Bathymetry, sediments and plate tectonics

Science, Geology

On March 23, 1968 a Glomar Challenger ship was launched from Orange, Texas under the supervision of NationalScienceFoundation and the Regents, University of California. This marked the beginning of a new era in the field of oceanographic explorations. The Glomar Challenger explored the Atlantic, Indian and Pacific Oceans as well as the Mediterranean and the Red Seas, drilled and cored the bottom of the ocean and collected core samples.

These core samples became a definite proof for continental drift and sea floor renewal at rift zones. The theory proposed by Alfred Wegener that Earth once consisted of a single land mass now known as Pangaea was proved by their findings. The theories attempting to explain the formation of mountain ranges, deep sea trenches and earthquakes provided by the two geologists, W. Jason Morgan and Xavier Le Pichon also gained support from these findings.

As for the evidence for sea floor spreading there are ample examples. Samples from the deep ocean floor show that Basaltic oceanic crust and overlying sediment become much younger while nearing the mid ocean ridge. The sediment cover is thinner near the ridge. Moreover the age of the ocean is no more than 200 million years while the age of the Earth is roughly 3 billion years. Also evidence of periodic reversals in magnetic polarity of the Earth, or paleomagnetism proves the theory of sea floor spreading.

The study of plate tectonics has advanced rapidly over the last 50 years. The advent of sophisticated oceanographic instruments has made the inaccessible regions easy to access. The easiest method of sampling sea floor includes coring using a long metal pipe weighted at the top. Gravity covers collects samples of sea floor sediments. There are machines that

allow scientists to submerge beneath the water and observe the sea floor. Submersibles can carry up to a 5-person crew at a time.

Most of these submersibles are geared with high frequency cameras, lights, mechanical arms for collection of samples, temperature measurers and other electromagnetic tools. Information regarding the sedimentation of the bedrocks can be obtained by shipboard gravimeters that can measure rock density and magnetometers, which measure the magnetic properties. Reflection of sound waves is used in seismic service and help in getting information about submarine topography and the thickness and folding and faulting of rocks covered with sediments.

Seismic surveys are particularly helpful for finding out oil and gas deposits. Seismic surveys can be done by high voltage sparks, mechanical clappers or electronic pulse to create a spectrum of sonar frequencies. The Fundy Basin on Atlantic coast between New Brunswick and Nova Scotia is where the oldest ocean sediments can be found. References: xpubs. vsgs. gov/gip/dynamic/historical. html Wikipedia Glomar Challenger Wikipedia Mid Atlantic Ridge Answers. com