

Marine environment and their divisions

INTRODUCTION

- The ocean currently covers 71% of the earth's surface. Around two thirds of earth's land area is found in the Northern Hemisphere .
- The marine ecosystem is the largest aquatic system of the planet which includes oceans, coral reefs, and estuaries. Since it is large and a complex one, it is very difficult to deal with as a whole.
- This makes the oceanographers divide the ocean into zones according to physical characteristics, mainly based on depth, light and temperature.
- The two major zones of the ocean are the sea floor, or bottom region, called the benthic realm and the watery region above the sea floor called the pelagic realm.

PELAGIC REALM

- The ocean's pelagic realm is divided horizontally into two zones,
 1. **neritic zones** :The neritic zone, also called coastal zone, is the region which lies above the continental shelf. This is a shallow part of the ocean and is very close to the land mass.
 2. **oceanic zone** :The oceanic zone, is the pelagic zone which lies above the sea floor beyond the depth of continental shelf, i.e. the water mass that lies beyond the depth of 200 meter to the deepest part of the ocean.
- pelagic realm is also divided into different zones, based on the penetration of light and depth of water.

THE PELAGIC REALM IS FURTHER SUBDIVIDED VERTICALLY INTO FIVE ZONES

- i. Epipelagic zone** - 0 - 200 meters deep from the surface of the ocean (Photic zone; all light rays are seen here initially)
- ii. Mesopelagic zone** - from 200 -1000 meters deep (dysphotic zone; only blue light is seen here: also referred as "twilight zone"); its lower boundary in the tropics is the 10° C isotherm.
- iii. Bathypelagic zone** - falls below 1000- 4000 meters deep (aphotic zone; no light reaches this depth, total darkness); lying between the boundaries of water with 10 and 4° C isotherm layers.
- iv. Abyssopelagic zone** - lies below 2000 - 6000 meters deep (aphotic zone).
- v. Hadal pelagic zone** - has a depth of 6000-10000 meters (aphotic zone).

EPIPELAGIC, OR EUPHOTIC ZONE :

- It is the top layer of the ocean zones. This is the ideal place for about 90 % of all ocean life to live because of warm temperature and sunlight that goes down about 660 feet.
- This is the only zone to support plant life because it has the light needed for photosynthesis.
- As this region is diverse in plant life, there is a variety of animals including zooplankton, crustaceans, molluscs, sharks, sting rays, mackerels, tuna, seals, sea lions, sea turtles, etc.

MESOPELAGIC ZONE

- Though some sunlight penetrates through this zone, it is not enough for photosynthesis to occur and plants to grow.
- This zone has some animals including octopus, squid, and hatchet fish.
- The animals living in this zone must survive cold temperatures, increased water pressure, and dark water.
- Some fish have extra big eyes to help them see, while others produce their own light called bioluminescence using special organs in their bodies called photophors.
- Most fish don't chase their food but they either wait for it or stalk it. Some have sharp fangs or big mouths to help them catch their food

BATHYPELAGIC ZONE

- It can be as deep as 20,000 feet. No sunlight reaches this zone so it is freezing and completely dark.
- It also has a very intense water pressure which can be as great as two tons per square inch.
- Just like the mesopelagic zone, there are no plants and even fewer organisms.
- Some organisms in this zone are vampire squid, giant squid, amphipod, slime stars, snake dragon fish, anglerfish, oarfish, gulper eel

HADAL ZONE

- It is the deepest parts of the ocean, causing it to be totally dark, and constantly cold, with a very intense pressure.
- The deep-sea creatures have adapted to the darkness by reducing their use of eyesight.
- The fish do have eyes, though, and they are usually enormous, which indicates enough flashes of bioluminescent light to keep their eyes from totally deteriorating.
- The animals that live near the bottom have a reddish or pinkish coloration, possibly because the red light waves are absorbed in the topmost layers of the ocean.

BENTHIC REALM

- Benthic, a term meaning bottom is the name of the ocean zone ranging from the deepest parts of the ocean to the tidal affected areas.
- The most productive region of the benthic zone is the area over the continental margin, which is unaffected by the tides.
- Many groups and varieties of animals live here, a few are worms, sea pens, crustaceans, stars, and protozoa.
- The life in this zone is mostly made up of bottom dwellers which get most of their food from dead and decaying organisms.
- Therefore most of the organisms in the benthic zone are scavengers because they depend on dead flesh as their main food source.

THE BENTHIC ENVIRONMENT IS FURTHER DIVIDED BY DEPTH INTO FIVE ZONES

- i. Intertidal zone** – the area between the lowest low tide and highest high tide markings, it is sometimes called the littoral zone.
- ii. Sub littoral zone** – from the lowest low tide mark to the shelf break, about 200 m deep. This area essentially coincides with the continental shelf.
- iii. Bathyal zone** – from the shelf break to 4000 m. This area coincides with the continental slope and rise.
- iv. Abyssal zone** – from 4000 to 6000 m. This includes the average depth of the deep ocean floor.
- v. Hadal zone** – sea floor deeper than 6000 m. This includes the trenches, the deepest part of the sea floor.

