

富嶽三十六景  
神奈川  
波神

# Introduction to Oceanography



# Oceanography

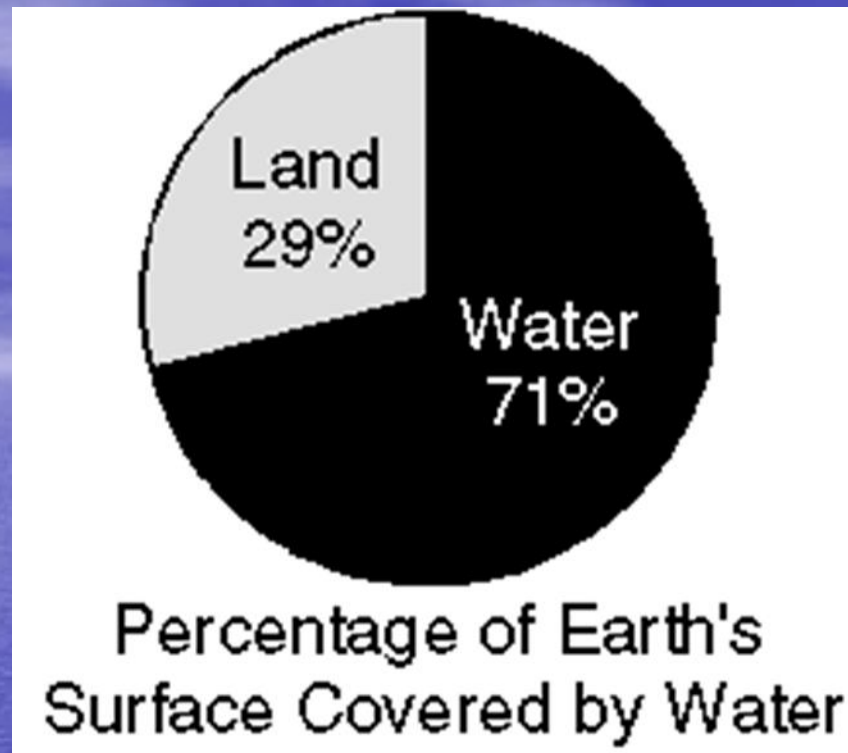
- ❖ The branch of science that deals with the physical and biological properties and phenomena of the ocean.
- ❖ The study of the physical and biological aspects of the ocean.

# Oceans

- ❖ Ocean, continuous and very vast water body of salt water that is contained in enormous basins on Earth's surface.
- ❖ When viewed from space, the predominance of Earth's oceans is readily apparent. The oceans and their marginal seas cover nearly 71 percent of Earth's surface, with an average depth of 3,688 metres (12,100 feet).

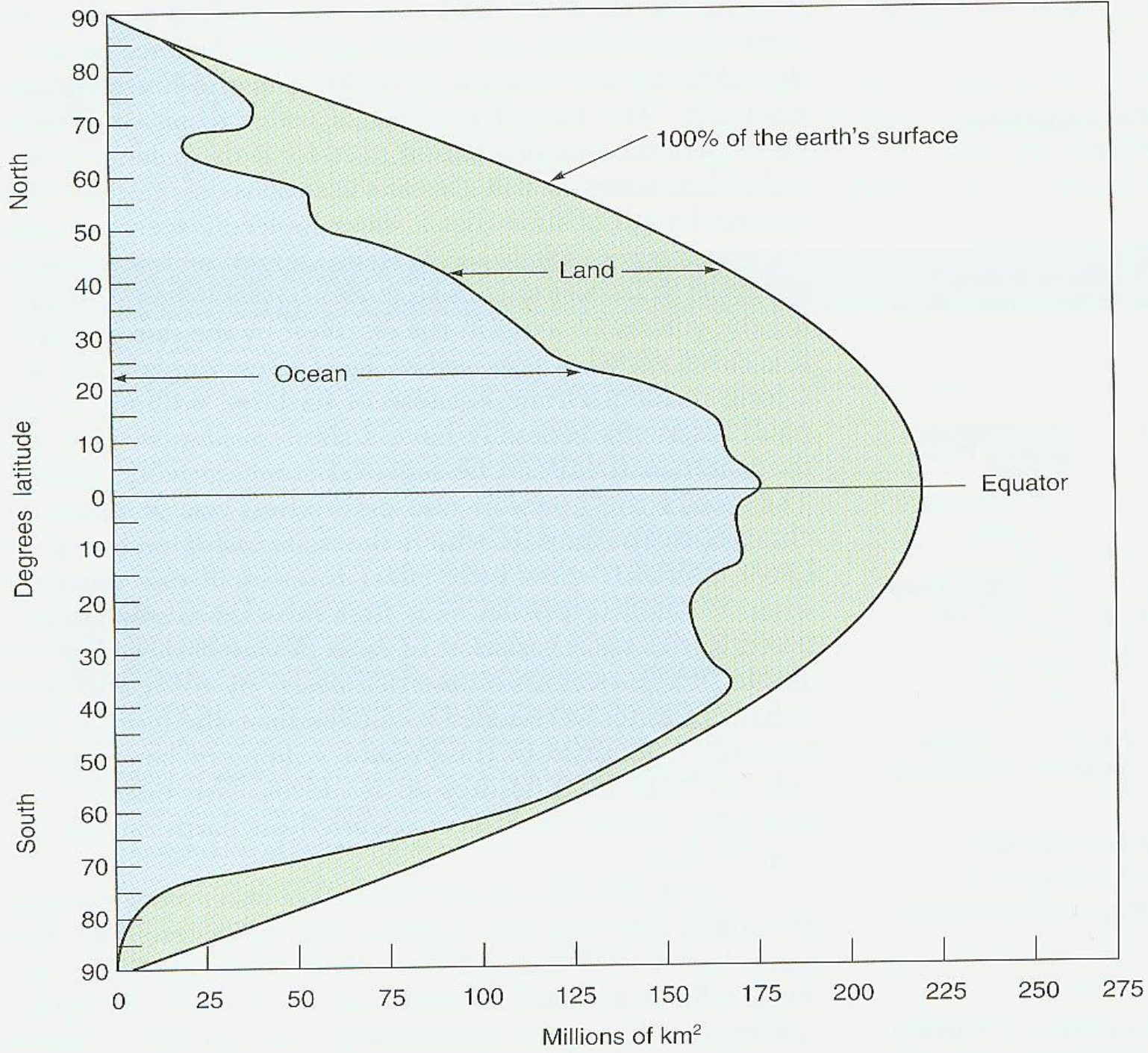


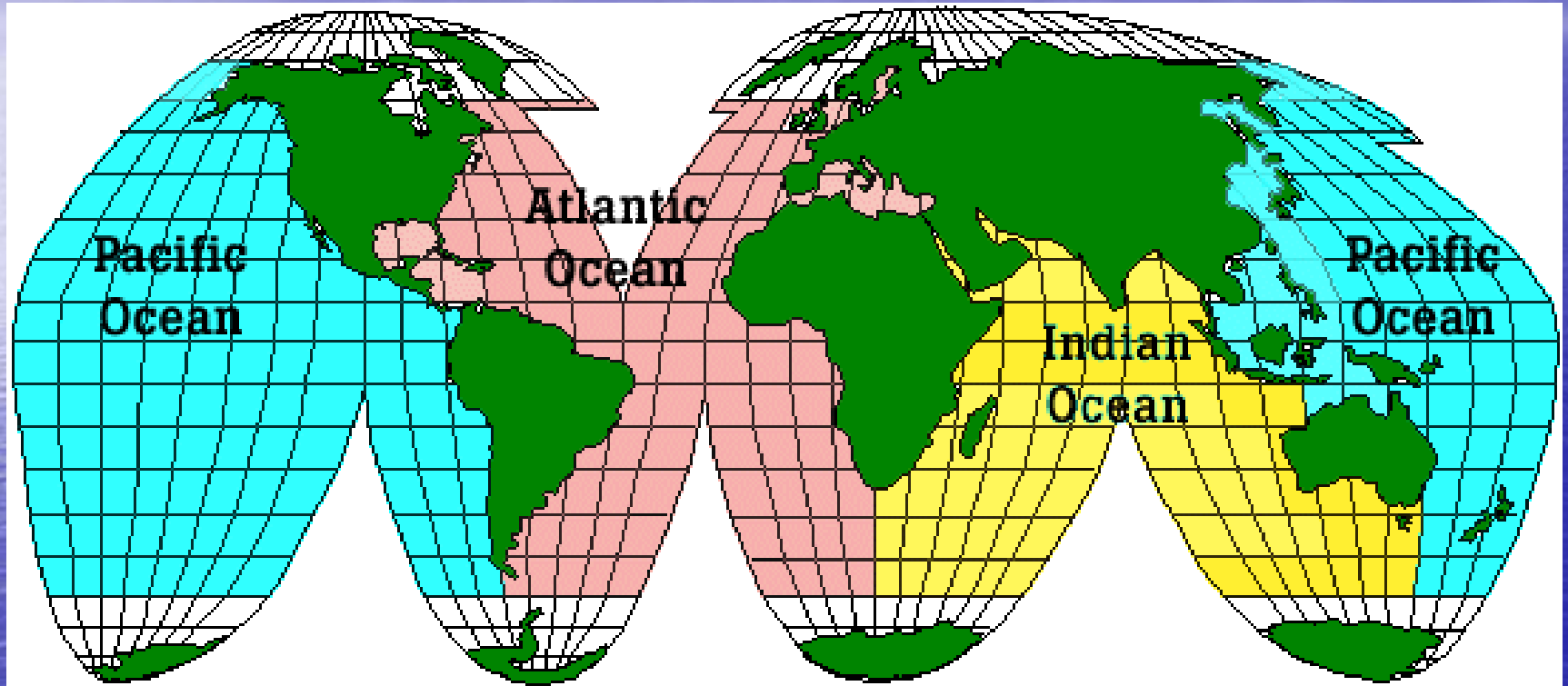
- The exposed land occupies the remaining 29 percent of the planetary surface and has a mean elevation of about 840 metres (approximately 2,755 feet). Actually, all the elevated land could be hidden under the oceans and Earth reduced to a smooth sphere that would be completely covered by a continuous layer of seawater more than 2,600 metres (8,530 feet) deep. This is known as the sphere depth of the oceans and serves to underscore the abundance of water on Earth's surface.



- The volume of living space in the ocean is huge compared to that on land.
- About 71% of Earth's surface is covered by oceans. Land is only 29% of the earth's surface.









**Table 1.4**

## Ocean Areas and Volumes versus Depth

Depth (m)	Atlantic (mean depth 3332 m)		Pacific (mean depth 4028 m)		Indian (mean depth 3897 m)		All oceans (mean depth 3795 m)	
	<i>Area</i> <sup>1</sup>	<i>Volume</i> <sup>2</sup>	<i>Area</i>	<i>Volume</i>	<i>Area</i>	<i>Volume</i>	<i>Area</i>	<i>Volume</i>
0	106.4	354.7	179.7	723.7	74.9	291.9	361.0	1370.3
1000	84.7	259.1	164.0	550.5	69.4	219.7	318.1	1029.3
2000	79.1	177.2	156.9	388.8	66.9	151.6	302.9	717.6
3000	69.7	102.8	147.5	236.6	61.3	87.5	278.5	426.9
4000	50.0	43.0	114.3	105.7	43.4	35.1	207.7	183.8
5000	22.6	6.7	51.0	23.1	14.8	6.0	88.4	35.8
6000	0.64	0	3.2	0.2	0.3	0.1	4.14	0.3
7000	0	0	0.36	0	0	0	0.36	0

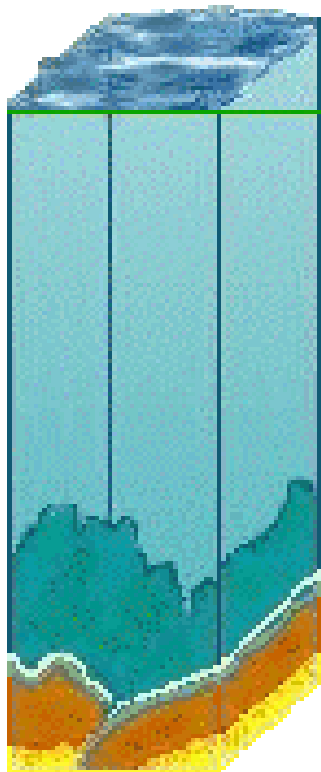
<sup>1</sup>All areas are given in 10<sup>6</sup> km<sup>2</sup>.<sup>2</sup>All volumes are given in 10<sup>6</sup> km<sup>3</sup>.

$$\Sigma = 3763 \times 10^6 \text{ km}^3$$



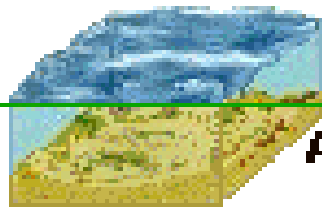
•The deepest trench in the ocean is Challenger Deep in the Mariana Trench **11020 meters**

•Longest Trench is Peru-Chile 5900 km.

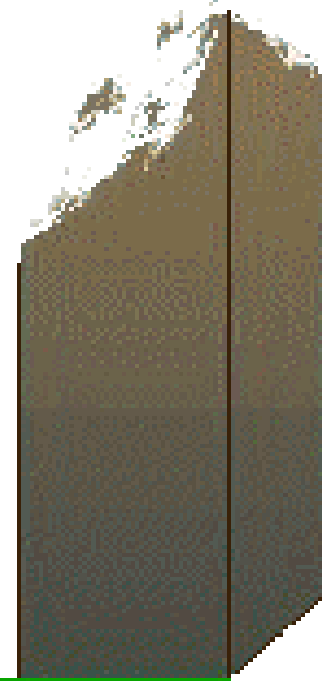


**Average depth  
of the ocean  
3730m**

**Mariana Trench  
11.035m**



**Average height  
of the land  
870m**

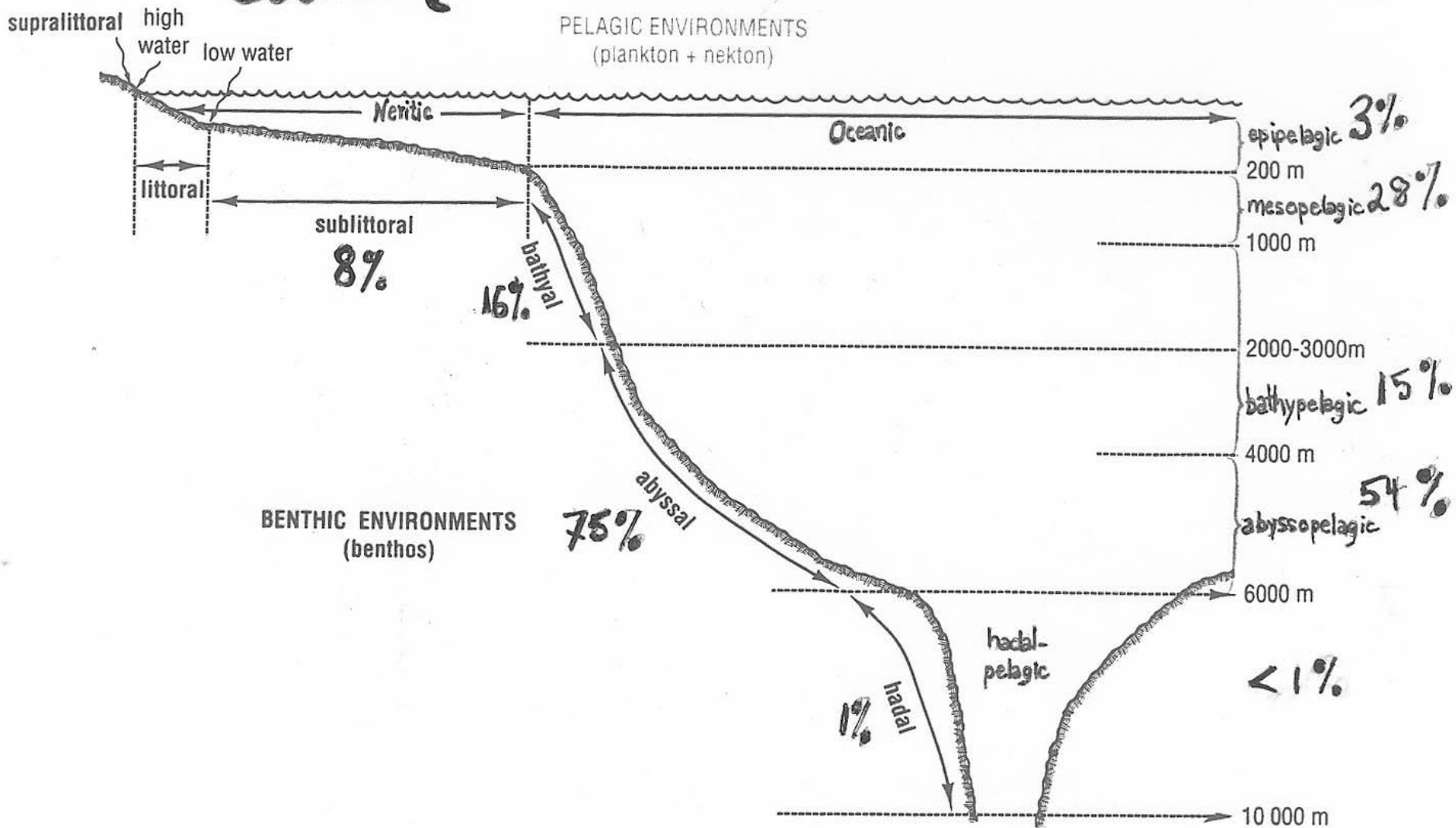


**Mount Everest  
8848m**



# Coastal

# OPEN OCEAN



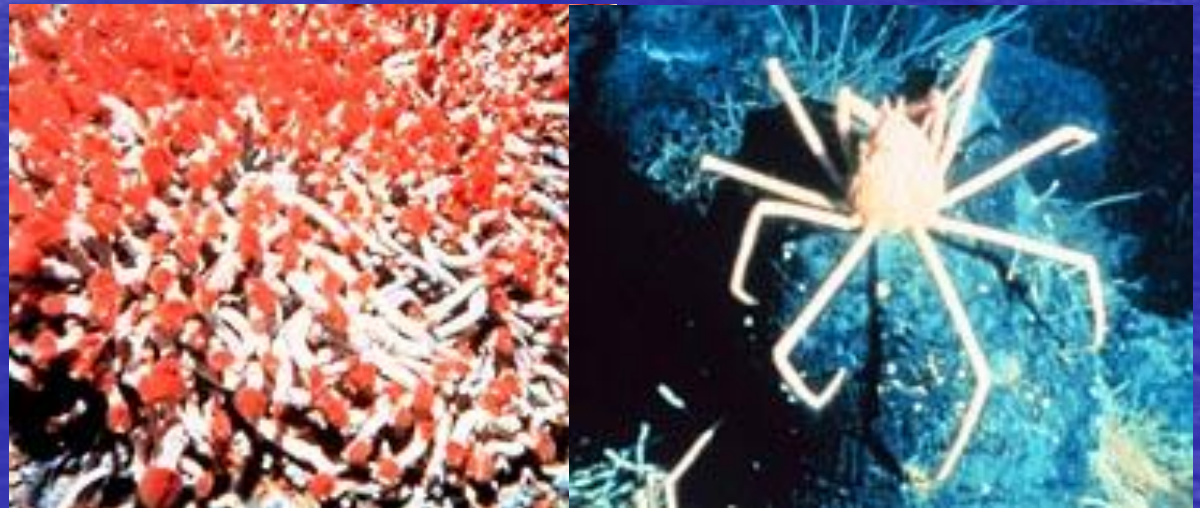
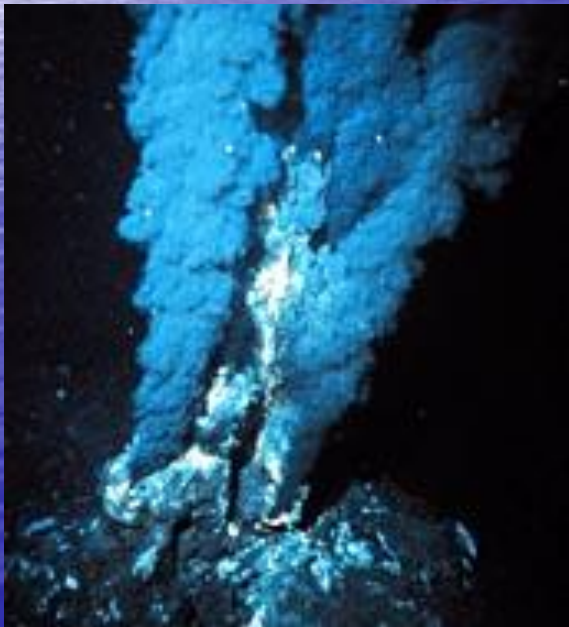




Why study the ocean???

We study the ocean for the following reasons...

- The ocean has a vast amount of living space that we know little about. What lives there and how do these organisms interact? How are they adapted to their environment?



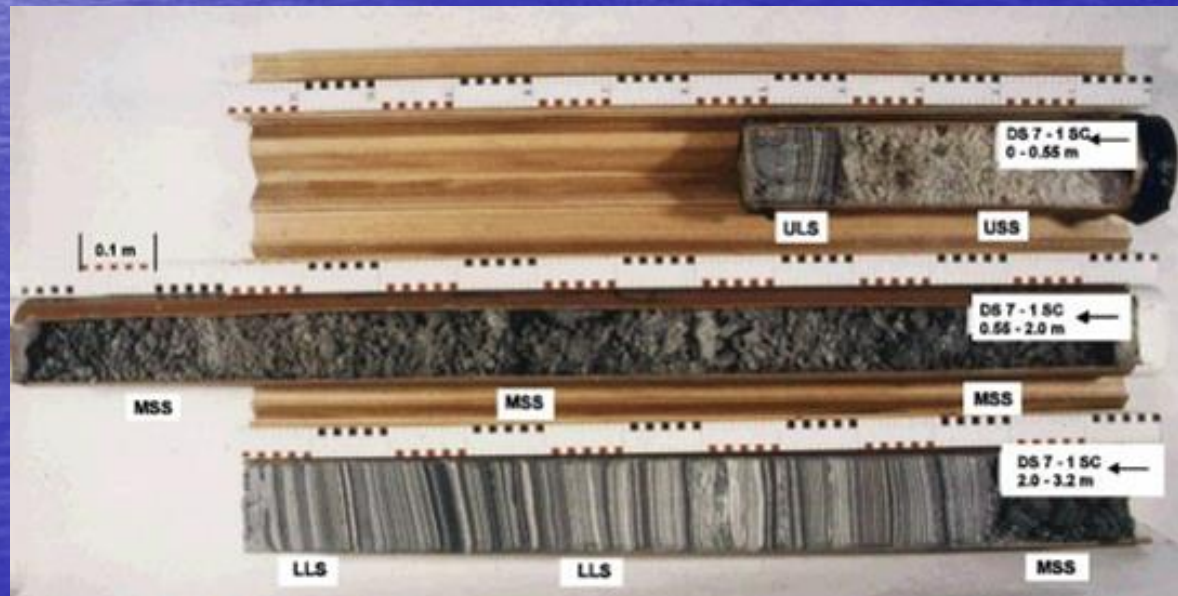






We also study the ocean for the following reasons...

- The ocean's influence on weather and climate.  
(CO<sub>2</sub> (1/3 of all emissions) absorption, El Nino, hurricanes)
- There are many minerals in the sea.  
(Manganese nodules, oil drilling platforms, etc...)
- Past climate research (paleoclimates) – Cores





We also study the ocean for the following reasons...

- Human use of the ocean.
  - Fisheries, causes of fluctuations in resources, influence of commercial & sport fishing. Fin & shellfish etc...Aquaculture – Salmon, Mussels, etc...
  - Carrageenan from macro-algae: source of Food.
  - Drugs from marine organisms.

# Classification of Oceanography

- ❖ Traditionally, oceanography has been divided into four separate but related branches: physical oceanography, chemical oceanography, marine geology, and marine ecology.
- ❖ Physical oceanography deals with the properties of seawater (temperature, density, pressure, and so on), its movement (waves, currents, and tides), and the interactions between the ocean waters and the atmosphere.
- ❖ Chemical oceanography has to do with the composition of seawater and the biogeochemical cycles that affect it.
- ❖ Marine geology focuses on the structure, features, and evolution of the ocean basins.
- ❖ Marine ecology, also called biological oceanography, involves the study of the plants and animals of the sea, including life cycles and food production.



Thank You!

