

INTRODUCTION AND HISTORY OF DEVELOPMENT OF MARINE GEOLOGY

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Ocean occupy about 70% of the earth's surface and the geologists have always realised the importance of investigating this vast submerged territory but until 1940's had remained virtually a terra incognita. From the world wars that were fought the Naval Scientists and the Civilian Advisers realised that naval operation needed a background knowledge of the ocean and its floor.

The geological study of the ocean realm which is called Marine Geology deals with the study of the coasts and beaches as far as they are related to the marine process of the continental shelves surrounding the continents and the relatively steep slopes that extend the abyssal depths and the deep ocean floor. Both the continental shelves and the deep ocean floor are equally important from the scientific point of view as well as exploration and exploitation of non-living resources. Between 1872-1876 HMS Challenger carried out a history making voyage across the 3 oceans and collected a wealth of information regarding seafloor. Later the U.S. fishery steamer Albatross also collected some geological information from 1888 to 1920. Another large collection of samples was made by the Netherlands Ship Siboga during 1899-1900. the German steamer Edis Stephe and Planet also collected sediment samples in European waters. Shortly after World War I the Germans carried out investigations in the South Atlantic which revealed that ocean floors have irregularities as great as on the land. The Snellius expedition to East Indies (1929-1930) also produced some important reports.

The development of echosounding prompted the marine surveyors to construct very detailed charts of the continental shelves and slopes. This made possible the production of bathymetric contour charts along the different coasts.

Studies of the bottom character notation of the coastal charts of the World in 1930's led to the discovery that sediments do not grade seaward across the continental shelf from coarse to fine. Further the extensive sample collection and their study provided the first clear indication of the types of marine environments, in which petroleum is accumulating. The study of long cores also showed that it was possible to recognize the times of pleistocene glaciation of the sediments.

It was in 1930's that Marine Geology programmes in the U.S. began at Woodshole Oceanography Institute, Scripps Institute of Oceanography and La Monte Geological laboratory. These programmes expanded enormously and since World War II several leading universities and other institutions also started marine geological investigations. The source of funding for these investigations is mainly from U.S. Navy and the National Science Foundation.

In other countries also somewhat smaller programmes have been initiated that have also made important contributions to the science. In this context mention may be made of the studies in France, U.K., Canada, Germany, Japan, USSR, etc.

Among the ships that helped make history in marine geology are old Atlantis of Woodshole, the E.W. Scripps of Scripps Institution, Vem of La Mont Laboratory, Atlantis II, Melville of Scripps Institution, Discovery 3 of the National Institute of Oceanography, U.K., and Vitiyaz and large fleet of oceanographic ships of the Soviet Union.

The first largest scale of development in marine geology came directly after World War II when the U.S. Navy began extensive subsidising of the studies at various oceanographic institutions which enabled them to map widely the bathymetry of the oceans. Mapping of the oceans has also been pursued on a large scale by the Soviet Union Scientists too. In 1950's seismic reflection profilers were developed which enabled the scientists to study the character of the structure and the formation of the underlying ocean floor. Many of the continental slopes of the world have been investigated using these equipment and innumerable profiles have crossed all the oceans providing an enormous information on the subsurface geological features of the oceans.

1960's witnessed the development of startling theory of seafloor spreading and starting of drilling programme on a large scale of the ocean basins to understand the biostratigraphy, structure and evolution history of the oceans and confirmation of the theory of plate tectonics. This period marked the heatflow measurements for confirmation of the seafloor spreading.

While the mapping of the seafloor in great detail and study of sediments provided very valuable scientific information in regard to the oceans the same information has also revealed that the oceans have a very high potential for a variety of minerals. In the present context of the fast depleting land based mineral resources, the time is not far off when the mankind has to look to the oceans as an alternative source of mineral deposits for the survival of the industry based economy. Further the recently accepted concept of Exclusive Economic Zone has bestowed exclusive rights to each country for the exploration and exploitation of the seabed upto 200 nautical miles from its coast. Taking into consideration all these developments, almost all the maritim countries in the world are showing great interest in the exploration of the oceans either by themselves or through assistance from other countries and the development of the science further and technology required for harnessing the wealth of the oceans is the only hope for the mankind for its survival.