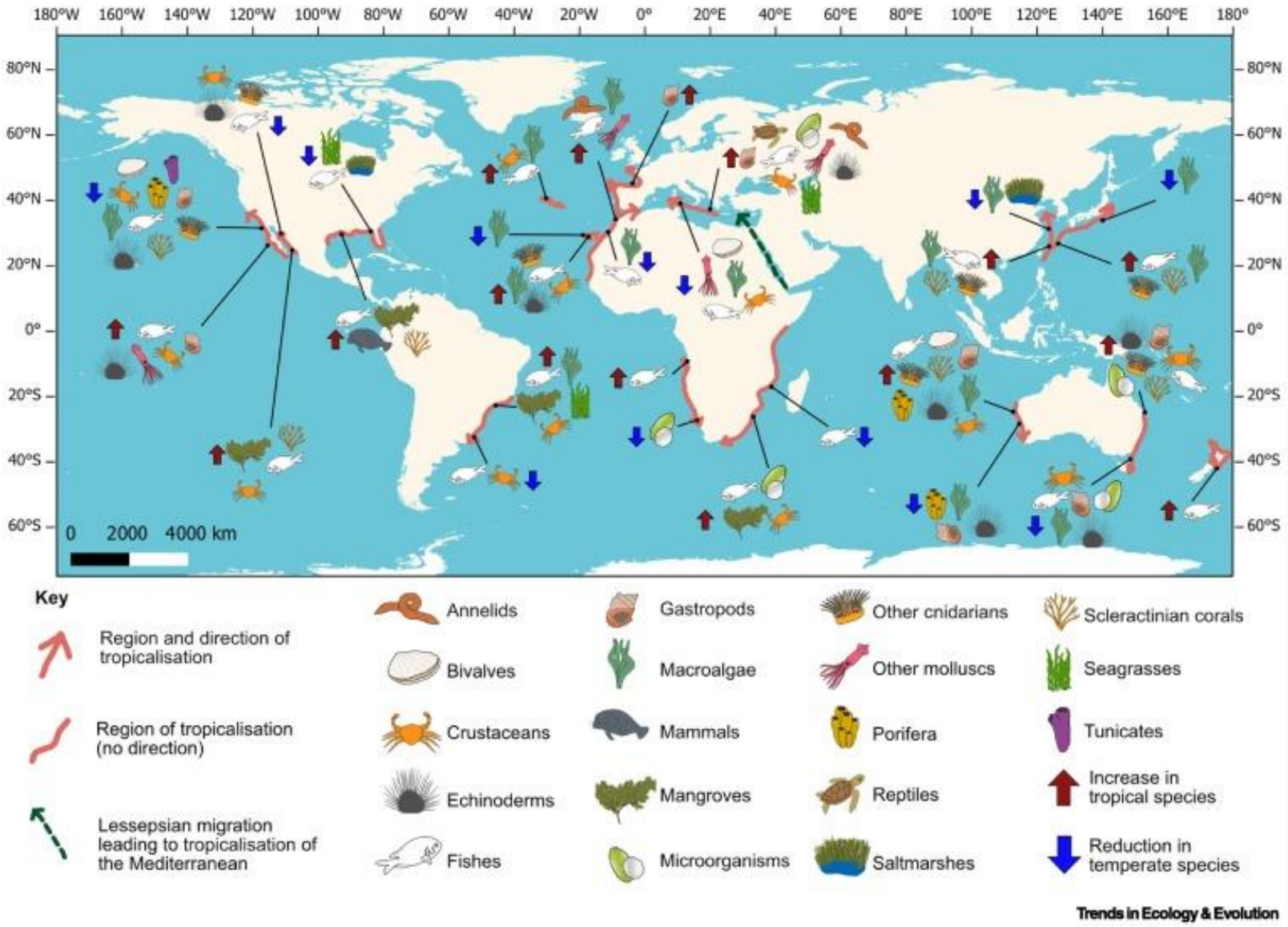
- The first instance of this process was identified in the **Mediterranean Sea.**

- The Mediterranean Sea is considered as a "**tropicalisation hotspot" due to an increase in tropical species.**

Points to Know :

- **Borealisation** – The expansion of temperate species into Arctic Polar regions has been called Borealisation .

- In contrast to tropicalisation , **borealisation , applies to both marine and terrestrial ecosystems.**



Latitudinal Diversity Gradient (LDG)

- pattern of having **lots of species at the equator with diversity reducing towards poles** .

Note -

Why more biodiversity in Tropics ?

- Niche Specialisation- Conditions + habitat – Less seasonal + Predictable
- Tropical Biodiversity – **Time** – Glaciation + Ice Age - Speciation
- Solar Energy – Higher Productivity + Speciation - formation of new species in millions of years

Humbold's Enigma

- Alexander von Humboldt - **mountain regions generally display higher diversity than tropical regions .**
- Tropical areas **receive more solar energy, fostering greater primary productivity and biodiversity due to the availability of ecological niches.**
- **Mountain Exception**: Mountains, despite being outside the tropics, have been an exception to the rule, posing Humboldt's enigma- **Ex - Western Ghats**

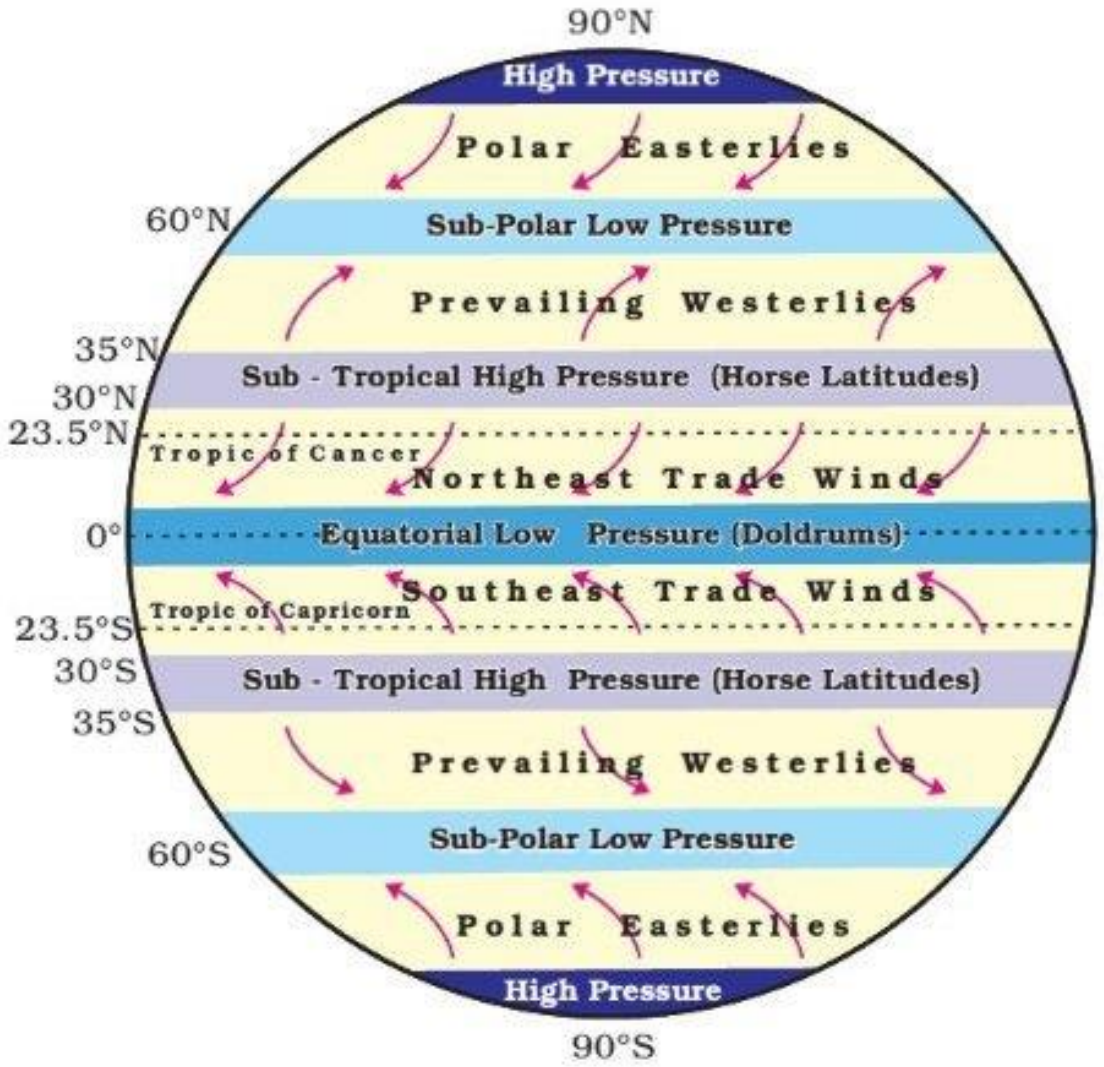
Note – Geology uplift leading to mountains – new habitat- (CRADLE) + Climatological Stable Mountains –(MUSEUMS).

Ex – Mountains surrounded by lowlands – Sky Islands - Sholas

Southern Annular Mode (SAM)

- It is the **north-south movement of Southern Westerly Winds** over timescales of 10s to 100s of years - **Antarctic Oscillation .**
- Continuously in the mid- to high-latitudes of the southern hemisphere

- **Positive SAM** - Shift South
- **Negative SAM** - further north than Usual



Major Pressure Belts and Wind System


H

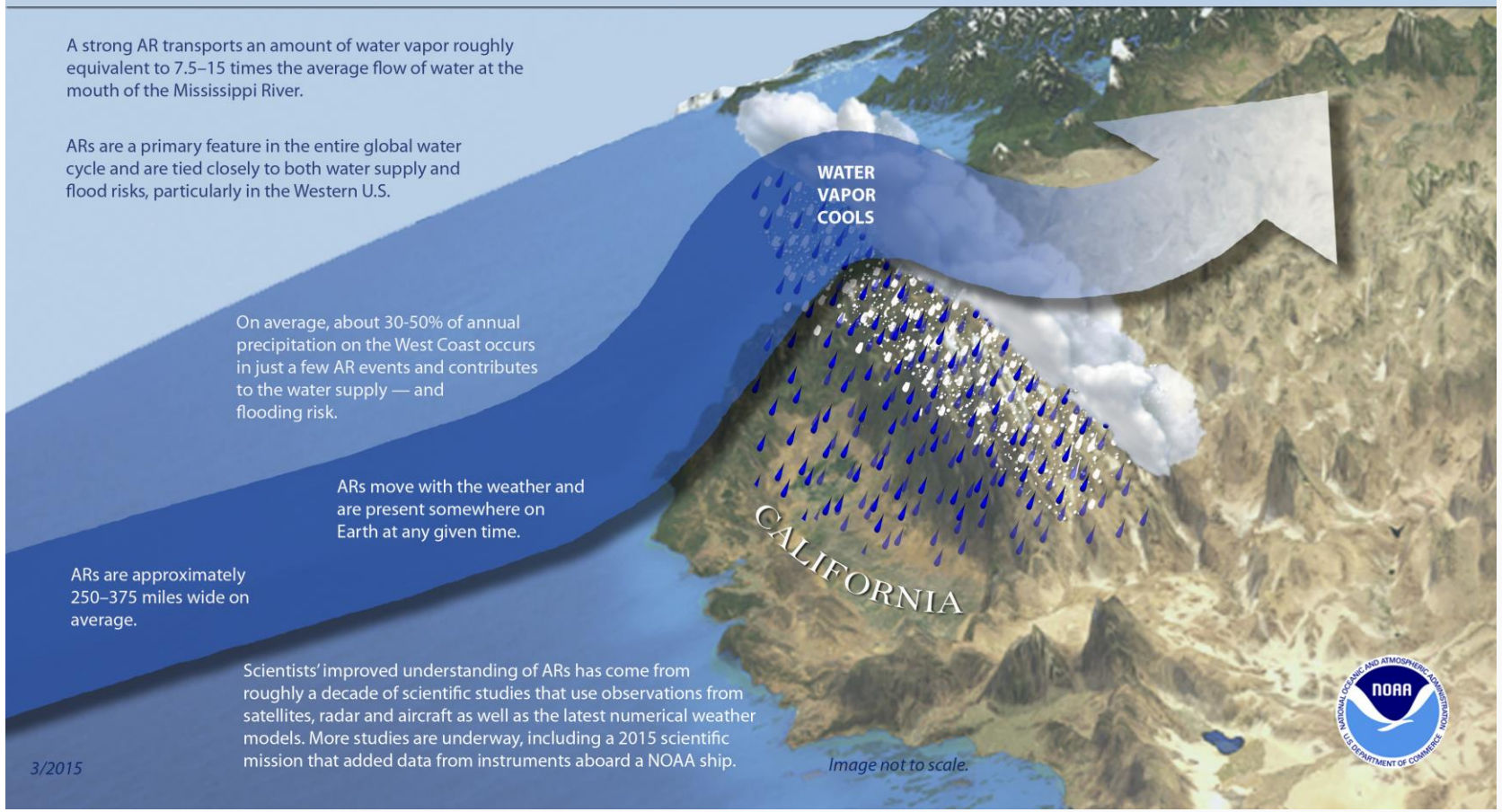

WEATHERWATCH.CO.NZ™
New Zealand's Weather News Authority
S30°
ROARING FORTIES
E130°
S50°
E150°
E110°
E170°
FURIOUS FIFTIES
E 90°
W170°
SCREAMING SIXTIES
W150°

Atmospheric River – Pineapple Express

- Long, narrow band of moisture-filled air that transports significant amounts of water vapor from the tropics to higher latitudes.
- Earth's tropics near equator to Poles .
- Pineapple Express - US West Coast, particularly California.

The science behind atmospheric rivers

An atmospheric river (AR) is a flowing column of condensed water vapor in the atmosphere responsible for producing significant levels of rain and snow, especially in the Western United States. When ARs move inland and sweep over the mountains, the water vapor rises and cools to create heavy precipitation. Though many ARs are weak systems that simply provide beneficial rain or snow, some of the larger, more powerful ARs can create extreme rainfall and floods capable of disrupting travel, inducing mudslides and causing catastrophic damage to life and property. Visit www.research.noaa.gov to learn more.



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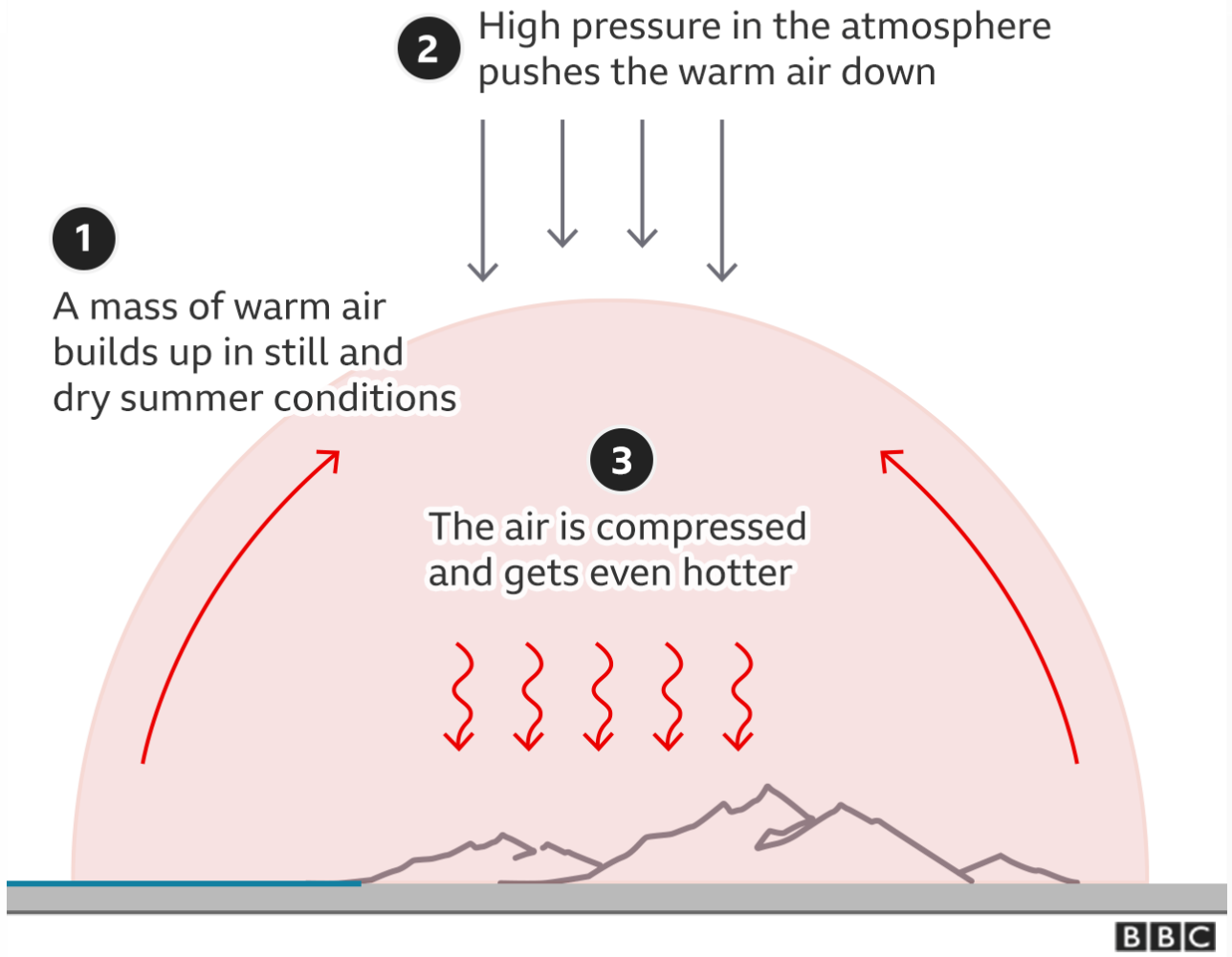
Marine Heatwaves

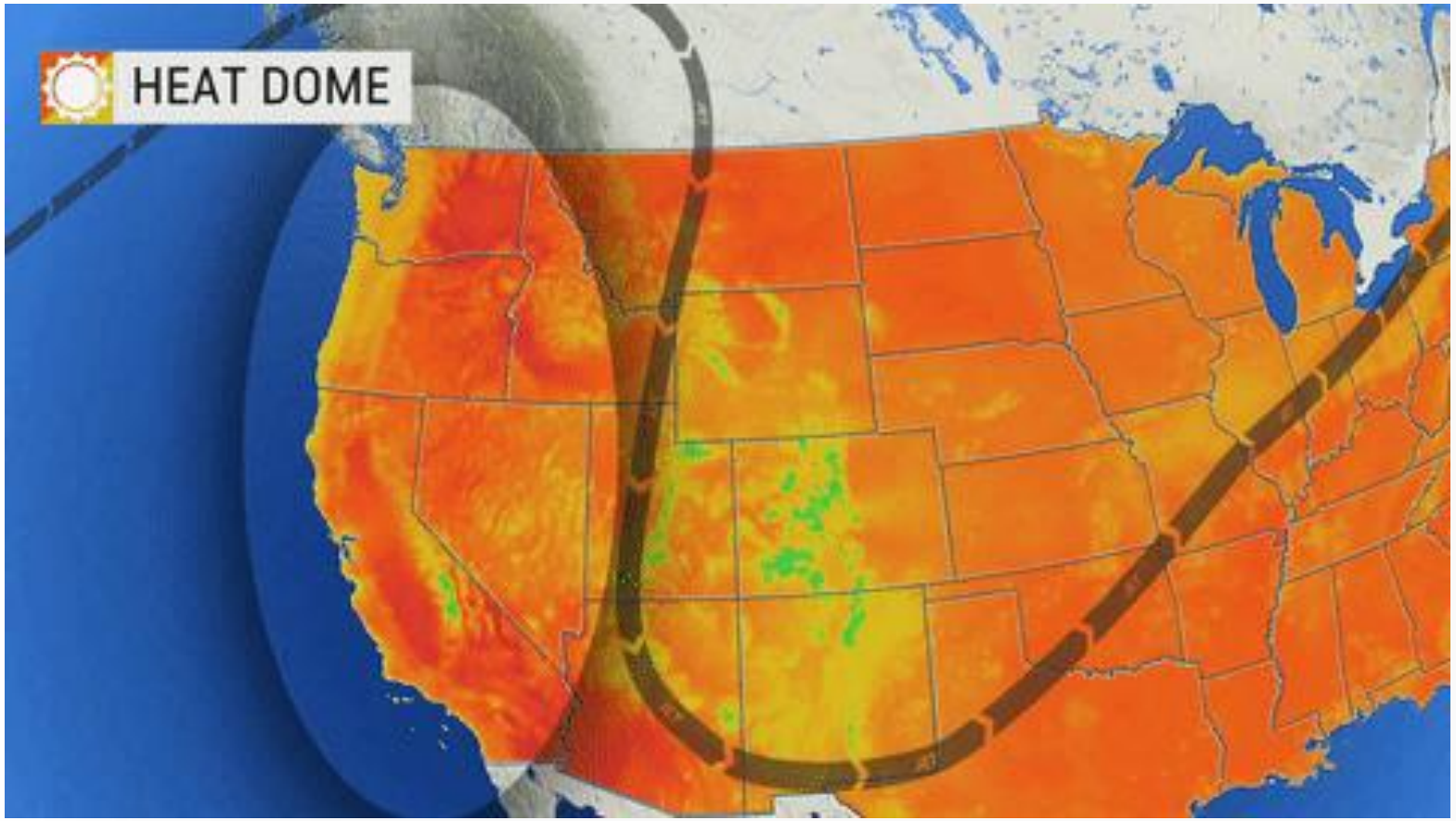
- Period of **unusually high ocean temperatures and is defined by its duration and intensity**.
- Sea surface temperature Deviations from average sea surface temperature - temperature anomalies.
- It occurs when the **surface temperature of a particular region of the sea rises to 3 or 4 degree Celsius above the average temperature for at least five days.**

Heat Dome

- **Area of high-pressure traps warm air over a region -** for an extended period of time.
- The **longer that air remains trapped -** producing warmer conditions with every passing day.

How a heat dome forms




HEAT DOME

Soda Lakes

- A soda lake or alkaline lake is a lake on the **strongly alkaline side of neutrality, typically with a pH value between 9 and 12**
- High carbonate concentration, especially sodium carbonate, is responsible for the alkalinity of the water
- Africa and Asia have the highest number of soda lakes since the two continents have vast desert conditions which are perfect for the formation of soda lakes.
- Most of the soda lakes in Africa are located in Eastern Africa, especially in Kenya, Tanzania, and Ethiopia **+ India and China have the highest number of soda lakes in Asia**

- **Note - A shallow, salty lake in western Canada gives new support to Charles Darwin's idea that life could have emerged in a 'warm little pond.**

Volcanic Vortex Rings

- Gas, predominantly water vapour, is released rapidly through a vent in the crater.
- Vent that has opened up in volcano's crater is almost perfectly circular, so the rings that have been seen are also circular.
- **Note -** Mount Etna

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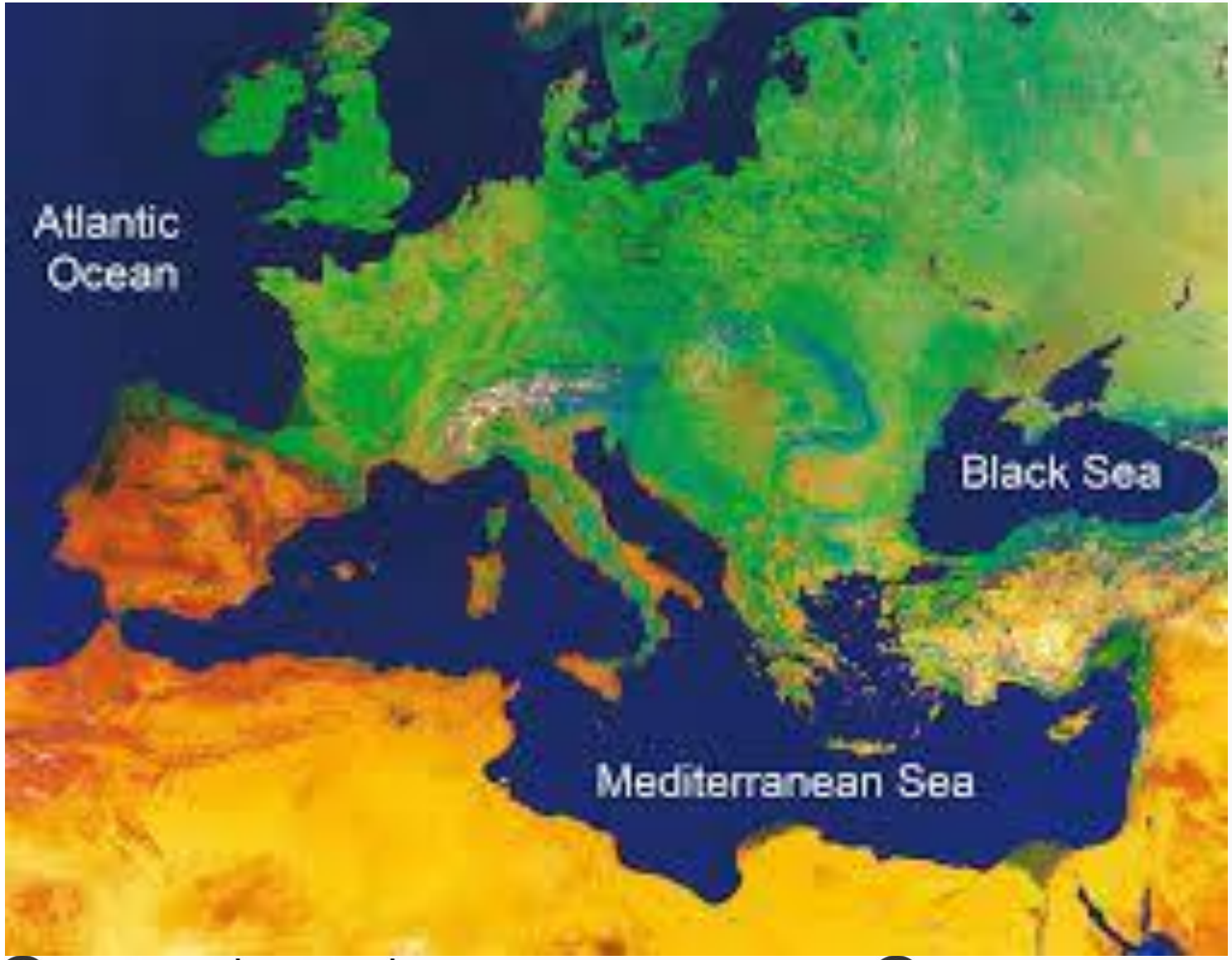
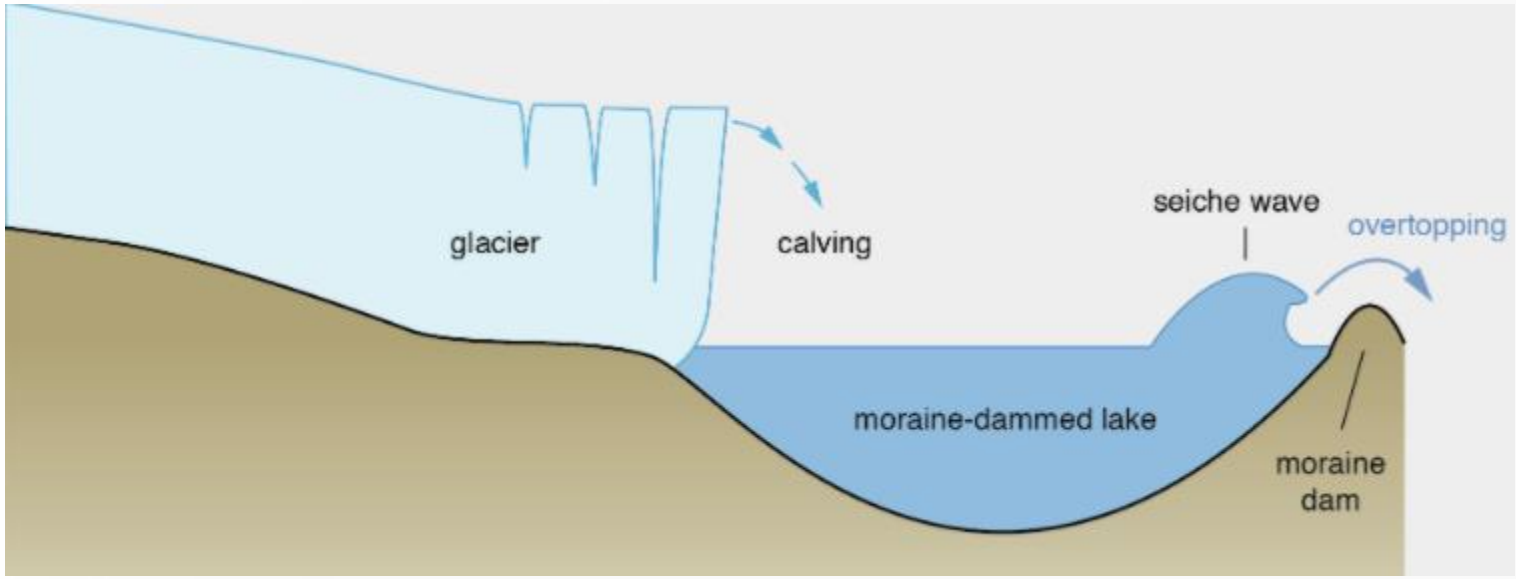
Messinian Events

- Messinian Salinity Crisis (MSC), the Messinian event was a geological event during which the **Mediterranean Sea went into a cycle of partial or nearly complete desiccation (drying up).**
- It was one of the most severe ecological crises in the Earth's history.


Atlantic Ocean
Black Sea
Mediterranean Sea

GLOF in Sikkim



GLOF in Sikkim

Waiting to Happen! What was the Trigger?

As South Lhonak glacier continued to retreat amid global warming by another 400 m between 2008 and 2019, lakes only grew

Glacial lake outburst flood (Glof) like disaster was waiting to happen

Trigger could be anything from cloudburst to landslide, avalanche or earthquake

Mitigation Steps

First field expedition of glacial lake conducted in August 2014, followed by another in 2016 which resulted in a project to start siphoning off lake water

Three pipelines were installed to siphon off 150 mlitres of water per second at that time

Early warning system was set in place in some locations by Centre for Development of Advanced Computing

Central Water Commission initiated an advisory to evaluate the South Lhonak glacier

Himalayan Problem

Problem of receding glaciers and the spectre of Glof devastation faces the entire Himalayan region as global warming provides new triggers in the young mountain ranges

Add to that the build- up of infrastructure, habitation, road networks and hydropower plants

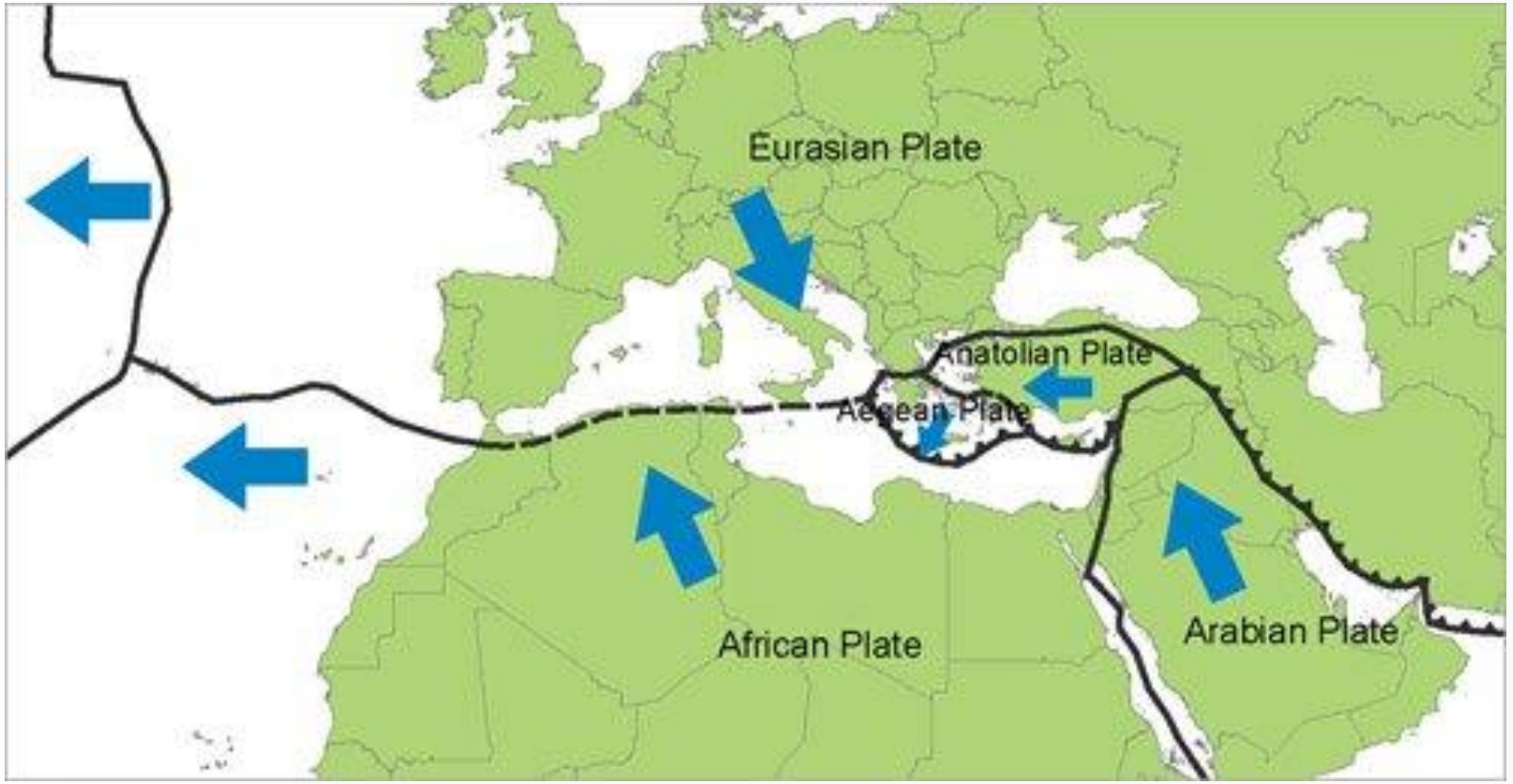
A 2021 study warned that 'both the existing and planned hydropower plants are exposed to potential outburst floods from glacial lakes'

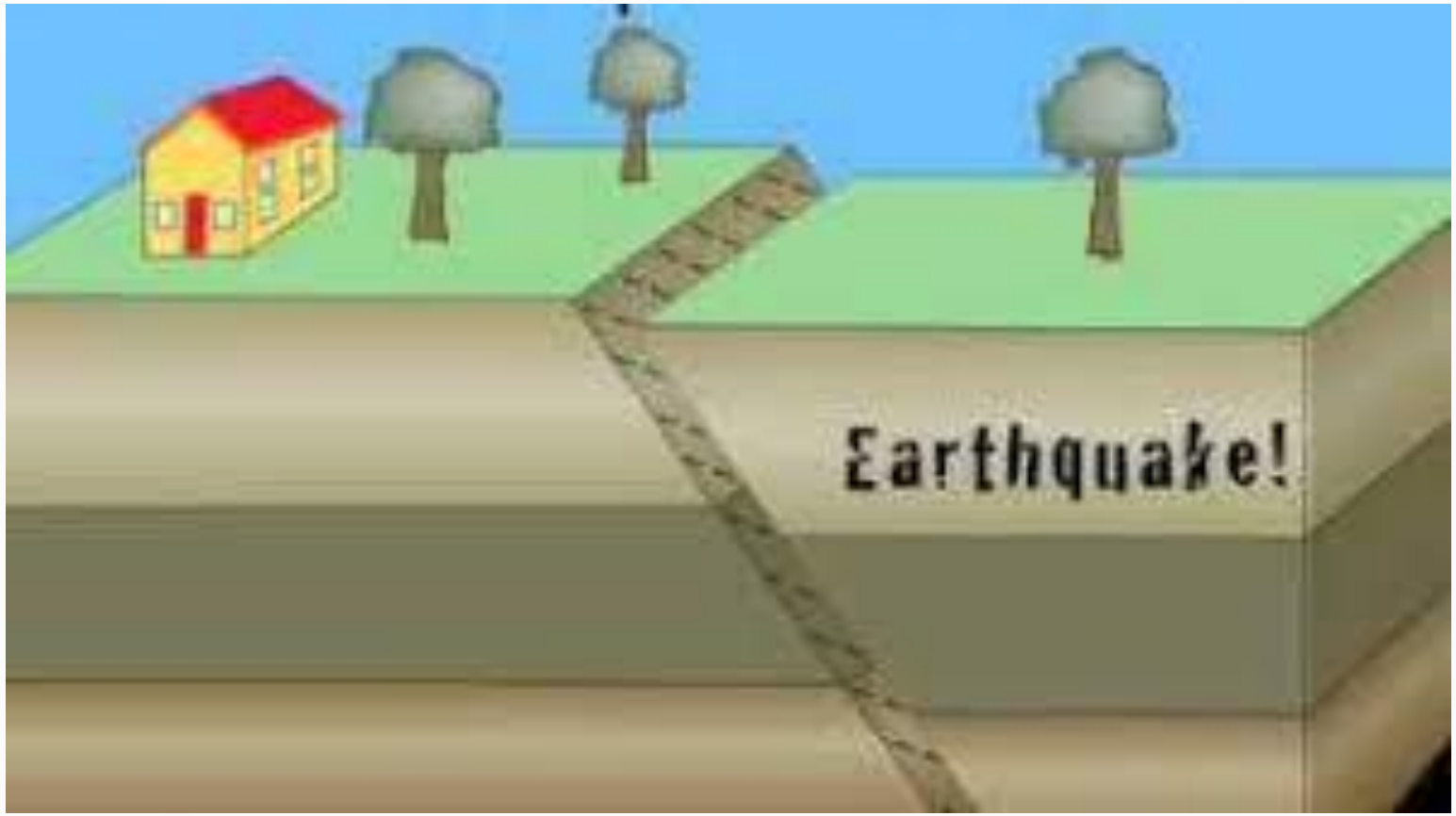
GLOF in Sikkim

- South Lhonak Lake, a glacial lake - **experienced a rupture as a result of continuous rainfall.**
- Causing flooding in the **Teesta River**
- **Chungthang Hydro-Dam in Sikkim to breach**

Morocco Earthquake

- **African plate and the Eurasian plate**.
- "oblique-reverse," indicating movement along the fault plane where the **upper block moves up and over the lower block within the Moroccan High Atlas Mountain range.**


Eurasian Plate
Anatolian Plate
Aegean Plate
African Plate
Arabian Plate


Earthquake!

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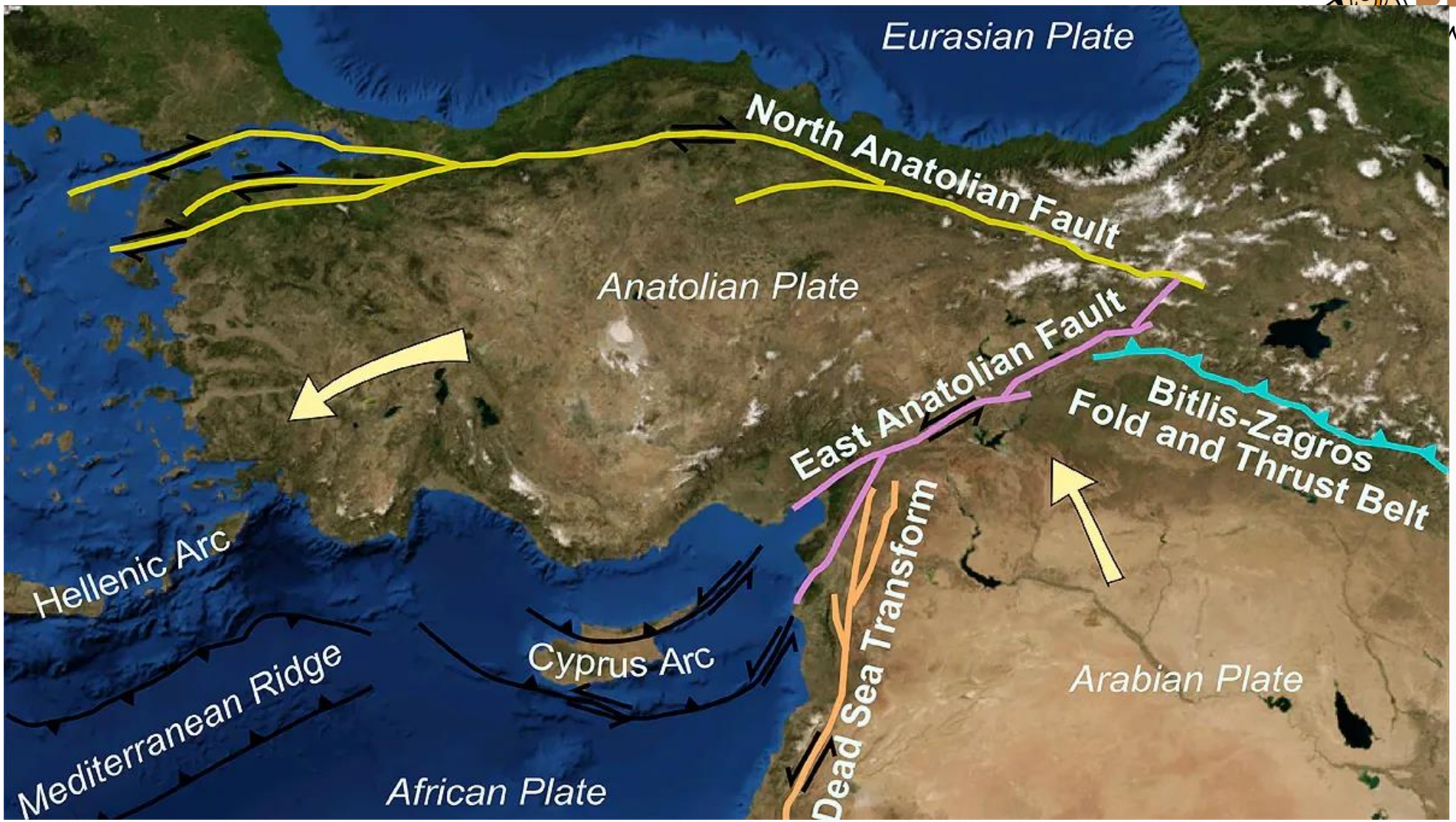
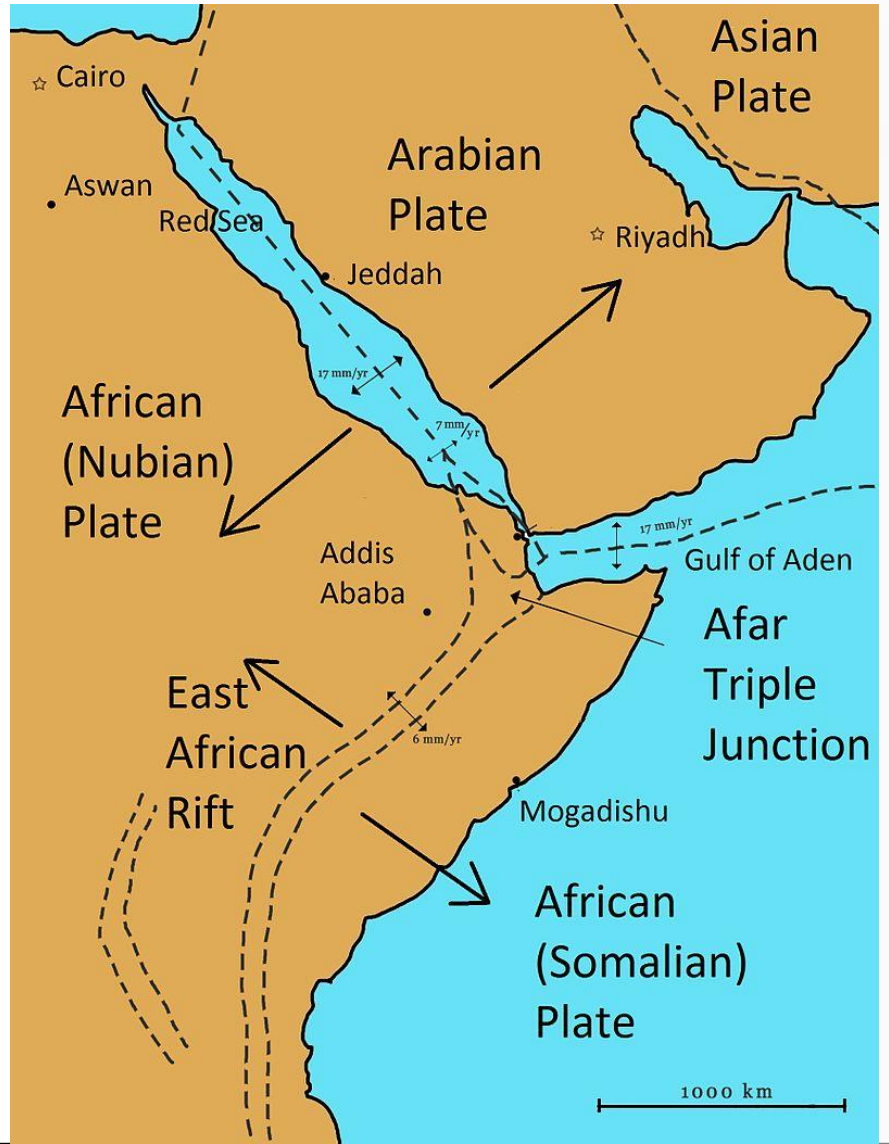
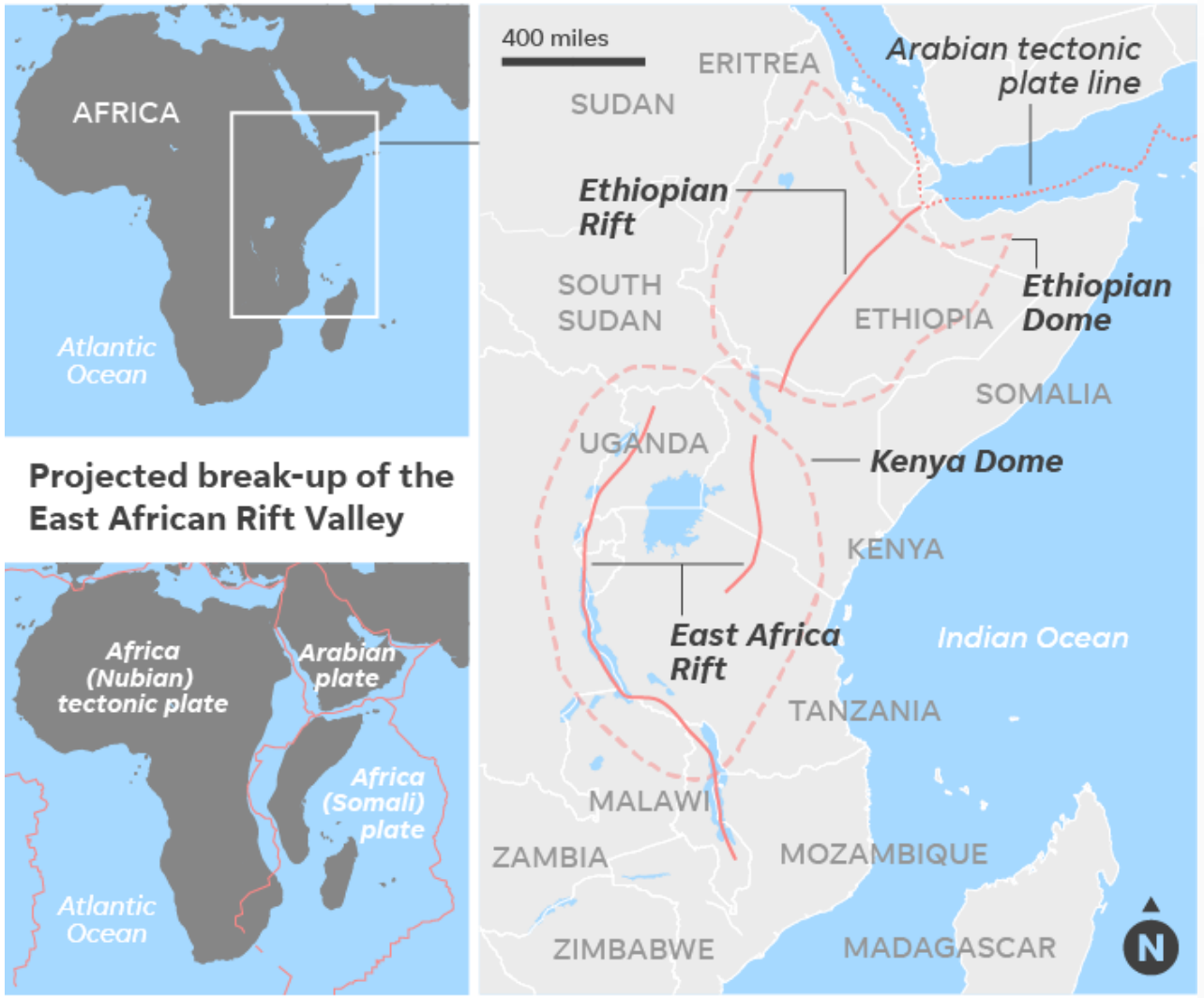
Turkey Earthquake


Eurasian Plate
North Anatolian Fault
Anatolian Plate
East Anatolian Fault
Bitlis-Zagros
Fold and Thrust Belt
Hellenic Arc
Cyprus Arc
Mediterranean Ridge
Dead Sea Transform
Arabian Plate
African Plate

A study revealed that the gradual separation of the African continent is leading to the formation of a new ocean basin.



The East African Rift System



Projected break-up of the East African Rift Valley

SOURCE NASA; geology.com

Plate Tectonics- Case of Japan

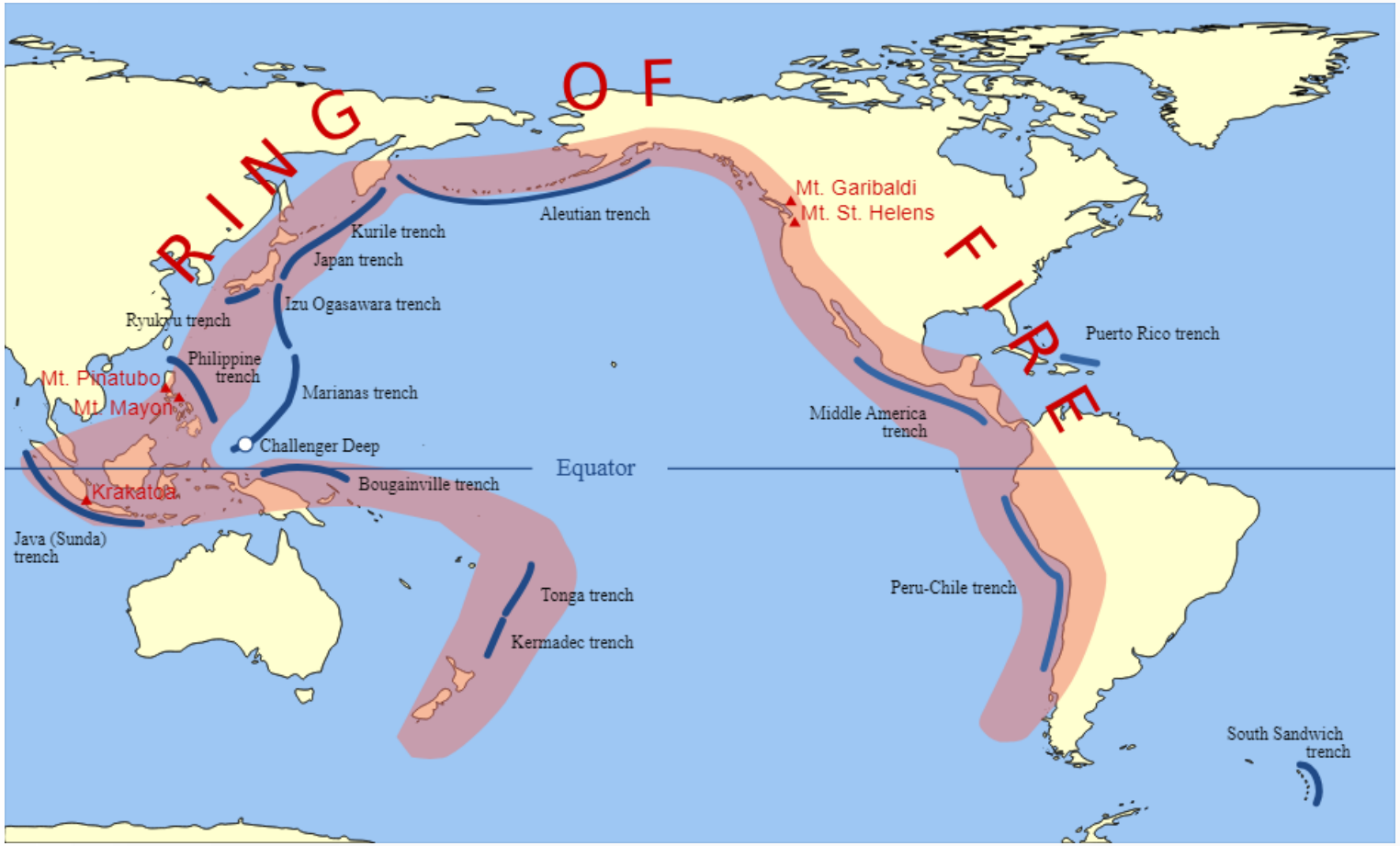


Plate Tectonics- Case of Japan

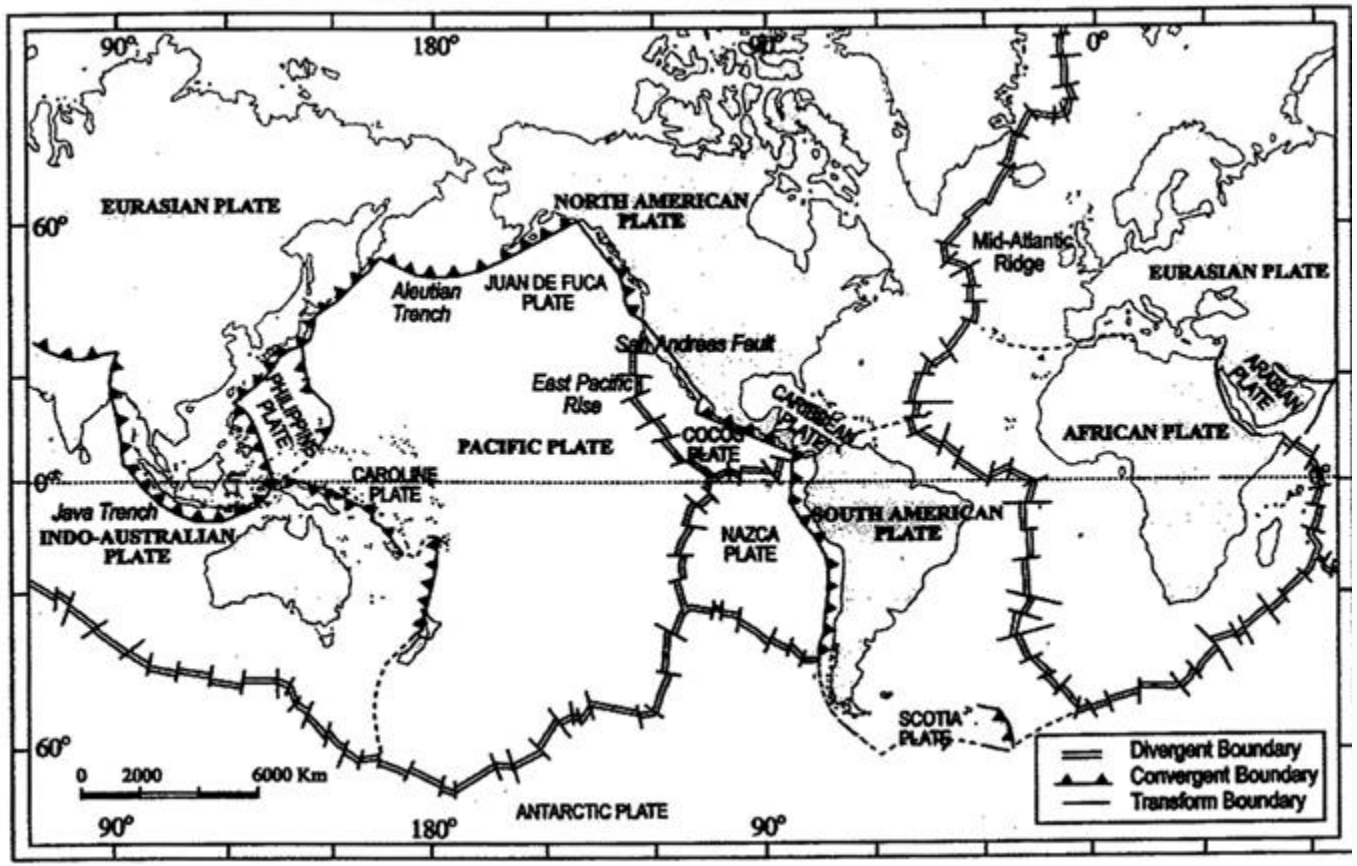
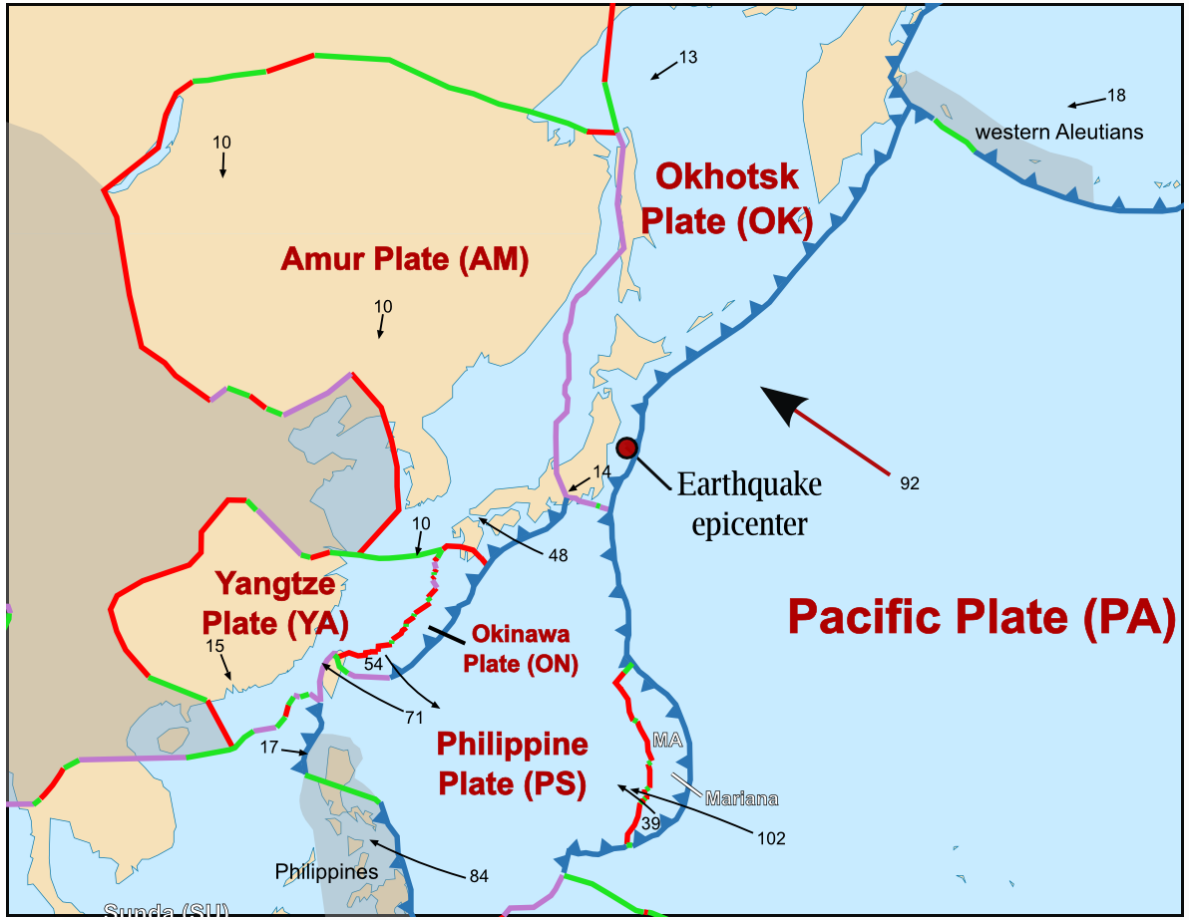
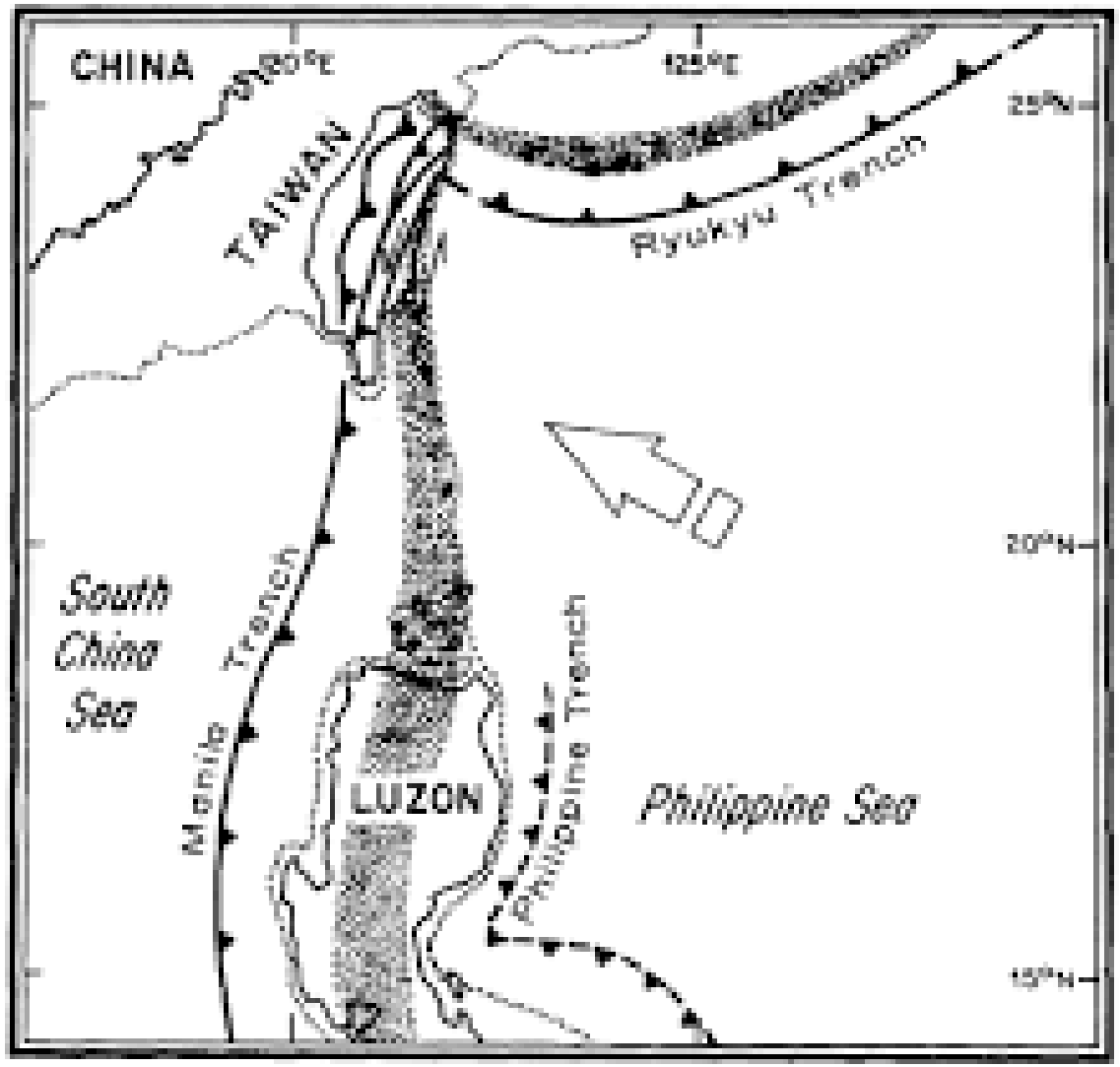


Plate Tectonics- Case of Japan



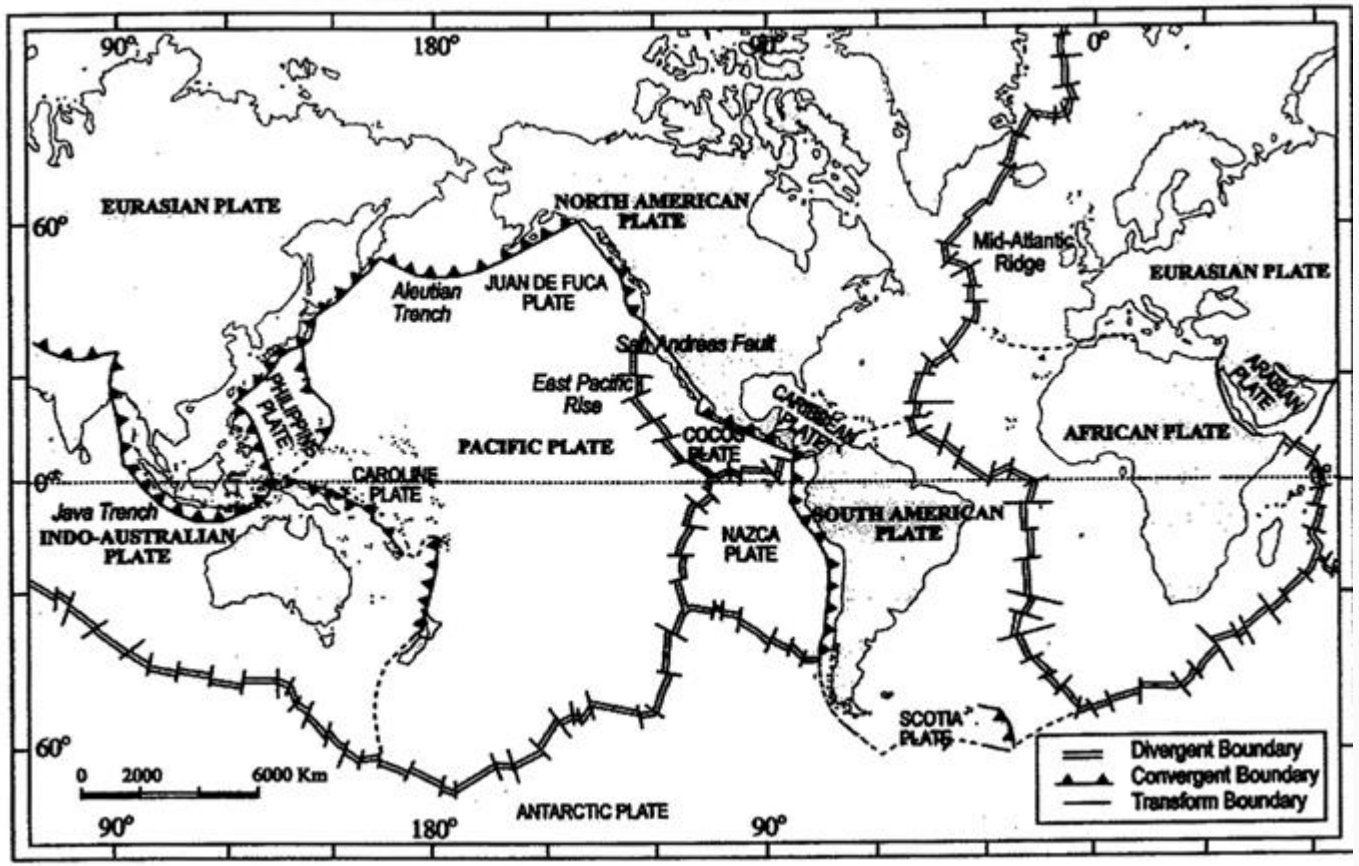
Taiwan Earthquake

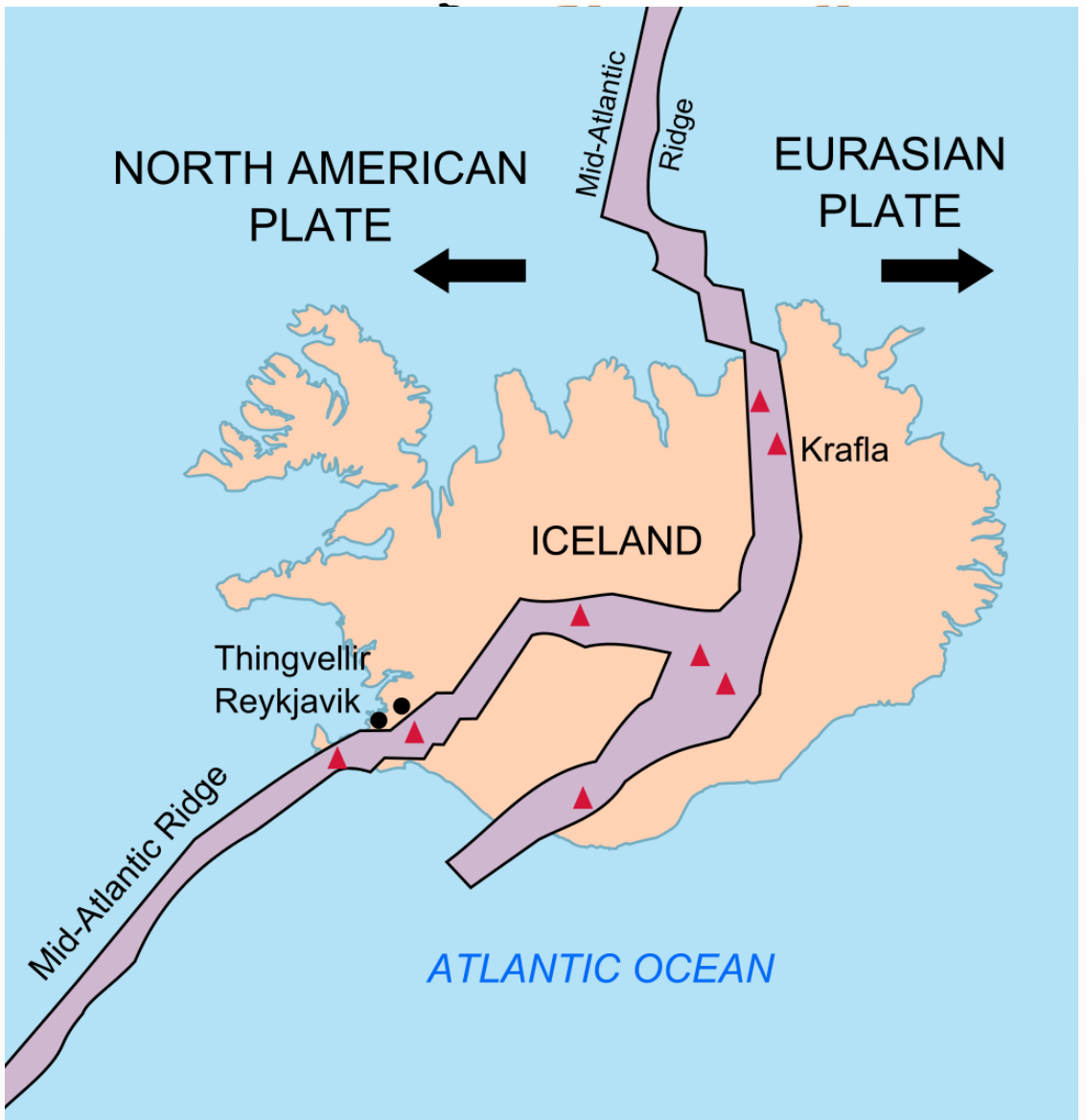


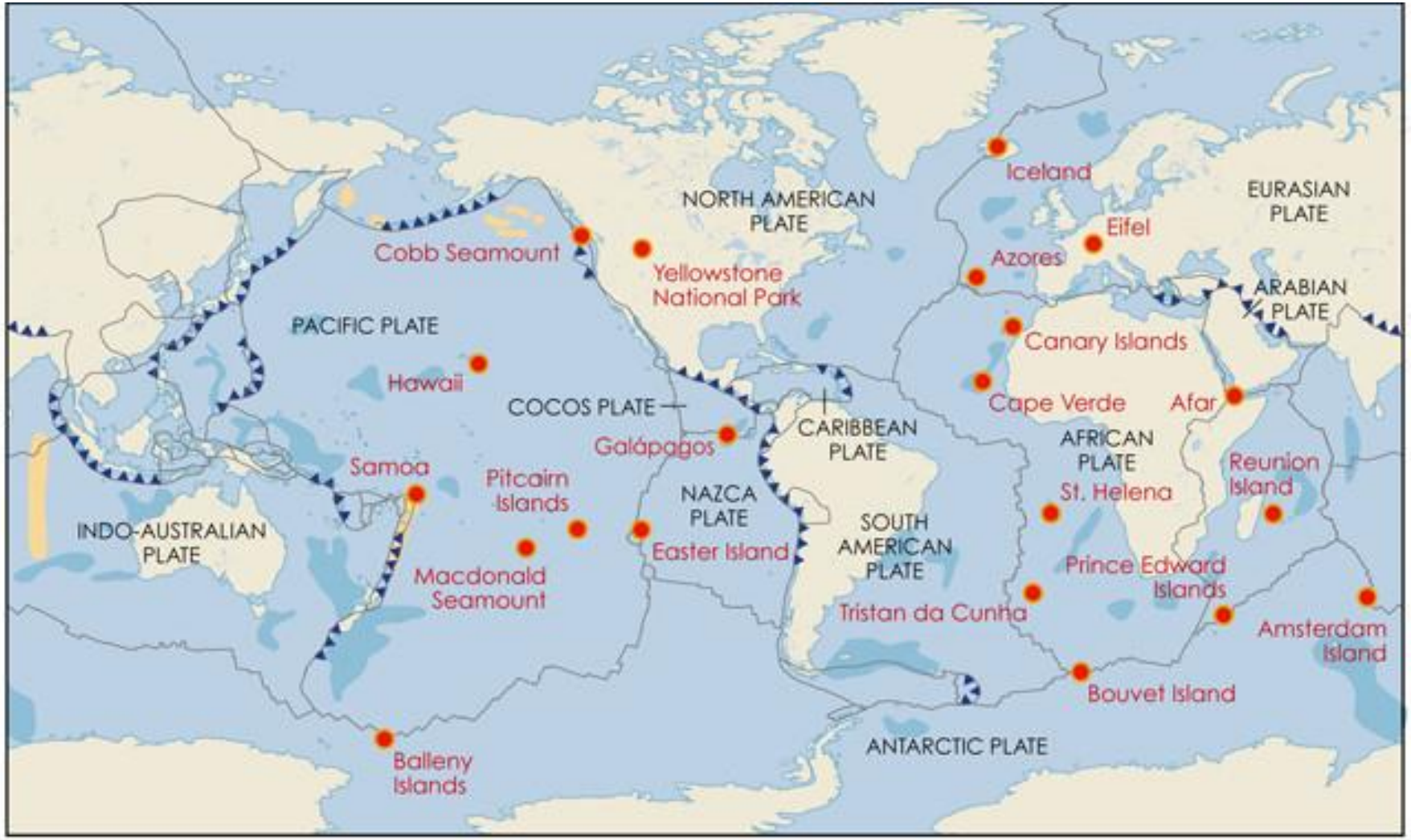
Earthquake Swarm - Iceland Earthquake

- series of many **low-intensity earthquakes without a discernible main shock** that can occur over weeks in active geothermal areas.
- **Mantle Plumes**
- **Mid Oceanic Ridges – Plate Tectonics**


GREENLAND SEA
Grimsey
Ísafjörður
Westfjords
Sauðárkrókur
Akureyri
Northwestern Region
Northeastern Region
Egilsstaðir
Western Region
ICELAND
Eastern Region
Borgarnes
Capital Region
REYKJAVÍK
Keflavík
Southern Region
Selfoss
Southern Peninsula
Vestmannaeyjar
Surtsey
NORTH ATLANTIC OCEAN
alamy - 2F3MKJB


90°
180°
90°
0°
60°
EURASIAN PLATE
NORTH AMERICAN PLATE
Aleutian Trench
JUAN DE FUCA PLATE
San Andreas Fault
East Pacific Rise
Mid-Atlantic Ridge
EURASIAN PLATE
PHILIPPINE PLATE
CARIBBEAN PLATE
ARABIAN PLATE
PACIFIC PLATE
COCOS PLATE
AFRICAN PLATE
0°
CAROLINE PLATE
Java Trench
INDO-AUSTRALIAN PLATE
NAZCA PLATE
SOUTH AMERICAN PLATE
SCOTIA PLATE
60°
0 2000 6000 Km
ANTARCTIC PLATE
90°
180°
90°
Divergent Boundary
Convergent Boundary
Transform Boundary


NORTH AMERICAN PLATE
Mid-Atlantic Ridge
EURASIAN PLATE
Krafla
ICELAND
Thingvellir
Reykjavik
Mid-Atlantic Ridge
ATLANTIC OCEAN



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