

A NOTE ON MONITORING OF ICEBERGS DURING VOYAGES OF 15th INDIAN ANTARCTIC EXPEDITION

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Abstract

Icebergs were monitored during onward and return voyages during the 15th expedition as an integral part of a long term project. A record number of 504 icebergs of various dimensions were monitored during onward voyage and 243 icebergs on return voyage. The dimensions and distribution pattern of the icebergs is discussed.

Introduction

Geological Survey of India has been monitoring the icebergs encountered during Antarctic voyages since 1985, as per the guidelines of Norwegian Polar Research Institute for a world-wide watch on icebergs. The data is collected mainly to provide information on frequency, size and shape of icebergs in southern ocean for studying the long-term changes in Southern Ocean environment.

About four fifth of the total icebergs found in Antarctic water are calved from the ice shelves which constitute nearly 30 percent of the total coastline of continental Antarctica. As soon as they are released from the source area, their seaward journey begins, which is influenced by the circumpolar currents. The movements of the icebergs is westwards till they reach the Antarctic convergence, whence their journey is reversed in easterly direction following the southern ocean current. Driven by the internal fractures, they go on breaking into smaller ice forms, as they melt in warmer northern waters of the ocean.

Monitoring of Icebergs

The onward voyage to Antarctica for the 15th expedition began on 7.12.1995 from Goa and the first iceberg was sighted on 27.12.1995 at 53° 45' south latitude and 30° 04' E longitude. A comparison of the first sightings of icebergs during previous expeditions is given in **Fig.1**. As can be seen, the

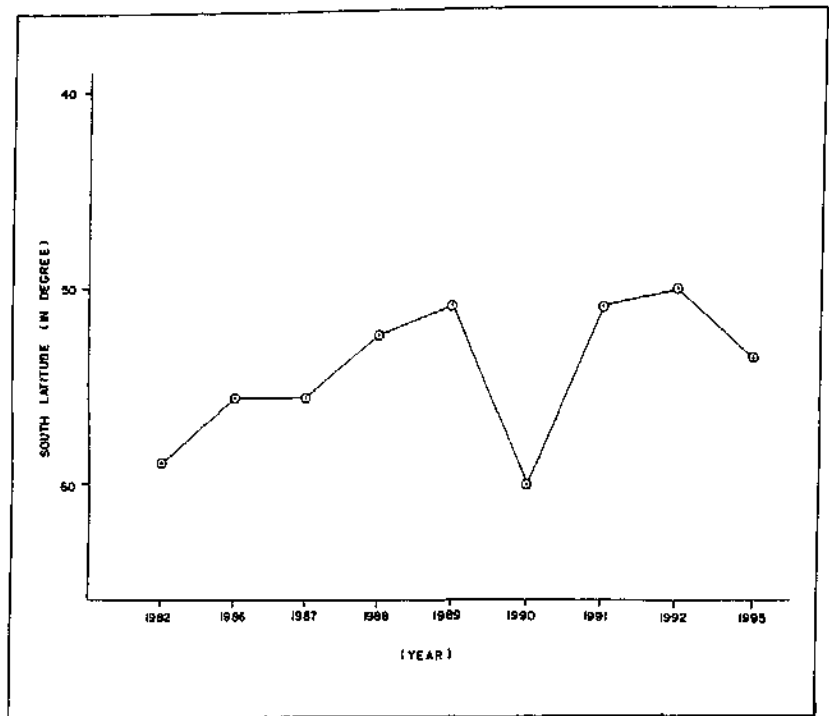


Fig. 1 : First sighting of icebergs in previous expeditions

earliest encounter with an iceberg was at $50^{\circ} 19'$ S lat. in the year 1992 by the 12th Indian Antarctic Expedition. While during the 10th expedition the first iceberg could be sighted as late as at $60^{\circ} 19'$ S lat.

A total of 504 icebergs were recorded till the ship sailed into polynia on 31.12.1995. Most of these icebergs were counted and studied visually. While others were monitored with the help of ship's radar. Only such icebergs were recorded which were within a radius of 24 NM from the ship. During return voyage, a total of 243 icebergs were recorded and the last iceberg was sighted on 2.03.1996 at $53^{\circ} 16'$ S lat. and $30^{\circ} 42'$ E long.

Distribution of Icebergs

The icebergs were found to be concentrated in two prominent zones. The first zone lies between 55° - 60° south latitudes and the second between 65° - 70° south latitudes (Fig.2). These zones correspond to the Southern Ocean current and the Antarctic Coastal current, respectively. The latitude-wise dis-

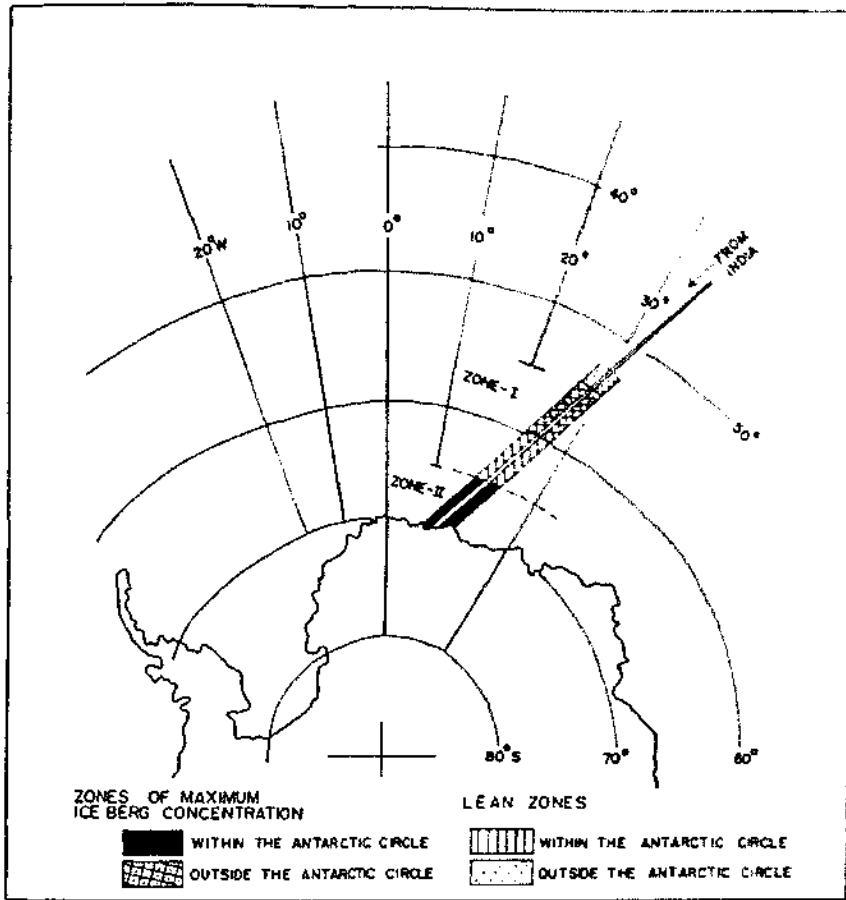


Fig. 2: Zones of concentration of icebergs

tribution of icebergs is shown in Fig.3 wherein the icebergs encountered during both onward and return voyage are depicted.

Considerable variation is recorded with respect to the size and shape of the icebergs. At times these are enormously large (500- 1000 m) tabular icebergs, while majority of them measured between 50-200 m. Fig.4 shows the size-wise distribution of icebergs. The size of the icebergs varied from 10 m to 1000 m though only very few icebergs measuring more than 1000 m were recorded. The shapes noticed among the icebergs varied from tabular. flat topped ones to sharply angled, weathered. tilted to rounded to sub-rounded ones (Figs 5,6,7). The shape of the iceberg to a large extent is a measure of weathering and the amount of drifting that an iceberg has undergone. Hence it is common to see

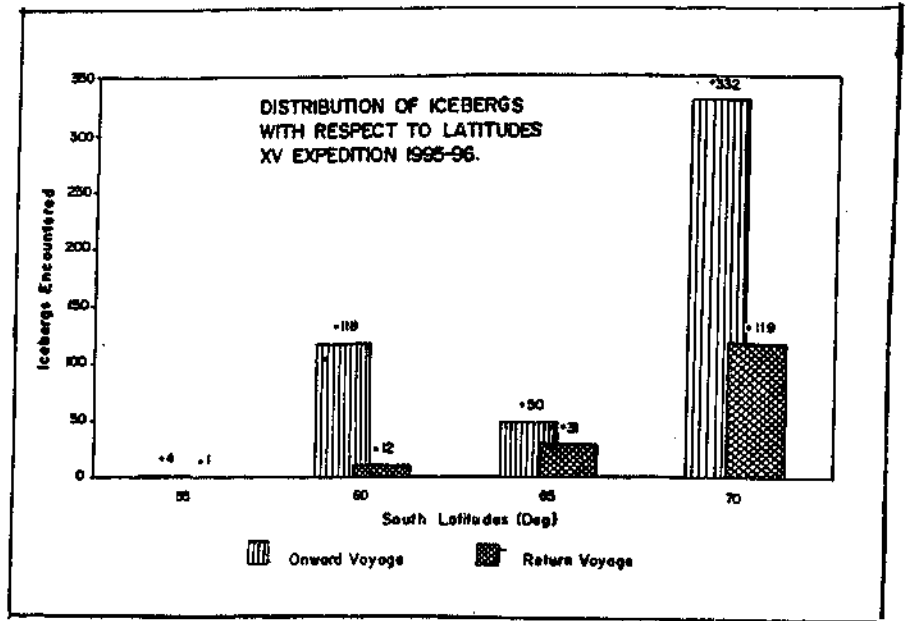


Fig. 3 : Distribution of icebergs.

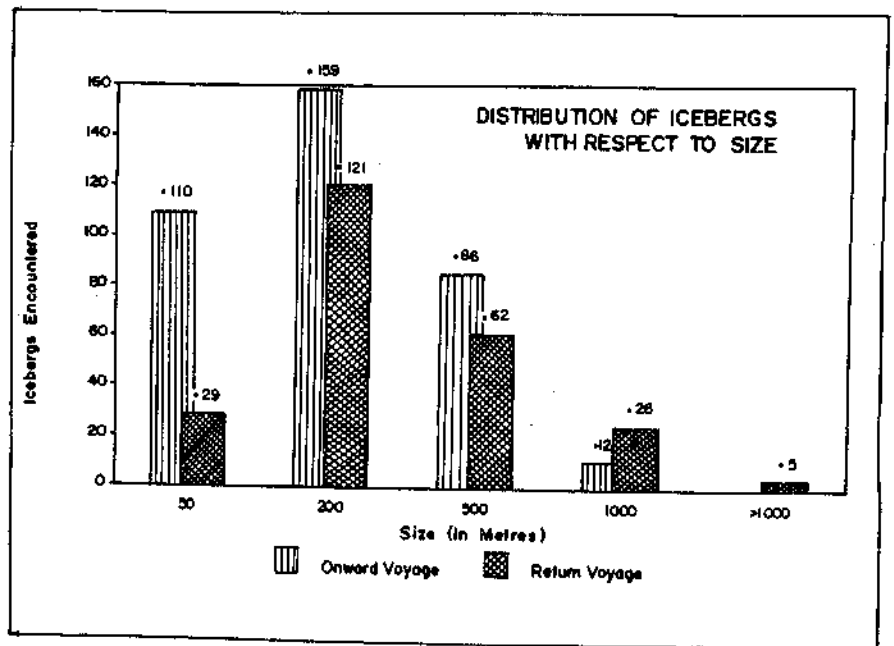


Fig. 4 : Sizewise classification of icebergs



Fig 5. A flat-topped iceber



Fig 6 : A sharply-angled iceberg



Fig. 7: A weathered iceberg

highly weathered and disintegrated icebergs far away from the Antarctic coast and fresh and tabular icebergs nearer the Antarctic coast.

Acknowledgements

Authors wish to acknowledge the facilities extended by the Department of Ocean Development, for undertaking the studies. Help rendered by the fellow expedition members, S/Shri Manoj Pant and Y. Bhatnagar is gratefully acknowledged. We place on record our sincere thanks to Shri M.K. Kaul, Director, G.S.I, for his constant encouragement and guidance during the course of studies and finalisation of this manuscript.