Geography Class 30

REVISION OF THE PREVIOUS CLASS (09:16 AM):

- **11 Climatic regions:**
- Hot zone Eastern margin.
- China type.
- Steppe type.
- Cool Temperate Western margin.
- Cool Temperate Eastern margin.
- Cool Temperate continental.
- **Factors affecting ocean temperature:**
- Winds.
- Ocean currents.
- Landmass.

SALINITY (09:21 AM):

- 35 grams/1000 gm = 35 parts per thousand (ppt or o/oo).
- **What:**
- Salinity is the number of grams of dissolved salts in 1000 grams of seawater measured as parts per thousand.
- The average salinity of the Earth's ocean is equal to **35 ppt**.
- **Sources of Salinity:**
- The below-mentioned **sources add salinity** to the ocean.
- a) Sediments: (There are some dissolvable sediments in river water which have salinity and those which do not dissolve, get settle down on bottom of ocean.)
- These are brought by winds, rivers, and glaciers which get dissolved in ocean water
- b) Evaporation over oceans causes an increase in salinity.
- c) Volcanic eruption: (Cooling of magma form rocks and these rocks can have some minerals which are dissolvable)
- The below-mentioned **sources reduce salinity** in the ocean.
- a) Fresh water brought by rivers. (As we can see, near deltas salinity of ocean is less.) (Sediments will cause salinity but it takes time to get dissolved.)
- b) Precipitation will add fresh water.
- c) Melting of ice reduces the salinity by adding fresh water. (when state of water changes it leaves behind its previous elements.)
- d) Precipitation of salts within the ocean water.

due to reason of temperature change or something else capacity of carrying salt by ocean water decreases and due to this salt gets settle down to the bottom of ocean.

- **Composition:**
- Chlorine - the highest proportion of salt in the ocean - 18.97
- Chlorine > Sodium > Sulphate > magnesium > calcium > potassium.

Table : 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

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Not important

Cl > Na > SO2-4 > Mg > Ca > K

Kal Nana Se Manga Calcium Potassium

Fresh water has salinity below 5ppt.

- **Factors responsible for the variation of salinity across the World:**
- a) Temperature:
- Higher temperature causes higher salinity due to the high rate of evaporation.
- Example - Red Sea, Mediterranean Sea, etc.
- Lower temperature results in lower salinity.
- Example - North Sea, Baltic Sea, Arctic Ocean.
- b) Wind speed:
- The higher the wind speed, the higher the evaporation causing higher salinity.
- c) Ice formation and Ice melting:
- Ice formation increases salinity and ice melting decreases salinity.
- Example - Arctic Ocean during winter and summer.
- d) Rivers:
- Rivers that bring a massive quantity of fresh water reduce salinity around the deltas.
- Example - Ganga, Brahmaputra, Amazon.
- e) Rainfall:
- Rainfall adds fresh water and reduces salinity.
- Example - the Subtropical regions in the ocean experiences higher salinity than Equatorial regions.
- f) Distribution of landmass:
- Water bodies that are surrounded by land and receive a higher quantity of freshwater experience lower salinity.
- Example - Bay of Bengal, Black Sea.
- The water bodies that are enclosed and are within the Subtropical regions experience higher salinity because of a higher rate of evaporation.
- g) Ocean currents and circulations:
- It helps distribute salinity from one region to another and brings uniformity.

Red Sea and Persian Gulf are surrounded by land so temperature is high and evaporation is high as well as there is no addition of fresh water which cause high salinity.

- **Distribution of Ocean Salinity (10:05 am):**
- **Vertical Distribution:**
- Along Subtropical regions, higher evaporation leads to higher salinity along the surface and decreases sharply to become uniform after a certain depth.
- Along the Equatorial region, higher precipitation causes lower salinity, and it increases with depth and finally decreases to become uniform.
- Along Temperate and Polar regions, salinity is lower at the surface and it increases to become uniform after a certain depth.

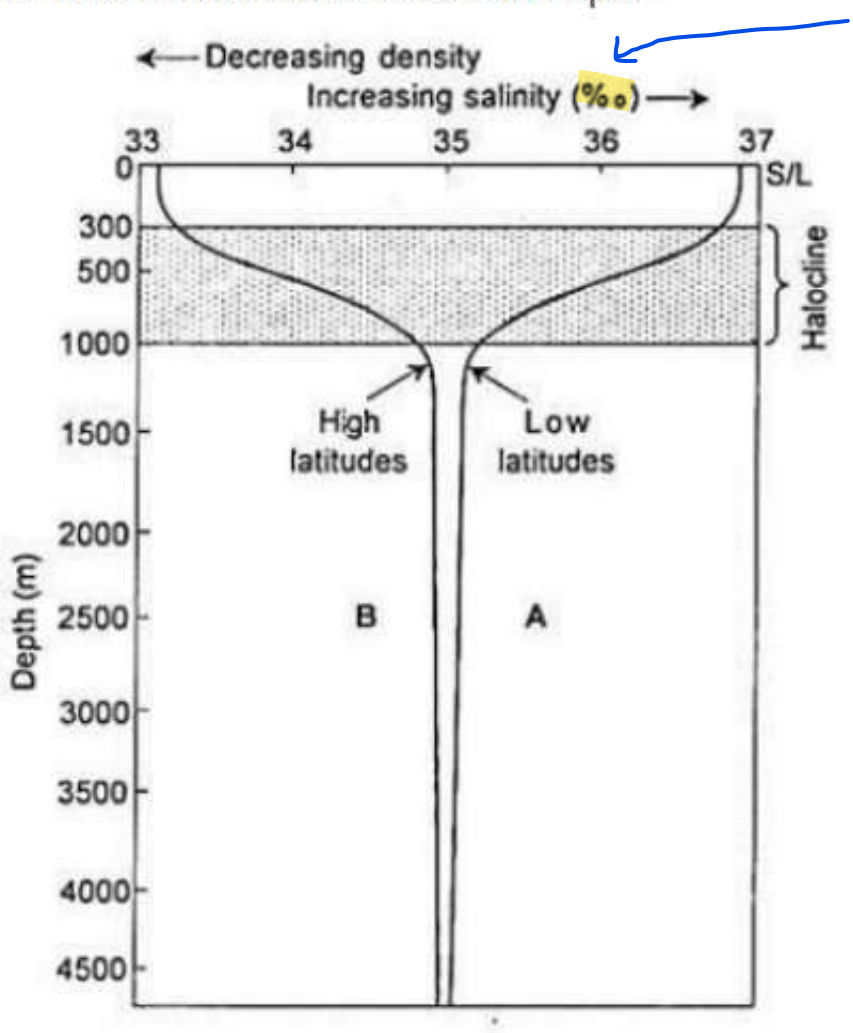

Fig: Vertical Distribution of Ocean Salinity

- **Horizontal Distribution:**
- Subtropical Region > Equatorial Region > Temperate Region > Polar Region.
- Examples of very high saline water bodies:
- Lake Van - 330 ppt. (Turkey)
- Dead Sea - 240 ppt.
- Great Salt Lake (USA).
- Sambhar Salt Lake (Rajasthan, India).
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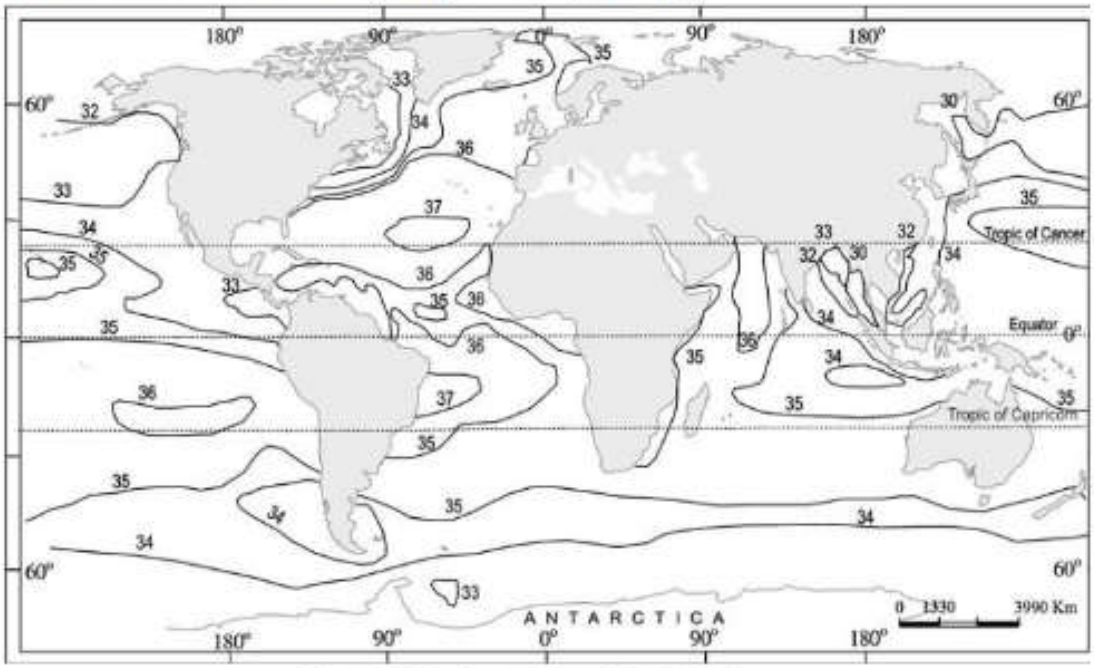


Figure13.5 : Surface salinity of the World's Oceans

OCEANIC DEPOSITS (10:20 AM):

- a) Terrigenous or lithogenous Deposits - Derived from land.
- Examples - Gravels, sand, silt, mud. (Mainly found in continental shelf.)
- b) Hydrogenous/Inorganic Deposits - Derived from water.
- Examples - Red clay, salt precipitation, polymetallic nodules.
- c) Biogenous/Organic Deposits - derived from life that are present in the ocean.
- Examples - Sea shells, fossil fuels, coral reefs, ooze (shelly skeleton remains of microorganisms).
- d) Cosmogenous Deposits.
- Examples - Meteoritic debris.

CORAL REEFS (10:51 AM):

- A special type of ecosystem found along the Continental shelf.
- Corals are marine animals that live in large colonies.

- **What are Coral Reefs?**
- Coral Reefs are masses of **limestone and dolomite** accumulated by lime-secreting organisms called **Coral Polyps**.
- They are developed due to the **Symbiotic Relationship** between Coral Polyps and Algae Zooxanthellae.
- Coral Reefs provide habitat to nearly 31 phyla of animals leading to rich biodiversity.
- They are also called **Rainforests of Oceans**.
- **Conditions Required:**
- Temperature - Average temperature should be around 20 degrees Celsius.
- Latitudinal extent of 30 degrees North and South. (because at this depth only temp. can be 20 degree celsius and sunlight can reach only to this much depth which is necessary for photosynthesis of that algae.)
- Depth of water not more than 200-250 feet below sea level.
- Within the Tropical regions along the Western margin of Continents, the temperature is lower due to cold ocean currents, therefore, Coral Reefs are not found.
- Salinity should be average around 35 ppt.
- The water should be sediment-free. (because sediments can block the mouths of coral reefs and because of this they will not be able to take nutrients.)
- Therefore, Coral Reefs are not found along river deltas. For example - the Eastern Coast of India.
- Presence of a submarine platform on which Corals can grow and build Reefs.

- **Types of Coral Reefs (11:23 AM):**
- Three types - Fringing, Barrier Reef, and Atoll.
- a) Fringing Reef:
- Narrow coral platform which is lying close to the coast.
- Example - Coral Reefs of Caribbean Sea and Andaman Nicobar.
- b) Barrier Reef:
- A wide coral platform located far from the coast and separated by the **lagoon.**
- Example - Great Barrier Reef (The longest living structure).
- c) Atoll: (in Australia)
- The circular Coral Reef developed around a sea mount or a guyot or an Island.
- Examples - Islands of the Pacific Ocean.

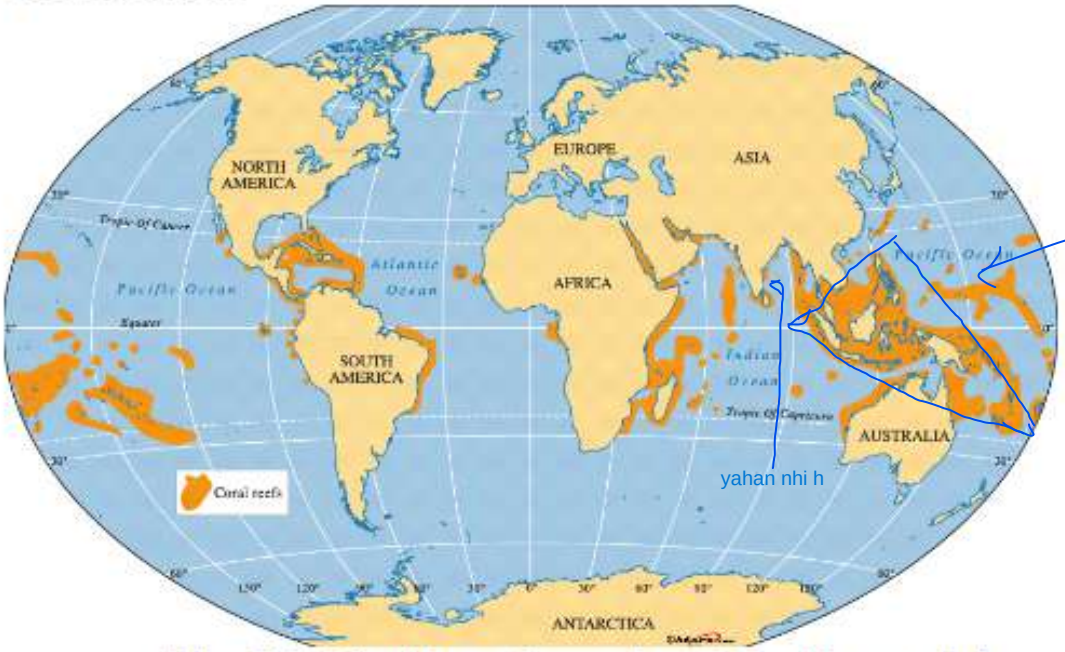
- **Distribution:**
- 

Fig: Distribution of coral reefs in the world

- Coral Triangle:
- Region of Coral Triangle includes the Islands of South East Asia and Northern and North East Australia including the Great Barrier Reef.
- The Islands of the Pacific Ocean cover Melanesia, Micronesia, and Polynesia.
- Caribbean Islands and Tropical waters of the Western Atlantic.
- Northern and Western Indian Ocean covering Red Sea, Persian Gulf, and Island around Mauritius and Madagascar.

- **Coral Bleaching (11:43 AM):**
- Corals receive their coloration from the algae living in symbiotic relationships.
- Coral bleaching refers to the loss of color of corals due to stress-induced expulsion of symbiotic algae.
- **Reasons Behind Coral Bleaching:**
- Change in water temperature and salinity.
- Increased sedimentation.
- Increased pollution.
- Ocean warming.
- Ocean acidification.
- Increased occurrence of cyclones and storms.
- El-Nino.
- Dredging (removal of sediments).
- Trawling. (Dragging of net from bottom of ocean for greater fishing.)
- **Examples of Coral Bleaching Events:**
- 1997, 1998 - Large scale bleaching of Northern Indian Ocean.
- 2014-17 - Due to El Nino, the largest bleaching event during which the Great Barrier Reef was bleached by more than 50%.

Coral reefs are the longest living creature.

THE TOPIC FOR THE NEXT CLASS WILL BE OCEANIC CIRCULATIONS.

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