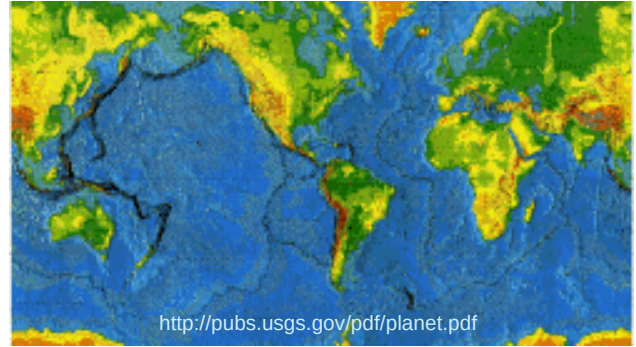
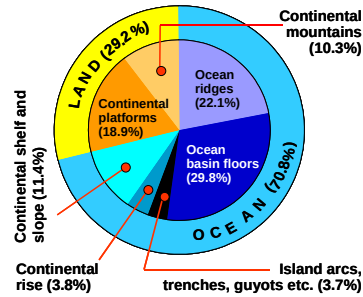


# The Sea Floor

## The Oceans

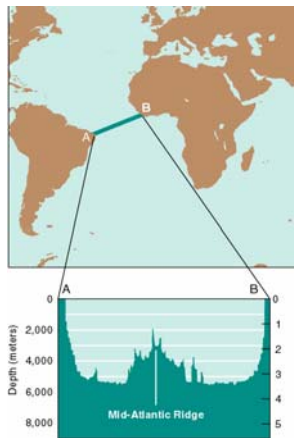
- cover ~72% of the earth's surface;
- have an average depth of ~3.8 Km, compared to ~840 m average height of the continents; and
- comprise  $\leq 200$  Ma old basaltic floor; but were plausibly created ~3.7 Ga ago;



Visit the US Geological Survey at <http://pubs.usgs.gov/pdf/planet.pdf> or the Marine Geology and Geophysics Division of National Oceanic & Atmospheric Administration's (NOAA) National Geophysics Data Center (NGDC) at the URL: <http://ngdc.noaa.gov/mgg/mggd.html>

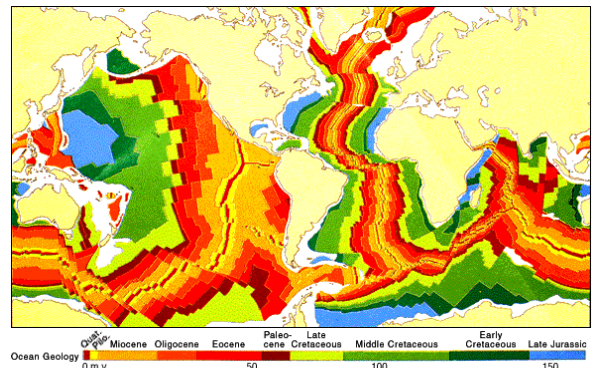
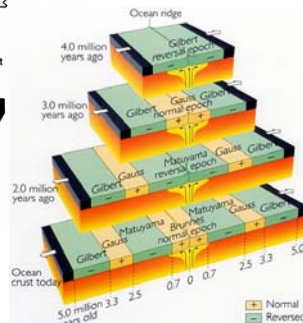
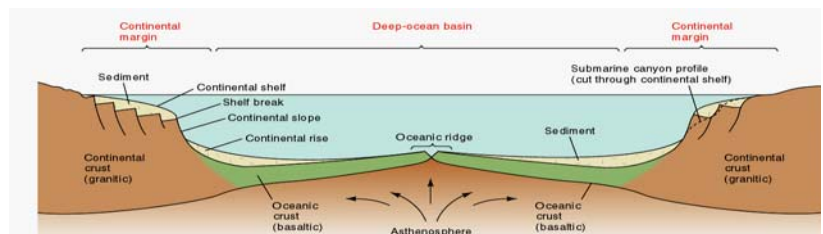
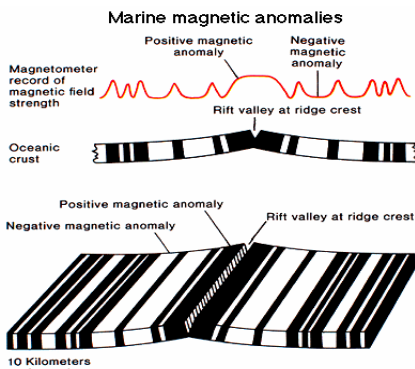
## Geology of the Sea-Floor

- Bathymetric, magnetic and stratigraphic profiles across the submarine ridges and rises tend to be symmetric.
- Ridge axes have the youngest rocks, high heat flow and seismicity.
- Interpretation of these magnetic anomaly profiles using the Vine and Matthews model yields the map of seafloor ages.



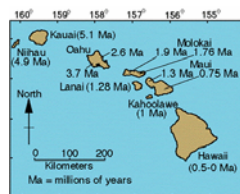
## Physiography of the Sea Floor

- Ocean floor comprises (a) continental margins and (b) deep ocean basins.
- Continental margins (a) can be active (i.e., seismic) or passive (i.e., aseismic); (b) comprise ~14% of ocean area, with ~750 m average depth; and (c) carry ~52% of all sediments (thickness:  $\leq 7$  Km).
- Deep ocean basins (a) cover ~85% of the ocean surface and (b) comprise (i) abyssal seafloor (~80% of ocean area, ~4.5 Km average depth, ~13% of all sediments averaging ~200 m in thickness); (ii) ridges and rises (e.g., the Mid-Atlantic Ridge, East Pacific Rise etc.): ~6% of ocean area, ~2.5 Km average depth, ~28% of world's sediments (thickness ~8 Km); and (iii) deep sea trenches and island arcs: ~1% of ocean area, ~6.5 Km average depth, ~1% (?) of all sediments.



## This Postulate of Sea-Floor Spread

ascribes the forming of new ocean floor to continental rifting and incessant volcanism at the rifted margins — a process that creates spreading submarine ridges and rises.



- Deep sea trenches form, on this picture, when the converging sea floor edges collide.
- The other notable features of the sea floor include aseismic rises, seamounts, guyots, and submarine canyons.