

## **Influence of Bathymetry in Manganese Nodule Pilot Mine Site Selection: A Case Study from the Central Indian Basin**

*V. N. Kodagali*  
National Institute of Oceanography  
Dona Paula, Goa, India

### **Abstract:**

Although manganese nodules are observed in all world oceans, known reserves cannot be only criterion in future mine sites selection and sizing. Detailed and accurate depth data is another major prerequisite. With the advent of multibeam swath mapping systems, our knowledge of the complexities of the seafloor has increased many fold. Use of the high resolution bathymetric data in pilot mine site selection is discussed here.

About 23,000 km<sup>2</sup> of detailed multibeam-Hydrosweep data from the Central Indian Basin is presented here. Average depth is 5150 m. This area is comparatively flat-except for the large seamount of height 1200 m which appears on the northernmost part of the area. Also, there are two small abyssal hills in the center of the area. Average nodule abundance in the study area is 5.5 kg/m<sup>2</sup>.

Seafloor slope angles calculated from the water depth data reveal that, the area has predominantly gentle slopes. However, the regions of seamount and abyssal hills show higher slopes- up to 40°. The areas of steep slope are unlikely to be approachable for the future mining system. The slope angle data can be used to actually plan tracks for the mining equipment to optimise recovery. Based on the

relief characteristics and manganese nodule abundances data, about 90% of the study area can be demarcated for mining.

**Key words:** manganese nodules, pilot mining, Central Indian Basin, topography, slope angles seamount

### **Introduction and background**

Deep ocean floor is the storehouse of vast quantities of mineral resources. These are not being exploited till today only because of the technological constraints. Two major mineral deposits of economic interest in the deep ocean floor are the hydrothermal deposits associated with ridge systems and manganese nodules spread over deep sea abyssal floor.

The possible economic importance of the manganese nodules in future has been attributed to the substantial concentration of certain elements e.g. nickel, copper, cobalt etc., accounting to over 2% combined. After the mineral resources of the deep sea bed beyond the limits of national jurisdiction were declared as the "Common Heritage of Mankind" in the United Nations Law of the Sea convention, additional commercial interest in these nodule deposits on the deep-sea floor was generated. Since then a large amount of