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## Class #5: OCEAN BASINS: Distribution and Depths

Ocean bottom features, cont'd

Ocean Basin Floor

Mid-Ocean Ridges

Trenches

Sampling/Exploring the Ocean Bottom

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**Ocean basin floor** - extends from continental rises to mid-ocean ridges.

Deep areas of the oceans, excluding the very deep trenches

Typical depth = 4,000 - 6,000 m

Usually flat (mantled by sediments)

But numerous volcanic features poke out of this in places, most commonly in the Pacific.

Islands- poke out of the top of the ocean

Seamounts- same, but are not high enough to poke out  
flat-topped seamounts called "Guyots"

Underwater hills

Sediment and rock layers lying underneath the flat areas: revealed by  
"seismic profiling."

Much like echo sounding

More powerful sound pulses; penetrate into the sediments

Bounce back from tops of layers

Sound receivers on ship measure these "echoes" that come back  
and determine the depths to the various layers

Sediment thickness can be a km or more!

### **Mid-ocean ridges and Mid-ocean rises**

A globe-encircling, continuous volcanic "mountain range" that rises about 2,000 m above the adjacent ocean-basin floor. They are one of the most impressive topographic features of our planet.

### **Trenches**

6-11,000 m deep -- deepest regions of the sea floor

Occur at margins of basins, especially Pacific

East Pacific -- edge of continental margin

West Pacific -- adjacent to volcanic island chains- "island arcs"

**Fracture zones** -- faults that offset sections of mid-ocean ridges. They extend into and across the floor of ocean basins.

### **Sampling the Ocean Floor**

**Dredges and grab-samplers**- scoop up material; operate at the end of very long cables

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**Submersibles-** e.g., Alvin, allow people to observe and sample at great depth  
Many of our best observations of the living organisms at hydrothermal vents come from Alvin and other submersibles

**Coring-** weighted, hollow tubes plunge into sediments and the hollow part gets filled with sediment

**Drilling and coring-** oil wells can be drilled by floating platforms in shallow water, and there are specialized ships that can drill in deep water and recover material (cores) through a hollow center channel in the drill string

**Observations:**

These sampling techniques (along with seismic profiling- see above) gave scientists the ability to observe the materials that make up the sea floor, and the makeup and age of the layers of sediment below the sea floor.

Some areas covered with thick piles of layered sediments

Fossils in the sediments indicate ages

Other areas: bare volcanic rock

Seamounts that look like underwater volcanoes often have rock that looks like it was squeezed out as molten lava- pillow-like