

## Seabed Sulphides, Gas Hydrates, and Hydrocarbon Resources in the Andaman Sea, North-East Indian Ocean

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### ABSTRACT:

The Andaman Sea in the NE Indian Ocean lies between 6 and 14 degrees north, and 91 and 94 degrees east. It is a heavily sedimented, actively extending back-arc basin on the India-China continental margin. The Andaman Sea is an extensional basin. It started opening about 13 million years ago, which corresponds to middle Miocene time. The rate of opening is worked out as 37 cm per year. At present the total opening is taken as about 460 km.

Two categories of minerals which have not been recovered within exclusive economic zone of India in the Bay of Bengal but are considered prospective are (1) the volcanogenic massive sulfide (VMS) which are considered to form through hydrothermal emanations from the axial rift of the Andaman Sea, and (2) the cobalt rich ferromanganese crust which are formed at the flanks of the older sea mounts in the water depth of 500 to 2000 m range.

The Andaman Sea which lies between the oil bearing Indonesian basin to the south and Burmese (Myanmar) basin to the north has potential for petroleum as well, as methane gas hydrates. There are clear prospect for occurrence of hydrocarbon and gas hydrates in this region. The Indian Oil and Natural Gas Corporation has made exploratory drilling.

Potential of these resources has been discussed in this article.

**KEY WORDS:** Andaman Sea, Seafloor sulfide, Hydrocarbons, gas hydrates, spreading axis, back arc setting.

### INTRODUCTION

The Sumatra earthquake and resultant Tsunami havoc of 26th December, 2004 has again focused attention to this region. It is important therefore to review the mineral and hydrocarbon potentials of the region because in long term, it will be a place of large investments. The Oil and Natural Gas Corporation of India has committed of nearly US \$ 2 billion for exploration of hydrocarbon in the Bay of Bengal. This is likely to increase in the coming years. References to the mineral resources of the Andaman Sea are available in Roonwal (1986, 1989, 1997, 1999, 2005); Roonwal and Glasby (1996); and Anon (1992) and for petroleum resources with the Oil and Natural Gas Corporation (ONGC) of India (2004); Roy 1983; Roy and Das Sharma, (1991, 1993) and Anon (1992) and in SPG (1998). Major interest lies in hydrocarbon deposits (cf. ONGC of India) and the volcanogenic

massive sulphides (VMS). These have been discussed in this review.

The Andaman Sea in the NE Indian Ocean, lies between 6° - 14°N and 91° - 94°E (Figs. 1A and B, and 2), is heavily sedimented (up to 6000 m), actively extending back-arc basin on the Indo-China continental margin. In this respect, the Andaman Sea is an extensional basin, which began opening about 13 my ago (Middle Miocene) with a rate of about 37 mm/yr (Curry et al., 1982). Total opening of the basin has been about 460 km and it now occupies about 800,000 km<sup>2</sup> (Rodolfo, 1969).

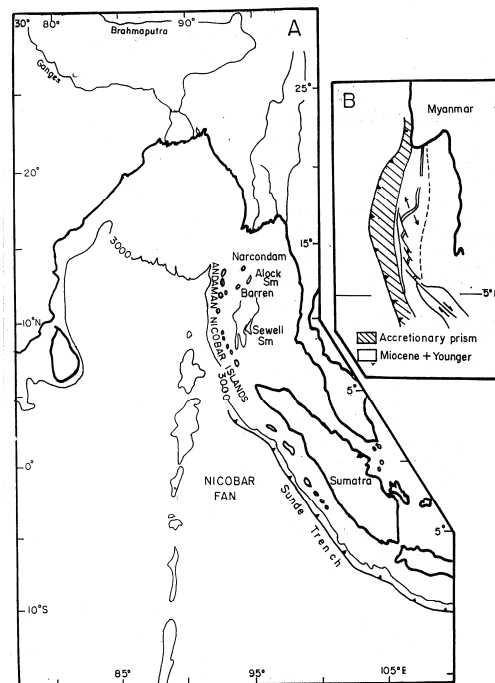


Fig. 1(A and B): Location of Andaman Sea in the NE Indian Ocean.

The bathymetry of the basin is complex (Fig.2). To the west lies the Andaman-Nicobar Ridge which marks the boundary between the Indian and Eurasian-China plates, and to the east the Malay continental margin. The main topographic features of the basin are (a) the Central Andaman Rift, (b) the Central Andaman Trough, (c) the Deep Through,