Abstract

Data collection for logical interpretation of the observations made in any branch of science is solely dependent on the method or an approach to a particular problem. The techniques therefore followed to obtain complete or near complete solution depend upon the type of instrument used to make these observations. A morphological observation method to understand the sea floor involves a complex set of data collection to arrive at proper interpretation of a morphological feature. In the marine environment, careful system design is essential to overcome errors due to unstable nature of observation platform and the medium, which undergoes a continuous process of random or periodic variations.
The ultimate goal of a bathymetric survey is to produce a bathymetric map of an area surveyed with a certain geographical reference frame.[1] The other important aspect of bathymetric observations is for geological and geophysical exploratory type of surveys, which provide a vital link between studying morphological variations of the sea-floor and their impact on drawing inference on tectonic changes as a primary evidence of the earth-ocean dynamics. This data can provide a great insight in earth evolutionary processes on continental shelf dynamics, canyon and sea-mount formations, riverine fans extending to large distances into ocean basins. Bathymetry data obtained for any area is very useful in gravity anomaly studies etc. In all these observations, a good navigation system plays a key role of fixing a proper geographical reference frame. This will need a specific knowledge of the medium, underwater acoustics and a number of complementary sensor data such as attitude and heave measurement in addition to a number of instruments available for the depth determination.

A sub-bottom profiler basically provides details of the substrata layering of the ocean floor. During the movement of terrestrial material through rivers and flows meeting the sea, gets deposited in the nearshore region initially. This deposited material in the form sand, clay or silt OR in a combination, moves towards the deeper ocean floor due to wave interaction and bottom currents. As new deposits keep accumulating, layers of these deposit are formed. In many cases, organic matter also gets entrapped with this material. At certain conditions of pressure (due to sediment mass) and temperature, this organic matter converts into hydrocarbon deposits or gas-hydrate deposit. Therefore the study of the substrata below the sea-bottom provides in-depth knowledge of possible hydrocarbon deposits. These layers also provide history of bottom evolution. Also with these sediments foraminifera species which die, get deposited. These species provide vital information about the climate in the past. An altogether new branch of oceanography termed as ?paleo-oceanography? has evolved. Therefore the subbottom profilers are an important sonar tool in ocean exploration.

References

6. SIS Seafloor Information System reference manual 337660/E.
Index Terms

Computer Science

Information Systems

Keywords

Sonar, acoustic, multibeam, Sub-bottom profiler, echosounder