

Some unsolved questions regarding future of marine geology

Introduction

The sea covers nearly 70% of the earth's surface and the study of the sea is fundamental to our understanding of the earth. There are many important aspects and necessities for study of Marine Geology. The sea receives sediments from the rivers that is eroded from the land areas. These sediments records the history of all important geological events and the fossils embedded in the sediments represents the changing life in the sea. The sea is the primary source of water that reaches the continents as rains or snows. It is also the largest reservoir for carbon involved in the biological cycle. The life of the sea has been an important source of food for man through ages. The land areas are getting filled up by human settlements and industrialization. Hence only the sea is left to us for various kinds of exploration. The chemical resources include magnesium, potassium, bromine or iodine. The Placer Minerals including gold and diamond, magnetite, ilmenite, rutile, monazite are very important. Offshore oil and gas deposits has opened up a new horizon. The sea is very important for communication and transport. The underwater Navigation and Remote sensing by satellites has become very important these days. The coastal zones are the places where most of the people are living and the population tends to concentrate in these areas where many industries are situated, Also these zones are very rich in placer deposits which are being exploited all over the world. Also these areas are suitable for transportation and communication. Hence a COASTAL ZONE MANAGEMENT PLAN is essential for these zone. In this write up a few points have been briefly stated to address some unsolved questions regarding the future of Marine Geology as given in the next few pages.

All scientific work should be oriented for societal improvement:

We are all living in a society and in all our work we should aim at solving societal problems. Thus we have to think of coastal erosion, pollution in coastal states, earthquake hazard or tsunami effect. These should be considered first. The background of these processes are not clear to us, even then we are trying to find a solution. We should try to focus on the basics and fundamentals of these problems and detail studies should be carried out on selected key areas. Then a Process- Response Model should be evolved for each system to avoid unpredictable undesirable consequences.

Volcanic, tectonic, or thermal modification due to activity by fluids:

Modification of earth is controlled by fluids like water in fault zone, erupting magma on mid-oceanic ridges, island arcs, plumes, hydrothermal circulation in oceanic crust and sediments, methane in continental margins. Geological activity should focus on these studies. We must have clear idea about the physical properties and medium through which the fluid flows, the stress acting on the system and their chemical, mechanical and thermal interaction with the host rock has plenty of scope specially on the oceanic regions.

Proper documentation of earth's stable states and their triggering mechanisms:

Present day condition do not represent the whole geological history. The linkage between different systems like climate and tectonic should be studied. Present day near shore sedimentary sequences reflect flooding of world's shelf due to ice melting, sea floor volcanic activity has completely dominated formation of new crust

Volume 4 Issue 5 - 2020

Tapas Kumar Mallik

Former Director (Selection Grade), Geological Survey of India, India

Correspondence: Tapas kumar mallik, Former Director (Selection Grade), Geological Survey of India, Marine Wing, FD -317, Sector -3, Salt Lake, KOLKATA -700106, India, Tel 033-4004-7354, Email tkmallik@rediffmail.com

Received: August 05, 2020 | **Published:** October 13, 2020

at the mid ocean., During glacial maxima sediments by passed the continental margins through a series of canyons. Sea level changes can explain many factors. We should try to know what events trigger the stable state to other.

Effects of biosphere in marine geology: A great variety of Marine life records the ocean history. Biological activity from the scale of bacteria to human plays important role in cycling of nutrients and their interaction has not yet been fully understood. They have important role in modifying the environment. and there is a good scope to work on this topic.

Study of geologic events as they happen: The catastrophic events in geological records like earthquakes, landslides, volcanic eruptions, tsunami etc. are usually studied after the event is over and the processes become discontinuous. The true impact should be studied by installing observatories and event detection system under the sea by discovering new technology.

Study in near coastal high energy zones: Proper equipment should be deployed to work in these near coastal high energy zones. Proper monitoring of these zones should get a priority.

Climatic studies: The mechanism of climate ocean system variability and the climatic oscillations should be studied in detail. The role of Arctic and Antarctic studies in triggering ocean climate should be studied in detail.

Coastal zone studies: Society depends the coastal zone for a number of different reasons i.e. for its biological diversity, mineral resources, for fulfilling recreational opportunity, for waste disposal, transportation and climate modification. There is massive increase in population in these zones. Reports on storm damage, sea level rise, coastal erosion and silting causes disturbance to human population in these zones. Multidisciplinary investigations of sediment dynamics and environment should be given priority for the benefit of mankind.

Sediment studies: These studies should include sealevel history, coastal morphodynamics, sediment transport modelling for near coastal region, sequence stratigraphy etc. There are many unsolved questions in these areas. The fine scale starta structure in sedimentary facies, energy fluctuations in sediment water interface is not known clearly. The sedimentary dynamics of the shelf and shore face environment is to be studied carefully. These studies should reflect

particle transport, numerical modeling facies architecture, crystal balance etc. Attempt should be made to collect cores, vibrocores for sandy sediments drilling will be useful.

Understanding of catastrophic events: Catastrophic events like earthquakes, volcanic eruptions, tsunamis, ice sheet collapse are societal concern. These events should be understood properly for understanding the societal effect. Ocean drilling can solve many of these problems,

Tsunami studies: Interdisciplinary studies should be carried out and a proper data bank has to be created. Knowledge related to coastal hazard, their genesis and efficient management is a prerequisite. The Coastal zones should be studied properly. Close coordination of different scientists of various disciplines is necessary to work in these problems,

Mineral resource studies: Ocean can eliminate shortage of many important things like food, minerals, water and hydrocarbons. Ocean can also provide shelter and effective measure of transport. India has great potential for placer deposits of magnetite, ilmenite, monazite, rutile, garnet, zircon, and sillimanite. The calcareous sand deposits around Lakshadweep lagoons is a huge reserve and we can get immediate return from these deposits. A number of organizations like G.S.I., N.I.O., D.O.D. etc. are involved in various types of work

around these islands and various types of researches should be carried on different aspects.

Conclusions

We must always remember that we have to work for the advancement of Science and service of humanity. All socially relevant issues should get a priority. The presence of gas hydrate in marine sediments in form of frozen gas is interesting and thought provoking. An integrated ocean drilling programme to solve the various issues regarding the gas hydrates for the benefit of mankind. SWOT (Strength, Weakness, Opportunity, Threats) Analyses is suggested for implementation and orientation of relevant programme.

Acknowledgements

None.

Conflicts of interest

Authors declare no conflict of interest exists.

Funding

None.