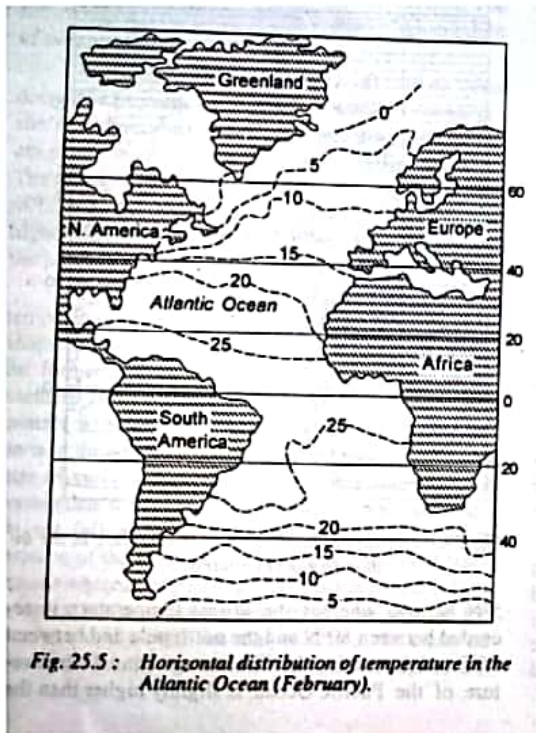
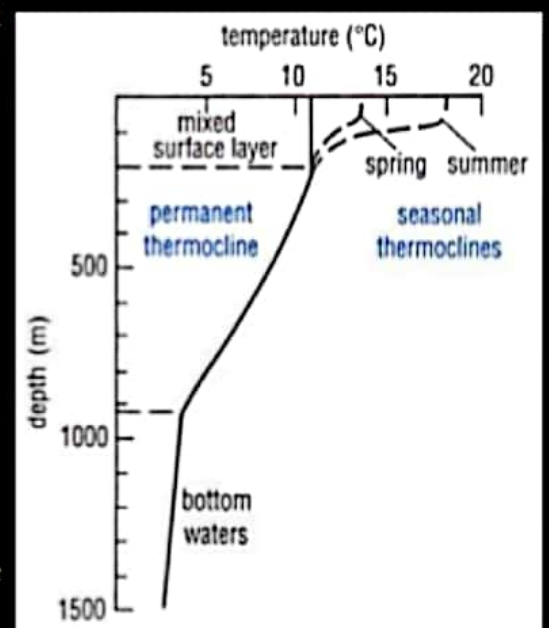


Horizontal Distribution of Temperature



Vertical Distribution

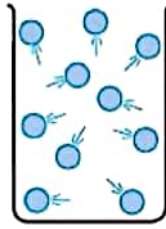
- ❖ The vertical distribution of temperature is not uniform in different latitudes.
- ❖ At high latitudes, the difference between the surface & the deep layers is very less as compared to that of low and middle latitudes. Its because at high latitudes heat from surface passes to the atmosphere, hence reducing the temperature difference between surface and deep sea layers
- ❖ In the middle & low latitudes, there will be a layer with maximum temperature decrease per unit depth. This vertical temperature gradient is known as "Thermocline"
- ❖ In the tropical waters, it may occupy depth of 100-300m & can be stable throughout the year. Thermocline are of different types.



Density of Oceans

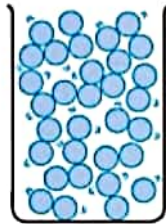
Gas

Hydrogen: 0.089 kg/m³
 Oxygen: 1.43 kg/m³
 Carbon Dioxide: 1.96 kg/m³



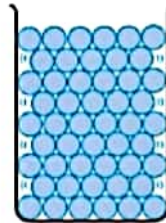
Liquid

Alcohol: 789 kg/m³
 Water: 1000 kg/m³
 Mercury: 13534 kg/m³



Solid

Aluminium: 2700 kg/m³
 Steel: 7500 kg/m³
 Uranium: 18800 kg/m³



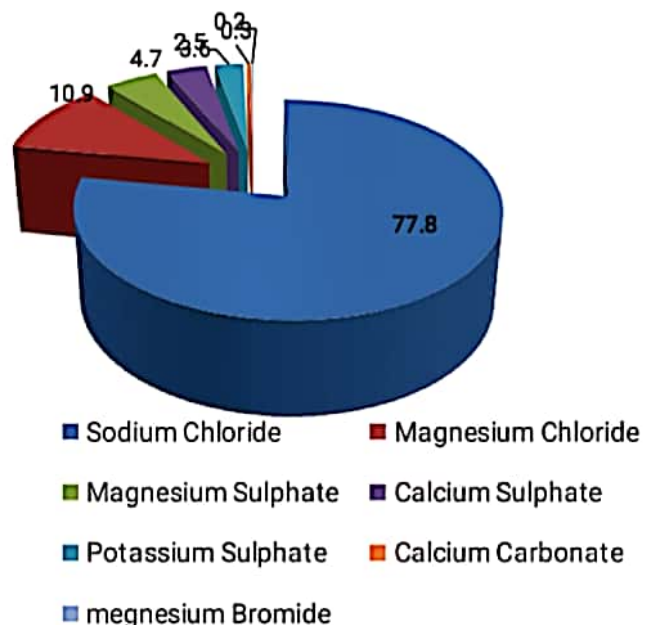
Density of sea water depends

- Temperature (inversely related with density of sea water)
- Pressure (positively related, but has less important role than air)
- Salinity (positively related)

Salinity

- The amount of salt mixed in sea water is called salinity.
- Expressed in parts per thousand (‰).
- The average salinity of sea water is about 35 ‰ (parts per thousand).

Salts in Sea Water



Sources of Oceanic Salinity

- Rivers
- Waves action
- Volcanic Ashes
- openings in the seafloor

- **Controlling Factors of Salinity**
- Evaporation
- Precipitation
- Influx of river water
- Melting of Icebergs
- Atmospheric pressure and wind direction (36-37‰ in Gulf of Mexico but only 34‰ in Gulf of California)
- Ocean currents



Horizontal Distribution of Salinity

Table 26.2: Latitudinal Distribution of Salinity

Latitudinal zones	Salinity (‰)	Latitudinal zones	Salinity (‰)
70°-50°N	30-31	10°-30° S	35-36
50°-40°N	33-34	30°-50° S	34-35
40°-15°N	35-36	50°-70° S	33-34
15°-10°N	34.5-35		

(A) Seas having salinity above normal-(a) Red Sea (34-41‰), (b) Persian Gulf (37-38‰), and (c) Mediterranean Sea (37-39‰).

(B) Seas having normal salinity- (a) Caribbean Sea and Gulf of Mexico 35-36‰, (b) Bass Strait (35.0‰), and (c) Gulf of California (25-35.5‰).

(c) Seas having salinity below normal-(a) Slightly less: (i) Arctic Ocean (20-35‰), (ii) North Australian Sea (33-34‰), (iii) Bering Sea (28-33‰), (iv) Okhotsk Sea (30-32‰), (v) Japan Sea (30-34‰), (vi) China Sea (25-35‰), (vii) Andman Sea (30-32‰), (viii) North Sea (31-35‰), (ix) English Channel (32-35‰), and (x) Gulf of St. Lawrence (30-32‰); (b) Much below: (i) Baltic Sea (3-15‰), Hudson Bay (3-15‰).

